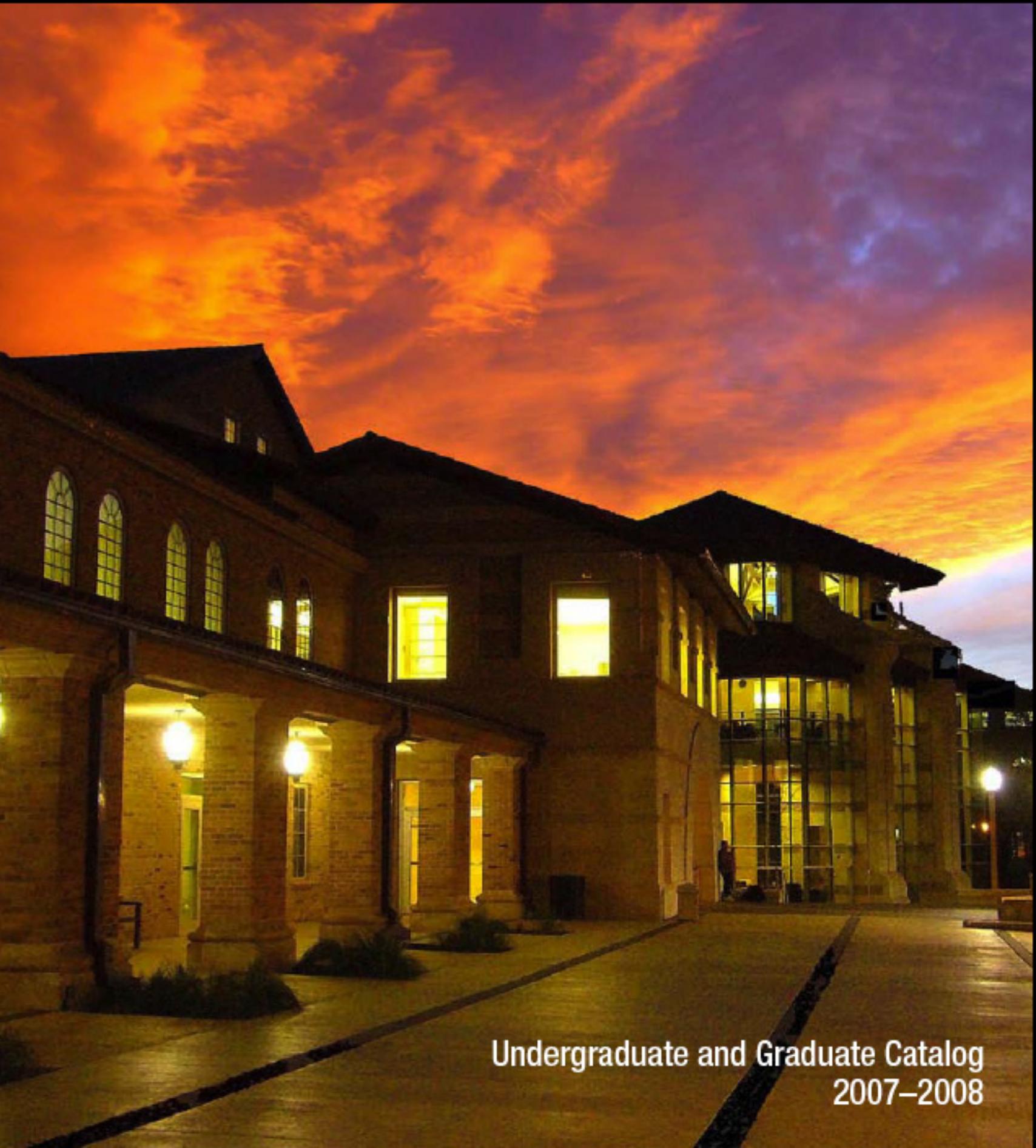




TEXAS TECH UNIVERSITY



Undergraduate and Graduate Catalog
2007–2008

TTU Directory Assistance 806.742.2011

Students who have disabilities and need assistance should contact Student Disability Services, 335 West Hall, 806.742.2405.



Undergraduate Admission Deadlines

Domestic Admission

- **Spring 2008 Freshman and Transfer**
Deadline to complete application process: November 15, 2007
- **Summer or Fall 2008 Freshman and Transfer**
Deadline to complete application process: May 1, 2008
- **Spring 2009 Freshman and Transfer**
Deadline to complete application process: November 15, 2008
- **Summer or Fall 2009 Freshman and Transfer**
Deadline to complete application process: May 1, 2009
- Submit application electronically at www.applytexas.org

International Admission

- **Spring 2008**
Deadline to complete application process: November 1, 2007
- **Summer or Fall 2008**
Deadline to complete application process: April 1, 2008
- **Spring 2009**
Deadline to complete application process: November 1, 2008
- **Summer or Fall 2009**
Deadline to complete application process: April 1, 2009
- Submit application electronically at www.applytexas.org

Former Texas Tech Student Admission

- Information and application for re-admission available at www.depts.ttu.edu/formertech

Graduate Admission Deadlines

Domestic Admission

- Complete admission application at least three months before intended enrollment date. Applications available at www.gradschool.ttu.edu

International Admission

- **Spring 2008**
Deadline to complete application process: September 1, 2007
- **Summer 2008**
Deadline to complete application process: February 1, 2008
- **Fall 2008**
Deadline to complete application process: March 1, 2008
- Applications available at www.gradschool.ttu.edu

Contact Information

Undergraduate

Office of Admissions | Texas Tech University | Box 45005
Lubbock, Texas 79409-5005 | T 806.742.1480 | F 806.742.0062
www.gototexastech.com | admissions@ttu.edu

Graduate

Graduate Admissions | Texas Tech University | Box 41030
Lubbock, Texas 79409-1030 | T 806.742.2787 | F 806.742.4038
www.gradschool.ttu.edu | gradschool@ttu.edu



TEXAS TECH UNIVERSITY™



Undergraduate and Graduate **Catalog** 2007–2008

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Committed to teaching and the advancement of knowledge, Texas Tech University, a comprehensive public research university, provides the highest standards of excellence in higher education, fosters intellectual and personal development, and stimulates meaningful research and service to humankind.

The 2007-08 Undergraduate and Graduate Catalog is an official publication of Texas Tech University. The annual catalog is published each summer and its provisions apply during the following academic year, September through August. New students who register at the university for the first time during a summer session are subject to the degree requirements set forth in the catalog effective for the upcoming fall semester. Those degree requirements expire at the end of the summer session of the seventh academic year after publication.

Acceptance of registration by Texas Tech University and admission to any educational program of the university does not constitute a contract or warranty that the university will continue indefinitely to offer the program in which a student is enrolled. The university expressly reserves the right to change, phase out, or discontinue any program.

The listing of courses contained in this university catalog is by way of announcement only and shall not be regarded as an offer of contract. The university expressly reserves the right to (1) add or delete courses from its offerings; (2) change times or locations of courses or programs; (3) change academic calendars without notice; (4) cancel any course for insufficient registration; or (5) revise or change rules, charges, fees, schedules, courses, requirements for degrees, and any other policy or regulation affecting students, including, but not limited to, evaluation standards, whenever the same is considered to be in the best interests of the university.

Students who enter a college within the university in the academic year of this catalog generally may expect to follow the graduation requirements set forth by that college in this catalog. Because the faculty of each college reserves the right to change graduation requirements, students should meet with their college advisor regularly to be certain that they are aware of any changes in graduation requirements that may apply to them. Although faculty, academic advisors, and staff members are available to assist students, each student is responsible for knowing and following the academic rules, regulations, guidelines, and timelines of the university and the appropriate academic degree program.

Courses to be offered during any semester or summer term are announced prior to the registration period for that semester or term in the form of an online class schedule that can be found at www.depts.ttu.edu/officialpublications.

Important Information

- More than 70 percent of degrees at Texas Tech are designed to take four years to complete. The university's Graduate-On-Time (GOT) program will not only help students save money but also catapult them into a career or graduate/professional program as soon as possible. See pages 51–52.
- A complete explanation of tuition and fees is available online at www.sbs.ttu.edu.
- How does the university define “in academic good standing”? See page 50.
- The grade of I (incomplete) will revert to an F for undergraduates after one calendar year if the conditions for completing the I have not been met. See page 47.
- Students may drop a course through the 45th class day of a long semester or the 15th class day of a summer term and receive a W regardless of their progress in the class. What happens if a class has not been dropped within the specified time period? See pages 45–47.
- First-time freshmen entering in the fall of 2004 or thereafter have four W's permitting them to drop a maximum of four courses during their time at Texas Tech. Transfer students have three W's. What happens after all W's have been used? See page 47.
- Students who find it necessary to withdraw completely from the university before the end of the semester do not have to use their W's for withdrawal. See page 49.
- Because excessive absences constitute cause for dropping a student from class, the instructor will assign a grade of W if the drop occurs within the specified drop period or an F thereafter. See page 46.
- There is an incentive for not dropping any course prior to the last semester of a degree program. See page 46.

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Student Conduct

Responsible citizenship among college students includes honesty and integrity in class work; regard for the rights of others; and respect for local, state, and federal laws as well as campus standards. Specific standards concerning the rights and responsibilities of students and registered student organizations at Texas Tech are contained in the “Code of Student Conduct” and *Student Handbook*. Students are expected to become thoroughly familiar with and abide by these standards. The “Code of Student Conduct” and *Student Handbook* may be obtained from the Office of Student Judicial Programs, 020 Student Union, 806.742.1714, or online at www.studentaffairs.ttu.edu or www.depts.ttu.edu/studentjudicialprograms.

Equal Opportunity Policy

Texas Tech University is open to all persons eligible for admission as students regardless of race, color, religion, sex, age, national origin, or disability. All students admitted to the university are treated without discrimination in regard to their participation in university educational programs or activities. The university is an equal opportunity employer and no applicant or employee will be discriminated against because of race, color, religion, sex, age, national origin, or disability in regard to employment or during the course of employment in the institution. The university does not discriminate on the basis of sex or disability in its educational programs. Any student with inquiries or complaints concerning Section 504 of the Rehabilitation Act of 1973 (504) or the Americans with Disabilities Act (ADA) of 1990 should contact Student Disability Services, 335 West Hall, 806.742.2405.

Students with Disabilities

Students with disabilities will find numerous programs designated to coordinate academic accommodations and promote access to every phase of university life. Such programming is coordinated through Student Disability Services.

SDS personnel oversee and coordinate programs to ensure accessibility on an individual basis to students with disabilities. Texas Tech strives to provide these students with equal access to a college education and support in adjusting to the college experience. The ADA compliance officer is located in the Office of the Provost and also works with students with disabilities to coordinate accessible facilities.

Prospective and current students interested in receiving more information regarding programs for students with disabilities should contact Student Disability Services, 335 West Hall, 806.742.2405 or visit online at www.studentaffairs.ttu.edu/sds.

DARS—Division of Blind Services

The state office of the Division of Blind Services within the Department of Assistive and Rehabilitative Services (DARS) is located on the Texas Tech University campus. In those instances in which the disability constitutes a substantial handicap to employment, several vocational rehabilitation programs are available to provide educational assistance for blind and visually impaired students. For detailed information concerning these programs, contact DBS counselor Sue Ann Hansford, 3rd floor, TTU Library, 806.742.2253.

Accrediting Organizations

Inquiries regarding the accreditation status of Texas Tech University may be directed to the following:

Southern Association of Colleges and Schools
Commission on Colleges
1866 Southern Lane
Decatur, GA 30033-4097
404.679.4501

- AACSB International
- Accreditation Commission for Dietetics Education
- Accreditation Council for Occupational Therapy Education
- Accreditation Review Commission on Education for the Physician Assistant
- Accrediting Commission for Education for Health Services Administration
- Accrediting Commission for Programs in Hospitality Administration
- Accrediting Council for Education in Journalism and Mass Communications
- American Association of Family and Consumer Sciences
- American Association of Museums
- American Association of Petroleum Land Management
- American Bar Association
- American Chemical Society
- American Nurses Credentialing Center
- American Psychological Association
- American Society of Landscape Architects
- American Society of Mammalogists
- American Speech-Language-Hearing Association
- Association for Access Merit and Accreditation of Laboratory Animal Care, Intl.
- Association of American Law Schools
- Board of Nurse Examiners for the State of Texas
- The Certified Financial Planner Board of Standards, Inc.
- Commission on Accreditation for Marriage and Family Therapy Education
- Commission on Accreditation in Physical Therapy Education
- Commission on Accreditation of Athletic Training Education
- Commission on Collegiate Nursing Education
- Council for the Accreditation of Counseling and Related Educational Programs
- Council for Exceptional Children
- Council for Interior Design Accreditation
- Council on Rehabilitation Education
- Council on Social Work Education
- Engineering Accreditation Commission of ABET
- Human Factors and Ergonomics Society
- International Association for the Education of Young Children
- Landscape Architectural Accrediting Board
- National Accrediting Agency for Clinical Laboratory Sciences
- National Architectural Accrediting Board
- National Association for the Education of Young Children
- National Association of Schools of Art and Design
- National Association of Schools of Music
- National Association of Schools of Public Affairs and Administration
- National Association of Schools of Theatre
- National Collegiate Athletic Association
- National Council for the Accreditation of Teacher Education
- National Council of Teachers of Mathematics
- National Science Teachers Association
- Society for Range Management
- Southern Association of Colleges and Schools
- Sport Management Program Review Council
- State Board for Educator Certification
- Supreme Court of Texas
- Technology Accreditation Commission of ABET

2007-2008 Academic Calendar

	FALL '07	SPRING '08	SUMMER I '08	SUMMER II '08
Residence Halls Open for Occupancy	Aug. 19	Jan. 6	May 26	July 6
Registration for New Students	Aug. 23-24	Jan. 8	May 27	July 7
Final Day to Register or Withdraw Without Penalty	Aug. 24	Jan. 8	May 27	July 7
Classes Begin	Aug. 27	Jan. 9	May 28	July 8
Final Day to Declare Pass/Fail Intentions	Oct. 30	March 12	June 17	July 28
Advance Registration for Next Term	Nov. 5-20	April 1-16		
Open Registration Begins	Nov. 26	April 17		
No Exams Except Makeup or Scheduled Lab Exams	Nov. 30-Dec. 6	April 23-29		
Last Day of Classes	Dec. 6	April 29	June 26	Aug. 6
Individual Study Day	Dec. 7	April 30		
Final Examinations	Dec. 8-12	May 1-6	June 27-28	Aug. 7-8
Semester/Term Ends	Dec. 12	May 6	June 28	Aug. 8
Residence Halls Close (with exceptions*)	Dec. 13	May 7	June 29	Aug. 9
Commencement – Graduate School	Dec. 14	May 9		Aug. 9
Commencement – Undergraduate	Dec. 15	May 10		Aug. 9
PAYMENTS AND REFUNDS**				
Final Day to Make Full Payment or Payment Arrangements for pre-registration	Aug. 20	Jan. 4	May 23	July 3
Final Day to Drop a Course and Receive a Refund (not applicable to students dropping to 0 hours)	Sept. 12	Jan. 25	June 2	July 11
Last Day to Withdraw and Receive Partial Refund	Sept. 24	Feb. 6		
ADD/DROP (changes in schedule), WITHDRAWAL (dropping all courses)				
Student-Initiated Add on the Web	Aug. 27-30	Jan. 9-14	May 28-29	July 8-9
Student-Initiated Drop on the Web	Aug. 27-Sept. 12	Jan. 9-25	May 28-June 2	July 8-11
Last Day to Drop a Course	Oct. 30	March 12	June 17	July 28
Last Day to Withdraw from the University	Dec. 3	April 24	June 24	Aug. 4
Last Day to Transfer Between Colleges	Nov. 26	April 17	June 17	July 28
DEADLINES RELATED TO GRADUATION				
Final Day for Undergraduate Degree Candidates to Remove Grades of I and PR, Complete Final Exams for Correspondence	Nov. 30	April 25	June 24	Aug. 4
Final Day to Order Invitations/Academic Regalia at Bookstore	Oct. 23	March 5	June 13	
Graduate School—Final Day to File Statement of Intent to Graduate	Sept. 7	Jan. 25	June 9	
Graduate School—Final Day to Defend Thesis/Dissertation	Oct. 26	March 27	June 26	
Graduate School—Final Day to Submit Final Defense Reports	Oct. 29	March 28	June 27	
Graduate School—Final Day to Remove Grades of I or CR	Nov. 16	April 11		July 11
Graduate School—Final Day to Pay Document Fee	Oct. 26	March 27	June 26	
Graduate School—Final Day for Master's Candidates to Submit Comprehensive Exam Reports	Nov. 16	April 15		July 9
Graduate School—Final Day to Submit Final Draft of Thesis/Dissertation	Nov. 2	April 2		July 7
Graduate School—Final Day to Submit Final Corrected PDF of Thesis/Dissertation	Nov. 28	April 23		July 25
HOLIDAYS AND VACATION DAYS				
Labor Day Holiday	Sept. 3			
Fall Break	Oct. 12			
Thanksgiving Vacation	Nov. 21-25			
Martin Luther King Day		Jan. 21		
Spring Vacation		March 17-21		
No Classes		March 24		
INTERSESSION, WINTERSESSION AT JUNCTION				
WinterSession Classes at Junction Center Campus	Dec. 26-Jan. 8			
Interession Classes at Junction Center Campus			May 7-22	
FACULTY-RELATED INFORMATION				
Faculty on Duty	Aug. 20	Jan. 7	May 27	July 7
Mid-Semester Grades Due***	Oct. 23	March 5		
Web for Faculty available for Faculty Grading	Dec. 7	May 1		
Grades Due for Graduating Students***	Dec. 13	May 7		
Final Grades Due***	Dec. 17	May 12	July 3	Aug. 11

* See detailed chronological calendar at www.depts.ttu.edu/officialpublications/calendar.html

** See Finance section of catalog for details of payment arrangements, dates, and refunds

*** Via Web for Faculty

About the University

Campuses

More than 28,000 students attend classes in Lubbock on the 1,839-acre Texas Tech University campus. The university also operates the Research Center–East Campus (Lubbock); Texas Tech University Farm at Pantex in the Texas Panhandle; research facilities at Reese Technology Center (west of Lubbock); agricultural field laboratories at New Deal; Texas Tech University Center at Junction (411-acre educational facility in the Texas Hill Country); and off-campus educational sites at Abilene, Amarillo, Highland Lakes, and Fredericksburg. The Texas Tech University Health Sciences Center is a separate university that includes the School of Medicine, School of Nursing, School of Allied Health, Graduate School of Biomedical Sciences, and the School of Pharmacy. The Health Sciences Center has regional campuses in Amarillo, El Paso, and Odessa-Midland. Planning is underway to expand the medical school on the El Paso campus from a two-year into a four-year facility.

Location

With a population of more than 200,000, Lubbock is located in the heart of the vast Southern Plains of West Texas and Eastern New Mexico. It is a major medical center for an area within a 300-mile radius of Lubbock and a major regional center for business and industry. The climate is excellent, with over 3,550 hours of sunshine every year. Winters are dry and moderate (average annual rainfall is 18 inches) while the summer heat is tempered by very little humidity. Several airlines and an interstate bus line serve the city, as well as an interstate highway and three additional U.S. highways.

History

Texas Tech University was created by legislative action in 1923 and has the distinction of being the largest comprehensive higher education institution in the western two-thirds of the state of Texas. The university serves a region larger than 46 of the nation's 50 states and is the only campus in Texas that is home to a major university, law school, and medical school.

Originally named Texas Technological College, the college opened in 1925 with six buildings and an enrollment of 910. Graduate instruction did not begin until 1927 within the School of Liberal Arts. A "Division of Graduate Studies" was established in 1935 and eventually became known as the Graduate School in 1954.

By action of the Texas State Legislature, Texas Technological College formally became Texas Tech University on September 1, 1969. At that time the schools of Agricultural Sciences, Arts and Sciences, Business Administration, Education, Engineering, and Home Economics also became known as "colleges." Architecture became a college in 1986. Two colleges changed their names in 1993 to reflect the broadening fields each serves: the College of Agricultural Sciences became the College of Agricultural Sciences and Natural Resources and the College of Home Economics became the College of Human Sciences. The Honors College was established in 1998, and the College of Visual and Performing Arts opened in 2002. Mass Communications became a college in 2004.

Texas Tech was first accredited by the Southern Association of Colleges and Schools in 1928 and has been accredited continuously since that time. The university is classified as a Research University Extensive by the Carnegie Foundation, making it one of the top 125 universities in the nation.

Although Texas Tech is one of the youngest major universities in the nation, a spirit of intellectual growth pervades the campus.

Many of the special facilities for research are described in this catalog. The library is one of the finest in the Southwest, with strong collections in the humanities and in biological and physical sciences. An International Cultural Center provides a unique approach to international education and contributes to ongoing efforts to diversify the campus and foster diversity among students.

As a member of the National Collegiate Athletic Association, Texas Tech began competing in the Big 12 Conference in 1996 after a 35-year membership in the former Southwest Conference.

The presidents of Texas Tech have been Paul Whitfield Horn (1925–1932), Bradford Knapp (1932–1938), Clifford Bartlett Jones (1938–1944), William Marvin Whyburn (1944–1948), Dossie Marion Wiggins (1948–1952), Edward Newlon Jones (1952–1959), Robert Cabaniss Goodwin (1960–1966), Grover Elmer Murray (1966–1976), Maurice Cecil Mackey, Jr. (1976–1979), Lauro Fred Cavazos (1980–1988), Robert W. Lawless (1989–1996), Donald R. Haragan (1996–2000), David J. Schmidly (2000–2002), and Jon Whitmore (2003–Present).

Financial Support

The university receives the major share of its operating funds from tuition and appropriations by the Legislature. For the construction and renovation of academic and general buildings, funds are made available from the Higher Education Assistance Fund (HEAF), Tuition Revenue Bonds, and gifts. State-appropriated funds are not used to support the residence halls, intercollegiate athletics, bookstore, student publications, health service, or Student Union.

The Texas Tech Foundation is a nonprofit corporation that receives and distributes gifts to the university. Gifts and grants received through the foundation supplement state funds in supporting research, establishing scholarships and fellowships, and helping to provide physical facilities and educational materials.

Organizational Structure

Texas Tech University is governed by a nine-member Board of Regents who also govern the Texas Tech University Health Sciences Center, which is a separate university by legislative mandate. The Regents 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 government, control, and direction of the university are vested in the Regents who in turn appoint a Chancellor to carry out the policies of the system as determined by the Regents. The Chancellor appoints a President of Texas Tech University and a President of Texas Tech University Health Sciences Center. The presidents are chief executive officers of their respective institutions and responsible for the strategic operation of each institution. The President of Texas Tech University is supported by a Provost who oversees the educational programs of the university; a Vice President for Fiscal Affairs who is responsible for the fiscal operations of the university; a Vice President for Student Affairs who is concerned with the general welfare of the students of the university; a Vice President for Research who directs the research efforts of the university; and a Vice President for Operations who manages the physical plant.

Texas Tech University consists of the Graduate School; School of Law; Honors College; and the Colleges of Agricultural Sciences and Natural Resources, Architecture, Arts and Sciences, Business Administration, Education, Engineering, Human Sciences, Mass Communications, and Visual and Performing Arts. Each college is administered by a dean and consists of a number of instructional departments or areas.

Administration

Board of Regents

Officers

L. Frederick Francis, Chair

J. Frank Miller, Vice Chair

Ben W. Lock, Secretary

Christina Martinez, Executive Secretary to the Board of Regents

Regents

Term Expires January 31, 2007

(Awaiting new appointments by Governor)

C. Robert Black Horseshoe Bay

L. Frederick Francis El Paso

Dr. Bob L. Stafford Amarillo

Term Expires January 31, 2009

J. Frank Miller, III Dallas

Windy Sitton Lubbock

F. Scott Dueser Abilene

Term Expires January 31, 2011

Larry Anders Dallas

Mark Griffin Lubbock

Dan Serna Arlington

Student Regent

Ebtesam Attaya Islam Lubbock

Administrative Officers

Date following rank indicates year of appointment to Texas Tech.

Office of the Chancellor

Chancellor Kent Hance, 2006. B.S., Texas Tech, 1965; J.D., Texas, 1968.

Chief of Staff Jodey C. Arrington, 2007. B.S., Texas Tech, 1994; M.A., M.P.A., 1997.

Special Assistant to the Chancellor Russell H. Thomasson, 2007. B.B.A., Texas Tech, 1998; J.D., Texas, 2001.

Executive Assistant to the Chancellor Robert E. Dragoo, 2007. B.S.M.E., Texas Tech, 1962.

Executive Assistant to the Chancellor and Secretary of the Board of Regents Ben W. Lock, 1996. B.B.A., Texas, 1981; M.B.A., 1984.

Vice Chancellor and Chief Financial Officer Jim Brunjes, 1991. B.A., Texas A&M, 1969; M.Stat., 1972.

Vice Chancellor and General Counsel Pat Campbell, 1981. B.S., Texas Tech, 1968; J.D., 1971.

Vice Chancellor for Facilities Planning and Construction Michael A. Ellicott, 1999. B.S., Lafayette, 1968; M.S., Missouri, 1976; Reg. Prof. Engineer (Virginia).

Vice Chancellor for Policy and Planning John Opperman, 2002. B.A., Texas Tech, 1977; M.P.A., Texas, 1982; Ph.D., 1994.

Vice Chancellor for Governmental Relations John Michael Sanders, 1969. B.A., Abilene Christian, 1966; J.D., Texas Tech, 1970.

Associate Vice Chancellor and Chief Information Officer Kay Rhodes, 1980. B.A., Baylor, 1976.

Executive Secretary to the Board of Regents, Christina Martinez, 1996. B.B.A., Texas Tech, 2001.

Office of the President

President Jon Whitmore, Professor of Theatre, 2003. B.S., Washington State, 1967; M.A., 1968; Ph.D., California (Santa Barbara), 1974.

Provost and Senior Vice President for Academic Affairs William M. Marcy, Professor of Computer Science, 1975. B.S., Texas Tech, 1964; M.S., 1966; Ph.D., 1972; Reg. Prof. Engineer (Texas).

Senior Vice President for Administration and Finance Thomas Anderes, 2004. B.A., Arizona, 1973; M.P.A., 1973; Ph.D., Connecticut, 1985.

Vice President for Student Affairs Michael D. Shonrock, Associate Professor in Educational Psychology and Leadership, 1990. B.S., Western Illinois, 1979; M.S., 1981; Ed.S., Pittsburgh State, 1987; Ph.D., Kansas, 1991.

Vice President for Research Dean O. Smith, 2005. B.A., Harvard, 1967; A.M., Stanford, 1969; Ph.D., 1971.

Reader's Guide to Catalog

How to Read Catalog Course Descriptions

Texas Tech offers nearly 4,500 courses as part of its curriculum. These courses are listed alphabetically by subject prefix (see prefix listing on next page) within each college and departmental section of this catalog. The courses appear in numerical order, moving from beginning freshman or developmental level courses to graduate, research, and professional courses.

Not all courses listed in this catalog are offered every year. An online class schedule (www.depts.ttu.edu/officialpublications/ClassSchedule.html) published before each registration period

indicates courses that will be available during the upcoming term or semester and when each class will meet. The university reserves the right to cancel any scheduled course or withdraw any program from the list of offerings when the best interests of the institution require such action.

Courses are designated by a subject prefix and number along with a descriptive title. The following illustration may help readers better interpret the course descriptions found throughout this publication.

Subject Prefix – Indicates course subject (HLTH = Health). See subject prefixes on next page.

Course prefix and numbers in brackets – Identify this course as part of the Texas Common Course Numbering System that facilitates transfer between Texas colleges and universities (see page 18). Always appears in brackets immediately after the TTU course number.

Course title

Description of course content

Numbers in parenthesis (3:3:0) – Denote in order of appearance: hours of semester credit earned, hours of lecture in the classroom per week, and hours of laboratory work per week (0 indicates no lab work). A single number in parenthesis (3) indicates the credit in semester hours and is typically an individual studies class with no class time or laboratory. When the letter V precedes the numbers (e.g., V1-6), this indicates the class is a variable credit course. Such courses are ordinarily research courses and permit enrollment for any number of hours up to the limit indicated by the second number in the parenthesis.

Course prefix and numbers in parenthesis – Cross-listed with an identical course offered by another academic department.

Writing Intensive – Every degree plan must include 6 hours of writing intensive courses. Course descriptions have a “Writing Intensive” designation when a course has been cited by the department as meeting the criteria for this requirement.

Semester of Course Offering – Some course descriptions indicate when the course is normally taught (F–fall, S–spring, SSI–first summer term, SSII–second summer term, SSIII–summer trimester, which combines SSI and SSII).

Prerequisites – Some courses have specific prerequisites that must be met before the student can enroll. Before taking this course, the student must have had HLTH 2300.

First digit in course number – Indicates the academic level of the course. The course in the above example is a sophomore-level 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. Developmental courses begin with “0” (e.g., MATH 0301). A number of 5 or above designates a graduate-level course. Graduate standing is a prerequisite for enrollment in all courses numbered in the 5000 series or above and are intended only for graduate students (except for seniors who are within 12 hours of graduation and whose enrollment has been authorized by the graduate dean). Although graduate students occasionally enroll in undergraduate courses to fill out deficiencies in their preparation for graduate work, coursework credited toward a graduate degree must, except in rare instances, be of graduate level (5000 series or above).

Second digit in course number – Indicates the semester hour credit of the course. Thus, HLTH 2305 is a sophomore-level course with 3 semester hours of credit.

Last two digits of course number – The distinguishing numbers of the course.

Example: HLTH 2305
 2305. [PSYC 2306, SOCI 2306] Human Sexuality (3:3:0). Prerequisite: HLTH 2300. Examination of the structural and functional traits of sexuality and how they affect well-being; covers relationships, reproduction, and lifestyle alternatives. F, S. (Writing Intensive) (W S 2305)

Subject Prefixes Used in Course Descriptions

AAEC	Agricultural and Applied Economics	EDSE	Secondary Education	LIBR	Library Research
ACCT	Accounting	EDSP	Special Education	LING	Linguistics
ACOM	Agricultural Communications	EET	Electrical–Electronics Engineering Technology	LPMD	Land-Use Planning, Management, and Design
ADM	Apparel Design and Manufacturing	EM&C	Electronic Media and Communications	M E	Mechanical Engineering
ADRS	Addiction Disorders and Recovery Studies	ENCO	Energy Commerce	MATH	Mathematics
ADV	Advertising	ENGL	English	MBIO	Microbiology
AERS	Aerospace Studies	ENGR	Engineering	MCOM	Mass Communications
AGED	Agricultural Education	ENTX	Environmental Toxicology	MFT	Marriage and Family Therapy
AGSC	Agricultural Science	ENVE	Environmental Engineering	MGT	Management
AGSM	Agricultural Systems Management	EPCE	Counselor Education	MILS	Military Science
AHAT	Athletic Training	EPSY	Educational Psychology	MKT	Marketing
AHCM	Clinical Services Management	ESL	English as a Second Language	MSE	Manufacturing Systems and Engineering
AHMP	Molecular Pathology	ESS	Exercise and Sports Science	MTEC	Mechanical Engineering Technology
AHMT	Clinical Laboratory Sciences	FCSE	Family and Consumer Sciences Education	MUAL	Music Student Teaching—All-Level
AHOT	Occupational Therapy	FDSC	Food Science	MUAP	Music, Applied
AHPA	Physician Assistant	FIN	Finance	MUCP	Music Composition
AHPT	Physical Therapy	FREN	French	MUED	Music Education
AHRC	Rehabilitation Counseling	G CH	Geochemistry	MUEN	Music Ensemble
AHSL	Speech-Language Pathology	G PH	Geophysics	MUHL	Music History and Literature
ANSC	Animal Science	G ST	General Studies	MUMT	Music Technology
ANTH	Anthropology	GANM	Cell and Molecular Biology	MUSI	Music
ARAB	Arabic	GBCH	Biochemistry	MUSM	Museum Science
ARCH	Architecture	GBTC	Biotechnology (Medical)	MUTH	Music Theory
ART	Art	GEOG	Geography	NHH	Natural History and Humanities
ASL	American Sign Language	GEOL	Geology	NRM	Natural Resources Management
ASTR	Astronomy	GERM	German	NS	Nutritional Sciences
ATMO	Atmospheric Science	GIDN	Neuroscience	NURS	Nursing
B A	Business Administration	GIHC	Health Communications	P R	Public Relations
BINF	Biological Informatics	GIPM	Preventive Medicine	PETR	Petroleum Engineering
BIOL	Biology	GMIB	Microbiology (Medical)	PF&W	Personal Financial Planning
BLAW	Business Law	GPHM	Pharmacology	PHIL	Philosophy
BOT	Botany	GPHY	Physiology	PHOT	Photocommunications
BTEC	Biotechnology	GPSC	Pharmaceutical Sciences	PHYS	Physics
C E	Civil Engineering	GRK	Greek	POLS	Political Science
C LT	Comparative Literature	GSBS	Graduate School of Biomedical Sciences	PORT	Portuguese
C S	Computer Science	GTEC	General Engineering Technology	PRAG	Pragmatism
CEED	Consumer Economics and Environmental Design	HDFS	Human Development and Family Studies	PSS	Plant and Soil Science
CFAS	Community, Family, and Addiction Services	HIST	History	PSY	Psychology
CH E	Chemical Engineering	HLTH	Health	PUAD	Public Administration
CHEM	Chemistry	HMGT	Heritage Management	RHIM	Restaurant, Hotel, and Institutional Management
CHIN	Chinese	HONS	Honors	RTL	Retailing
CLAS	Classics	HUM	Humanities	RUSN	Russian
CMLL	Classical and Modern Languages and Literatures	HUSC	Human Sciences	S E	System Engineering
COIN	Cooperative Internship	I B	International Business	S W	Social Work
COMS	Communication Studies	I D	Interior Design	SLAV	Slavic
CTEC	Construction Engineering Technology	I E	Industrial Engineering	SOC	Sociology
DAN	Dance	I S	Interdisciplinary Studies	SPAN	Spanish
E E	Electrical Engineering	ISQS	Information Systems and Quantitative Sciences	STAT	Statistics
E GR	Engineering Graphics	ITAL	Italian	TH A	Theatre Arts
ECO	Economics	JAPN	Japanese	TOX	Toxicology
EDBL	Bilingual Education	JOUR	Journalism	TURK	Turkish
EDCI	Educational Curriculum and Instruction	LAIS	Latin American and Iberian Studies	VIET	Vietnamese
EDEC	Early Childhood Education	LARC	Landscape Architecture	VPA	Visual and Performing Arts
EDEL	Elementary Education	LAT	Latin	W S	Women's Studies
EDHE	Higher Education	LAW	Law	XL	Strategies for Learning
EDIT	Educational Instructional Technology			ZOOL	Zoology
EDLD	Educational Leadership				
EDLL	Language Literacy Education				

Facilities and Resources

Archive of Turkish Oral Narrative

The Archive of Turkish Oral Narrative is a research facility devoted to the study of Turkish folktales and related narrative forms: folk history, legends, folk minstrelsy, and myths. Its extensive holdings—in Turkish on magnetic tape and in English on bound type-script volumes—and its support services for researchers are unique. The archive is now online and can be accessed at www.aton.ttu.edu. Books, articles, papers, and recorded programs produced from archive materials flow from scholars in this country and abroad.

For additional information concerning, please contact the Southwest Collection/Special Collections Library at 806.742.3749.

Athletic Facilities, NCAA Programs

As a member of the National Collegiate Athletic Association and the Big 12 Conference, Texas Tech provides intercollegiate athletic programs for men and women. Both programs operate under NCAA and Big 12 rules and regulations as well as under the auspices of the Texas Tech Athletic Council whose membership represents the faculty, student body, Alumni Association, and a member-at-large appointed by the university president.

Athletic activities are organized under the Director of Athletics with head coaches in each of the sports responsible to the director. Texas Tech began competing in the Big 12 Conference in 1996 after a 35-year membership in the former Southwest Conference.

Women athletes compete in intercollegiate volleyball, soccer, cross country, basketball, golf, tennis, softball, and track and field. The women's program has grown rapidly since 1974 with teams participating in state, regional, and national competitions. In 1993 the Lady Raider basketball team claimed the school's first NCAA National Championship. The men's program includes football, basketball, cross country, track and field, baseball, golf, and tennis.

Jones AT&T Stadium is named for Texas Tech's late President Emeritus Clifford B. Jones and his wife Audrey and for SBC Communications. While SBC's gift of \$20 million enabled renovation of the stadium in 2003, the Jones family provided the initial funds to permit construction of the stadium in 1947. Because SBC Communications acquired AT&T in 2005 and chose to keep the AT&T name, the former Jones SBC Stadium was renamed and became the only collegiate athletic facility in the nation with the AT&T name.

The 2003 renovation added a new west side building, complete with 54 luxury suites, a club level, and press and camera levels. In 2006 the Board of Regents approved future expansion to the east side of the stadium and an estimated 10,000 additional seats.

Dan Law Field hosts the university's baseball team and debuted a new state-of-the-art scoreboard two years ago. Track and soccer events are held at the R.P. "Bob" Fuller Track Complex, and basketball games tip off in the 15,098-seat United Spirit Arena, one of the finest on-campus basketball-volleyball facilities in the nation.

The Texas Tech softball and tennis programs are enjoying new venues as the result of the opening in 2001 of the Don and Ethel McLeod Tennis Complex and the Rocky Johnson Field. The university's golf teams also began their first season at The Rawls Course in 2003. Named after Texas Tech alumnus Jerry S. Rawls, who provided an \$8.6 million gift for construction of the course, The Rawls Course was named as one of the nation's "Top 10 New Courses" by *Golf Magazine*.

The Marsha Sharp Center for Student Athletes opened in 2004 and features classrooms, a computer lab, a resource library, tutoring rooms, private study areas, and administrative offices.

During inclement weather, Texas Tech athletes can practice in the spacious Athletic Training Center, located just south of Jones AT&T Stadium. The facility contains over 3 million cubic feet of space, making it the largest full-circle membrane structure in the world for use by people. One of its main features is an artificial turf football field that can be rolled out to a maximum length of 60 yards. Other features include a 250-yard circular track and 10,000 square feet of weight training facilities.

Bookstore

Barnes and Noble at Texas Tech is the university's bookstore and is located in the Student Union Building. As the supplier for all required and recommended textbooks and supplies for students, it offers a large selection of used books and will buy back books from students at the end of each semester (prices based on books used for following semester).

The bookstore offers a wide selection of reference and general interest books as well as study guides, exam books, technical books, and bestsellers. In addition, the bookstore carries a variety of Texas Tech apparel and giftware; art, school, and engineering supplies; convenience items; and much more. Services include textbook reservations and special orders. The bookstore also houses a Barnes and Noble Cafe that serves Starbuck's coffee.

The bookstore accepts personal checks, major credit cards, and TechExpress. Store hours are 7:30 a.m. to 6 p.m. Monday through Thursday; 7:30 a.m. to 5 p.m. Friday; and some Saturdays (based on university events). The store closes one hour earlier during the spring and summer.

Contact information: www.bkstore.com/texastech, 806.742.3816.



Child Development Research Center

The Department of Human Development and Family Studies in the College of Human Sciences operates a Child Development Research Center (CDRC) that offers a full-day program for children from birth to 6 years old. The center provides varied opportunities for university students to work in classrooms with professional staff to acquire information and skills related to the development and guidance of young children.

The CDRC also provides opportunities for faculty and graduate students to conduct research on child behavior and family interactions as well as to generate innovative strategies for promoting human development and family studies across the life span.

Enrollment is open to children of any race, creed, or nationality. Applications should be made through the Child Development Research Center Office, at 15th and Akron or by calling 806.742.3016.

Computing Services

The Information Technology (IT) Division (www.infotech.ttu.edu) provides a wide range of computing resources, services, and support for students, faculty, and staff at Texas Tech University. Some of the key services provided to the university community are open access student computing facilities, free short courses, computer-based training modules (www.cbt.ttu.edu), personal Web pages, email (TechMail), secure remote network access, Help Desk operations, desktop support, secure wireless networking, videoconferencing facilities, and consulting. The Office of the CIO, as part of the Safe Computing Practices Campaign, hosts educational events each month and other educational resources to raise IT security awareness in the Texas Tech community (www.safecomputing.ttu.edu).

Technology Assessment (www.depts.ttu.edu/itta) provides timely and objective information and analysis of current and emerging technologies. The department helps customers keep current with technology news and trends and provides the concise information necessary for customers to make decisions regarding technology. Various levels of assessments of technology and technology-related issues are available, ranging from short briefs to comprehensive studies.

Technology Support (www.itts.ttu.edu) provides quality user services and operates the Advanced Technology Learning Center (ATLC) in the west basement of the Texas Tech Library. The 25,000-square-foot ATLC facility provides leading-edge computing technology to the university community. The Technology Support staff teaches short courses, manages university site licenses, creates documentation, and develops enterprise-level applications. Technology Support also manages five remote labs located throughout the campus (www.depts.ttu.edu/itts/labs).

IT Help Desk (www.helpdesk.ttu.edu) is an excellent IT service that provides students, faculty, and staff with a friendly IT “front line” for the university community. IT Help Central is the primary point of contact for those needing assistance regarding a technology issue. Help Desk services are structured to escalate questions, problems, and concerns from the user community to the proper IT staff member and track the incident until it is resolved (T 742-HELP).

Telecommunications (www.net.ttu.edu) architects and manages the Texas Tech community data and video network, TTUnet, secure wireless network access in academic areas, and wide-area Internet and Internet2 connections. Telecommunications directly supports education, research, and public service by planning and administering the development, acquisition, repair, maintenance, and delivery of network services. Telecommunications also provides the eRaider network authentication account that allows access to various IT services, including email.

High Performance Computing Center (www.hpcc.ttu.edu) manages several research computing clusters and initiatives. In addition,

TTU participates in local, regional, and national grid projects. A local resource is TechGrid, which consists of more than 300 CPU's. Faculty and researchers are welcome to take advantage of these services.

Institutional Research and Information Management provides precise statistical and management information to all units of the university, regulators, and others (www.irs.ttu.edu). This information includes statistics on students, faculty, semester credit hours, and course evaluations.

In addition to the IT Division resources, the Texas Tech System provides the following IT resources:

- **Communication Services** (www.itcs.ttu.edu) assists if you need a new telephone (office or cellular), additional telephone line, or voice mail; if your telephone is not working; or if you need a telephone number for someone on campus. For any of these needs, contact Communications Services at 806.742.2000.
- **Information Systems** (www.depts.ttu.edu/itis) develops and supports legacy and intranet systems for Texas Tech University and the Texas Tech University Health Sciences Center. Major systems supported by Information Systems are student information, human resources, payroll, accounting, and budget.
- **Technology Operations and Systems Management** staff members (www.tosm.ttu.edu) are available to answer the following questions: Do you have server administration, management, or support? Are you confident the data on your server is being backed up properly? Do you have questions about distributed mainframe print? TOSM also hosts the IBM 9672-R26 mainframe system supporting administrative, instructional, and research activities and offers such services as general purpose computation, optical scanning, and large-scale laser printing

Office of International Affairs

Working with and through the colleges, the Office of International Affairs (OIA) coordinates international activities at Texas Tech and is composed of the following units:

- International Cultural Center Operations
- Study Abroad
- International Student and Scholar Services
- International Center for Arid and Semiarid Land Studies
- Administrative Support Services

The OIA advocates and facilitates initiatives that bring an international dimension to the university's roles in teaching, research, and outreach.

The **International Cultural Center (ICC)** houses all units of the Office of International Affairs. In addition to offering attractive facilities for all types of meeting, conferences, and special events, the center hosts changing art exhibits and periodic lectures. The center represents the commitment of Texas Tech to become globally prominent. **Contact information:** Division of Operations, 806.742.2974, www.iaff.ttu.edu (click on “International Cultural Center Operations”)

International Student and Scholar Services (ISSS) operates the university's foreign student and exchange visitor immigration programs and provides employment-based immigration services to the university. ISSS assists with the university's compliance programs for nonresident tax and employment authorization. Counselors advise and assist international students and scholars concerning immigration rules, financial concerns, and cross-cultural issues. The office also facilitates cross-cultural programming and other extracurricular activities with campus and community-based organizations to enhance mutual understanding. Sponsored Student Programs is also part of ISSS. Priorities are to customize services to sponsoring agencies and students. Services to sponsors include special program design, student placement, monitoring academic studies, developing customized billing procedures, and providing periodic progress reports. An administrative fee of \$250

per semester and \$125 per summer term enrolled is charged for sponsored international students. **Contact information:** ISSS, International Cultural Center, 806.742.3667, www.iaff.ttu.edu (click on "ISSS Office")

The **Study Abroad Program** coordinates all study abroad programs for Texas Tech University. See the "Academic Support Services" section of this catalog to learn more about these programs.

The **International Center for Arid and Semiarid Land Studies (ICASALS)** was created in 1966 to promote the university's special mission—the interdisciplinary study of arid and semiarid environments that encompass about one-third of the earth's land surface. ICASALS promotes and facilitates multidisciplinary initiatives in research, education and regional development programs that address the understanding of the processes caused by both natural phenomena and human presence in arid and semiarid lands.

The mission of ICASALS focuses on water-related issues, one of the overarching strategic priorities of Texas Tech. ICASALS is a contributor and facilitator for international water-related projects involving multidisciplinary project teams highlighting strengths from departments and colleges across campus. Additionally, ICASALS promotes the capabilities and accomplishments of Texas Tech on the international stage and serves as a contracting unit of the university for international sustainable development programs.

ICASALS coordinates the Master of Arts or Master of Science degree program in Interdisciplinary Studies on Arid Land Studies and International Development. This program allows participants to take courses in several departments to satisfy degree requirements.

ICASALS also works closely with "ICASALS Associates"—Texas Tech faculty who provide a broad base of expertise for the numerous and varied functions of the center. ICASALS disseminates information about dry lands in the United States and abroad and publishes a newsletter with international readership. In addition to supporting and facilitating publications resulting from symposia, research, and professional meetings, the center operates an international data exchange and coordinates research and consultations for international scholars, government officials, and students coming to Texas Tech for scholarly purposes.

Contact information: ICASALS, International Cultural Center, 806.742.2218, www.icasals.ttu.edu

International Textile Center

The ITC is equipped and staffed to conduct research and development activities ranging from small-scale testing through large-scale manufacturing. Activities revolve around researching, testing, and evaluating natural and man-made fibers; production and evaluation of yarns and fabrics; alternative textile processing systems; dyeing and finishing; and special yarn and fabric treatments. A fundamental objective is to foster greater use of the natural fibers and increase textile manufacturing in Texas.

ITC occupies 110,000 square feet of space allowing researchers to conduct testing and evaluation from the raw fiber stage through the finished textile product. ITC facilities include a multimedia classroom, conference room and library, Materials Evaluation Laboratory, Short Staple Spinning Laboratory, Weaving Laboratory, Chemical Finishing Laboratory, Chemical Properties and Microscopy Laboratory, Flammability Laboratory, and Fabric Care Laboratory.

The ITC is an integral part of Texas Tech's academic programs and is used by the Colleges of Engineering, Agricultural Sciences and Natural Resources, and Human Sciences for advanced degree programs and special problems courses as well as for augmenting course curricula. In addition, scholars from throughout the world conduct post-graduate research at the center. More than 4,000 people visit the ITC annually. Several graduate-level courses are taught through the College of Agricultural Sciences and Natural Resources. Professional education activities include the Texas International Cotton School (www.texasintcottonschool.com) as well as short courses, conferences, seminars, and special tours.

Landmark Arts Galleries

The mission of Landmark Arts: The Galleries of Texas Tech University School of Art is to promote fine arts development in the Lubbock community through a program of exhibitions, symposia and workshops, publications, and hands-on experience with working artists. As a component of the School of Art, the program integrates academic and professional experience.

The galleries of Landmark Arts are Landmark Gallery, Studio Gallery, Folio, South Gallery, and SRO-Photo. The Landmark Gallery exhibits contemporary art by professional artists. The gallery hosts programs that engage campus and Lubbock community participation.

Folio Gallery is an intimate venue that displays prints, photographs, and drawings by visiting professional artists. The Studio Gallery and South Gallery offer student-driven exhibitions such as the capstone exhibitions of the M.F.A., B.F.A., and Art Teachers Certificate programs, the annual undergraduate juried competition, as well as work by alumni. The SRO-Photo Gallery presents the viewer with wide-ranging solo exhibitions of fine art photography by professional artists.

The galleries are open from 10 a.m. to 5 p.m. weekdays and 10 a.m. to 5 p.m. on Saturday. During university holidays the galleries are closed. More information is available at www.landmarkarts.org.

Libraries

With a vast library collection and extensive computing and communications resources, Texas Tech University Libraries serve as a vital partner with students and faculty in their research endeavors. The 2.5 million volumes in the Libraries collection support research activity in the humanities, social sciences, and science-technology disciplines. In addition to the Libraries' catalog, patrons also may access materials from the Health Sciences Center library, Vietnam Archive, and the Southwest Collection/Special Collections Library.

The University Library is a Patent and Trademark depository and is one of two regional depositories for U.S. government documents in Texas. The Libraries integrate the latest technologies into their services to support the teaching and research missions of the university. Its Web site (<http://library.ttu.edu/ul/>) provides access to online resources, including numerous electronic journals and full-text and bibliographic databases covering a wide range of subjects.

As a charter member of the Texas Digital Library (TDL), the Libraries make their digital collections available to Texas higher education students and faculty via the Internet through a consortium of research libraries. The Digital Media Studio (DMS) provides easy access to the latest Macintosh and PC computing equipment, as well as industry-standard design and video editing software. The DMS also offers digital cameras, high-definition digital camcorders, iPods, and thousands of American and international film titles, music, and audio books on DVD, CD, and VHS. Patrons have access to more than 200 public computers equipped with the full Microsoft Office Suite and Adobe Creative Suite (Photoshop, Illustrator, InDesign, etc.), AutoCAD, and other project and publishing tools. A document delivery service will obtain materials not owned by the Libraries for students and faculty.

The Libraries' one credit-hour course (LIB 1100) is offered to convey effective library research methods and strategies for scholastic success. The University Library is open more than 130 hours a week during each semester and is open around the clock during final exam periods.

Lubbock Lake Landmark

The Lubbock Lake Landmark, a renowned archaeological and natural history preserve, contains a complete cultural record from the Clovis Period (12,000 years ago) through historic times, making Lubbock one of the oldest communities in the world. The Landmark is a unit of the Museum of Texas Tech University and offers tours, outreach, and programs related to the on-going archaeological and natural history research at the preserve. Community and

student volunteers assist in much of the research conducted and educational programming offered at the site. The Landmark is closed on Monday but open from 9 a.m. to 5 p.m. Tuesday through Saturday and 1 to 5 p.m. Sunday.

Museum of Texas Tech

As an education resource for a diverse audience, the Museum of Texas Tech University collects, researches, and disseminates information about the natural and cultural heritage of local and related regions. It is accredited by the American Association of Museums and is located on the campus at Fourth Street and Indiana Avenue.

The building was completed in 1970 and contains over 250,000 square feet of galleries, research facilities, classrooms, work areas, and collection housing. The museum complex includes the main museum building, Moody Planetarium, Natural Science Research Laboratory, Diamond M Fine Art Gallery, Helen DeVitt Jones Auditorium and Sculpture Court, and Lubbock Lake Landmark facilities. A 40-foot mural, created in India ink by Peter Rogers, dominates the lobby. Exhibits include permanent and temporary displays drawn from the museum's own collections and traveling exhibits.

The Moody Planetarium is a 71-seat and two wheelchair area auditorium with a AVI laser projection system. It has daily programs for the public at 2 p.m. and 3:30 p.m. Tuesday through Friday, 6 p.m. and 7:30 p.m. Thursday evening, and 2 p.m. and 3:30 p.m. Saturday and Sunday.

A Master of Arts degree in Museum Science and a Master of Science in Heritage Management are offered by the Center for Advanced Study of Museum Science and Heritage Management as academic components of the museum.

Although the chief source of funding for the museum staff and facilities is legislative appropriation, additional support for programs and exhibitions comes from the Museum of Texas Tech University Association and granting agencies. Membership in the support association is open to all persons interested in the museum. The education division of the museum conducts tours and programs throughout the year, including curriculum-based tours for public schools, public workshops and lectures, special events, and opening activities for major exhibitions. Volunteers from the community and Texas Tech are always needed and welcome.

The museum is closed on Monday but open free of charge from 10 a.m. to 5 p.m. Tuesday through Saturday (Thursday evening until 8:30 p.m.) and 1 to 5 p.m. Sunday.

National Ranching Heritage Center

The National Ranching Heritage Center is a 16-acre museum with six galleries and an historical park containing 45 ranch structures that have been moved to the site from locations throughout the Southwest. The structures—a bunkhouse, one-room school house, half-dugout, train, depot, blacksmith shop, barns, windmills, and more—date from the late 1780s to the early 1930s and have been authentically restored. They illustrate the development of the ranching industry in the Southwest. Dedicated on July 4, 1976, the NRHC hosts a fund-raising gala and Ranch Day in the Spring and Candlelight at the Ranch in December. Community and student volunteers who comprise the Ranch Hosts organization help with these events and others at the National Ranching Heritage Center, which is open to the public free of charge from 10 a.m. to 5 p.m. Monday through Friday and 1 to 5 p.m. Sunday.

Psychology Clinic

The Psychology Clinic provides short- and long-term counseling, psychotherapy, and psychological and vocational assessment to Texas Tech students and staff as well as children and adults in the Lubbock community. The clinic provides training experience for doctoral students in clinical and counseling psychology. The clinic is located on the first floor in the east end of the Psychology Building.

Radio and TV Stations

KTXT-FM. KTXT-FM operates on a frequency of 88.1 Mhz with a power of 35,000 watts (ERP) and provides a service of music, news, and special programs of interest to the campus community. It also provides a channel of communication within the Texas Tech community and from the university to the Lubbock community.

KOHM-FM. Operating on a frequency of 89.1, KOHM-FM is a classical music and news station licensed to and owned by Texas Tech. KOHM is a division of the Office of the Provost and is professionally staffed. The station operates 24 hours a day, seven days a week at 70,000 watts, serving the South Plains within a 75-mile radius of Lubbock. The Corporation of Public Broadcasting recognizes KOHM as a fully qualified public radio station. The station is about 60 percent listener supported, supplanted by grants, underwriting, and limited financial support from Texas Tech. The programming format is unique to the South Plains and includes programming from National Public Radio, American Public Media and Public Radio International networks, classical music, jazz, local news, feature stories, and support for other fine arts events and programming. KOHM also features Lubbock's first digital broadcast radio signal using HD radio technology.

KTXT-TV. A noncommercial educational television station, KTXT-TV (Channel 5/Digital 5.1, 5.2, and 5.3) is licensed by the Federal Communications Commission (FCC) to the university's Board of Regents and operates as a division within the Office of the Provost.

Channel 5's office, studio, production, master-control, transmitters and engineering facilities, and 817-foot antenna-tower are located on the southwestern campus triangle west of Indiana Avenue. From this location the station broadcasts diverse programming 24 hours a day, seven days a week. The signal coverage zone encompasses Lubbock and the surrounding area within a 60-mile radius for Channel 5 and approximately a 75-mile radius on 60 kw Digital Channels 5.1, 5.2, and 5.3, serving a population of approximately 380,000.

KTXT-TV is a member of the Public Broadcasting Service (PBS), a noncommercial network of 349 television stations interconnected by satellite. Staffed by professional personnel, the station produces programming to satisfy the broadcasting and nonbroadcasting needs of the university and the community.

Much of the regular programming is available for use in the classroom. In addition, the station purchases, produces, or otherwise acquires instructional television series designed as college-credit courses or as in formal noncredit courses to broadcast on special schedules as a service to the university and viewers.

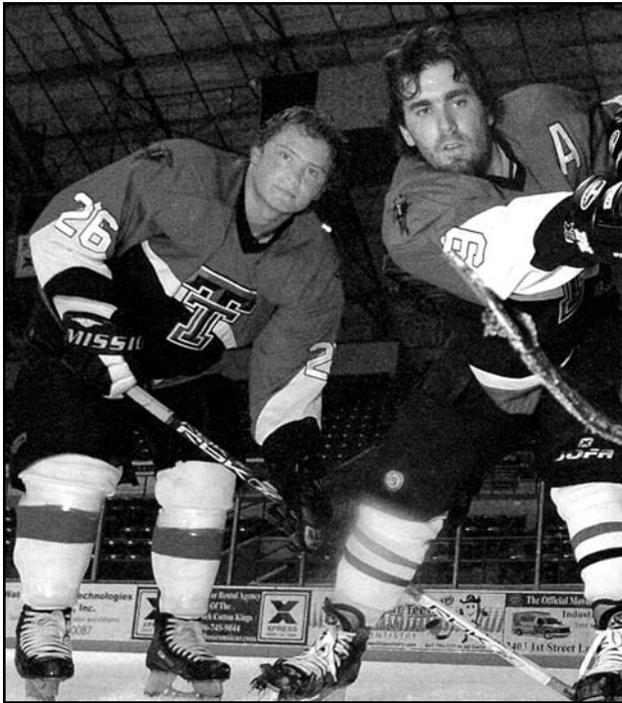
KTXT-TV continued its FCC-required transition to a digital broadcasting signal, completing Phase I in 2003 and Phase II in 2005. With the completion of Phase II, KTXT-TV began broadcasting 24 hours a day, seven days a week. Phase III will result in a state-of-the-art HD production facility scheduled to be completed by February 2009.

Recreational Sports

The Department of Recreational Sports serves the leisure needs of Texas Tech students through its eight main divisions: intramurals, open recreation, sport clubs, aquatics, clinics and classes, special events, fitness/wellness, and outdoor pursuits.

Through the intramural program, competition is offered in many coed, men's, and women's sports activities. These competitive activities include individual, dual, and team competition organized for residence halls, clubs, fraternities, sororities, and for unaffiliated students in an "open" division.

Open recreation provides an opportunity for informal, nonscheduled activities for students, faculty, and staff at the various campus recreational facilities. The Robert H. Ewalt Student Recreation Center has 242,000 square feet of activity and recreational space, making it one of the largest student recreation centers in the nation. The building includes seven basketball/volleyball courts; an indoor



soccer arena; a 6,500-square-foot Olympic weight room; more than 10,000 square feet of cardiovascular machines and selectorized weight machines; and a four-lane, 1/8 mile elevated jogging track. Also available are two aerobic/dance studios, a 52 foot high climbing center, 12 racquetball courts, a fitness/wellness center, locker rooms, an outdoor pursuits center, and an indoor/outdoor Olympic-size swimming pool. The program also provides equipment checkout for a variety of sports and reservation opportunities for tennis courts, fitness equipment, and racquetball courts.

Sport clubs offer a unique diversion from academic life through instruction and extramural or intercollegiate athletic competition on a club basis. Organized clubs include soccer, rugby, baseball, bowling, wrestling, lacrosse, water ski, aikido, kendo, racquetball, swimming, polo, judo, volleyball, cycling, ice hockey, ultimate frisbee, gymnastics, fencing, and tae kwon do—all of which receive some funding from the Department of Recreational Sports.

Texas Tech's indoor/outdoor aquatic facility, which adjoins the Student Recreation Center, offers a wide range of water sports and activities to students. This facility is one of the most unusual in the nation, with a removable bubble top that allows participants to enjoy an outdoor facility during warm-weather months. The aquatic facilities and programs are available to students daily throughout the year.

The clinic and class program includes noncredit instruction in weight training, racquetball, squash, tennis, and other recreation-related activities. Fitness activities include a wide range of fitness classes, personal training, individual analysis, and exercise prescription.

The special event program includes weekend tournaments, fun runs, triathlons, mud volleyball, and various other wild and zany recreational activities. Information on special rules and dates of activities can be obtained from the office on the upper level of the Student Recreation Center.

The outdoor pursuits center provides unique services for students, faculty, and staff, including an outdoor equipment rental shop, regularly scheduled trip outings, and a resource area with information on outdoor activities. Students may reserve a variety of equipment ranging from canoes to lanterns. The center is located near the main entrance to the Student Recreation Center.

Southwest Collection

The Southwest Collection/Special Collections Library research collections include Rare Books, the University Archive, the Archive of Turkish Oral Narrative, and the Southwest Collection.

The Southwest Collection is the regional repository for historical information pertaining to West Texas and the Southwest. It has collected and makes available for research more than 1,800 collections of personal papers and more than 5,000 hours of oral history interviews, noncurrent business and institutional records, as well as a noncirculating library of Texana, Western Americana, maps, periodicals, photographs, newspapers, taped interviews, films, videotapes, and microfilm. The Southwest Collection also houses one of the nation's most important collections on the Literature of Place—the James Sowell Family Collection in Literature, Community, and the Natural World.

All materials may be used by both the university community and the general public for research or reference. The Southwest Collection is located in the Southwest Collection/Special Collections Library Building north of the University Library. Service is provided from 9 a.m. to 5 p.m. Monday, Wednesday, and Friday; 9 a.m. to 7 p.m. Tuesday and Thursday; and 9 a.m. to 1 p.m. on Saturday. Inquiries and donations are welcomed. Tours are available.

Speech–Language, Hearing Clinic

The Speech–Language and Hearing Clinic, with facilities on the east side of the Health Sciences Center, serves as a practicum site for students in the Department of Speech, Language, and Hearing Sciences.

Under faculty supervision, students in speech–language pathology and audiology provide clinical services for the students, faculty, and staff of Texas Tech University and other residents of West Texas and eastern New Mexico. Assessment services and therapy are available for children and adults with hearing problems or disorders in language, voice, stuttering, or articulation. Individuals are accepted by self-referral and upon referral from other professionals. Anyone needing these services should contact the office of the Speech–Language and Hearing Clinic at 806.743.5678.

Student Union Building

The Student Union Building (SUB) is the community center of campus. Often referred to as the *living room* of the university, the SUB has as many as 15,000 students, faculty, staff, alumni, and guests come through its doors daily.

The SUB recently completed a \$45 million renovation and expansion that created one of the finest facilities in the United States. The expansion includes additional space for the Barnes and Nobles Campus Bookstore, the Student Organization Involvement Center, 60 registered student organization cubicles, TV and study lounges, Student Government Association office suite, Student Union and Activities administration offices, Dean of Students and the Center for Campus Life offices, Student Legal Services, Student Judicial Programs, and West Plaza Courtyard between the SUB and library. The renovation encompasses a five-concept food service court, a casual dining area with seating for 600 patrons, 8 reflection “study” rooms, 25 technologically capable meeting rooms for events, the 968-seat Allen Theatre, the Courtyard, and the east entrance ATM hub.

The retail and service corridor on the first floor houses a variety of businesses such as the PostTech post office, the University ID Center, a branch bank, a cellular phone store, Sam's Place convenience store, CopyTech copy center, High Tech Computer Service Center, the Union Bistro, and Healthy Choices.

The Student Union ticket booth located on the lower west level in the Escondido Theater serves as a major outlet for advance ticket sales for many campus functions as well as a Select-A-Seat location for events in Lubbock and throughout the region.

The Student Union Building is open from 7 a.m. to 11 p.m. weekdays, 8 a.m. to 11 p.m. Saturday, and noon to 11 p.m. Sunday.



Texas Tech University Theatre

A regular schedule of major dramatic productions is presented each academic year under the direction of professionally qualified members of the theatre arts faculty. Plays are chosen so that each student generation has an opportunity to see a representative selection of the great plays of the past as well as works by modern playwrights. These plays are presented on the Mainstage of the Charles E. Maedgen Jr. Theatre, which seats 385 patrons in a comfortable, continental arrangement.

A program of contemporary and original student-directed productions and a summer repertory season are presented in the Maedgen's Laboratory Theatre, an intimate, thrust-stage performance space. All Texas Tech students are eligible to audition for roles in TTUT plays or to work on production crews.

University Parking Services

Students are required to register their vehicles and display a Texas Tech parking permit on any vehicle parked on campus from 7:30 a.m. to 8 p.m. Monday through Friday. Students who operate motor vehicles on campus must comply with currently approved and published regulations that can be seen at www.parking.ttu.edu or obtained at the University Parking Services Office, 2903 4th St., Room 145, from 7:30 a.m. to 8 p.m. on weekdays. This office also provides vehicle registration forms and permit purchases.

Vietnam Center and Archive

Texas Tech University established the Vietnam Center in 1989 with the missions of funding and guiding the development of the Vietnam Archive and encouraging continued study of all aspects of the American Vietnam experience. The center provides a forum for all points of view and all topics related to Southeast Asia, particularly America's involvement in the region before, during, and since the Vietnam War.

The Vietnam Archive collects and preserves materials and artifacts focusing on the men and women who directly participated in wartime events. This includes people from the United States as well as from all participant nations. Located in the Special Collections Library, the Vietnam Archive currently contains approximately 20 million pages of material, making it the largest repository of Vietnam War related materials outside the U.S. federal government.

In addition to documents, artifacts, and related items, the Vietnam Archive houses a library of more than 12,000 books and an unrivaled microfilm/microfiche collection. The Vietnam Archive microform collection comprises material from all the U.S. presidential administrations involved in Southeast Asia from World War II to 1975 and contains a comprehensive collection of other government agency and military branch records. This collection also includes one of the largest French Indochina and Vietnamese newspaper collections in the country.

To ease the burden of researching these vast holdings, the Vietnam Archive has developed one of the largest online document retrieval systems in the nation. Started in 2001, The Virtual Vietnam Archive now provides access to more than 2.7 million pages of materials, all of which are accessible free of charge through the Internet. These online materials include more than 250,000 documents; 96,000 photographs and slides; and thousands of maps, audio recordings, oral history interviews, films, and more. The Vietnam Archive adds approximately 25,000 new pages of digital material online each month.

In addition to the Vietnam Archive and its component projects, the Vietnam Center administers a number of special projects and events, including scholarships for Texas Tech students and for students in Cambodia and Vietnam, annual conferences, triennial symposia, and numerous other projects and publications. The Vietnam Center conferences and symposia welcome student and community participation and attendance. For more information, visit www.vietnam.ttu.edu or contact the Vietnam Center at 806.742.3742, vietnam.center@ttu.edu.

Texas Tech Farm at Pantex

The university operates the Texas Tech University Farm at Pantex, located 12 miles east of Amarillo. This farm consists of 5,822 acres of deeded land and an agricultural use permit on an additional 5,304 acres controlled by the Department of Energy. The farm serves as a valuable resource for agricultural research and education, adding strength, flexibility, and prestige to the academic programs at Texas Tech.

Texas Tech Police Department

The Texas Tech Police Department is located at 2901 4th Street and is operated 24 hours a day, 7 days a week. The department provides police services and security for the entire Texas Tech community, an area much larger and more populated than many towns in Texas. The department phone number is 806.742.3931 or, in an emergency on campus, 9-911.

The Texas Tech Police Department employs 50 officers and 27 civilian employees. The officers are licensed by the Texas Commission on Law Enforcement Standards and Education and are fully commissioned.

The Texas Tech Police Department employs a full time Crime Prevention officer available to offer presentations on a number of topics, including personal safety, burglary/theft prevention, sexual assault awareness, and drug and alcohol awareness programs. In addition, this officer will discuss crime prevention with any student, faculty or staff member.

The department posts information and crime statistics online at www.depts.ttu.edu/ttpd/.

Admission to the University

Djuana Young, Director

Office of Admissions | West Hall | Box 45005
Lubbock, TX 79409-5005 | T 806.742.1480
F 806.742.0062 | admissions@ttu.edu
www.gototexastech.com

Undergraduate Admission

Texas Tech accepts the State of Texas Common Application for Admission to Public Universities. Applications will be sent upon request or can be obtained from the student's high school counseling office or college advisement center. Students may submit an application electronically (www.applytexas.org) or on paper. Essays and letters of recommendation are recommended.

Applicants may be considered for admission to the undergraduate divisions of the university by graduation from an accredited high school, by transfer from an accredited college, or equivalent. Additional factors may be considered in determining the applicant's eligibility for admission.

Students are admitted to a specific college within the university. The university reserves the right to modify its admission requirements in order to manage enrollment in high-demand areas. The colleges may set various requirements for continuance in certain degree programs in addition to the general university minimum requirements.

Deadlines to Complete Application Process

Spring 2008 Admission November 15, 2007
Summer I and/or II 2008 Admission..... May 1, 2008
Fall 2008 Admission May 1, 2008
Spring 2009 Admission November 15, 2008
Summer I and/or II 2009 Admission..... May 1, 2009
Fall 2009 Admission May 1, 2009

Residency Status Determination

For rules governing the determination of residency status as defined by the Texas Higher Education Coordinating Board, see www.collegefortexans.com.



Notice to Graduate Students

Students planning to earn graduate degrees at Texas Tech must be admitted to the Graduate School and also meet any special admission requirements of the department in which they are planning to study. General admission requirements of the Graduate School are described in the Graduate School section of this catalog. Any additional departmental requirements will be listed in the "Graduate Program" section of each college and department.

Admission Requirements

As a state-assisted institution, Texas Tech University recognizes its responsibility to provide excellent educational opportunities for its students. Class rank in high school, SAT/ACT scores, and/or college GPA are used to help predict potential academic performance. Other factors that could predict success at Texas Tech also may be considered.

First-Time Freshman Admission

To gain admission for the first time, an applicant must complete the following:

1. File a freshman application and pay an application fee of \$50. The fee may be paid by check, money order, or one of the following credit cards: Visa, MasterCard, American Express, Diners Club, or Discover. If payment of the fee creates financial hardship, please submit verification or documentation of need for a fee waiver along with your application and supporting documents for admission. Applications will not be complete without either the application fee or fee waiver documentation. No waiver of the international application fee is available.
2. Have an official high school transcript showing class rank sent directly to the Office of Admissions. Senior courses in progress must be provided on the transcript, a grade report, or listed on the State of Texas Common Application form. A final official high school transcript showing graduation date will be required after graduation and will become part of the student's permanent record. A student with a GED must submit their official GED scores as well as a partial high school transcript.
3. Have college entrance test scores, either the SAT or the ACT, sent from the testing agency at the time the test is taken.

The following courses are recommended but not mandatory to be considered for admission:

High School Subjects	Units Required
English	4
Mathematics ¹	3
Laboratory Science ²	2
Foreign Language ³	2

¹ Algebra I, Geometry, and Algebra II are the courses recommended for admission.

² Biology I, Chemistry I, or Physics I are the courses recommended for admission.

³ If two years of the foreign language are not completed in high school, at least two semesters of a single foreign language will be required at the college level.

Assured Admission

Students who graduate from an accredited high school or equivalent (including Department of Defense schools) with required coursework will be assured admission if they present the appropriate combination of class rank and minimum test scores.

High School Class Rank	Minimum Test Scores for Assured Admission*	
	ACT	SAT
Top Ten Percent	No Minimum	
First Quarter (other than top 10%)	25	1140
Second Quarter	28	1230
Lower Half	29	1270

* Writing portions of the ACT and SAT are not included in the minimum scores for assured admission.

Assured admission will be granted to all students who hold competitive scholarships awarded by an official Texas Tech University scholarship committee.

Admission Review

Applicants who do not meet the assured admission criteria will have their records reviewed in a holistic manner. Additional information used to evaluate a student's potential for success includes:

- High school coursework
- Honors or advanced placement
- Extracurricular activities
- Leadership experiences
- Civic or other service activities
- Socioeconomic background
- Family educational background
- Bilingual proficiency
- Affiliation with Texas Tech
- Special talents or awards
- Diversity of experience

A response to Topic B or C on the State of Texas Common Application is strongly recommended for students who do not meet the assured admission requirements.

Gateway Program

Freshman applicants who have been denied admission for the summer or fall semester are eligible to participate in the Gateway Program. Visit www.admissions.ttu.edu for details about this program.

Transfer Admission

Undergraduate students who have attended an accredited college **beyond high school graduation** may be accepted for admission to Texas Tech provided they meet admission requirements. Falsification or omission of application information will void admission to Texas Tech University. Applicants must complete the following:

1. File a transfer application and pay an application fee of \$50. The State of Texas Common Application is available at www.applytexas.org.
2. Provide official transcript(s) of academic records from all institutions in which the applicant has been or is currently enrolled. Admission will be determined by transferable work only. Applicants must be eligible to return to the institution most recently attended.

An unofficial copy of the high school transcript is necessary for academic advising prior to enrollment, but not required for admission unless the student has less than 12 transferable hours.

Transfer applicants will be assured admission if they meet the following requirements:

1. Complete 12 to 23 semester hours of transferable college work beyond high school graduation and have a cumulative 2.5 GPA.
2. Complete 24 or more semester hours of transferable college work beyond high school graduation and have a cumulative 2.25 GPA.
3. If transferring with fewer than 12 transferable completed hours, applicants must meet the same standards for admission as required of new freshmen entering from high school and have a minimum 2.0 transferable GPA in work completed. Applicants enrolled in their first semester of college after high school graduation should apply as transfer students but are required to submit a high school transcript and SAT and ACT scores and must meet freshman assured admission requirements.
4. Transfer applicants with 45 or more transferable hours must choose a major. The university reserves the right to modify its admission requirements to manage enrollment in high demand areas. Transfer students choosing the College of Business Administration must have a cumulative 2.75 GPA; College of Architecture, cumulative 3.0 GPA; Human Development and Family Studies, cumulative 2.5 GPA; and Interior Design, cumulative 3.0 GPA. These requirements are subject to change.

Admission Review. Students who do not meet assured admission requirements but have at least a 2.0 transferable GPA will be reviewed. The student's major, types of courses taken, and pattern of progress, as well as high school records, essays, and standardized test scores may be considered in the admissions process.

Credit Transferred from Other Colleges and Universities

Evaluation of course credit earned at other institutions by the Transfer Evaluation Office does not decree approval of the credit for use toward degree requirements. Only the academic dean of the college offering the program in which a student is enrolled has authority for determining which courses will be applied toward any specific program. The only exception to this rule is that no transferred course completed with a grade below C- may be applied to fulfill course requirements in majors, minors, or specializations.

Applicants must submit official records from all accredited institutions attended. Official transcripts must be sent directly to the Office of Admissions. All college-level, nonvocational courses completed with a passing grade of D or above at regionally accredited colleges and universities (not including trade or technical schools) will be evaluated for acceptance of transfer credit by the Transfer Evaluation Office. The Transfer Evaluation Office determines acceptable transfer credit on the basis of an evaluation of course content as described from the sending institution's catalog and in consultation with the appropriate academic units at Texas Tech University as necessary for clarification. While all credit hours presented on the sending institution's transcripts will be evaluated, and equivalent college-level courses posted to the student's academic record, a maximum of 66 semester credit hours from two-year colleges may be applied towards degree requirements.

Students are encouraged to meet with the academic advisors of the college in which they plan to enroll to discuss that college's policies on applicability of transfer credit for degree purposes. Credit hours will be applied to degree programs and majors when courses are deemed equivalent to the Texas Tech courses that satisfy various program requirements by the college in which the student is seeking a degree.

Students wishing to transfer credit to Texas Tech from a nonaccredited institution must:

- Complete 30 semester credit hours of work in residence at Texas Tech with at least a 2.0 GPA.
- Receive approval from the academic dean in order to validate credits for transfer.

Guidelines to the transfer of college credit:

- Original copies of official college transcripts will be reviewed and coursework evaluated before transfer credit will be posted to a student's permanent academic record. Courses that may have been accepted for credit by another institution will not necessarily be accepted by Texas Tech.
- Nonvocational, college-level courses completed with a grade of D or above at another accredited institution (including courses taken on a pass-fail basis and passed) will normally be accepted for transfer. No transferred course completed with a grade below C- may be applied to fulfill course requirements in majors, minors, or specializations.
- Courses completed with codes indicating no grade or credit will not be transferred. This includes courses from which a student has withdrawn or received a grade of incomplete.
- Vocational and technical courses normally not accepted for transfer may be transferred as credit with departmental approval. However, only the student's academic dean can determine the applicability of such credit towards a degree.
- Transferability of courses will not be affected by a student's academic standing (i.e., probation, suspension), but credits earned while on academic suspension from Texas Tech University will apply to a degree plan only if approved by the student's academic dean.
- Remedial courses will not be accepted for transfer and the credit hours will not be reflected on the student's academic record at Texas Tech.
- Nonvocational, college-level courses from a nonaccredited institution may be posted to the student's academic record only after the student has validated the credits for transfer with the student's academic dean according to Texas Tech policy.
- Credit by examination will be accepted when the student provides documentation of appropriate test scores on an original score report from the national testing organization or official high school transcript. Credit is awarded according to Texas Tech University's credit by examination guidelines.
- Credit granted for nontraditional educational experiences by community colleges or other universities will not be accepted for transfer. These include courses taken at a nondegree granting institution; life or work experience; and work completed at specialized proprietary schools.
- Credit for specialized support courses such as math, science, and English intended for use in an occupational program will not be transferred.
- Credit hours taken at a junior or community college may not be transferred as upper division work, even when the Texas Common Course Numbering System designation indicates similar course content.
- When a course has been repeated at another institution, only the most recent course and grade will be transferred and posted to the student's academic record, unless the course is designated in the institution's catalog as "may be repeated for credit."
- Texas Tech will not transfer credit for any college course documented only on a high school transcript.

Texas Common Course Numbering System

The Texas Common Course Numbering System (TCCNS) has been designed to aid students in the transfer of general academic courses between Texas public colleges and universities throughout the state. The system ensures students that courses designated as common will be accepted for transfer and the credit will be treated as if the courses had actually been taken on the receiving institution's campus. Texas Tech courses identified as common will have the Common Course Number listed in brackets in each course description.

For more information concerning the Texas Common Course Number System, please visit the TCCNS Web page at www.tccns.org/ccn. Visit www.reg.ttu.edu for information on how your credit will transfer. The following lower-division courses have been evaluated by academic departments and determined to be the equivalent of the Texas Tech courses listed.

TCCNS	TTU Equivalent
ACCT 2301.....	ACCT 2300
ACCT 2302.....	ACCT 2301
AGRI 1307.....	PSS 1321
AGRI 1309.....	AGSC 2300
AGRI 1329.....	FDSC 2300
AGRI 1407.....	PSS 1321
AGRI 1413.....	PSS 2401
AGRI 1415.....	PSS 1411
AGRI 1419.....	ANSC 1401
AGRI 2317.....	AAEC 2305
AGRI 2322.....	ANSC 2301
AGRI 2330.....	NRM 2301
ANTH 2101.....	ANTH 2100
ANTH 2301.....	ANTH 2300
ANTH 2302.....	ANTH 2301
ANTH 2351.....	ANTH 2302
ARAB 1511.....	ARAB 1502
ARAB 1512.....	ARAB 1502
ARAB 2311.....	ARAB 2301
ARAB 2312.....	ARAB 2302
ARCH 1301.....	ARCH 2311
ARCH 1302.....	ARCH 2315
ARCH 1303.....	ARCH 1412
ARCH 1304.....	ARCH 1412
ARCH 1311.....	ARCH 1311
ARCH 1403.....	ARCH 2401
ARCH 1404.....	ARCH 2402
ARCH 2312.....	ARCH 2351
ARTS 1301.....	ART 1309
ARTS 1303.....	ART 1310
ARTS 1304.....	ART 2311
ARTS 1311.....	ART 1302
ARTS 1312.....	ART 2303
ARTS 1313.....	ART 1309
ARTS 1316.....	ART 1303
ARTS 1317.....	ART 2304
BCIS 1305.....	ISQS 2340
BIOL 1322.....	NS 1325
BIOL 1406.....	BIOL 1403
BIOL 1407.....	BIOL 1404
BIOL 1411.....	BIOL 1401
BIOL 1413.....	BIOL 1402
BIOL 2106.....	BIOL 1113
BIOL 2306.....	BIOL 1305
BIOL 2401.....	ZOOL 2403
BIOL 2402.....	ZOOL 2404
BIOL 2406.....	BIOL 1305 + 1113
CHEM 1105.....	CHEM 1105
CHEM 1107.....	CHEM 1106
CHEM 1111.....	CHEM 1107
CHEM 1112.....	CHEM 1108
CHEM 1305.....	CHEM 1305
CHEM 1307.....	CHEM 1306
CHEM 1311.....	CHEM 1307
CHEM 1312.....	CHEM 1308
CHEM 1405.....	CHEM 1305 + 1105
CHEM 1407.....	CHEM 1306 + 1106
CHEM 1411.....	CHEM 1307 + 1107
CHEM 1412.....	CHEM 1308 + 1108
CHEM 1419.....	CHEM 2303 + 2103
CHIN 1511.....	CHIN 1501
CHIN 1512.....	CHIN 1502
CHIN 2311.....	CHIN 2301
CHIN 2312.....	CHIN 2302

TCCNS	TTU Equivalent
COMM 1307	MCOM 1300
COMM 1318	PHOT 2310
COMM 2302	JOUR 2300
COMM 2311	JOUR 2310
COMM 2366	TH A 2304
COSC 1300	C S 1300
COSC 1301	C S 1305
COSC 1319	C S 2350
COSC 1401	C S 1305
COSC 1436	C S 1411
COSC 1437	C S 1412
COSC 2315	C S 2413
COSC 2319	C S 2350
COSC 2325	C S 2350
COSC 2419	C S 2350
COSC 2425	C S 2350
COSC 2436	C S 2413
CZEC 1311	CMLL 1301
CZEC 1312	CMLL 1302
CZEC 1511	CMLL 1501
CZEC 1512	CMLL 1502
CZEC 2311	CMLL 2301
CZEC 2312	CMLL 2302
DANC 1110	DAN 1101
DANC 1112	DAN 1100
DANC 1113	DAN 1100
DANC 1141	DAN 1105
DANC 1145	DAN 1109
DANC 1147	DAN 1103
DANC 1151	DAN 1100
DANC 1152	DAN 1100
DANC 1210	DAN 1101
DANC 1212	DAN 1100
DANC 1213	DAN 1100
DANC 1241	DAN 1105
DANC 1245	DAN 1109
DANC 1247	DAN 1103
DANC 1251	DAN 1100
DANC 1252	DAN 1100
DANC 1341	DAN 1105
DANC 1345	DAN 1109
DANC 1347	DAN 1103
DANC 1351	DAN 1100
DANC 1352	DAN 1100
DANC 2112	DAN 1100
DANC 2113	DAN 1100
DANC 2151	DAN 1100
DANC 2152	DAN 1100
DANC 2210	DAN 1100
DANC 2211	DAN 1100
DANC 2212	DAN 1100
DANC 2213	DAN 1100
DANC 2251	DAN 1100
DANC 2252	DAN 1100
DANC 2351	DAN 1100
DANC 2352	DAN 1100
DRAM 1141	TH A 2101
DRAM 1241	TH A 2101
DRAM 1310	TH A 2303
DRAM 1322	TH A 1302
DRAM 1341	TH A 2101
DRAM 1351	TH A 2301
DRAM 1352	TH A 2312
DRAM 2336	TH A 1301
DRAM 2366	TH A 2304
ECON 1301	PFP 2370
ECON 1303	PFP 2370
ECON 2301	ECO 2302
ECON 2302	ECO 2301
ENGL 1301	ENGL 1301
ENGL 1302	ENGL 1302

TCCNS	TTU Equivalent
ENGL 2307	ENGL 2351
ENGL 2308	ENGL 2351
ENGL 2311	ENGL 2311
ENGR 1204	E GR 1206
ENGR 1307	CTEC 2301
ENGR 2301	C E 2301
ENGT 1407	EET 2314 + 2114
ENGT 1409	GTEC 1312 + 1112
ENGT 2310	MTEC 1312
ENVR 1101	BIOL 1113
ENVR 1301	BIOL 1305
ENVR 1401	BIOL 1305 + 1113
FREN 1511	FREN 1501
FREN 1512	FREN 1502
FREN 2311	FREN 2301
FREN 2312	FREN 2302
GEOG 1301	GEOG 1401
GEOG 1302	GEOG 2300
GEOG 1303	GEOG 2351
GEOL 1103	GEOL 1101
GEOL 1104	GEOL 1102
GEOL 1147	ATMO 1100
GEOL 1303	GEOL 1303
GEOL 1304	GEOL 1304
GEOL 1347	ATMO 1300
GEOL 1403	GEOL 1303 + 1101
GEOL 1404	GEOL 1304 + 1102
GEOL 1447	ATMO 1300 + 1100
GEOL 2309	GEOL 2305
GEOL 2409	GEOL 2305
GERM 1511	GERM 1501
GERM 1512	GERM 1502
GERM 2311	GERM 2301
GERM 2312	GERM 2302
GOVT 2301	POLS 1301
GOVT 2302	POLS 2302
GOVT 2305	POLS 1301
GOVT 2306	POLS 2302
GREE 1311	GRK 1301
GREE 1312	GRK 1302
GREE 2311	GRK 2301
GREE 2312	GRK 2302
HECO 1315	NS 2310
HECO 1320	ADM 2311
HECO 1322	N S 1325
HECO 1328	ADM 1303
HECO 1329	ADM 1304
HIST 1301	HIST 2300
HIST 1302	HIST 2301
HIST 2311	HIST 1300
HIST 2312	HIST 1301
HIST 2321	HIST 2322
HIST 2322	HIST 2323
HORT 1401	PSS 1411
HUMA 1301	HUM 2301
HUMA 1302	HUM 2302
ITAL 1411	ITAL 1301
ITAL 1412	ITAL 1302
ITAL 2311	ITAL 2301
ITAL 2312	ITAL 2302
JAPN 1511	JAPN 1501
JAPN 1512	JAPN 1502
JAPN 2311	JAPN 2301
JAPN 2312	JAPN 2302
LATI 1511	LAT 1501
LATI 1512	LAT 1502
LATI 2311	LAT 2301
LATI 2312	LAT 2302
MATH 1314	MATH 1320
MATH 1316	MATH 1321
MATH 1324	MATH 1330

TCCNS.....	TTU Equivalent
MATH 1325.....	MATH 1331
MATH 1332.....	MATH 1300
MATH 1342.....	MATH 2300
MATH 1348.....	MATH 1350
MATH 1350.....	MATH 2370
MATH 1414.....	MATH 1420
MATH 1425.....	MATH 1331
MATH 1442.....	MATH 2300
MATH 2305.....	MATH 2300
MATH 2312.....	MATH 1350
MATH 2313.....	MATH 1351
MATH 2314.....	MATH 1352
MATH 2315.....	MATH 2350
MATH 2318.....	MATH 2360
MATH 2342.....	MATH 2300
MATH 2412.....	MATH 1550
MATH 2413.....	MATH 1351
MATH 2414.....	MATH 1352
MATH 2415.....	MATH 2350
MATH 2417.....	MATH 1351
MATH 2418.....	MATH 2360
MATH 2419.....	MATH 1352
MATH 2442.....	MATH 2300
MATH 2513.....	MATH 1351
MATH 2517.....	MATH 1351
MATH 2519.....	MATH 1352
MUSI 1114.....	MUAP 1123
MUSI 1115.....	MUAP 1124
MUSI 1116.....	MUTH 1103
MUSI 1117.....	MUTH 1104
MUSI 1162.....	MUAP 1303
MUSI 1165.....	MUAP 1304
MUSI 1181.....	MUAP 1123
MUSI 1182.....	MUAP 1124
MUSI 1183.....	MUAP 1113
MUSI 1184.....	MUAP 1114
MUSI 1188.....	MUAP 1103
MUSI 1190.....	MUAP 2103
MUSI 1216.....	MUTH 1103
MUSI 1217.....	MUTH 1104
MUSI 1262.....	MUAP 1303
MUSI 1286.....	MUCP 1201
MUSI 1287.....	MUCP 1202
MUSI 1304.....	MUSI 2301
MUSI 1306.....	MUHL 1308
MUSI 1307.....	MUHL 1308
MUSI 1308.....	MUHL 2308
MUSI 1309.....	MUHL 2309
MUSI 1311.....	MUTH 1303
MUSI 1312.....	MUTH 1304
MUSI 1316.....	MUTH 1103
MUSI 1317.....	MUTH 1104
MUSI 1386.....	MUCP 2301
MUSI 2114.....	MUAP 2123
MUSI 2115.....	MUAP 2124
MUSI 2116.....	MUTH 2103
MUSI 2117.....	MUTH 2104
MUSI 2181.....	MUAP 2123
MUSI 2182.....	MUAP 2124
MUSI 2188.....	MUAP 1104
MUSI 2190.....	MUAP 2104
MUSI 2216.....	MUTH 2103
MUSI 2217.....	MUTH 2104
MUSI 2262.....	MUAP 1304
MUSI 2311.....	MUTH 2303
MUSI 2312.....	MUTH 2304
MUSI 2386.....	MUCP 2302
PHED 1151.....	PF&W 1141
PHED 1152.....	PF&W 1141
PHED 1153.....	PF&W 1140
PHED 1164.....	ESS 1301

TCCNS.....	TTU Equivalent
PHED 1238.....	ESS 1301
PHED 1251.....	PF&W 1141
PHED 1252.....	PF&W 1141
PHED 1301.....	ESS 1301
PHED 1304.....	HLTH 1300
PHED 1305.....	HLTH 1300
PHED 1338.....	PF&W 1112
PHED 2155.....	PF&W 2142
PHED 2255.....	ESS 2225
PHIL 1301.....	PHIL 2300
PHIL 1304.....	PHIL 2350
PHIL 2303.....	PHIL 1310
PHIL 2306.....	PHIL 2320
PHYS 1401.....	PHYS 1403
PHYS 1402.....	PHYS 1404
PHYS 1410.....	PHYS 1401
PHYS 1411.....	ASTR 1400
PHYS 1412.....	ASTR 1401
PHYS 2425.....	PHYS 1408
PHYS 2426.....	PHYS 2401
PHYS 2427.....	PHYS 2402
PORT 1511.....	PORT 1501
PORT 1512.....	PORT 1502
PORT 2311.....	PORT 2301
PORT 2312.....	PORT 2302
PSYC 2301.....	PSY 1300
PSYC 2306.....	HLTH 1305
PSYC 2307.....	PSY 2305
PSYC 2308.....	PSY 2301
PSYC 2309.....	PSY 2301
PSYC 2310.....	PSY 2301
PSYC 2311.....	HDFS 2303
PSYC 2312.....	HDFS 2303
PSYC 2313.....	PSY 2305
PSYC 2314.....	HDFS 2303
RUSN 1511.....	RUSN 1501
RUSN 1512.....	RUSN 1502
RUSS 2311.....	RUSN 2301
RUSS 2312.....	RUSN 2302
SGNL 1401.....	ASL 1301
SGNL 1402.....	ASL 1302
SGNL 2301.....	ASL 2301
SGNL 2302.....	ASL 2302
SOCI 1301.....	SOC 1301
SOCI 1306.....	SOC 1320
SOCI 2301.....	SOC 2331
SOCI 2306.....	HLTH 1305
SOCW 2361.....	S W 2301
SPAN 1305.....	SPAN 1507
SPAN 1511.....	SPAN 1501
SPAN 1512.....	SPAN 1502
SPAN 2311.....	SPAN 2301
SPAN 2312.....	SPAN 2302
SPCH 1311.....	COMS 1300
SPCH 1315.....	COMS 2300
SPCH 1318.....	COMS 1301
TECA 1311.....	HDFS 2311
TECA 1354.....	HDFS 2305
VIET 1311.....	CMLL 1301
VIET 1312.....	CMLL 1302
VIET 1511.....	CMLL 1501
VIET 1512.....	CMLL 1502
VIET 2311.....	CMLL 2301
VIET 2312.....	CMLL 2302

Transfer Disputes Involving Lower-Division Courses

If a dispute occurs involving the transfer of lower-division courses, the Texas Higher Education Coordinating Board has established the following procedures to resolve the dispute:

1. If an institution of higher education does not accept course credit earned by a student at another institution of higher education, the receiving institution shall give written notice to the student and to the sending institution that transfer of the course credit is denied. A receiving institution shall also provide written notice of the reasons for denying credit for a particular course or set of courses at the request of the sending institution.
2. A student who receives notice as specified in subsection (1) may dispute the denial of credit by contacting a designated official at either the sending or the receiving institution.
3. The two institutions and the student shall attempt to resolve the transfer of the course credit in accordance with Coordinating Board rules and guidelines.
4. If the transfer dispute is not resolved to the satisfaction of the student or the sending institution within 45 days after the date the student received written notice of denial, the institution that denies the course credit for transfer shall notify the Commissioner of Higher Education of its denial and the reasons for the denial.

The Commissioner of Higher Education or the commissioner's designee shall make the final determination about a dispute concerning the transfer of course credit and give written notice of the determination to the involved student and institutions. The Coordinating Board shall collect data on the types of transfer disputes that are reported and the disposition of each case that is considered by the commissioner or the commissioner's designee.

If a receiving institution has cause to believe that a course being presented by a student for transfer from another school is not of an acceptable level of quality, it should first contact the sending institution and attempt to resolve the problem. In the event that the two institutions are unable to come to a satisfactory resolution, the receiving institution may notify the Commissioner of Higher Education, who may investigate the course. If its quality is found to be unacceptable, the Coordinating Board may discontinue funding for the course.

Approval for Concurrent Attendance at Other Institutions

Students who are registered at Texas Tech and wish to register concurrently at another institution must obtain prior written approval from the academic dean of the college in which they are enrolled. This approval applies to all residence courses, extension courses, and distance education courses in progress elsewhere at the time of registration, and those begun during the semester.

A student registered at another institution but wishing to enroll concurrently for credit at Texas Tech will be considered as a transfer student and will be required to meet the standards for such students. Concurrent registration resulting in a combined enrollment beyond a maximum load at this institution will not be permitted.

Credit for Core Requirements Taken at Another State Institution

In accordance with the rules mandated by the Texas Legislature concerning the transfer of core curriculum: "If a student successfully completes the 42 semester credit hour core curriculum at an institution of higher education, that block of courses may be transferred to any other institution of higher education and must be substituted for the receiving institution's core curriculum. A student shall receive academic credit for each of the courses transferred and may not be required to take additional core curriculum

courses at the receiving institution unless the board has approved a larger core curriculum at that institution." (Section 5.402, d)

Credit for Educational Courses Completed in the Armed Services

Credit may be given for formal service school courses completed in the armed services after evaluation of official documents by the Transfer Evaluation Office. The student's academic dean decides if credit awarded for such courses will be applied toward requirements for the bachelor's degree.

Admission Requirements for International Students

International students may apply for admission to Texas Tech electronically at www.applytexas.org or by requesting an application from the Office of Admissions. With the official application, international applicants must furnish original documents or official certified copies indicating the nature and scope of their educational program and meet admission requirements stated in the catalog.

Applicants with foreign academic credentials must provide academic records in the original language with certified English translation. Applicants who have attended school outside the United States need to provide official results of secondary external examinations on examination board letterhead, (such as GCE "Ordinary" level exams); certificates of completion of a state secondary school examination; and official transcripts from any university-level studies already completed in the United States or elsewhere.

Failure to provide complete information regarding post-secondary level study could result in cancellation of admission. Entering freshman students who have completed secondary school in the United States must also take and submit scores from the SAT or ACT.

Students whose native language is not English must also present a score of at least 550 (paper exam) or 213 (computer exam) or 79 (IBT) on the Test of English as a Foreign Language (TOEFL) or a score of at least 6.5 on the International English Language Testing System (IELTS). These requirements may be waived if the student has attended a U.S. high school or a college for at least two years or if the student is a citizen of a country where English is the native language.

Countries Texas Tech University considers to have English as the native language include Australia, Canada (except the Province of Quebec), Commonwealth Caribbean Countries (Anguilla, Antigua, the Bahamas, Barbados, Belize, British Virgin Islands, Bermuda, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent, Trinidad and Tobago, and Turks and Caicos Islands), Ireland, Liberia, New Zealand, United Kingdom (England, Northern Ireland, Scotland, Wales), and the United States.

Information concerning the TOEFL may be obtained from the Educational Testing Service, P.O. Box 899, Princeton, NJ 08540, U.S.A. or online at www.toefl.org. Information about the IELTS may be obtained from IELTS International, 100 East Carson Street, Suite 200, Pasadena, CA 91103, U.S.A.; T 626.564.2954, F 626.564.2981; email ielts@ieltsintl.org or online at www.ielts.org. Further testing will be given once the student arrives on campus to verify competency. Students lacking adequate English proficiency will be required to enroll in basic English courses.

International students not living in the United States are encouraged to apply a year in advance and must verify their ability to support themselves financially (a required minimum of \$25,313 for the academic year in addition to travel money is necessary; this is subject to change if tuition, fees, or room and board charges are modified). The tuition rate for undergraduate international students is \$405 per semester credit hour. Each nonimmigrant international student will be charged an International Student Fee of \$50 per semester and \$25 for each summer term. Certain sponsored international students also will pay an administrative fee of \$250 per semester and \$125 per summer term.

A nonrefundable processing fee is required for all applicants. Those applying for either undergraduate or graduate programs will not be considered unless their applications are accompanied by an International Money Order in the amount of \$60 (U.S.), or U.S. Postal Money Order for applicants in the U.S., payable to Texas Tech University. Completed applications must be on file by the published international student admission deadlines.

Admission Requirements for Former Texas Tech Students

Application materials and deadlines for former Texas Tech students are available at www.depts.ttu.edu/formertech. Official transcripts from all institutions attended subsequent to Texas Tech enrollment must be submitted by the application deadline. Students who were on probation, suspension, or second/subsequent suspension and are returning to Texas Tech should refer to the admission criteria under “Scholastic Probation and Suspension” listed in the Undergraduate Academics section of this catalog and on the Web site listed above. Students who left in good standing must have a 2.0 GPA on work taken since leaving Texas Tech.

Academic Fresh Start

The applicant who elects to participate in this program must do so **at the time of application** and must otherwise meet current freshman or transfer admissions requirements. State residents may apply for admission to Texas public universities without consideration being given to academic work completed 10 or more years prior to the semester in which the applicant seeks to enroll. An applicant who is admitted under this plan may not receive any credit for courses taken 10 or more years prior to enrollment.

If a student who enrolls under this program completes a prescribed course of study, earns a baccalaureate degree, and applies for admission to a postgraduate or professional program offered by a public institution of higher education, the admitting institution will consider only the grade point average of the applicant established by the coursework completed after the student enrolled under this plan (along with other criteria the institution normally uses to evaluate applicants for admission).

Texas Success Initiative

The Texas Success Initiative (TSI) has replaced the Texas Academic Skills Program (TASP). Under the Texas Success Initiative, any student who is not exempt is required to take one of the following tests to assess basic skills in the areas of reading, writing, and mathematics: THEA, Accuplacer, Compass, or Asset. Students may be exempt if they have high ACT, SAT, or TAKS test scores or have earned an associate’s or baccalaureate degree (www.reg.ttu.edu gives other exemptions) at an accredited Texas public institution of higher education or from a regionally accredited out of state institution. Students may test with Accuplacer through Academic Testing Services, Room 242 West Hall, 806.742.3671. Students will need to present their driver’s license or passport for identification purposes. Once tested, students must submit their test scores to the TSI Compliance Office, 116 West Hall. A practice Accuplacer test can be taken at the Web site listed above. For THEA test registration or to take a practice THEA test, go to www.thea.nesinc.com. Students who have tested but not attained the minimum scores on all three sections of the test are required to obtain TSI advising before registration and enroll continuously in formal skills development through the TSI Basic Skills Office, 72 Holden Hall, 806.742.3242. To ask questions about your status with respect to the Texas Success Initiative, contact the TSI Compliance Office at 806.742.1183, ext. 248.

New Student Orientation

New Student Orientation (NSO) is a mandatory program designed to provide all incoming students an opportunity to meet with an academic advisor, register for classes, and gather information about Texas Tech programs and services. All new freshmen and transfer students are required to attend NSO. Sessions are held in January,

April, May, June, July, and August. To obtain more information, visit www.newstudentorientation.ttu.edu, call 806.742.0048, or email newstudentorientation@ttu.edu.

Special Programs

Special Undergraduate Programs for High School Students.

Outstanding local area high school students are invited to take advantage of the special enrollment program on the Texas Tech University campus. Students may take college classes and earn credit while still attending high school. To be accepted to the special enrollment program, a student must meet the following criteria with the permission of their high school:

- For fall or spring enrollment, students must be a high school junior or senior in the top 10 percent of their high school class with at least an 1180 SAT or 27 ACT score.
- For summer enrollment, students must be a high school senior in the top 25 percent of their class with at least an 1140 SAT or 25 ACT or a high school junior in the top 10 percent of their class with at least an 1180 SAT or 27 ACT score.
- Students enrolled in special academic programs (e.g., Lubbock Exemplary Academic Program [LEAP]) and students who do not meet the above requirements but have special circumstances will have their records reviewed to determine other factors that may influence their success in college level courses.

Students enrolling for a specific course with the permission of their high school will be approved on an exception basis. For more information contact the Office of Admissions.

Senior Citizen’s Program. This program is designed for students age 55 and above who wish to enrich their later years through the adventure of lifelong learning. Senior citizens can enroll either to earn a degree or take a series of classes for personal enrichment. No transcripts or SAT or ACT scores will be required for nondegree-seeking students. For more information or for a special application, contact the Office of Admissions.

Undergraduate Credit by Exam

It is the general policy of the university to recognize academic achievement of students gained by means other than through performance in organized classes. Students will be given the opportunity to receive credit by special examination in all courses in which proficiency may be determined by examination.

Students may achieve a high level of proficiency in certain subject areas through advanced work in high school, participation in advanced placement programs, or independent study. The university strongly encourages such superior attainment, recognizes it for academic purposes, and permits students who have done such work to obtain course credit through examination. A grade of Credit (CR) will be given on the examination to those earning credit, but the grade will not be considered in determining grade point averages. Course credit earned by examination is recorded by the Registrar on the student’s transcript as “(Number) hours of credit via credit by examination program in (course equivalent),” and no grade points are awarded. Course credit by examination may not be used to satisfy the 30-hour minimum residence credit requirement for graduation. Any current, former, or prospective Texas Tech student may attempt to earn undergraduate course credit using the designated exam options. Some credit-by-exam programs (AP and IB) are only administered at participating high schools. CLEP exams are a credit-by-exam option for several undergraduate subjects and are administered at Texas Tech throughout the year and during New Student Orientation. Students may not use credit-by-exam options to attempt to remove or replace a grade that has already been earned in a Texas Tech course. The student is responsible for complying with the following procedures:

1. All CLEP exams are computer-based. Appointments to use the computers and schedule the exams must be made through Academic Testing Services in 214 West Hall, 806.742.3671. For more information on CLEP, visit the Academic Testing Services Web site at www.depts.ttu.edu/testing or www.collegeboard.com.

2. The student is responsible for having test scores sent to the Registrar's Office unless tests are taken at Texas Tech University. Score reports sent from other university test centers must be requested from Academic Testing Services, 214 West Hall. The student is responsible for completing tests for lower-level courses in sufficient time to qualify for registering for higher-level courses.
3. After the 12th day of classes, credit by examination may be attempted for a course one is enrolled in only upon written approval of the appropriate academic dean's office.
4. In cooperation with and in compliance with federal nondiscrimination laws and policies, credit by examination is open to all persons. Students with mostly A and B grades who have higher admission test scores are encouraged to consider attempting credit by examination.
5. College Level Examination Program (CLEP) tests cannot be repeated before six months have passed.
6. Accommodations for nonstandard testing must be submitted in writing (before the test date) and supported by documentation from a professional who is licensed and certified to diagnose the disability. All requests are subject to approval and must be scheduled with Academic Testing Services, 214 West Hall, 806.742.3671.

There are five separate programs by which a student may earn course credit by examination. These include the following:

1. Specified SAT Subject Exams.
2. Advanced Placement Examinations that are a part of the College Board Advanced Placement Programs (AP) available in a limited number of secondary schools.
3. Specified subject examinations of the College Level Examination Program (CLEP).
4. Departmental examinations prepared, administered, and scored by faculty members who teach the related course.
5. Credit for an International Baccalaureate (IB) examination.

The student is responsible for taking the tests early enough to allow sufficient time for scores to be reported to the university and processed by the Registrar's Office. Many courses in the credit by examination program are prerequisites for higher-level courses; therefore, students seeking credit by examination must plan so that this credit can be assured before registering for advanced courses. Information regarding test dates and fees for national standardized examinations is available from Academic Testing Services at Texas Tech. It is the student's responsibility to request that his or her test scores be sent to the university. Information concerning each of the testing programs follows.

1. Credit for SAT Subject Exams. Achievement Tests are part of the College Board Admissions Testing Program. Each year there are several national administrations of the SAT Subject Exams. Students should plan to take the specified tests at national testing centers during their senior year of high school at an early testing date in order that scores may be reported to the university by June. For more information, view www.collegeboard.com; visit your high school counselor; or contact Academic Testing Services, Texas Tech University, Box 45002, Lubbock, Texas 79409-5002, 806.742.3671.

2. Credit for Advanced Placement (AP) Program Examinations. The Advanced Placement Examination is the final examination for a nationally standardized course offered in a limited number of secondary schools under the auspices of the Advanced Placement Program. The objective of the AP is to allow students to begin work toward college credit while still in high school. Students should check with their high school counselor or principal as to the availability of the AP examinations in their school. The AP exam is offered once a year during May at participating high schools. AP scores are reported to the university in July.

3. Credit for College Level Examination Program (CLEP) Examinations. Under the College Level Examination Program, the university will award credit only for specified examinations. Accepted exams vary among institutions, so students should be aware of which exams are accepted at Texas Tech. As with the other College Board testing programs, a student may attempt a

CLEP examination at a national CLEP testing center before enrolling and have the scores reported to the university. However, these examinations are offered on the Texas Tech campus during new student orientation conferences, as well as several times each month throughout the year.

NOTE: Scores accepted for credit vary among universities. Students are responsible for knowing what scores are accepted at Texas Tech. Required scores are psychometrically scaled conversions and do not correlate on a one-point, one-question basis, nor is the required score a percentile.

Further information about the CLEP tests may be obtained from your high school counselor or principal; www.collegeboard.com; or Academic Testing Services, Texas Tech University, Box 45002, Lubbock, TX 79409-5002, 806.742.3671.

4. Credit for an International Baccalaureate (IB) Examination.

The International Baccalaureate is an international program of courses and examinations offered at the high school level. Texas Tech welcomes students in the IB program and will grant a minimum of 24 hours credit for an IB Diploma completed with Higher or Standard Level exam scores of 4-7. For those individuals who participate in IB courses, but do not have an IB Diploma, individual course credit may be earned based on the subject and score obtained on specified IB exams. Students must send an IB examination transcript to Texas Tech to receive credit.

5. Credit by Departmental Examination. Any current or former Texas Tech student (or prospective student) may attempt to earn credit by examination for any undergraduate course provided the student has neither passed nor failed that course at Texas Tech. Several departments within the university prepare, administer, score, and award credit for their own examinations. Credit for specific courses is given upon satisfactory performance of the comprehensive examinations that are administered by the departments responsible for the courses and recommended by the deans of the respective colleges. To be eligible to attempt credit by departmental examination, a student must not have previously audited, enrolled in, or attempted credit by examination in the course. A student must apply in writing to the responsible department at least 30 days prior to taking a departmental examination for credit. Further information regarding any credit by departmental examination should be secured directly from the academic department concerned.



Exams for Advanced Placement (AP) Program

TTU Courses for Which Credit Can Be Earned	Standardized Test(s) Used	Minimum Score	Semester Hours
Art			
ART 1302	AP: Studio Art: 2-D Design	4	3
ART 1303	AP: Studio Art: Drawing	4	3
ART 1310	AP: Art History	4	3
ART 2303	AP: Studio Art: 3-D Design	4	3
ART 2311	AP: Art History	4	3
Biology			
BIOL 1401, 1402	AP: Biology	3	8
BIOL 1403, 1404	AP: Biology	5	8
Chemistry			
CHEM 1305, 1306 & 1105, 1106	AP: Chemistry	3	8
CHEM 1307, 1308 & 1107, 1108	AP: Chemistry	4	8
Computer Science			
C S 1303	AP: Computer Science A	4	4
C S 1303	AP: Computer Science AB	3	4
Economics			
ECO 2301	AP: Microeconomics	4	3
ECO 2302	AP: Macroeconomics	4	3
English			
ENGL 1301	AP: English Language and Composition	3	3
ENGL 1301, 1302	AP: English Language and Composition	4	6
ENGL 1301	AP: English Literature and Composition	3	3
ENGL 1301, 1302	AP: English Literature and Composition	4	6
French			
FREN 1501, 1502	AP: French	2	10
FREN 1501, 1502, 2301	AP: French	3	13
FREN 1501, 1502, 2301, 2302	AP: French	4	16
German			
GERM 1501, 1502	AP: German	2	10
GERM 1501, 1502, 2301	AP: German	3	13
GERM 1501, 1502, 2301, 2302	AP: German	4	16
History			
HIST 1300, 1301	AP: European History	3	6
HIST 2300, 2301	AP: U.S. History	3	6
HIST 2322 or 2323	AP: World History	3	3
Mathematics			
MATH 1351	AP: Calculus AB	4	3
MATH 1351, 1352	AP: Calculus BC	4	6
MATH 2300	AP: Statistics	4	3
Physics			
PHYS 1403, 1404	AP: Physics B	3	8
PHYS 1408	AP: Physics C–Mechanics	3	4
PHYS 2401	AP: Physics C–Electricity and Magnetism	3	4
Political Science			
POLS 1301	AP: U.S. Government and Politics	3	3
Psychology			
PSY 1300	AP: Psychology	3	3
Spanish			
SPAN 1501, 1502	AP: Spanish	2	10
SPAN 1501, 1502, 2301	AP: Spanish	3	13
SPAN 1501, 1502, 2301, 2302	AP: Spanish	4	16

Exams for College Level Examination Program (CLEP)

TTU Courses for Which Credit Can Be Earned	Standardized Test(s) Used	Minimum Score	Semester Hours
Biology			
BIOL 1401, 1402	CLEP-S: Biology	52	8
Business Administration			
ACCT 2300	CLEP-S: Financial Accounting	50	3
MGT 3370	CLEP-S: Principles of Management	52	3
MKT 3350	CLEP-S: Principles of Marketing	55	3
BLAW 3391	CLEP-S: Introduction to Business Law	51	3
Chemistry			
CHEM 1305, 1306 and 1105, 1106	CLEP-S: General Chemistry	52	8
CHEM 1307, 1308 and 1107, 1108	CLEP-S: General Chemistry	65	8
Computer Science			
C S 1300	CLEP-S: Information Systems and Computer Applications	55	3
Economics			
ECO 2301	CLEP-S: Principles of Microeconomics	50	3
ECO 2302	CLEP-S: Principles of Macroeconomics	50	3
English			
ENGL 1301*	CLEP-S: Freshman College Composition and a departmental essay score of...	55 3, 4	3
ENGL 1301, 1302*	CLEP-S: Freshman College Composition and a departmental essay score of...	55 5, 6	6
ENGL 2305, 2307	CLEP-S: Analyzing and Interpreting Literature	52	6
French			
FREN 1501	CLEP-S: French	50	5
FREN 1501, 1502	CLEP-S: French	55	10
FREN 1501, 1502, 2301	CLEP-S: French	62	13
FREN 1501, 1502, 2301, 2302	CLEP-S: French	66	16
German			
GERM 1501	CLEP-S: German	50	5
GERM 1501, 1502	CLEP-S: German	55	10
GERM 1501, 1502, 2301	CLEP-S: German	59	13
GERM 1501, 1502, 2301, 2302	CLEP-S: German	63	16
History			
HIST 1300	CLEP-S: Western Civilization I: Ancient Near East to 1648	51	3
HIST 1301	CLEP-S: Western Civilization II: 1648 to the Present	51	3
HIST 2300	CLEP-S: History of U.S. I: Early Colonizations to 1877	52	3
HIST 2301	CLEP-S: History of U.S. II: 1865 to Present	52	3
Mathematics			
MATH 1320	CLEP-S: College Algebra	52	3
MATH 1350, 1351	CLEP-S: Calculus	50	6
MATH 1350, 1351, 1352	CLEP-S: Calculus	56	9
MATH 1550	CLEP-S: Precalculus	50	5
Political Science			
POLS 1301	CLEP-S: American Government	50	3
Psychology			
PSY 1300	CLEP-S: Introductory Psychology	51	3
PSY 2301	CLEP-S: Human Growth and Development	53	3
Spanish			
SPAN 1501	CLEP-S: Spanish	50	5
SPAN 1501, 1502	CLEP-S: Spanish	55	10
SPAN 1501, 1502, 2301	CLEP-S: Spanish	66	13
SPAN 1501, 1502, 2301, 2302	CLEP-S: Spanish	68	16

* The multiple choice score of 55 on the Freshman College Composition CLEP earns an examinee the opportunity to sit for a 90-minute on-campus writing exam. The writing exam will determine the amount, if any, of credit hours awarded for Essentials of College Rhetoric (English 1301) and/or Advanced College Rhetoric (English 1302).

Exams for International Baccalaureate (IB)

TTU Courses for Which Credit Can Be Earned	Standardized Test(s) Used	Minimum Score	Semester Hours
Biology			
BIOL 1401, 1402	IB: Biology Standard Level	5, 6, 7	8
BIOL 1403, 1404	IB: Biology Higher Level	5, 6, 7	8
Chemistry			
CHEM 1301	IB: Chemistry Standard Level	4, 5, 6, 7	3
CHEM 1307, 1308 and 1107, 1108	IB: Chemistry Higher Level	5, 6, 7	8
Economics			
ECO 2301	IB: Economics Higher Level	5, 6, 7	3
English			
ENGL 1301	IB: English Language A1 or A2 Standard Level	4	3
ENGL 1301, 1302	IB: English Language A1 or A2 Higher Level	5, 6, 7	6
French			
FREN 1507	IB: French B Standard or Higher Level	3	5
FREN 2301, 2302	IB: French B Standard or Higher Level	4	6
FREN 2301, 2302, 3304	IB: French B Standard or Higher Level	5	9
FREN 2301, 2302, 3302, 3304	IB: French B Standard or Higher Level	6, 7	12
FREN 3302, 3304*	IB: French A1 or A2 Standard or Higher Level	6, 7	6
FREN 3304*	IB: French A1 or A2 Standard or Higher Level	4, 5	3
Geography			
GEOG 2351	IB: Geography Standard or Higher Level	5, 6, 7	3
German			
GERM 1507	IB: German B Standard or Higher Level	3	5
GERM 2301, 2302	IB: German B Standard or Higher Level	4	6
GERM 2301, 2302, 3303	IB: German B Standard or Higher Level	5	9
GERM 2301, 2302, 3303, 3304	IB: German B Standard or Higher Level	6, 7	12
GERM 3303*	IB: German A1 or A2 Standard or Higher Level	4, 5	3
GERM 3303, 3304*	IB: German A1 or A2 Standard or Higher Level	6, 7	6
History			
HIST 1300	IB: History Higher Level: European	5	3
HIST 1301	IB: History Higher Level: European	5	3
HIST 1300, 1301	IB: History Higher Level: European	6, 7	6
HIST 3395	IB: History Higher Level: African	5	3
HIST 3396	IB: History Higher Level: African	5	3
HIST 3395, 3396	IB: History Higher Level: African	6, 7	6
Mathematics			
MATH 1320	IB: Mathematics Studies Standard Level	5, 6, 7	3
MATH 1351	IB: Mathematics Methods Standard Level	6, 7	3
MATH 1351	IB: Mathematics Higher Level	5, 6, 7	3
MATH 1550	IB: Mathematics Methods Standard Level	4, 5	5
MATH 1550	IB: Mathematics Higher Level	4	5
Music			
MUHL 1301**	IB: Music Standard Higher Level	6, 7	4
MUTH 1303, 1103**	IB: Music Standard or Higher Level	6, 7	4
Philosophy			
PHIL 1310	IB: Philosophy Standard Level	5, 6, 7	3
PHIL 2300	IB: Philosophy Higher Level	5, 6, 7	3
Physics			
PHYS 1403, 1404	IB: Physics Standard Level	4, 5, 6, 7	8 or 4
PHYS 1408, 2401	IB: Physics Higher Level	4, 5, 6, 7	8

Psychology

PSY 1300	IB: Psychology Standard or Higher Level	5, 6, 7	3
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Spanish

SPAN 1507	IB: Spanish B Standard or Higher Level	3	5
SPAN 2301, 2302	IB: Spanish B Standard or Higher Level	4	6
SPAN 2301, 2302, 3305	IB: Spanish B Standard or Higher Level	5	9
SPAN 2301, 2302, 3305, 3307*	IB: Spanish B Standard or Higher Level	6, 7	12
SPAN 3305, 3307*	IB: Spanish A1 or A2 Standard or Higher Level	6, 7	6
SPAN 3305	IB: Spanish A1 or A2 Standard or Higher Level	4, 5	3

Theatre Arts

TH A 2301 or 2303	IB: Theater Arts Standard or Higher Level	5	3
TH A 2301 or 2303 and TH A 3308 or 3309 or 3335 or DAN 3313	IB: Theater Arts Standard or Higher Level	6, 7	6

* International students who have completed their secondary or high school degree in their native language and who have scores of 6 or 7 may consult the Department of Classical and Modern Languages and Literatures for possible credit by exam in 4000-level courses.

** As with transfer students and incoming freshmen, incoming students from IB (International Baccalaureate) programs will need to take a music theory placement exam for advising purposes.

Credit by Exam with SAT, ACT

TTU Courses for Which Credit Can Be Earned	Standardized Test(s) Used	Minimum Score	Semester Hours
English			
ENGL 1301	SAT: Critical Reading and Writing (each)	610	3
ENGL 1301, 1302	SAT: Critical Reading and Writing (each)	700	6
ENGL 1301, 1302	ACT: English Aptitude	31	6
History			
HIST 2300	SAT Subject: United States History	600	3
HIST 2300, 2301	SAT Subject: United States History	700	6
Mathematics			
MATH 1350	SAT Subject: Mathematics Level IC or IIC	670	3



Admission Requirements for Specific Colleges

Undergraduates who are accepted for admission to Texas Tech University will be enrolled in one of the university's 10 colleges. In addition to the admission requirements for enrollment in the university, each college may have admission requirements that must be met before acceptance.

Admissions requirements for each of the colleges are as follows:

College of Agricultural Sciences and Natural Resources

- The admissions requirements of the college are the same as those for the university.

College of Architecture

- Freshman admissions requirements of the college are the same as those for the university.
 - Freshmen choosing to major in architecture will be admitted to general architecture.
 - Transfer students can be admitted to general architecture by transferring with a 3.0 cumulative GPA.
- Admission into the preprofessional program is competitive and based on a comprehensive review of the student's portfolio, essay, statement of intent and GPA. The review to continue in the preprofessional program occurs at the end of the first year.

College of Arts and Sciences

- The admissions requirements of the college are the same as those for the university.
- Freshmen may be admitted into a general major known as Arts and Sciences Undeclared (ASUD) until they select the major degree program in which they intend to graduate. Students transferring from another institution with less than 60 hours (including coursework in progress) may choose Arts and Sciences Undeclared. Students who have completed 60 or more hours must declare a major to be considered for admission.

Rawls College of Business

- Students wishing to major in any business discipline must meet assured admission criteria and will be admitted to a general business major, COBA (College of Business Administration), until completion of the Lower Division Business Core with grades of C or higher and attainment of a minimum 2.75 adjusted cumulative Texas Tech GPA. Once these requirements have been met, students may declare a major. For more information on majors, check the Rawls College of Business section of the catalog.
- Students transferring from any institution must have a minimum of 12 transferable hours and a cumulative 2.75 GPA or higher on transferable hours taken.

College of Education

- The admissions requirements of the college are the same as those for the university.
- Freshmen and transfer students wishing to become teachers may major in multidisciplinary studies. Degrees leading to certification in special education and bilingual education are also available. Students wishing to become science teachers (grades 8-12) may major in multidisciplinary science.

- Students who major in the college or who major in another college and wish to become teachers must apply for admission to the Teacher Education Program. Requirements and applications are available online at www.educ.ttu.edu.

College of Engineering

- Students meeting the admissions requirements of the university will be admitted to any major within the college except mechanical engineering.
- For admission into mechanical engineering, freshmen must meet assured admission requirements. Students not meeting assured admission requirements but still wanting to pursue a degree in engineering will be admitted to Engineering Undecided. Once a student has earned a 2.5 GPA or higher, mechanical engineering can be declared as a major.

Honors College

- The admissions requirements for the Honors College majors are the same as those for the university.
- Students who are admitted to a major within another college at the university, but who wish to participate in the honors program, must submit an additional application to the Honors College. This application is available online at www.honr.ttu.edu.

College of Human Sciences

- Students meeting the admissions requirements of the university will be admitted to any major within the college with the exception of interior design; human development and family studies; and community, family, and addiction services.
- For admission into interior design, freshmen must meet assured admission requirements, and transfer students must have at least a 3.0 cumulative GPA.
- For admission into the human development and family studies program and community, family, and addiction services, freshmen must meet university admission requirements and transfer students must have a 2.5 cumulative GPA.
- Students seeking teacher certification in early childhood or family and consumer sciences must meet the university requirements for admission to the Teacher Education Program.

College of Mass Communications

- The admissions requirements of the college are the same as those for the university.
- Students enrolling in or transferring into the school for the first time will be admitted as general mass communication students. To declare a major, a student must have a cumulative 2.75 in the first 15 hours taken at Texas Tech University.

College of Visual and Performing Arts

- The admissions requirements of the college are the same as those for the university.
- Students applying to communication design will be admitted to art undeclared and must apply and present a portfolio for admission to the major.
- Students applying to music will be admitted to music undeclared until their audition. Music majors must audition in their declared principal applied area with the appropriate faculty for acceptance into any music program.
- Students applying to the Bachelor of Fine Arts (BFA) program in theatre arts will be admitted initially to the Bachelor of Arts program. Entrance to the BFA program is by audition and interview, normally at the end of the sophomore year.

Registration

Don Wickard, Registrar

Office of the Registrar | 103 West Hall | Box 45015
Lubbock, TX 79409-5015 | T 806.742.3661
F 806.742.0355 | www.reg.ttu.edu

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, every student who completes the admission process is notified of his or her admission to the university and is furnished additional materials that deal with the actual registration.

Scholastic Order for Registration. Priority for time of registration is based upon the student's last name and classification. To provide equity in registration time assignments, students' names will be rotated alphabetically each long semester. Scholastic order for registration will apply to new students, transfer students, and currently enrolled sophomores and freshmen. Exceptions to any of the assigned registration times will not be made.

Matriculation Number. Generally, the student's social security number is used for matriculation and record identification purposes. However, disclosure of the social security number for these purposes is voluntary. Any student who chooses not to use the social security number in this manner will be assigned a matriculation number by the university.

Stop Enrollment/Stop Registration. Insufficient information or improper information given by the student on any admission or registration form will constitute cause for delaying the admission or enrollment for the student. Students with this type of administrative hold on their records may be denied registration. For information about administrative holds and status of holds on students' records, refer to "Administrative Holds" in the Academic Information section of this catalog.

Name Change. Students who have a change in legal name must notify the Registrar's Office prior to registration for the change to be effective for that semester of enrollment. A student may not register under a name different from that used during the last enrollment without completing the change of name form and supplying official documentation of name change. All grade reports and transcripts are issued under the student's legal name as recorded in the Registrar's Office.

Registration of Undergraduate Students in Graduate Courses. An undergraduate student who is within 12 semester hours of graduation and has at least a B average in the major subject may enroll for courses carrying graduate credit, subject to the approval of the dean of the academic 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. Graduate work taken under this provision may not be used to meet undergraduate degree requirements. An undergraduate who is permitted to enroll for graduate credit as described above but has not previously taken the Aptitude Test of the Gradu-

ate Record Examinations will be required to take the test during the first semester of enrollment in graduate courses.

The maximum course load that 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 obtain 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. With proper approval, students who wish to request a change in schedule may do so. Student-initiated changes in schedule, including adding and dropping courses, must be arranged via the Web for Students or in person; changes are not official until all steps in the process have been completed. The university reserves the right to make changes in a student's schedule.

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. 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 enrolled for fewer than 12 semester credit hours in a semester (6 hours in summer) must pay a \$10 fee for the privilege of auditing a course. Written permission from the dean of the college in which the course is being taught and from the course instructor is required. No charge is assessed for enrollment of 12 or more semester credit hours. (Senior citizens 65 years of age and older are exempt from payment of this fee regardless of the number of semester credit hours.)

Veterans' Exemptions From Fees Under the Hazlewood Act.

The following men and women who were legal residents of Texas at the time of entry into the Armed Forces and who have been legal residents of Texas for a period of not less than twelve months immediately preceding their registration in Texas Tech University are by state law exempt from the payment of all fees except laboratory and library fees or similar deposits and fees or charges for room and board: all nurses and honorably discharged members of the Armed Forces of the United States who served during the Spanish-American War, World War I, World War II (except those who were discharged from service because they were over the age of 38 or because of a personal request on the part of the person that he or she be discharged), the National Emergency which began on June 27, 1950 (also referred to as the Korean War), and all persons who were honorably discharged after service on active military duty, excluding training, for more than 180 days during the Cold War (which began on the date of the termination of the Korean War); the Vietnam era which began on December 21, 1961, and ended on May 7, 1975;

Notice to Graduate Students

Additional registration information specific to graduate students can be found in the catalog's Graduate School section.

the Grenada and Lebanon era which began on August 24, 1982, and ended on July 31, 1984; the Panama era which began on December 10, 1989, and ended on January 21, 1990; and the Persian Gulf War which began on August 2, 1990, and ended on the date thereafter prescribed by Presidential proclamation or September 1, 1997, whichever occurred first; or any future national emergency declared in accordance with federal law.

These exemptions also apply to the children of members of the armed forces of the United States who are or were killed in action, who die or died while in service, who are missing in action, or whose death is documented to be directly caused by illness or injury connected with service in the armed forces of the United States, and to the benefit of orphans of members of the Texas National Guard and the Texas Air National Guard killed since January 1, 1946, while on active duty.

The exemptions provided for shall not exceed a cumulative total of 150 credit hours. The exemption from fees provided for above does not apply to persons if at the time of their registration they are eligible for educational benefits under federal legislation in effect at the time of their registration.

Discharge papers must be presented by the student to the Office of the Registrar, who will in turn certify the student's eligibility to Student Business Services.

NOTE: This provision of the catalog will be altered to comply with any amendment to state or federal law.

Veterans' Certification. Each student using VA Educational Assistance is responsible for providing accurate information to the VA Coordinator, Room 117 West Hall. Because the Department of Veteran Affairs requires updated information concerning any changes, students must report all changes of status in their academic schedule or address. Undergraduate students who have accumulated 64 or more credit hours must file a copy of their official degree plan or teacher certification plan with the Veterans Coordinator or enrollment certification will be canceled. Graduate students must have taken the GRE, GMAT, or LSAT and provide a copy of their letter of acceptance from the Graduate School. Graduate students must also provide a degree plan as soon as possible after enrollment in Texas Tech.

Each student using the Hazlewood Act must be certified each semester through the Office of the Registrar, Room 106 West Hall.



Finances

Stephanie Smith, Interim Managing Director Student Business Services

301 West Hall | Box 41099 | Lubbock, TX 79409-1099
T 806.742.3272, toll free 866.774.9477
F 806.742.0445 | www.sbs.ttu.edu

Tuition and Fees

Texas Tech University reserves the right, without notice in this or any other publication, to change, amend, add to, or otherwise alter any or all fees, dues, rates, or other charges set forth herein and subject to action by the Texas State Legislature, the Board of Regents of the Texas Tech University System, or other authority as the case may be.

Texas Tech University reserves the right to deny credit for coursework completed in a semester or term and/or registration in a future semester or term for unpaid balances. This also includes the release of official academic transcripts.

The university accepts no responsibility for billings or refund checks sent to incorrect addresses or difficulties caused by the postal service or other delivery services.

It is the student's responsibility to ensure that payment is in the possession of Student Business Services by the university established due dates announced each semester.

Payment Policy

Failure to make payment arrangements by the due date will result in cancellation of the registration. Students who choose the payment option or who incur incidental fees during the semester must make full payment by the established due dates or be prohibited from registering for future terms until full payment is made. A student who is not 100% paid prior to the end of the term may be denied credit for coursework completed that semester or term.

Fee Payment. Payment arrangements must be made prior to the first class day. See our Web site at www.sbs.ttu.edu for payment due dates. Students will receive email billings prior to the due dates.

Payment must reach Student Business Services by close of business on the due date. Cancellation for non-payment will occur after close of business on the due date. Students who are cancelled prior to the first class day for nonpayment will not be allowed to reregister for classes until open registration.

Students registering after the first due date will have until the 12th class day (4th class day in summer) to make payment arrangements. Students who are cancelled after the 12th class day (4th class day in summer) will be assessed late charges before being allowed to reregister.

Tuition and fees may be paid using one of the following options:

Option 1: Payment of the total amount due (cash, check, credit card, 100% financial aid).

Option 2: Payment option plan (not available for summer terms). All charges, including housing and hospitality.

Option 3: Emergency enrollment loan (tuition and fees only).

Payment Option Plan (Option 2)

Texas State Law (Texas Education Code, Section 54.007a) allows students to pay tuition, fees, housing, and hospitality in three installments over the course of the semester. Students selecting this option are required to enroll in the payment option plan online through the eBill system. Additional instructions for enrolling in the payment option plan are available at www.sbs.ttu.edu.

The first installment of 50 percent of all tuition and fees is due at the time the student enrolls in the payment option plan. The second and third installments must be made in increments of one-half of the remaining balance for each installment. During the fall semester, the second installment is due October 1 and the third installment is due November 1. In the spring semester, the second installment is due February 15 and the third installment is due March 15. A service charge of \$25 must be paid at the time the student enrolls in the plan in addition to the 50 percent down payment. This option is not available for summer terms. Students who have elected the payment option plan and subsequently add or change courses must maintain a 50 percent or greater payment status on the 12th class day. Please check your account information via the Web to ensure compliance with the terms of the agreement.

Emergency Enrollment Loan (Option 3)

Students may request an Emergency Enrollment Loan (EEL) for tuition and fees. Students selecting the EEL option prior to second cancellation are required to sign up online through the eBill system. After second cancellation, the EEL will only be available via paper form. The form may be obtained from Student Business Services in the Student Financial Center, located at 301 West Hall or online at www.sbs.ttu.edu. A service charge of \$25 is due at the time the student requests the EEL option. Emergency Enrollment Loans are disbursed on a first come, first served basis until funds are depleted. Please visit the Web site at www.sbs.ttu.edu for additional information and payment dates.

Billings

Billings will be sent via email to all preregistered students one month prior to the due date. Students registering after preregistration or those making changes to their billing after the initial billing will receive weekly e-bill updates to their established email address or addresses. Monthly billings for incidental expenses will be emailed the 10th of each month and must be paid in full prior to the 1st of the following month to avoid late fees. Students are billed based on their location of residence and location of classes. Students must verify their location each term when registering and may request a location change anytime by entering the change at www.techsis.admin.ttu.edu/student.

General Payment Information

How to Pay. Payment can be made as follows:

- **In Person.** Students can pay in cash at the Student Business Services office located in the Student Financial Center at 301 West Hall or by personal check, cashier's check, money order, VISA, MasterCard, American Express, or Discover Card. Checks should be made payable to Texas Tech University. All payments made other than cash are subject to final acceptance for payment.
- **Mail.** Cash should not be sent through the mail, and Texas Tech accepts no responsibility for cash sent by mail. Payments should

be mailed to P.O. Box 41099, Lubbock, TX 79409 at least 5 to 7 days prior to the due date. Express mail your payments to Student Business Services, Texas Tech University, 301 West Hall, Box 41099, Lubbock, TX 79409-1099.

- **Web Credit Card, Debit Card or E-Check Payments.** Pay online at www.techsis.admin.ttu.edu/student.

Account Information. Tuition and fee information can be obtained at the following: www.techsis.admin.ttu.edu/student. The student's eRaider user ID and password will be required to view this information.

Late Payment Fee. A \$50 per due date fee will be charged the first working day after the university-established due date. Postmarks will not be considered in assessing this charge.

Late Registration Fee. A \$50 fee will be charged to registrations after classes have begun. This includes reregistration and re-enrollment in the event of cancellation.

Returned Check Charge. A fee will be assessed for each check returned from the bank unpaid. A returned check for initial payment of tuition and fees may result in cancellation of enrollment. Responsibility rests with the student regardless of the maker of the check.

Reinstatement Fee. A \$200 fee will be charged for registering, reregistering, or re-enrolling after the 12th class day (4th class day in summer). The amount of the reinstatement fee is subject to change by action of the Board of Regents without prior notice.

Refund Policy

Students may choose either to have their refund checks mailed to them or to have their funds automatically deposited into their checking or savings account.

Automatic Deposit. Students may have their refund deposited directly into their checking or savings account at the bank of their choice prior to the first class day. The Direct Deposit Authorization form may be obtained from Student Business Services located in the Student Financial Center in 301 West Hall. Forms are also located online at www.sbs.ttu.edu.

Refund Checks. Paper refund checks will be mailed on the first class day. A manual review of each check will take place prior to mailing.

Address selection criteria in the Student Information System permit students to establish the address to which their refund check will be sent. A refund address may be established online at www.techsis.admin.ttu.edu/student. The selection criteria for address printing on the check will be as follows:

- First selection: Refund Address
- Second selection: Local Address
- Third selection: Permanent Legal Address

It is the student's responsibility to maintain a current address in the Student Information System.

Refund Check Replacement Policy. The time period for reissuing a refund check will be 10 business days from the date of the check. This will allow sufficient time for the postal system to forward the check in cases of changed addresses.

Change in Class Schedule. Any refund as a result of class change will be processed and mailed no later than the 35th class day of a fall or spring semester or the 20th class day of a summer term. The class change refund amount will be in accordance with the following:

- **Summer Terms:**
 - 1st class day through 4th class day 100%
 - After the 4th class day None

Withdrawal—Students withdrawing at their request or those who have been withdrawn due to university action may be eligible to receive a refund of paid tuition and fees. The student will be required to pay tuition and fees according to the following schedule:

Before the 1st class day.....	None
1st, 2nd, or 3rd class day	20%
4th, 5th, or 6th class day.....	50%
7th class day or later.....	100%

- **Fall or Spring Semester:**

1st class day through 12th class day	100%
After the 12th class day.....	None

Withdrawal—Students withdrawing at their request or those who have been withdrawn due to university action may be eligible to receive a refund of paid tuition and fees. The student will be required to pay tuition and fees according to the following schedule:

Before the 1st class day.....	None
1st five class days.....	20%
2nd five class days	30%
3rd five class days	50%
4th five class days	75%
21st class day and after.....	100%

Any refund due to a student will be after calculation of the amount of tuition and fees due at the time of withdrawal. If the student has paid less than the amount due at the time of withdrawal, the student will be required to pay the percentage due.

Federal Refund Formula. The federal refund formula requires federal student aid to be refunded at a pro rata basis if a complete withdrawal from the institution occurs before 60 percent of the semester has been completed.

Tuition Rates

Undergraduate Students

Undergraduate students are charged tuition using a modified tuition structure designed to reward students for taking a greater number of semester credit hours. A complete explanation of the plan and its benefits is available at www.sbs.ttu.edu.

Graduate Students

A complete explanation of tuition and fees is available online at www.sbs.ttu.edu.

Law Students

A complete explanation of tuition and fees is available online at www.sbs.ttu.edu.

Residency Status Determination

For rules governing the determination of residency status as defined by the Texas Higher Education Coordinating Board, see www.theccb.state.tx.us/Rules/tac3.cfm?Chapter_ID=21&Subchapter=X.

General Fees

All fees are mandatory and authorized by state statute or the Board of Regents of the Texas Tech University System. Please see the Student Business Services Web site at www.sbs.ttu.edu for a complete list of current fees and amounts.

Academic Fees

- **Laboratory Fee:** Fee charged per lab section.
- **Information Technology Fee:** Per semester credit hour fee used to fund the current information technology infrastructure within the university.
- **Library Fee:** Per semester credit hour fee used to provide continued support for the acquisition and access of materials used for teaching and research.
- **Advising, Retention, and Placement Fees:** Per semester credit hour fees that are college specific and will allow the college to provide enhanced student advising, retention programs, and to provide funding for recruitment of potential employers for students graduating from programs within these colleges. Those charging this fee are the College of Agri-

- cultural Sciences and Natural Resources, the Rawls College of Business, and the College of Engineering.
- **Cultural Activities Fee:** Per semester credit hour fee used to fund all aspects of the presentational elements for the College of Visual and Performing Arts so that all students are able to fully participate in the widely diverse presentations without an additional charge.
 - **Course Fee:** Per semester credit hour not to exceed the cost of materials or services directly associated with the course.
 - **Special Instruction Fee:** Fee charged for one-time cost associated with a particular or special section of a course.
 - **Field Trip Fee:** Fee assessed to students for courses that require travel by students for field trips associated with the course.
 - **Off-Campus Travel Fee:** Set fee that reflects the cost of faculty members traveling off campus to deliver a course.
 - **Auditing Fee:** Students enrolled for fewer than 12 semester credit hours in a semester (6 hours in summer) must pay a fee for the privilege of auditing a course. Written permission from the dean of the college in which the course is being taught and from the course instructor is required. No charge is assessed for enrollment of 12 or more semester credit hours. (Senior citizens 65 years of age and older are exempt from payment of this fee regardless of the number of semester credit hours.)
 - **Law School Deposit:** Each accepted applicant is required to pay a deposit soon after being accepted to hold a place in the class.
 - **Law School Academic Support and Advising Fee:** Per semester credit hour fee for all law school students to provide funds to implement a formal academic support system and to enhance student placement and career services at the School of Law.
 - **Probation/Post Suspension Assistance Fee (XL-Strategies):** Fee that allows the XL: Strategies for Learning Program to offer sections of the non-credit study strategy assistance course required of freshmen on probation and first-return suspension students.
 - **Library Fines:** Fee charged to cover costs ranging from late return fees to lost, stolen, or damaged interlibrary loan books.

Student-Related Fees

- **Student Services Fee:** Per semester credit hour fee to support student services.
- **Student Union Fee:** Per semester fee to support the Student Union.
- **Medical Services Fee:** Per semester fee to support medical services.
- **International Education Fee:** Per semester fee to support international education.
- **Student Recreation Center Fee:** Per semester fee to support Student Recreation Center.
- **Student Transportation Fee:** Per semester credit hour fee to support student transportation.
- **Identification Card Maintenance Fee:** Per semester fee to support identification card maintenance.
- **Identification Card Replacement Fee:** Per semester fee to support replacement of identification card.

Other Fees

- **Intercollegiate Athletic Fee:** Per semester fee to allow students to access the student seating for all home sporting events on a first-come basis.
- **Student Business Services Fee:** Per semester credit hour fee to support the student support areas of the university. Funds the Office of Admissions, Office of the Registrar, Student Business Services and New Student Relations.
- **Application Fee:** Varied fee charged for applications from prospective students.
- **New Student Orientation Fee:** A one-time fee for all incoming freshmen and transfer students to support the cost of orientation.

- **Diploma Replacement Fee:** Fee charged for printing and mailing a replacement diploma.
- **Diploma Insertion Fee:** Fee charged for reapplication for graduation.
- **Duplicate Copy of Registration Fee Receipt:** Fee charged for each duplicate copy of registration fee receipt.
- **Fee for Binding Theses and Dissertations:** Varied fees charged for official copies, personal copies, packets for enclosure and mailing charges.
- **Sponsored International Student Administrative Fee:** A semesterly fee assessed to each international student.
- **Education Abroad Fee:** A flat fee to support the Study Abroad Program.
- **International Student Fee:** A semesterly fee assessed to each non-immigrant international student.
- **Option Fee for Installment Payment of Tuition/Fees:** Service charge for processing and maintenance of the Payment Option Plan.
- **Late Charges on Emergency Loans:** A late fee assessed after the due date for emergency enrollment loans and charged monthly on outstanding emergency loan amounts.
- **Late Payment Fee:** Fee assessed the first working day after the billing due date for tuition and fees.
- **Late Registration Fee:** Fee assessed for registration after the first class day, including registration and re-enrollment in the event of cancellation.
- **Reinstatement Fee:** Fee assessed for registering, reregistering or re-enrolling after the 12th class day (4th class day in summer).
- **Returned Check Charge:** Fee charged for each check or webcheck that is returned from the bank unpaid.
- **Facilities Fee:** Per semester credit hour fee to support the cost of facilities maintenance and renewal at off-campus educational sites. Applies only to those students enrolled in courses at any of the following sites: TTU at Abilene, TTU at Amarillo, TTU at Fredericksburg, TTU at Highland Lakes, and TTU Center at Junction.
- **Parking Fee:** A fee is required for all vehicles parked on campus. A schedule of these fees may be obtained from University Parking Services.
- **Distance Learning/Electronic Instruction Fee:** For non-resident students residing out of state, the fee rate may be an amount not to exceed twice the amount of nonresident tuition. Contact the department offering the course to determine the exact fee.

Please see Student Business Services Web site at www.sbs.ttu.edu for current fee amounts.

General Information

Tuition Rate for Excess Doctoral Hours. Doctoral students registering with 130 or more doctoral hours (150 in the areas of clinical psychology and counseling psychology) will pay out-of-state tuition (full cost of education). These fees may not be waived by virtue of employment or scholarship.

Tuition Rate for Excess Undergraduate Credit Hours. Texas Education Code, Section 54.068, states that a resident student who has attempted 45 semester credit hours in excess of the number of hours required for completion of the degree program in which the student is enrolled may be charged a higher tuition rate not to exceed the rate charged to a nonresident.

Tuition Rebate for Certain Undergraduates. A qualified student is eligible for a rebate of a portion of the undergraduate tuition the student has paid if the student is awarded a baccalaureate degree and has attempted no more than 3 hours in excess of the minimum number of semester credit hours required to complete the degree, including transfer credits and course credit earned exclusively by examination. The amount of tuition rebated is \$1,000 unless the total amount of undergraduate tuition paid by the student awarded the degree was less than \$1,000, in which event the amount of tuition rebated is an amount equal to the amount of undergraduate tuition paid by the student. To qualify, the student must have been

a resident of Texas and entitled to pay tuition required of a resident student at all times while pursuing the degree and submit application prior to graduation. Student Business Services should be contacted for information regarding outstanding student loans and how the rebate will be applied toward them. If the student has an outstanding student loan, including an emergency loan, owed or guaranteed by this state, including the Texas Guaranteed Student Loan Corporation, the amount of the rebate shall be applied to the student's loan. If a student has more than one outstanding loan, the institution shall apply the amount of the rebate to the loans as directed by the student. If the student fails to provide timely instructions on the application of the amount, the institution shall apply the amount of the rebate to the loans according to priorities established by the coordinating board. All application forms must be submitted to Student Business Services prior to the completion of the degree.

Exemptions and Waivers

All exemptions or waivers have been authorized by statute in the Texas Education Code or through action of the Board of Regents of the Texas Tech University System. Texas Tech reserves the right, without notice in this or any other publication, to change, amend, add to or otherwise alter any or all exemptions and waivers subject to and in accordance with actions of the Texas State Legislature and/or the Board of Regents.

Waivers must be submitted no later than the 12th class day of a fall or spring semester or the 4th class day of a summer term. It is the student's responsibility to check the student account prior to the 20th class day to ensure the application of a waiver. **Under no circumstances will waivers be accepted after the 20th class day.**

Texas Tech University reserves the right to apply exemptions and waivers after the census day (12th class day of a fall or spring semester or the 4th class day of a summer term). Also, Texas Tech University reserves the right to audit any exemption or waiver prior to application to a student's tuition and fee account.

- **Academic Common Market:** Exempts nonresident tuition over and above Texas resident tuition rate. Certification by Academic Common Market Coordinator is required.
- **Blind Students:** Exempts a student from payment of all tuition and fees excluding charges for room and board. Certification by the Texas Rehabilitation Commission or the Texas Commission for the Blind is required.
- **Biomedical Research Program—Scholarship Student:** Exempts nonresident tuition. Documentation is required through the Office of International Affairs.
- **Children of Disabled Firemen:** Exempts a student from payment of tuition and required fees. Certification by Texas Higher Education Coordinating Board is required.
- **Children of Disabled Peace Officers:** Exempts a student from payment of tuition and required fees. Certification by Texas Higher Education Coordinating Board is required.
- **Children of Prisoners of War or Persons Missing in Action:** Exempts a student from payment of Texas resident tuition and required fees. Certification by Texas Higher Education Coordinating Board is required.
- **Competitive Scholarship:** Exempts a student from payment of nonresident tuition over and above resident tuition. Student must be awarded a competitive scholarship of at least \$1,000 for the academic year or summer of his enrollment and be either a nonresident or citizen of a country other than the United States. Student must compete with other students including Texas residents and the award must be made through a duly recognized scholarship committee. Certification is sent to Student Business Services from the Financial Aid Office.
- **Deaf Students:** Exempts a student from payment of all tuition and fees excluding charges for room and board. Certification by Texas Rehabilitation Commission or the Texas Commission for the Deaf and Hard of Hearing.
- **Early High School Graduate:** A student graduating prior to September 1, 2003, may be awarded \$1,000 for tuition only. A student graduating after September 1, 2003, may be awarded:
 - A. \$2,000 if the student graduated in less than 36 months (an additional \$1,000 will be awarded if the student also graduated with at least 15 hours college credit).
 - B. \$500 if the student graduated in more than 36 but less than 41 months (an additional \$1,000 will be awarded if the student also graduated with at least 30 hours of college credit).
 - C. \$1,000 if the student graduated in more than 41 months but less than 45 months and also has at least 30 hours of college credit.
- **Economic Development and Diversification Employees, Spouses, and Dependents:** Exempts a student from payment of nonresident tuition. The Texas Higher Education Coordinating Board provides a listing of eligible companies. Students must provide employment certification accordingly.
- **Educational Aide Exemption:** Exempts a student from payment of all tuition and fees except charges for class and laboratory fees. Student must apply for this exemption through the Financial Aid Office with certification provided by the Texas Higher Education Coordinating Board.
- **Faculty Exemption (Teacher or Professor):** Exempts a student from payment of nonresident tuition. Certification by employing department is required.
- **Faculty Dependent (Nonresident Dependent of Teacher or Professor):** Exempts a student from payment of nonresident tuition. Certification by employing department is required.
- **Foster Care:** Exempts a student from payment of tuition and fees. Must be a Texas resident. Certification from Department of Protective and Regulatory Services is required.
- **Good Neighbor (Students from other Nations of the Western Hemisphere):** Exempts a limited number of students from payment of 100% of tuition. Certification through the Office of International Affairs is required.
- **Mexico and Canada Exchange Program:** Exempts a student from payment of nonresident tuition. Certification by the Office of International Affairs is required.
- **Military Personnel and Dependents:** Exempts a student from payment of nonresident tuition. Application must be made through Admissions and Records. Certification by Unit Commander or Unit Personnel Officer is required. A separate certification is required, in original form with original signature, for each semester or term of enrollment.
- **Prisoner of War:** Exempts a student from payment of tuition and required fees. The U.S. Department of Defense must have classified student as a prisoner of war on or after January 1, 1999.
- **Senior Citizens (55 Years of Age and Older):** Exempts a student from payment of up to 6 semester or term credit hours of resident or nonresident tuition. Student must be 55 years of age or older by the first class day. Notification should be given to Student Business Services at time of enrollment.
- **Senior Citizens (65 Years of Age and Older):** Exempts a student from payment of up to 6 semester or term credit hours of resident tuition. Student must be 65 years of age or older by the first class day. Notification should be given to Student Business Services at time of enrollment.
- **TANF Students:** Exempts a student from payment of tuition and fees for the first academic year of enrollment. Certification is required from the Department of Protective and Regulatory Services.
- **Valedictorian (Highest Ranking High School Graduate):** Exempts a Texas resident student from payment of 100% of tuition during both semesters of the first regular session immediately following his or her graduation from high school. Documentation must be provided to Student Business Services.

- **Veterans and Dependents (Hazlewood):** Exempts a student from payment of tuition and fees except the Student Services Fee and Medical Services Fee and charges for class materials paid directly to the department as a reimbursement for materials used in a laboratory setting. Requires Registrar's certification.
 - **Veterans and Dependents (Partial Hazlewood):** Certification by the Registrar's Office is required. The amount exempted will be that amount calculated after the application of federal aid, which the student must utilize first.
 - **Nursing Preceptor Program:** Exempts a student from payment of \$500 of the total amount of resident tuition. Student must be a registered nurse and serving under a written preceptor agreement with an undergraduate professional nursing program as a clinical preceptor or is a child of someone meeting these qualifications.
 - **Graduate Student Tuition/Fee Assistance Program: Teaching Assistant, Research Assistant, Graduate Assistant, Graduate Part-Time Instructor.** Exempts, by Board of Regents action, the student from payment of certain fees. By Board of Regents mandate, appointment must be on or before the 12th class day of the fall or spring semester (4th class day of a summer term) as a benefits-eligible employee with employment of at least one-half time as a TA, RA, GA, or GPTI. For more information see www.gradschool.ttu.edu.
 - **Graduate Student Tuition/Fee Assistance Program: Non-resident State Tuition Exemption— Teaching Assistant, Research Assistant, Graduate Assistant, Graduate Part-Time Instructor.** Exempts a student from payment of certain fees and nonresident tuition over and above the state resident rate. By Texas Education Code and Texas Tech Board of Regents mandate, appointment must be on or before the 12th class day of the fall or spring semester (4th class day of a summer term) in a position that meets the definition of the Texas Tech Pay Plan in work related to the student's degree program. For more information see www.gradschool.ttu.edu.
 - **Benefits-Eligible Medical Services Waiver:** Waives the student from payment of the Medical Services Fee. By Board of Regents mandate, appointment must be on or before the 12th class day of the fall or spring semester (4th class day of a summer term) in a position eligible for state benefits as defined in the Texas Civil Statutes and the Teacher Retirement System of Texas.
 - **Teaching Assistant, Research Assistant, Graduate Assistant, Graduate Part-Time Instructor Dependents:** Exempts a student from payment of nonresident tuition over and above state resident rate. Certification from the employing department is required.
 - **Employee Tuition Assistance Program:** Full-time benefits-eligible employee with one continuous year of Texas Tech employment. Exempts, by Board of Regents action, the student from payment of tuition and fees for three semester credit hours each fall and spring term. By Board of Regents mandate, the student must maintain a 2.25 minimum cumulative GPA, must be in compliance with Texas Tech operating policies regarding employee enrollment and must be admitted to a degree or certification program.
- Estimated expenses for undergraduate students can be found at www.sbs.ttu.edu. For questions or further information, contact Student Business Services at 806.742.3272 (toll free 866.774.9477) or email sbs@ttu.edu.



Student Financial Assistance

Becky Wilson, Director Office of Student Financial Aid

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The Office of Student Financial Aid provides financial assistance in an effective and timely manner to students who would not be able to pursue a higher education without such assistance. The financial assistance offered at Texas Tech 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 cost of attending Texas Tech and the amount of money reasonably available to the student from all sources.

No student or prospective student shall be excluded from participating in or be denied the benefits of any financial aid program at Texas Tech on the grounds of race, color, national origin, religion, or sex. Although qualifications required for each financial aid program may differ, the general requirements for financial assistance at Texas Tech 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.

Types of Assistance. The university participates in the following financial assistance programs:

- Federal Work–Study Program
- Hinson–Hazlewood College Access Loan
- LEAP
- Parent Loans for Undergraduate Students
- Perkins Student Loan
- SLEAP
- Stafford Loans
- State Incentive Grant
- Red Raider Student Employment Center
- Supplemental Educational Opportunity Grants
- Texas B-On-Time Loan
- TEXAS Grant
- Texas Public Education Grants
- Texas Public Education–State Student Incentives Grant
- ACG – Academic Competitiveness Grant
- National SMART (Science and Mathematics Access to Retain Talent) Grant
- PLUS Loans for Graduate Students
- TTU Grant

Application Deadlines. Although no strict deadlines have been established for applications for most financial aid programs at Texas Tech, preference is given to applications completed by April 15 for the fall semester, by October 1 for the spring semester, and by March 1 for the summer session. Applications completed after these dates will be considered, but no guarantee can be given that the funds will be available when needed. Deadline for scholarship applications is February 1.

Scholarship Information. Incoming students can submit applications at www.applytexas.org and current Texas Tech students can submit applications at www.financialaid.ttu.edu for consideration for merit scholarships, college and departmental scholarships, and need-based scholarships. Students may choose to further seek major-specific scholarships by contacting their department or college dean's office.

Merit scholarships offered through the Honors College are awarded to entering freshmen based on SAT and ACT test scores and class rank of top 10 percent. Merit scholarships range in value from \$1,000 to \$12,700 per year. Contact the Honors College at www.honr.ttu.edu for more information on merit scholarships.

College and departmental scholarships are awarded to students from the 10 colleges and more than 100 academic departments at Texas Tech. They are awarded to entering and current students based on major, academics, leadership, community involvement, financial need, or any combination of these factors. College and departmental scholarships range in value from \$200 to \$5,000 per year. For more information on college and departmental scholarships, please contact those offices or go to www.depts.ttu.edu for a Web site listing of departments.

Need-based scholarships are awarded to entering and current students based on financial need, academics, major, leadership, county of residence, or any combination of these and other factors. Need-based scholarships range in value from \$200 to \$2,500 per year. For more information on need-based scholarships, go to www.financialaid.ttu.edu.

Students receiving scholarships from sources outside of Texas Tech University should submit scholarship checks to the following: Texas Tech University Scholarship Office, Box 45011, Lubbock, TX 79409-5011. External scholarships will be credited to tuition and fees and included in financial aid packages.

Academic Requirements for Assistance. Federal regulations require that all financial aid recipients maintain satisfactory academic progress. The guidelines applied in determining satisfactory academic progress are located on the financial aid Web site at www.financialaid.ttu.edu.

Assistance for Graduate Students. A number of fellowships are available for graduate work at Texas Tech, especially for doctoral work. These are usually offered directly through the departments. Many departments also support graduate students through teaching assistantships and research assistantships, both of which must be requested from the department concerned. Some departments also offer tuition scholarships. To enhance assistantship stipends, Chancellor's Fellowships are available to qualified students through departmental nomination.

Applications must be completed and the student must first be accepted by the Graduate School before departments can act on requests for fellowships and assistantships and make Chancellor's Fellowship nominations.

Other fellowships and financial assistance available through the Graduate School include the Cash Family Endowed Fellowships, the James Douglas and Mary Hazlewood Memorial Fellowships, the Helen DeVitt Jones Graduate Fellowships, the Arthur J. Waterman Scholarships, the Health and Social Service Fellowships, the Ronald E. McNair Post-Baccalaureate Achievement Program, Mr. and Mrs. Carl H. Gelin Emergency Loan Fund, and the Junction Summer Scholarship Program.

Competitive Graduate Dean's Summer Research Awards are also available to assist students completing theses and dissertations. See www.ttu.edu/gradschool for details.

Although the university's military service programs do not offer graduate courses or degrees, Texas Tech's departments of Aerospace Studies (Air Force ROTC) and Military Science (Army ROTC) offer commissioning programs for which graduate students may qualify if their graduate studies will extend for three to four full semesters, not including summer school. Students who have successfully completed the Army ROTC Basic Course or who qualify through enlisted service may enter directly into the Advanced Program. Others may qualify by attending a five-week Army ROTC summer camp. There are no prerequisites for taking the Air Force ROTC upper division classes. Financial assistance is available for all qualified students in either program. For further information, inquire directly to the appropriate department.

Housing and Hospitality

Sean Duggan, Managing Director Housing and Residence Life

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T 806.742.2661 | F 806.742.2696
housing@ttu.edu | www.housing.ttu.edu

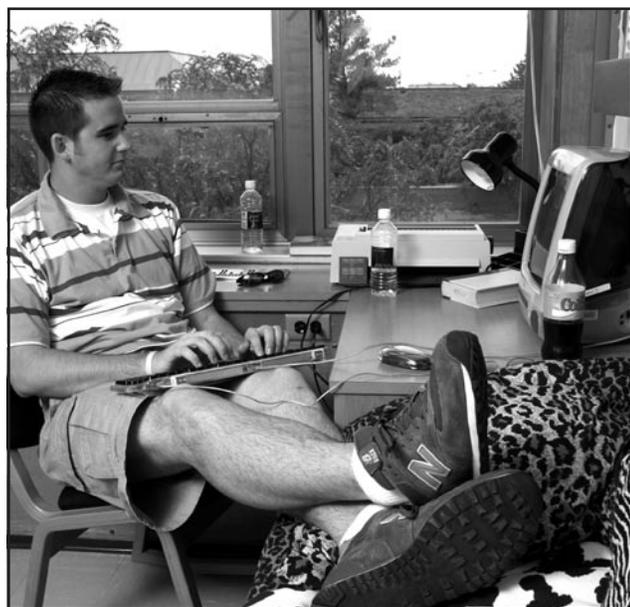
Sam Bennett, Ed.D., Managing Director Hospitality Services

114 Doak Hall | Box 41141 | Lubbock, TX 79409-1141
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hospitality@ttu.edu | www.depts.ttu.edu/hospitality

The Texas Tech residence hall system includes a variety of living options and provides convenient and affordable housing for approximately 6,000 students. Special interest housing (Honors, Intensive Study, Substance-Free, and Learning Communities as well as upperclass-graduate areas) provides students with the opportunity to live with others of similar interests. The Carpenter/Wells Complex, which is arranged in three-bedroom townhouses or four-bedroom flats, offers private bedrooms in an apartment setting. Murray Hall offers suite-style accommodations to men and women. Most suites include four private bedrooms, a common living area, and shared bathrooms. Priority for assignment to Murray Hall will be given to students of sophomore or above classification. Gordon Hall, a suite-style residence, is designated as the Honors College residence hall.

Ethernet computer connections are provided in each room. Other services include basic cable television service, coin-operated laundry and vending machines, and desk services.

An experienced and trained staff of Residence Life Coordinators and Community Advisors manages each residence hall. Each residence hall office provides assistance to residents with concerns, including maintenance requests, room and roommate assignments, and resource information.



The interests of students living on campus are promoted through the Residence Halls Association and individual hall governments. Each hall government sponsors social, cultural, educational, and recreational activities.

Freshman Residency Policy

Students have greater opportunities for a well-rounded educational experience when they live in a supervised residence hall designed for student living. Statistical data indicates that students who reside on campus perform better academically and are more likely to earn a college degree than those who live outside the university environment during their first years. Therefore, the university requires that all students having fewer than 30 hours of academic credit (not including credit by exam or dual credit) prior to the beginning of their first semester, live in the university residence halls. The residency requirement applies to all students registered for six or more credit hours (three or more credit hours during a summer session). However, those students registered for a full-time academic schedule (12 or more hours) will be given assignment priority. Registration for classes may be delayed pending verification of housing. All newly admitted students must either apply for on-campus housing or complete a request for exemption to the residence hall policy.

Requests for exemptions from the freshman residency requirement must be submitted to the Department of Housing and Residence Life no later than May 1 for fall or summer enrollment and November 1 for spring enrollment. Because of unforeseen changes in a student's circumstances such as illness or other personal reasons, some petitions are considered after the above dates. Unless it is clearly established that illness or personal reasons were not known prior to the above dates and necessitate a student's living off campus, students should not expect to be relieved of their residence hall contract. Students are encouraged to discuss such developments with the Department of Housing and Residence Life in Doak Hall. Subject to verification and authorization by the Department of Housing and Residence Life, students who meet one or more of the following criteria may be given permission to live off campus:

1. The student is residing and continues to reside in the established primary residence of her/his parents (legal guardian) if it is within a 60-mile radius of the university. The parents must have established their primary Lubbock residency at least six months prior to the request for an exemption. In order for an exemption to be considered, legal guardianship must have been established by a court of law at least one year prior to a request for an exemption.
2. The student presents sufficient evidence of an extreme financial hardship condition based on guidelines similar to those for Financial Aid.
3. The student is married or has dependent children.
4. The student is 21 years of age or over on or before the first day of classes of the initial semester of enrollment.
5. The student has successfully completed 30 or more semester hours of academic credit before the beginning of the initial semester of enrollment. Credit earned by exam and hours received from concurrent high school hours are not considered.
6. A student is awarded a university scholarship by a department or college, which minimally includes the equivalence of the current academic school year's room, board, tuition, fees, and textbooks (as estimated by the Student Financial Center). Upon prior approval from the awarding department or college, the student may opt to reside on campus or off campus. The department or college awarding the university scholar-

ship (current academic school year's room, board, tuition, fees, and textbooks) should provide verification in writing to the Department of Housing and Residence Life prior to the student's enrollment and/or re-enrollment to the university.

7. The student has served in the active military service as verified by a discharge certificate (DD214).
8. The student presents sufficient evidence of an extreme medical condition, as documented by her/his treating physician for which on-campus accommodations cannot be made.
9. The student presents evidence of an extreme or unusual hardship that will be intensified by living in the residence halls.

In conjunction with the university's support of academic integrity, evidence of deliberate falsification of information, data, or any materials submitted, or providing false or erroneous information in connection with an application for exemption from the freshman residency requirement will be grounds for disciplinary action. Such action may include, but is not limited to, revocation of a previously approved exemption, restitution of up to a semester's room and board fees, or probation, as determined by the Department of Student Judicial Services and in accordance with the Code of Student Conduct of Texas Tech University.

Students sign a Residence Hall Contract for the summer session, the academic year (fall and spring semesters), or 12 months (fall, spring and both summer sessions). Any student wishing to move from the residence halls should consult the Residence Hall Contract for the provisions applicable to cancellation of the contract. Authorization for exemption from the freshman residency requirement does not relieve the student of contractual obligations that may have been assumed with the university for housing in the residence halls.

It is the responsibility of the student to file a change of address form or correct any information regarding place of residence with the Office of the Registrar. Failure to do so will be considered cause for disciplinary action.

Housing Reservations

Residence halls, like all other services and facilities of Texas Tech, are available to all students regardless of race, creed, national origin, age, sex, or disability. Application for admission to the university and application for residence hall accommodations are separate transactions. To apply for housing at Texas Tech, students must first be admitted to the university. Students are encouraged to apply for housing as soon as they are notified of their admission status and receive and activate their eRaider account information. To complete the housing application, go to the Web site www.myhousing.ttu.edu and follow the instructions provided.

Students entering in the fall 2008 semester will have the opportunity to request specific room assignments. This process will begin during fall 2007 after current students have completed room assignment selections for the upcoming year. Spaces that are not reserved by current students will be available during the selection stage for new freshmen and transfer students. For information on the dates that applications are accepted, go to www.housing.ttu.edu.

Students entering the residence halls for the spring semester may only request a residence hall instead of a specific room because it will be necessary to assign these residents to spaces that are made available when a limited number of students vacate space at the end of the fall term. Room assignments for spring applicants will be made to available space based upon the date we receive the completed application. Students should notify the Department of Housing and Residence Life through the housing Web site if cancellation of the application becomes necessary. Information relating to cancellation is included with the contract.

All unclaimed rooms in the residence halls will be declared vacant at 8 a.m. on the first day of classes. Students who enroll at the university but fail to claim their assigned residence hall room will be subject to the cancellation provisions stated in the section "termination of contract during occupancy" of the applicable residence hall contract.

Dining Plans

Hospitality Services provides a wide variety of dining options and dining plans. Dining Bucks Plans can be used in any of the residence dining halls, The Market food court at Stangel/Murdough, the Union Plaza food court, Student Union dining outlets or Sam's Place mini-markets. The five levels of Dining Buck Plans offer students the option of selecting the plan that best fits their individual appetite and needs. For example, the Red and Black or Diamond levels are best for those students who consistently eat three meals per day. These plans also have plenty of flexibility for the student who needs late-night options and will take maximum advantage of the extensive offerings of our mini-markets. The Platinum or Gold levels will appeal to students who eat most meals on campus and who take advantage of the mini-market and late-night offerings. The Silver level is a choice for students who may miss meals for various reasons or who work off campus. The room and board rates listed on this page include the Diamond Dining Bucks Plan.

Dining Bucks allow students the freedom of purchasing complete meals or between-meal snacks. Dining Bucks provide maximum flexibility for both cash operations and all-you-care-to-eat dining halls. Students will receive a preset amount of Dining Bucks per semester and their balance will decline as they purchase meals from any of the all-you-care-to-eat dining locations or food items from cash operations such as The Market food court at Stangel/Murdough, any of Sam's Place mini-markets, or any of the food outlets in the Student Union.

Students who live off campus may purchase a Commuter Dining Plan and eat in any Hospitality Services restaurant on campus. This includes any all-you-care-to-eat dining hall, the five Sam's Place mini-markets, the Market at Stangel/Murdough, the Union Plaza Food Court, and the Student Union food outlets. Students can choose from one of three Commuter Dining Plans and receive a discount when they dine.

Room and Board Rates

Room and board fees are billed on a semester basis and included on the same billing account as tuition and fees. Payments must be made in accordance with the established payment due dates and amounts provided on the billing. If payments are not made by the established due date, a late fee will be assessed. For assistance, contact Student Financial Services at 806.742.3272. For questions about specific charges for room and board, contact Housing and Residence Life at 806.742.2661.

Rates for room and board are based on a per-person charge and are established by the Texas Tech University Board of Regents. **The following room and board rates have been proposed for 2007-08 but are pending approval by the Board of Regents as this catalog goes to press. Rates are subject to change.**

Non-Air-Conditioned Halls*

Bledsoe \$6,394

Air-Conditioned Halls*

Chitwood, Clement, Coleman, Gates, Horn, Hulen, Knapp, Murdough, Sneed, Stangel, Wall, Weymouth..... \$7,310

Air-Conditioned Suites

Gordon (2-bedroom)* \$7,576
Murray (4-bedroom, nine months)** \$8,491
Murray (4-bedroom, twelve months)** \$10,028

Carpenter/Wells Complex**

3-Bedroom townhouse \$8,419
4-Bedroom flat \$8,113

* Rates are for a *double* room and the Diamond Dining Bucks Plan (excluding state and local taxes).

** Rates are for a *single* room and the Diamond Dining Bucks Plan (excluding state and local taxes).

Undergraduate Academics

William Marcy, Ph.D., PE, Provost and Senior Vice President for Academic Affairs

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Students are responsible for their academic progress. All baccalaureate degrees conferred by Texas Tech University are based on the satisfactory completion of specific authorized degree programs comprised of a minimum of 120 semester hours. A student's major subject is the degree program in which he or she is working. The degree programs are offered through the 10 undergraduate instructional colleges of the university and are usually supervised by the departments in each college.

Requirements for undergraduate degrees are established at three different levels:

1. The university as a whole (Uniform Undergraduate Degree Requirements).
2. The college through which the degree is conferred.
3. The particular degree program in which the student is working.

Students should familiarize themselves with all three sets of requirements that must be fulfilled before the degree is granted.

Uniform Undergraduate Degree Requirements

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 one-fourth of the total hours applicable toward the degree sought. In addition, the last 30 hours of coursework must be from Texas Tech. A Texas Tech resident student may apply coursework completed at a distance through the university's Outreach and Distance Education (ODE) office toward a bachelor's degree with prior approval of his or her academic dean. A student who has failed a course taken in residence may take that course or a degree-plan alternative through ODE with prior approval of the academic dean.

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

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 a post-secondary school program, assuming that the program has not changed from the original degree objective. For the student who changes a degree objective after beginning a college career, the degree requirements in effect when the student is officially admitted to the college from which the degree is to be received will be applicable. Only with the specific approval of the 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 catalog is published each summer, and its provisions apply 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 the initial enrollment.

Double Major. A student interested in pursuing a double (dual) major should contact his or her academic dean for specific requirements. A double major will typically require more than 130 hours.

Application for Degree. A candidate should file an application for a degree in the academic dean's office at the time designated by the dean, at least one calendar year prior to graduation. Veterans must file a degree plan by the time they have accumulated 64 semester hours.

Students who file a late application for a degree in the semester or summer session in which they expect to complete the work for a bachelor's degree, but who have less than the number of grade points required for graduation, will be granted only conditional admission to candidacy.

Commencement Exercises. Diplomas are awarded at the end of each semester and the summer terms. Commencement exercises are held at the end of each long semester and at the end of the second summer term. Students may participate only in the commencement exercises that immediately follow completion of their degree.

Second Bachelor's Degree. No second bachelor's degree is conferred until the candidate has completed at least 24 semester hours—exclusive of credit by examination—in addition to the courses counted toward the first bachelor's degree. A second bachelor's degree sought by a student who did not graduate from a public Texas university must include the required Core Curriculum.

Multicultural Requirement

Every student must include at least one 3-hour multicultural course or its equivalent that focuses explicitly on the distinctive subcultures of the United States or on the culture of another society. Completion of a registered "study abroad" course can also fulfill the requirement. Many courses fulfill a Core Curriculum requirement and at the same time satisfy the multicultural emphasis. All students should check with an advisor for appropriate courses. Courses that fulfill the university's multicultural requirement are listed on the next page.

Foreign Language Requirement

Unless the second year of credit in a single foreign language has been received before entrance into the university, one year (or the equivalent) of a single language must be taken at the college level. This can be accomplished, for example, by successful completion of FREN 1502 or 1507. For most programs in the College of Arts and Sciences, sophomore level proficiency is required. International students whose native language is not English and who graduated from a secondary school using primarily their native language may satisfy this requirement by bringing their certificate of graduation to the academic dean's office.

Students who take freshman level courses to satisfy the foreign language graduation requirement may not use those courses to satisfy any other specified university degree requirements. Hours in the required freshman level language courses may count toward free elective hours included in any baccalaureate degree.



The foreign language requirement may be met through credit by examination, described elsewhere in this catalog. Students who petition to complete the foreign language requirement via study abroad through a non-Texas Tech affiliated program must agree to have foreign language credit applied to their degrees based on scores on a language placement test administered by the language laboratory after their return from the study abroad. Approval to do this must be granted *in advance* by the student's associate dean. For more information, consult the Department of Classical and Modern Languages and Literatures.

Core Curriculum

The Core Curriculum is designed to give all graduating students the opportunity to acquire a general knowledge of study areas that have traditionally been regarded as basic to a university education. This general knowledge base requires study in the natural and applied sciences, social sciences, mathematics, humanities, visual and performing arts, and the tools of language and thought. The curriculum complies with 1997 Texas legislation requiring each state-supported institution to establish a "core curriculum...in the liberal arts, humanities, sciences, and political, social, and cultural history."

In addition to the Core, each student must complete at least one 3-hour multicultural course that focuses explicitly on the distinctive subcultures of the United States or on the culture of another society (see previous page). Many courses fulfill Core Curriculum requirements and at the same time satisfy the multicultural emphasis. Students should check with an advisor for appropriate courses.

Students should choose only Core Curriculum courses that follow their degree plans. The following courses have been approved for the Core Curriculum:

A. Communication: 9 hours

1. Written—English rhetoric, composition: 6 hours

The objective of a communication component of a core curriculum is to enable the student to communicate effectively in clear and correct prose in a style appropriate to the subject, occasion, and audience.

TTU Course		TCCNS*
ENGL 1301	Essentials of College Rhetoric	ENGL 1301
ENGL 1302	Advanced College Rhetoric	ENGL 1302

In addition to the 6 hours of composition and rhetoric, a writing-across-the-curriculum requirement includes 6 hours of writing intensive courses in each degree plan (see criteria on page 49).

2. Oral—Speech: 3 hours

Oral communication means the basic skills acquired in speaking and listening effectively and critically.

TTU Course		TCCNS*
CFAS 2300	Communication, Civility and Ethics	
CH E 2306	Exposition of Technical Information	
COMS 1300	Introduction to Communication Studies	SPCH 1311
COMS 2300	Public Speaking	SPCH 1315
COMS 3358	Business and Professional Communication	
MGT 3373	Managerial Communication	
PETR 3308	Engineering Communications	

B. Mathematics: Logic, college-level algebra or equivalent, finite math, statistics, calculus or above: 6 hours (at least 3 must be mathematics)

The objective of the mathematics component of the core curriculum is to develop a quantitatively literate college graduate. Every college graduate should be able to apply basic mathematical tools in the solution of real-world problems.

TTU Course		TCCNS*
AAEC 3401	Agricultural Statistics	
I E 3341	Engineering Statistics	
MATH	All mathematics courses above 1300, except 3430	
MATH	1320 (College Algebra) or MATH 1300 or MATH 1420 (only 1 of the 3); or any math course 1321 or higher, except 3430	MATH 1314
MUTH 3303	Form, Analysis, and Synthesis	
PHIL 2310	Logic	
PHIL 4310	Advanced Logic	
PSY 3400	Statistical Methods	
SOC 3391	Introduction to Social Research I	

C. Natural Science: 8 hours (related 1-hour laboratory course must accompany 3-hour lecture courses)

The objective of the study of the natural sciences component of a core curriculum is to enable the student to understand, construct, and evaluate relationships in the natural sciences, and to enable the student to understand the bases for building and testing theories. (*The natural sciences investigate the phenomena of the physical world.*)

TTU Course		TCCNS*
ANSC 3404	Consumer Selection and Utilization of Meat Products	
ANTH 2300	Physical Anthropology	ANTH 2301**
ANTH 2100	Physical Anthropology Laboratory	ANTH 2101
ASTR 1400	Solar System Astronomy	PHYS 1411
ASTR 1401	Stellar Astronomy	PHYS 1412
ATMO 1300	Introduction to Atmospheric Science	GEOL 1347
ATMO 1100	Atmospheric Science Laboratory	GEOL 1447
		GEOL 1147
		GEOL 1447
BIOL 1305	Ecology and Environmental Problems	BIOL 2306
		BIOL 2406
		ENVR 1301
		ENVR 1401
BIOL 1113	Environmental Problems Lab	BIOL 2106
		BIOL 2406
		ENVR 1301
		ENVR 1401
BIOL 1401	Biology of Plants	BIOL 1411
BIOL 1402	Biology of Animals	BIOL 1413

* See page 18 for an explanation of TCCNS (Texas Common Course Numbering System).

** Does not include lab course.

E. Humanities: 3 hours

The objective of the humanities in a core curriculum is to expand the student's knowledge of the human condition and human cultures, especially in relation to behaviors, ideas, and values expressed in works of human imagination and thought. Through study in disciplines such as literature and philosophy, students will engage in critical analysis and develop an appreciation of the humanities as fundamental to the health and survival of any society. **Any foreign language courses not used to satisfy the foreign language requirement or other Core Curriculum requirements may be used to satisfy the humanities requirement.**

TTU Course

ADM 3312	History and Philosophy of Dress
ANTH 3323	Religion of Culture
ANTH 3325	Anthropological Folklore
ANTH 3346	Ancient Civilizations of Middle and South America
ANTH 3351	Language and Culture
ARCH —	All architecture history courses
CLAS 3302	Classical Mythology
CLAS 3303	Sports and Public Spectacles in the Ancient World
CLAS 3320	The World of Greece
CLAS 3330	The World of Rome
CLAS 3350	Comparative Mythology
C LT 4305	Contemporary Theories of Cultural Meaning
COMS 3311	Rhetoric in Western Thought
COMS 3318	Persuasion and Social Movements
ENGL —	All English courses in literature or linguistics. Excludes courses in technical writing.
ENGR 4392	Engineering Ethics and Its Impact on Society
HIST —	Any history courses not used to fulfill Core Curriculum American history requirement
HONS 1301	Honors First-Year Seminar in Humanities
HONS 3301	Honors Seminar in Humanities
HUM 2301	Introduction to Humanities
HUM 2302	Introduction to Humanities
JOUR 3350	History of American Journalism
LAIS 2300	Latin America and Iberia: An Interdisciplinary Introduction
LAIS 3300	Topics in Latin American and Iberian Studies
LAIS 4300	Seminar in Latin American and Iberian Studies
LARC 3302	Dev. of Landscape Architecture
NHH 1301	The Natural History Tradition
PHIL 2300	Beginning Philosophy
PHIL 2320	Introduction to Ethics
PHIL 2350	World Religions and Philosophy
PHIL 3301	Classical Greek Philosophy
PHIL 3302	Asian Philosophy
PHIL 3303	Modern European Philosophy
PHIL 3304	Existentialism and Phenomenology
PHIL 3320	Introduction to Political Philosophy (POLS 3331)*
PHIL 3322	Biomedical Ethics
PHIL 3324	Philosophy of Religion
PHIL 3332	Feminism and Philosophy
PHIL 4320	Ethics
PHIL 4323	Aesthetics
PHIL 4330	Epistemology
PHIL 4331	Philosophy of Language
PHIL 4340	Metaphysics
POLS 3330	Ancient and Medieval Political Theory

TCCNS

HUMA 1301
HUMA 1302

PHIL 1301
PHIL 2306
PHIL 1304

POLS 3331

POLS 3332
POLS 3333
VPA 3301
W S 2300
W S 3341

W S 4327

W S 4374

Introduction to Political Philosophy (PHIL 3320)*
Modern Political Theory
Contemporary Political Theory
Critical Issues in Arts and Culture
Introduction to Women's Studies
Women in European Civilization (HIST 3341)*
Gender, Race, and Class in U.S. Law (HIST 4327)*
Love, Death, and Magic in Europe 1500–1800 (HIST 4374)*

F. Visual and Performing Arts: 3 hours

The objective of the visual and performing arts in a core curriculum is to expand the student's knowledge of the human condition and human cultures, especially in relation to behaviors, ideas, and values expressed in works of human imagination and thought. Through study in disciplines such as the visual and performing arts, students will engage in critical analysis, form aesthetic judgments, and develop an appreciation for arts as fundamental to the health and survival of any society.

TTU Course

ARCH 1412	Architectural Design Studio I
ARCH 1441	Architectural Delineation I
ARCH 1442	Architectural Delineation II
ART 1302	Design Introduction
ART 1303	Drawing Introduction
ART 1309	Art Appreciation
ART 1310	Art History Survey I
ART 2311	Art History Survey II
DAN 3313	Dance History
DAN 4301	World Dance Forms
EM&C 3308	Visual Communications
HONS 1304	Honors First-Year Sem. in Fine Arts
HONS 2302	Honors Experience in Fine Arts II
HONS 3304	Honors Seminar in Fine Arts
LARC 1401	Landscape Architecture
MUAP 1001	Drawing and Drafting
MUAP 1002	Applied Music Instrument or Voice
MUAP 2001	Applied Music Instrument or Voice
MUAP 2002	Applied Music Instrument or Voice
MUAP 1123	Group Keyboard Instruction I
MUAP 1124	Group Keyboard Instruction II
MUAP 2123	Group Keyboard Instruction III
MUAP 2124	Group Keyboard Instruction IV
MUAP 3205	Jazz Improvisation
MUEN 2100	New Music Ensemble
MUEN 3101	Choir
MUEN 3102	Music Theatre
MUEN 3103	Band
MUEN 3104	Orchestra
MUEN 3105	Jazz Ensemble
MUEN 3106	Small Ensemble
MUEN 3110	Medium Ensemble
MUEN 3201	University Choir
MUEN 3202	Music Theatre
MUEN 3203	Band
MUEN 3204	Orchestra
MUHL 1308	Music Appreciation
MUHL 2301	History of Music (music majors)
MUHL 2302	History of Music (music majors)
MUHL 2308	Heritage of Music
MUHL 2309	Heritage of Music
MUHL 3304	History of Jazz
MUHL 3308	Masterpieces in Music

TCCNS

ARCH 1303
ARCH 1304

ARTS 1311
ARTS 1316
ARTS 1301
ARTS 1313
ARTS 1303
ARTS 1304

MUSI 1114
MUSI 1181
MUSI 1115
MUSI 1182
MUSI 2114
MUSI 2181
MUSI 2115
MUSI 2182

*Cross-listed courses: Cannot receive credit for both courses.

MUHL 3310	History of Rock and Roll
MUSI 2301	Essential Elements of Music
MUTH 1300	Songwriting
MUTH 1303	Elementary Music Theory I
MUTH 1103	Elementary Aural Skills I
MUTH 1304	Elementary Music Theory II
MUTH 1104	Elementary Aural Skills II
SPAN 4392	The Play in Spanish
TH A 2301	Introduction to Acting
TH A 2302	Principles of Acting I
TH A 2303	Theatre Appreciation
TH A 2304	Introduction to Cinema
TH A 4303	Theory and Practice of Playwriting

MUSI 1304
MUSI 1311
MUSI 1116
MUSI 1216
MUSI 1316
MUSI 1312
MUSI 1117
MUSI 1217
MUSI 1317
DRAM 1351
DRAM 1310
DRAM 2366

ANTH 3315	Health, Medicine, and Culture
ANTH 3331	Indians of North America
ANTH 3332	Peoples of Latin America
ANTH 3345	North American Archeology
ANTH 3371	Peoples of the Southwest
ANTH 4372	Society and Culture of Mexico
ARCH 1311	Design, Environment, and Society
ART 3311	Native American Arts
ART 4315	Arts of Pre-Columbian America
COMS 1301	Interpersonal Communication
COMS 2350	Intro. to Communication Disorders
COMS 3313	Persuasion
COMS 3331	Nonverbal Communication
COMS 3332	Intercultural Communication
COMS 3334	Gender and Communication
COMS 3353	Small Group Communication
COMS 3355	Communication in Organizations
COMS 3356	Leadership and Communication
ECO 2301	Principles of Economics I
ECO 2302	Principles of Economics II
ECO 2305	Principles of Economics
EDEL 2300	Schools, Society, and Diversity
EDSE 2300	Schools, Society, and Diversity
ESS 3352	Gender Issues in Sports
ESS 3354	Sport in World Cultures
GEOG 2300	Introduction to Human Geography
GEOG 2351	Regional Geography GEOG 1303 of the World
GEOG 3337	Economic Geography
HDFS 2303	Life Span Human Development
HDFS 2322	Partnering: The Development of Intimate Relationships
HDFS 3301	Theories of Human Development and the Family
HDFS 3321	Human Sexuality Through Family Life Cycle
HDFS 3322	The Family in the Community
HDFS 3331	Parenting
HDFS 3332	Aging in the Family
HLTH 1305	Human Sexuality
HLTH 2302	Environmental Health and Awareness
HLTH 3325	Health Concerns in Chemical Dependencies
HONS 1303	Honors First-Year Seminar in Social Studies
HONS 3303	Honors Seminar in Social Sciences
I E 3301	Engineering Economic Analysis
I E 4361	Engineering Design for People
JOUR 4330	Public Opinion and Propaganda
MCOM 1300	Intro. to Mass Communication
NS 4380	Cultural Aspects of Food
PFP 3301	Financial Planning for Young Adults
PHIL 3321	Philosophy of Law
PHIL 3331	Philosophy of Social and Human Sciences
POLS 3326	Women in Politics
POLS 3341	The Administrative Process
POLS 3351	The Judicial Process
POLS 3361	International Politics
POLS 3371	Comparative Politics
PSY 1300	General Psychology
PSY 2301	Child Psychology
PSY 3398	Ethnic Minority Psychology
PSY 4300	Psych. of Human Sexual Behavior
PSY 4325	Drugs, Alcohol, and Behavior

ARCH 1311

SPCH 1318

ECON 2302

ECON 2301

GEOG 1302

PSYC 2311

PSYC 2312

PSYC 2314

PSYC 2306

SOCI 2306

COMM 1307

PSYC 2301

PSYC 2308

PSYC 2309

PSYC 2310

G. Social and Behavioral Sciences: 15 hours

The objective of a social and behavioral science component of a core curriculum is to increase the student's knowledge of how social and behavioral scientists discover, describe, and explain the behaviors and interactions among individuals, groups, institutions, events, and ideas. Such knowledge will better equip students to understand themselves and the roles they play in addressing the issues facing humanity.

1. U.S. History: 6 hours

Under state law all students who receive bachelor's degrees from Texas Tech University must complete 6 hours in American history. Students will normally fulfill this requirement by completing HIST 2300 and 2301. However, this requirement may be satisfied by juniors and seniors by completing any 6 hours from among the American history courses listed under the Department of History portion of the catalog. Also, 3 semester hours of Texas history, HIST 3310, may be substituted for 3 of the American history hours.

TTU Course

HIST 2300	History of the U.S. to 1877
HIST 2301	History of the U.S. Since 1877
HIST 3310	History of Texas
W S 3323	History of Women in America (HIST 3323)*

TCCNS

HIST 1301
HIST 1302

2. Political Science: U.S. and Texas – 6 hours

Under state law all students must have received credit for 6 semester hours in political science, covering the federal and Texas constitutions. Students will normally fulfill this requirement by completing POLS 1301, which is a prerequisite for all other political science courses, and POLS 2302. If a student earns AP credit for a grade of A or B in POLS 1301, he or she may substitute in place of POLS 2302 one of the upper-level courses marked with an asterisk in the course list under the Department of Political Science portion of the catalog. (Permission of the instructor may be required for such substitution.)

TTU Course

POLS 1301	American Government, Organization
POLS 2302	American Public Policy

TCCNS

GOVT 2301
GOVT 2305
GOVT 2302
GOVT 2306

3. Individual or Group Behavior: 3 hours

AAEC 2305	Fundamentals of Agricultural and Applied Economics
ADRS 3325	Family Dynamics of Addiction and Recovery
ADV 4313	International Advertising
ANTH 1301	Understanding Multicultural America
ANTH 2301	Introduction to Archeology
ANTH 2302	Cultural Anthropology
ANTH 3305	Anthropological Linguistics
ANTH 3306	Women in Culture and Society

AGRI 2317

ANTH 2302
ANTH 2351

*Cross-listed courses: Cannot receive credit for both courses.

PSY 4330	Psychology of Life Span Development and Aging	
SOC 1301	Introduction to Sociology	SOCI 1301
SOC 1320	Current Social Problems	SOCI 1306
SOC 2331	The Sociology of Marriage	SOCI 2301
SOC—All sociology advanced courses except SOC 3391 and 4395		
S W 2301	Introduction to the Social Welfare Institution	SOCW 2361
S W 3311	Human Behavior and the Social Environment I	
W S 1305	Human Sexuality (HLTH 1305)*	
W S 2331	Sociology of Marriage (SOC 2331)*	
W S 3306	Women in Culture and Society (ANTH 3306)*	
W S 3312	Gender and Communication (COMS 3334)*	
W S 3321	Human Sexuality Through Family Life Cycle (HDFS 3321)*	
W S 3325	Gendered Lives (SOC 3325)*	
W S 3326	Women in Politics (POLS 3326)*	
W S 3331	Sociology of the Family (SOC 3331)*	
W S 3337	Inequality in America (SOC 3337)*	
W S 4302	Psychology of Human Sexual Behavior (PSY 4300)*	
W S 4399	Women's Studies Seminar	

*Cross-listed courses: Cannot receive credit for both courses.



Academic Regulations

Classification of Students. An undergraduate student is classified according to the following: freshman, 0 to 29 hours completed; sophomore, 30 to 59; junior, 60 to 89; senior, 90 to completion of degree requirements. The junior and senior ranks 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 freshman may have remedial courses (numbered 0301 or 0302) counted as part of a full course load although these courses do not count toward a degree.

All baccalaureate degrees conferred by Texas Tech University are based on the satisfactory completion of specific authorized degree programs comprised of a minimum of 120 semester hours. Students are considered to be making satisfactory progress toward a degree objective when they complete at least 30 credit hours in each calendar/academic year, achieve a GPA of 2.00 or higher in each semester, and maintain an overall GPA 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 maximum number of semester hours a student may take without specific permission of the academic dean is as follows: 19 hours per long semester, 16 hours per long semester for students on scholastic probation, and 8 hours per summer term. In determining a greater load, the dean considers the quality of scholastic work performed by the student, the types of courses involved, the student's health, and extracurricular interests and activities.

Quarter Hour Conversion. Quarter credit hours are converted to semester credit hours by multiplying the number of quarter hours by two-thirds (or .67). Since a fraction of a credit hour cannot be awarded, the remaining fraction of semester hour credit is rounded to the nearest whole number from the tenth's position of the decimal.

For example, 5 quarter hours are equivalent to 3.4 semester hours, which in turn would be rounded to 3 semester hours of credit: 5 quarter hours x .67 = 3.4 semester hours = 3 semester hours. Applicability of transfer credit towards degree requirements at Texas Tech University will be at the discretion of the student's academic dean.

Enrollment in One of the Colleges or Schools. Each student accepted for admission will enroll in one of the following colleges or schools of the university: Agricultural Sciences and Natural Resources, Architecture, Arts and Sciences, Business Administration, Education, Engineering, Honors, Human Sciences, Mass Communications, Visual and Performing Arts, Law, or Graduate. The student should consult the dean of the college or school whenever any question arises concerning academic status. Matters specifically requiring the dean's approval include:

- Concurrent enrollment
- Pass-fail option
- Credit by examination
- Withdrawal and honorable dismissal from the university
- Graduation requirements and candidacy for a degree
- Applicability of transfer credits to degree programs

Dropping a Course. Dropping a course delays graduation. Students should plan their schedules and make a serious commitment to academic success. When it becomes necessary to drop a course, the procedure varies according to the following:

1. Undergraduate and Graduate Students Entering Before Fall 2004

Students who entered Texas Tech before fall 2004 may officially drop a course through the 45th class day of a long semester or the 15th class day of a summer term and receive

the grade of W regardless of their progress in the class. The student must initiate the drop by following the procedures listed at www.techsis.admin.ttu.edu/student. Further information can be obtained at 806.742.3661.

2. First-Time Freshmen and Transfer Students Entering Fall 2004 or Thereafter

- **First-time freshmen** entering in the fall of 2004 or thereafter have four W's permitting them to drop a maximum of four courses during their time at Texas Tech. Any student who entered as a first-time freshman and did not drop a course during the pursuit of a degree may take one course without paying institutional tuition (as opposed to state tuition) during the last semester of that degree program.
- **Transfer students** have three W's permitting them to drop a maximum of three courses.
- Students may use their limited drops (W's) up to the 45th class day of the long semester and the 15th class day of the short summer terms. Students must initiate a drop by following the procedures listed on the Web for Students at www.techsis.admin.ttu.edu/student. Further information can be obtained at 806.742.3661.
- The student-initiated drop/add period at the start of the term lies outside these limits in regard to the number of drops.
- After all W's have been used by a student who was either a first-time freshman (4 drops) or a transfer (3 drops) entering in the fall of 2004 or thereafter, the student must complete all courses taken and receive a grade.
- Students who find it necessary to withdraw completely from the university before the end of the semester will not have to use their W's for withdrawal. See Operating Procedure (OP) 34.05.

Change of College. Students who wish to transfer from one college of the university to another should contact the academic dean of the college to which they plan to transfer to ensure that they can meet all enrollment requirements. Students should then complete an academic transfer form in the receiving dean's office. The last day to change colleges is the first day of open registration for the next semester.

Change of Address. Each student is responsible for maintaining his or her correct address on file in the Office of Admissions and Records. Change of address forms are available in that office, and other campus departments will be notified when such a form is filed. Students required by the housing residence rules to live on campus may not move off campus during the semester without approval from the Department of Housing and Residence Life.

Administrative Holds. Failure to meet certain university obligations may result in an administrative hold being placed on a student's access to such university procedures as registration, release of transcripts, and course add/drops.

Administrative holds may be placed on a student's record until resolution of such problems as an outstanding debt to the university, disciplinary action, academic suspension, incomplete admission forms or substandard test scores. It is the student's responsibility to get the hold released, which can be accomplished by meeting the requirements of the department placing the hold. Status of holds on student records may be obtained online at www.techsis.admin.ttu.edu/student.

Class Attendance. Responsibility for class attendance rests with the student. Instructors set an attendance policy for each course they teach. The university expects regular and punctual attendance at all scheduled classes, and the university reserves the right to deal at any time with individual cases of nonattendance. Instructors should state clearly in their syllabi their policy regarding student absences and how absences affect grades. Excessive absences constitute cause for dropping a student from class.

In the event of excessive absences, the student must visit the instructor to discuss his or her status in the course. If the drop

occurs before the 45th class day of the long semester or the 15th class day of the summer term, the instructor will assign a grade of W (see sections on dropping a course and on withdrawal). If the drop occurs after that time period, the student will receive a grade of F. This drop can be initiated by the instructor but must be formally executed by the academic dean. In extreme cases the academic dean may suspend the student from the university.

Department chairpersons, directors, or others responsible for a student representing the university on officially approved trips should notify the student's instructors of the departure and return schedules in advance of the trip. The instructor so notified must not penalize the student, although the student is responsible for material missed. Students absent because of university business must be given the same privileges as other students (e.g., if other students are given the choice of dropping one of four tests, then students with excused absences must be given the same privilege).

Reporting Illness. In case of an illness that will require absence from class for more than one week, the student should notify his or her academic dean. The dean's office will inform the student's instructors through the departmental office. In case of class absences because of a brief illness, the student should inform the instructor directly. Other information related to illness is found in the *Student Handbook* and the *Residence Halls Handbook*.

Absence Due to Religious Observance. A student may be excused from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused for this purpose may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused.

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 students to present as their own any work that they have not honestly performed is regarded by the faculty and administration as a serious offense and renders the offenders liable to serious consequences, possibly suspension.

The instructor in a course is responsible for initiating action for dishonesty or plagiarism that occurs in his or her class. In cases of convincing evidence of or admitted academic dishonesty or plagiarism, an instructor should take appropriate action. Before taking such action, however, the instructor should attempt to discuss the matter with the student. If cheating is suspected on a final exam, the instructor should not submit a grade until a reasonable attempt can be made to contact the student, preferably within one month after the end of the semester. See the section on "Academic Conduct" in the *Code of Student Conduct* for details of this policy.

"Scholastic dishonesty" includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

"Cheating" includes, but is not limited to, the following:

1. Copying from another student's test paper.
2. Using materials during a test that have not been authorized by the person giving the test.
3. Failing to comply with instructions given by the person administering the test.
4. Possessing materials during a test that are not authorized by the person giving the test, such as class notes or specifically designed "crib notes." The presence of textbooks constitutes a violation only if they have been specifically prohibited by the person administering the test.
5. Using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program.

6. Collaborating with or seeking aid or receiving assistance from another student or individual during a test or in conjunction with an assignment without authority.
7. Discussing the contents of an examination with another student who will take the examination.
8. Divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructor has designated that the examination is not to be removed from the examination room or not to be returned to or kept by the student.
9. Substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment.
10. Paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program, or information about an unadministered test, test key, homework solution, or computer program.
11. Falsifying research data, laboratory reports, and/or other academic work offered for credit.
12. Taking, keeping, misplacing, or damaging the property of the university, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct.

“Plagiarism” includes, but is not limited to, the appropriation of, buying, receiving as a gift, or obtaining by any means material that is attributable in whole or in part to another source, including words, ideas, illustrations, structure, computer code, other expression and media, and presenting that material as one’s own academic work being offered for credit. Any student who fails to give credit for quotations or for an essentially identical expression of material taken from books, encyclopedias, magazines, Internet documents, reference works or from the themes, reports, or other writings of a fellow student is guilty of plagiarism.

“Collusion” includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

“Falsifying academic records” includes, but is not limited to, altering or assisting in the altering of any official record of the university, and/or submitting false information or omitting requested information that is required for or related to any academic record of the university. Academic records include, but are not limited to, applications for admission, the awarding of a degree, grade reports, test papers, registration materials, grade change forms, and reporting forms used by the Office of the Registrar. A former student who engages in such conduct is subject to a bar against readmission, revocation of a degree, and withdrawal of a diploma.

“Misrepresenting facts” to the university or an agent of the university includes, but is not limited to, providing false grades or resumés; providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment for the purpose of obtaining an academic or financial benefit for oneself or another individual; or providing false or misleading information in an effort to injure another student academically or financially.

Civility in the Classroom. Students are expected to assist in maintaining a classroom environment that is conducive to learning. To ensure that all students have the opportunity to gain from time spent in class, faculty members are encouraged to include a statement in their course syllabi relating to behavioral expectations in the classroom.

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 approval of the student’s dean.

The instructor of record determines all grades for a course. The method of determining a grade will be included in the course syllabus presented to students at the beginning of the semester.

The grades used, including plus and minus, with their interpretations, are A, excellent; B, good; C, average; D, inferior (passing, but not necessarily satisfying degree requirements); F, failure; P, passing; PR, in progress; I, incomplete; and W, withdrawal. The letter R designates a course repeated to remove an I. The grade of PR is given only when the work in a course extends beyond the semester or term; it implies satisfactory performance and is used primarily in individual study courses. The grades of CR (credit) and NC (no credit) are given in certain instances.

The grade of I is given only when a student’s work is satisfactory in quality but, due to reasons beyond his or her control, has not been completed. It is not given instead of an F. Prior to assigning the I, the instructor must fill out a form provided on the Web for Faculty stating the reasons beyond the student’s control for granting the I and the conditions to be met to remove the I. Both the student and faculty member must sign the form. The I may be replaced by an R if the course is repeated, and the appropriate grade will be given for the second registration. The grade of I will revert to an F after one calendar year if the conditions for completing the I as stated on the form have not been met.

For students who entered Texas Tech prior to fall 2004, a grade of W will be given for a course officially dropped through the 45th class day of a long semester or the 15th class day of a summer term. Regardless of a student’s grade status at the time a course is dropped, only a W will appear on the student’s records.

First-year freshmen entering Texas Tech in the fall of 2004 or thereafter will be allowed only four W’s to be used at any time during their college career to drop a course through the 45th class day of a long semester or the 15th class day of a summer term.

Transfer students entering in the fall of 2004 or thereafter will be allowed only three W’s. Regardless of a student’s grade status at the time a course is dropped, only a W will appear on the student’s records. When a student who entered Texas Tech in the fall of 2004 or thereafter has used all allotted W’s, the student must complete every course taken and receive a grade.

An NP is given if the student has not paid certain fees by the end of the semester. If the student subsequently pays the fees, Student Business Services will notify the registrar, who will then record the academic grade earned.

When a faculty member determines according to Part II B 2 of the *Student Handbook* that academic dishonesty has occurred and assigns a grade of F for the course, the grade of F will stand as a final grade, notwithstanding a subsequent withdrawal from the course by the student. A faculty member shall notify the registrar of the intention to assign a grade of F for the course, in addition to the notifications of the department chairperson and the student’s academic dean, as provided in Part II B 2 of the *Student Handbook*.

Grade Appeals. A student who wishes to appeal a final course grade should first consult with the course instructor, then with the department chairperson, and then, if the matter remains unresolved, with the dean of the college in which the course is offered. A grade appeal must be filed in the office of the dean of the college in which the course is offered within 45 days of the start of the next long semester after the term in which the disputed grade was received. Copies of the grade appeals policy can be obtained from any academic dean’s office or from the Center for Campus Life.

Semester Grade Reports. At the close of each semester and each summer term, final course grades are available on the Texas Tech student Web site or as a hard copy. Students wishing to receive a hard copy should update their grading address on the student Web site.

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 assigned grade points.

Grade Point Averages. Only courses taken and grades received at this university are used in calculating grade point averages. The current grade point average 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 grades such as W, I, P, CR, and PR are received. In the same manner, the cumulative grade point average is obtained by dividing the total number of grade points earned in all courses for which the student has registered at this university, including hours for an F, by the total number of semester hours.

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.

Grade Replacement Policy. Students may apply to the registrar for grade replacement after a Texas Tech course has been retaken at Texas Tech and prior to their graduation. The grade replacement is for the purpose of providing an adjusted grade point average. The cumulative adjusted GPA will be posted on the bottom of the student's transcript. A notation will indicate the original course that is being replaced. The original grade and original cumulative GPA will remain. The cumulative (not the adjusted) GPA will be used for honors designation.

The most recent passing grade will replace all previous grades in that course. First-time freshmen and transfer students who entered Texas Tech in the fall of 2004 or thereafter will not be allowed to repeat a course in which they have earned a grade of C or above. When students repeat a course after having received a grade of D or F, they can repeat the course for credit only one time at the normal tuition rate. Students repeating a course more than once after having received a grade of D or F must pay an additional fee.

A student placed on academic suspension or probation at the end of the semester will not be removed from suspension on the basis of grade replacements that can be or are made after the semester grades are reported. However, a suspended student who attains an adjusted GPA of 2.0 or higher after official grades have been submitted and academic status has been determined may be allowed to attend Texas Tech upon appeal to the academic dean.

After the current semester academic procedures have been completed, students can initiate a grade replacement by obtaining an application in the Office of the Registrar or online at www.depts.ttu.edu/registrar.

Students may apply after the passing grade is received in the replacing course. Students wanting to replace a grade received before fall 1983 should contact their academic dean's office.

Pass-Fail Option. Undergraduate students may take up to 13 elective semester hours toward satisfying degree requirements in which they will be graded on a pass-fail basis. Courses specified in the catalog as available only with pass-fail grading and courses taken in excess of degree requirements are not included in the 13-hour restriction. Freshman Seminar (I S 1100) cannot be taken pass-fail.

A college may further restrict the pass-fail option but may not broaden it beyond elective courses. No student on probation will be allowed the pass-fail option. The names of students taking a course pass-fail will not be made known to the instructor.

Students wishing to take a course pass-fail should contact the academic dean's office of the college in which they are enrolled. Students must declare their intent to take a course pass-fail no later than the last day on which a W is automatically given for courses dropped. A student who has chosen to take a course pass-fail may not subsequently change to a letter grade option. A grade of F received on a course taken pass-fail will be computed into the grade point average.

An exception to the above-stated rules applies to students who have had two years of one foreign language in high school and who enroll in the same foreign language at the 1501 level even though a 1507 course is available. Those students taking the 1501 course are required to take it pass-fail.

Courses taken in the declared major or minor shall not be taken by pass-fail unless required by the department. The department of the major or minor will decide whether courses taken under the pass-fail system, before a student has declared a major or minor, shall count toward satisfying the degree requirements.

University students may take elective courses through Outreach and Distance Education (ODE) on a pass-fail basis under the same regulations governing resident students. ODE must receive the pass-fail form, signed by the student's dean, before the first course lesson may be submitted. Once a lesson has been submitted, a student cannot switch from the pass-fail option to a letter grade option. Students enrolling in ODE college courses must adhere to the provisions outlined in the *Undergraduate/Graduate Catalog* concerning the Texas Success Initiative (formerly known as TASP). For additional TSI information, contact the Texas Success Initiative Office in Admissions, 116 West Hall.

Administration Building / Memorial Circle



Credit by Examination for Matriculated Students. Matriculated students may be given the opportunity to receive credit by special examination in courses in which proficiency may be determined by examination. Credit earned by examination is the same as credit earned by successfully passing the equivalent Texas Tech course. A grade of Pass (P) will be given to those students earning course credit by examination, but no credit by exam will be recorded until a student officially completes 12 credit hours at Texas Tech. For more detailed information, see “Undergraduate Credit by Examination” in the Admission to the University section of this catalog.

Writing Intensive Course Requirement. Each degree program will include six hours of writing intensive coursework in the specific area of study. The fundamental premise of a writing intensive course is that students will write often. Furthermore, student writing will be critiqued by the instructor, and the student will rewrite, based on that critique.

The writing intensive course emphasizes the process as well as the products of writing. Faculty use writing to reinforce learning. Students write to formulate ideas, raise questions, and express considered opinions. Students write to analyze, integrate, and synthesize as well as to communicate.

Graduation Requirements. Graduation requirements include a minimum adjusted or cumulative GPA of 2.0 for all courses, including repeated courses, attempted in the degree program in which students seek graduation. To obtain a degree granted by the university, at least 25 percent of the total semester credit hours must be earned through instruction offered by Texas Tech University.

Graduation Rates. Federal regulations require that the university disclose graduation rates for men and women who are full-time, degree-seeking undergraduate students. Disclosure of graduation rates for various student populations, including athletes, is also required. These are the same rates as those supplied by Texas Tech to the National Collegiate Athletic Association. Detailed graduation rates are available from the Office of Communications and Marketing.

Withdrawal from the University. Students who find it necessary to withdraw from the university before the end of a semester or summer term must apply to the Office of the Registrar in 103 West Hall. Students under the age of 18 should first consult their parents and secure from them a written statement that they have permission to withdraw. Although a W will be recorded for all classes that semester or term, these W's will not be counted as one of the four W's permitted for first-time freshmen or one of the three W's permitted for transfer students who entered in the fall of 2004 or thereafter.

A student who withdraws from a residence course with a grade of W may complete the course through the Division of Outreach and Distance Education (ODE) by registering for correspondence work, provided the course is regularly offered through ODE and provided the instructor who taught the residence course is assigned as the instructor.

International students must receive clearance from the director of International Programs as a part of the withdrawal procedure.

Undergraduate Honors

Honor Rolls. Full-time undergraduate students who earn a grade point average of 4.0 during a semester are eligible for the President's Honor Roll. Those who earn a GPA of 3.5 or higher during a semester are eligible for the Dean's Honor List of the college in which they are enrolled during that semester. For these acknowledgments, students must be enrolled for at least 12 hours, excluding any courses that are graded pass-fail.

Students taking between 7 and 11 hours and enrolled in the South Plains College (SPC) Spanish courses taught on the TTU campus (SPCS 1501, 1502) may count the SPC hours to accumulate enough hours to qualify for the President's Honor Roll and the Dean's Honor List if they would otherwise qualify for those hon-

ors without the SPC courses. The SPC grades are not sufficient to advance students to qualify for the President's or Dean's list, but the courses can be used to acquire the necessary number of hours (minimum of 12) to qualify and thus keep the student eligible.

Graduation with Honors. Members of a graduating class who complete their work with a cumulative grade point average of 3.9 or above are graduated *Summa Cum Laude*; those who complete their work with a GPA of 3.7 to 3.89 are graduated *Magna Cum Laude*; and those who complete their work with a GPA of 3.5 to 3.69 are graduated *Cum Laude*. Appropriate designation of the honor is made on the diploma and on the commencement program. No person is considered for graduation honors unless at least one-half of the degree credit has been completed at this institution, and that half must include the senior year. Only grades earned at Texas Tech are counted, and only the cumulative GPA is used to calculate honors.

Those who graduate from the Honors College after acquiring at least 24 Honors credit hours (including two Honors seminars) graduate with “Honors,” a distinction that is noted on diplomas and transcripts and receives special recognition at graduation ceremonies. Those who also complete a senior thesis consisting of 6 additional hours graduate with “Highest Honors.”

Honors Studies. Honors courses are available to students in all undergraduate colleges. Interested students should consult the dean of the Honors College or their college advisors.

Texas Tech offers one of the best honors programs in the nation for highly motivated and academically talented students who want to maximize their college education. Students must make special application to be considered for admission to the Honors College either as an entering freshman or as a continuing Texas Tech or transfer student. With the exception of those in the natural history and humanities major and the arts and letters major, students accepted into the Honors College are also enrolled concurrently in the college that houses their major area of study.

Honor Societies and Organizations. The honorary societies listed here represent more than 20 university organizations open to undergraduates who qualify as a result of their academic achievements. To view a comprehensive listing of all honorary societies at Texas Tech, visit www.depts.ttu.edu/centerforcampuslife/StuOrg/

- **Phi Beta Kappa** — Eligibility is limited to upper-division students with outstanding records of achievement in what the Phi Beta Kappa Society designates as the liberal arts and sciences. Phi Beta Kappa is the oldest honorary society in America and has only three chapters at public universities in Texas.
- **Mortar Board** — Mortar Board is a national honor society that recognizes college seniors for distinguished ability and achievement in scholarship, leadership, and service. The Texas Tech chapter is limited to 50 of the top seniors on campus, and members are chosen each spring.
- **Omicron Delta Kappa** — Omicron Delta Kappa is a national leadership honor society in which student membership candidates must rank in the upper 35 percent in scholarship of their school or college and must show leadership in at least one of five areas: scholarship; athletics; campus or community service, social and religious activities, and campus government; journalism, speech, and the mass media; and creative and performing arts.
- **Phi Kappa Phi** — The Honor Society of Phi Kappa Phi is the nation's oldest all-discipline honor society. Membership is by invitation only to the top 7.5 percent of second semester juniors and the top 10 percent of seniors and graduate students.
- **National Society of Collegiate Scholars** — The National Society of Collegiate Scholars is an honors organization recognizing outstanding academic achievement among first- and second-year students who rank in the top 20th percentile of their class and have a minimum GPA of 3.4. Chapters are involved in service to their campus and local communities as well as scholastic and social activities.

- **Honor Societies for Freshmen** — Alpha Lambda Delta and Phi Eta Sigma are national honor societies that recognize scholastic attainment during the freshman year. Membership is offered to students who earn a grade point average of at least 3.50 during the first semester of their freshman year while completing at least 12 semester hours of coursework. Students who do not qualify during the first semester may become eligible by earning a grade point average of at least 3.50 for the first two semesters of work combined.

Undergraduate Academic Status Policy

Good Standing, Probation, Suspension

Texas Tech University has four possible academic status levels for students:

1. Academic Good Standing — The student has an adjusted GPA at or above 2.0 and is eligible for all extracurricular activities as governed by the rules of the specific activity. Some academic and extracurricular programs have requirements over and above the adjusted GPA of 2.0. Students who have an adjusted GPA above 2.0 but whose current semester GPA is below 2.0 should seek advice from their academic dean. Cumulative GPA will determine academic status for those students without an adjusted GPA.

2. Academic Probation. A student whose adjusted GPA falls below 2.0 will be placed on “academic probation.” Such a student may not enroll for more than 16 hours without prior approval of the academic dean. In addition, the student must continue to seek regularly scheduled advice and counsel from an academic advisor or the dean. Any freshman whose semester GPA is below 2.0 in his/her first semester must complete XL 0201, Strategies for Learning, the next semester and pay a nonrefundable course fee. A student on academic probation remains eligible for all extracurricular activities as governed by the rules of the specific activity.

3. Continued Academic Probation. A probationary student whose current GPA is 2.0 or higher but whose adjusted GPA is below 2.0 will be placed on “continued academic probation” until the adjusted GPA is 2.0 or higher. A student remains eligible for all extracurricular activities as governed by the rules of the specific activity subject to the conditions established by the academic dean or committee granting permission to attend classes. Failure to meet the conditions established will result in **academic suspension**.

4. Academic Suspension. A probationary student who has a current and an adjusted GPA below 2.0 at the end of a fall and spring semester will be on suspension unless grade replacements for courses completed at that time raise the adjusted GPA above 2.0. The student must initiate grade replacements in the Registrar’s Office. Any courses that are completed after probation or suspension status has been determined for a particular semester will not alter that probation or suspension. A suspended student who attains an adjusted GPA of 2.0 or higher after official grades have been submitted and academic status has been determined may be allowed to attend Texas Tech upon appeal to the academic dean.

A student on academic suspension is not permitted to take classes and is ineligible to participate in any extracurricular activities once the suspension is posted. If the circumstances that resulted in the suspension are mitigating, an appeal may be directed to the appropriate academic dean or committee. The student is ineligible to participate in extracurricular activities during the appeal process. If the appeal results in granting the student permission to attend classes, then the student will be reinstated and placed on continued academic probation until the student meets the conditions established by the academic dean or committee granting the appeal and/or achieves an adjusted GPA at or above 2.0.

Reinstatement, Readmission After Suspension

Students wishing to return to the university after suspension will be treated as former students for reinstatement purposes and must provide copies of transcripts for all academic work completed at institutions other than Texas Tech. Application materials and deadlines for former Texas Tech students are available at www.depts.ttu.edu/formertech.

Reinstatement granted after suspension will be probationary, and students who apply for reinstatement after suspension will be required to undergo any testing and/or counseling considered necessary by the academic dean.

Conditions of Return from a First Academic Suspension.

Students on academic suspension may seek reinstatement after a minimum of one semester. Both summer terms are considered to be a semester for the purpose of serving a suspension. Students who are reinstated after first suspension will be required to complete XL 0201 Strategies for Learning successfully during their first semester of reinstatement and pay a nonrefundable course fee (see www.depts.ttu.edu/passxl). Attendance in XL 0201 is mandatory from the first day of classes. Absences accumulate from the beginning of the semester. Three absences will result in a student being withdrawn from the university.

Students who are reinstated from a first suspension and desire to change colleges to pursue a different major or career goal must (1) contact the associate academic dean of the college to which they desire to transfer and ensure they meet enrollment requirements, (2) complete an academic transfer form in the receiving dean’s office, and (3) complete the process by the last day to change colleges, which is the first day of open registration for the next semester.

Subsequent Suspensions and Conditions of Return. Students who have received more than one suspension may seek readmission after two semesters. Both summer terms are considered to be a semester for the purpose of serving a suspension. A student’s academic dean must approve readmission after the student has been suspended for a second or subsequent time. Readmission is rare and solely at the discretion of the academic dean. Permission to change colleges following a second or subsequent suspension is granted infrequently, only when good cause has been shown, and then by agreement of the deans of both affected colleges.

If a student is readmitted following a second or subsequent suspension, the student must meet with the academic dean or advisor upon return to the university to determine an appropriate plan for academic success. The student’s dean may require that a student sign a contract indicating his or her intention to complete that plan. A student who fails to adhere to the terms of such a contract may be withdrawn from the university and/or barred from enrolling in other Texas Tech courses until the terms of the contract are successfully completed.

Course Descriptions for Strategies for Learning (XL)

- 0201. Strategies for Learning (0:3:0).** Explores strategies for academic success and personal management and techniques for implementation of those strategies. The class meets 3 hours a week for 11 weeks.
- 0201. Strategies for Learning (0:6:0).** Explores strategies for academic success and personal management and techniques for implementation of those strategies. The class meets 6 hours a week for seven weeks.

Graduate-On-Time (GOT): Saves You Money and Time

The university's Graduate-On-Time (GOT) program will not only help students save money but also will help catapult them into a career or graduate/professional program as soon as possible. More than 70 percent of degrees at Texas Tech are designated to take four years to complete. These degree programs require only a minimum semester course load of 15 to 16 hours. Students who spend five and a half years getting a four-year degree also will spend more than \$26,300 extra for a college education.

The GOT contract is a two-party agreement signed by the student and the Provost of Texas Tech University. The contract is offered to first-year freshmen to help ensure that their college investment will be used as efficiently as possible. Only students who enter the university directly from high school are eligible to sign the agreement and participate in the GOT contract. First-year students will receive information about the Graduate-On-Time initiative during summer orientation and academic advising sessions. Students may sign a letter of intent during summer orientation. Because of the importance of choosing a major and deciding on a course of study, the contract must be signed in the office of the student's academic advisor anytime prior to advance registration during the second long semester of classes (early April for students who enter in the fall).

Both the student and the student's advisor will develop an educational plan to assist the student in graduating within the specified time period. The plan will include, but is not limited to:

- A semester-by-semester plan of course sequencing.
- A time line for making informed decisions leading to a choice of major and career.
- A means of making efficient use of academic support services available to the student.



STUDENT COMMITMENT

By signing the GOT contract, the student agrees to the following conditions:

- Choose a major that qualifies for the GOT contract.
- Be admitted to a major (or change majors) in time to meet the sequence of required courses in the contract period.
- Stay on track by earning a minimum of 30 credit hours per academic calendar year (September to August).
- Avoid being placed on academic suspension.
- Maintain a current email address, local mailing address, and other contact information. Make changes to these addresses at anytime on www.techsis.admin.ttu.edu/students.
- Meet with the academic program advisor at least once each semester to discuss progress toward graduation and identify courses needed the next semester.
- Register during the advanced registration period.
- Enroll in and successfully complete the courses needed for the chosen academic program of study with the understanding that certain courses must be taken during specific terms to allow for appropriate progress toward the degree and timely graduation.
- Accept responsibility for monitoring academic progress so that the student can stay on schedule for graduating on time. This includes filing a degree plan and applying for graduation by the stipulated deadlines.
- Keep documentation to prove that all these requirements were satisfied.
- Avoid cancellation of an advanced course registration schedule by meeting all payment obligations to Texas Tech.
- Accept responsibility for timely annual application for all necessary financial assistance.
- Notify the academic program advisor immediately if graduation appears in danger of being delayed.

TEXAS TECH COMMITMENT

Texas Tech University assures GOT Contract participants that they will be able to enroll in courses that permit graduation in the specified and mutually agreed upon time period. The plan does not apply to programs combining a baccalaureate and master's degree. Texas Tech will ensure the availability of courses. In the event the university does not satisfy the commitments made herein and the student would be unable to graduate due to the unavailability of a course(s), the department and college offering the major will choose one of the following options as the exclusive remedy for GOT contract signers:

- Allow the student to graduate in the specified and mutually agreed upon time period, substituting a different course(s) or independent study assignment for the unavailable course(s) as determined by the department and college offering the major.
- Allow the student to graduate on time by waiving the requirement to be met by the department or college offering the major.
- Allow the unavailability of a course(s) to delay the student from graduating on time, in which case the university will pay the institutional tuition and fees for the student to take the unavailable course(s) at Texas Tech University in a later term.

For more information on the GOT program and its benefits, refer to www.graduateontime.ttu.edu or contact Senior Administrator—University Academic Advising, Room 8 Holden Hall, 806.742.0876.

GOT Contract Undergraduate Majors

Under the conditions of the GOT contract, students majoring in the areas listed below pledge to complete their degrees within the time period specified. Texas Tech, in turn, pledges to ensure that the courses needed by a participating student are available. In the event that the courses are not available and the student may experience a delay in graduation, the student's academic program advisor will seek a substitute or an exemption. If neither of these measures is possible and the student must exceed the specified time limit, Texas Tech will not charge institutional tuition and fees for the course(s) needed to complete the degree.

MAJOR*	YEARS TO COMPLETE DEGREE
• Agricultural Sciences and Natural Resources	
Agribusiness (joint)	4
Agricultural and Applied Economics	4
Agricultural and Applied Economics/ General Business (dual)	5 (144 hrs.)
Agricultural Communications	4
Agronomy	4
Animal Science	4
Environmental Conservation of Natural Resources	4
Food Science	4.5 (134 hrs.)
Horticulture	4
Interdisciplinary Agriculture (Agric. Education)	4
Landscape Architecture	5 (148 hrs.)
Plant Biotechnology	4
Range Management	4
Wildlife and Fisheries Management	4
• Architecture	
Architecture (Bachelor of Science)	4.5 (131 hrs.)
Architecture/General Business (dual)	5.5 (161 hrs.)
Architecture/Civil Engineering (dual)	5.5 (177 hrs.)
• Arts and Sciences	
Anthropology	4
Biochemistry	4.5 (132-134)
Biology	4
Cell and Molecular Biology	4
Chemistry	4.5 (129-134)
Classics (Classical Languages)	4
Communication Studies	4
Economics	4
English	4
Exercise and Sport Sciences	4
French	4
General Studies	4
Geography	4
Geosciences with geology or geophysics concentrations	4
German	4
Health (Community)	4
Health (School)	4.5 (133 hrs.)
History	4
International Economics	4
Latin American/Iberian Studies	4
Mathematics/Computer Science (dual)	5.5 (159 hrs.)
Mathematics	4
Microbiology	4
Philosophy	4
Physics	4.5 (132 hrs.)
Political Science	4
Psychology	4
Russian Language and Area Studies	4
Social Work	4
Sociology	4
Spanish	4
Zoology	4
• Business	
Accounting	4
Agribusiness (joint)	4
Agric. and Applied Eco./Gen. Business (dual)	4.5 (132 hrs.)
Architecture/General Business (dual)	5.5 (161 hrs.)
Economics	4
Energy Commerce	4
Finance	4
General Business	4
International Business	4
Management	4
Management Information Systems	4
Marketing	4
• Education	
Multidisciplinary Studies	4.5 (126-139)
Multidisciplinary Science	4.5 (129)
• Engineering	
Chemical Engineering	4
Chemical Engineering/Computer Science (dual)	5.5 (155 hrs.)
Civil Engineering	4
Civil Engineering/Architecture (dual)	5.5 (178 hrs.)
Computer Engineering	4.5 (129 hrs.)
Computer Science	4
Electrical Engineering	4.5 (129 hrs.)
Electrical Engineering/Computer Science (dual)	5.5 (150 hrs.)
Engineering Physics	4.5 (125-133)
Engineering Technology with concentrations in either construction, electrical/electronics, or mechanical	4
Environmental Engineering	4
Industrial Engineering	4
Mathematics/Computer Science (dual)	5.5 (159 hrs.)
Mechanical Engineering	4
Petroleum Engineering	4.5 (129 hrs.)
• Honors College	
Natural History and Humanities	4
Honors Arts and Letters	4
• Human Sciences	
Apparel Design and Manufacturing	4
Community, Family and Addiction Services	
Early Childhood	4.5 (137 hrs.)
Family and Consumer Sciences	4
Human Development and Family Studies	4
Interior Design	4
Nutritional Sciences	4
Personal Financial Planning	4
Restaurant, Hotel, and Institutional Management	4
Retailing	4
• Mass Communications	
Advertising	4
Electronic Media and Communications	4
Journalism with broadcasting, news editorial or online concentrations	4
Photocommunications	4
Public Relations	4
• Visual and Performing Arts	
Art History	4
Dance	4
Communication Design (Art)	4
General Studies	4
Music (Bachelor of Arts)	4
Music (Teacher Certification)	4.5 (137-138)
Music Composition	4.5 (137 hrs.)
Music Performance	4.5 (122-135)
Music Theory	4.5 (134 hrs.)
Studio Art	4
Theatre Arts (Bachelor of Arts)	4
Theatre Arts with acting or design/technology concentrations	4.5 (130 min.)
Visual Studies (Art Teacher Certification)	4.5 (135 hrs.)

* 4-year degree plans = 120 to 128 hours
Teacher certification requires additional hours.

Academic Support Services

Academic Advising

Texas Tech University believes in the potential of each student to succeed and values their pursuit of excellence. Therefore, Texas Tech provides academic advisors and advising programs to inform, guide, empower, and encourage students from the time of their new student orientation until graduation. While students are responsible for their academic progress, academic advisors assist with educational planning that leads to timely matriculation and graduation. Students' success requires their commitment to and investment in an action-oriented decision-making process. This fosters intellectual and personal development which results in informed and invested educational choices.

Students' Responsibilities. The advising process is designed to prepare students to be leaders and decision-makers. To that end, students are responsible for being active and invested participants, especially by:

- Investing the time and energy necessary to meet and exceed the highest standards of academic excellence.
- Engaging in a mutually respectful working relationship with their academic advisor(s).
- Making and keeping a minimum of one appointment per semester with the appropriate academic advisor(s).
- Creating a class schedule based on deliberate examination of educational, career, and life goals.
- Cooperating and communicating with the university by reading and responding to all official communications.
- Reading and acting in accordance with official university documents related to institutional procedures, degree program requirements, standards of academic progress, and the code of student conduct.
- Completing required paperwork and adhering to university deadlines.
- Discussing the Graduate-On-Time (GOT) contract program with an academic advisor to determine its merits to their educational plan and, when deemed appropriate, signing a contract in the academic advisor's office before the university-stipulated deadline.
- Keeping advisors informed about circumstances that could influence academic performance (e.g. work schedules, illness, family situations).
- Notifying advisors immediately when receiving a course grade of D or F, when dropping a course, or when withdrawing from the university.
- Exploring and, as appropriate, utilizing available student resources.
- Investigating opportunities to study abroad, conduct undergraduate research, and participate in service learning.
- Documenting and maintaining records of all university interactions.

Advisors' Responsibilities. Advising is a process through which students examine themselves, explore their opportunities, determine their best-fit educational paths, and develop action plans for achieving their university degrees. Academic advisors facilitate this process. Additionally, advisors advocate for students in the university system, serve as resource brokers for the university community, and help students thrive in a large university setting. Academic advising programs identify relevant and desirable student learning and development outcomes and provide programs and services that encourage the achievement of those outcomes. The most important outcome of academic advising is self-discovery: each student's educational goals are matched with offerings of the university. To that end, advisors are responsible for:

Student Growth and Development

- Reinforcing student self-direction and self-sufficiency.
- Assisting students in assessing their interests and abilities, making decisions, and developing short-term and long-term plans to meet their objectives.
- Discussing and clarifying educational, career, and life goals to assist in the development of a meaningful educational plan.
- Assisting students to understand the educational context within which they are enrolled.
- Assisting students to make the best academic decisions possible by encouraging identification and assessment of alternatives and consideration of the consequences of their decisions.
- Instructing students in the use of course selection tools and registration systems.

Accuracy and Availability

- Interpreting university policies, procedures, and standards, and clarifying requirements for both general education and their chosen academic major.
- Providing current, accurate, and timely information, especially for the selection of appropriate courses and other educational experiences.
- Making advising conferences available to students each academic term in a format that is convenient to the student (i.e., in person, by telephone, or online, individually or in groups).
- Allowing an appropriate amount of time for students to discuss plans, programs, courses, academic progress, and other subjects related to their educational programs.

Assessment, Referral, and Confidentiality

- Directing students with educational, career or personal concerns, or skill/learning deficiencies to resources and programs on the campus when necessary.
- Making students aware of and referring to educational, institutional, and community resources and services (e.g., internship, study abroad, honors, service-learning, research opportunities).
- Identifying environmental conditions that may positively or negatively influence student academic achievement and proposing interventions that may neutralize negative conditions.
- Evaluating and monitoring student academic progress and the impact on achievement of goals.
- Collecting and distributing relevant data about student needs, preferences, aspirations, and performance for use in institutional decisions and policy.
- Maintaining confidentiality in accordance with the Operating Policies of Texas Tech University and the Family Educational Rights and Privacy Act of 1974.

Departments in each academic college provide academic advisors who specialize in specific majors. Texas Tech also values students who have yet to choose an academic major or who are uncertain of their educational direction. The Texas Tech University Advising Center serves these students through retention-based academic advising and conducts university-wide transition programs to facilitate the persistence and success of all students.

When faced with a difficult question or challenging situation, the University Advising Center is always a good place to begin. From here, it's possible.

Contact information: Texas Tech University Advising Center, 79 Holden Hall, T 806.742.2189, F 806.742.2200, advising@ttu.edu, www.advising.ttu.edu

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Academic Testing Services

Academic Testing Services provides a wide variety of standardized exams integral to the admissions, enrollment, matriculation, and graduation/certification/licensure requirements of Texas Tech, the state, and specific employers recruiting TTU graduates. These standardized exams meet specific requirement needs for undergraduate, graduate, and professional career path programs at Texas Tech. Exams administered include, but are not limited to: Accuplacer, ACT, GRE, LSAT, MAT, MCAT, MPRE, NICET, OKAP, PCAT, PRAXIS, Texas Educator Certification (formerly TeXes), THEA, and TOEFL.

Note: Students may choose to take the International English Language Testing System (IELTS) rather than the TOEFL. However, IELTS is not administered on the Texas Tech campus. A full list of test centers is available on the IELTS Web site at www.ielts.org. Information regarding scores accepted at Texas Tech for both the TOEFL and the IELTS can be found in the Admissions section of this catalog and the Graduate School section.

CLEP exams for course credit and Distance Education/Distance Learning exams may expedite the matriculation time of enrolled students. All exams are administered in a proctored, standardized testing environment.

Contact information: Pat McConnel, Director; 214 West Hall; 806.742.3671; testing@ttu.edu; www.depts.ttu.edu/testing

Cross-Cultural Academic Advancement Center

The Cross-Cultural Academic Advancement Center was established to help ensure that all Texas Tech students are prepared for a pluralistic society. The center focuses on retention activities; referral services; and collaboration with enrollment management, academic departments, and student affairs. The objectives of the center include:

Affirming identity

- Through the sponsorship of culturally sensitive programming and in concert with academically relevant support services, the center supports an environment that “maximizes the intellectual and leadership potential of [our] students.”

Building community

- By affording students a physical location in which to meet their need for affirmation and encourage their willingness to engage with others across lines of difference.
- By serving as a respite for students to engage and affirm their own sense of identity and that of others.

Cultivating academic achievement

- By carefully coordinating and tracking referral services (i.e., existent counseling service, ACTT, PEGASUS Program, McNair Scholars Program, Career Center, college/departmental advising, and PASS).
- By monitoring targeted students (i.e., those likely to leave Texas Tech prematurely).
- By establishing opportunities to participate in graduate and undergraduate research.
- By establishing academic apprentice relationships with faculty through the Lauro Cavazos and Ophelia Powell-Malone Mentoring Program (Mentor Tech).

Contact information: Cross-Cultural Academic Advancement Center, 806.742.8682

DISCOVERY! Program

Begin with the **DISCOVERY! Major Map**.

Choosing a major is a big decision, but it doesn't have to be difficult. **DISCOVERY!** helps you find your direction by examining your values, skills, interests, and abilities. Once you have identified your direction, you will be ready to determine which academic majors are the best fit for you. Through a deliberate study of yourself and one-to-one meetings with an academic advisor, you will narrow the range of academic alternatives and be equipped to choose a compatible career.

Then, the **DISCOVERY! Academic Physical** will help you:

- Determine your style of procrastination, learn how to manage it, and begin to take action.
- Understand how to learn in a classroom in which your preferred learning style is different from the instructor's style of teaching.
- Identify your Top 10 Survival Strategies, and design your action plan for success.

DISCOVERY! will help you find your direction to an amazing university experience, an on-time graduation, and a future career field that will be fulfilling and rewarding.

Contact Information: 79 Holden Hall, 806.742.2189, discovery@ttu.edu, www.discovery.ttu.edu

Marsha Sharp Center for Student Athletes

The Marsha Sharp Center for Student Athletes is a facility to support the academic success of student athletes at Texas Tech. The 15,500-square-foot facility has a hall of honor to recognize the academic performance of student athletes, two classrooms, two computer labs, tutoring rooms, a study lounge, and administrative offices.

In addition to enhancing academic performance of student athletes, the center also serves as the primary facility to administer the Life Skills program for student athletes at the university. It is also a meeting facility for the Student Athlete Advisory Committee and for other athletic and campus meetings and events.

McNair Scholars Program

The McNair Scholars Program prepares first generation college undergraduate students from low-income backgrounds for doctoral study. McNair Scholars participate in undergraduate research in partnership with a faculty mentor in a specific field of study. The undergraduate is also paired with a graduate student mentor whose personal and professional interests are similar to those of the McNair Scholar. The graduate student mentor guides the exploration of graduate-level education and assists with the application process.

McNair Scholars attend workshops, conduct research, and receive scholarship and travel funds for academic and professional development. Scholars work with departmental advisors for course selection and meet one-to-one with McNair staff for assistance with such issues as financial, cultural, and personal needs extending beyond the traditional advising relationship.

Contact Information: 341 Administration Building, 806.742.1095, mcnairscholars@ttu.edu, www.mcnairscholars.ttu.edu

PASS Learning Center

Under direction of Programs for Academic Support Services (PASS), the Learning Center provides students with a wide variety of services designed to increase their study strategy effectiveness and enable them to get the most out of their education. In-house and online peer tutoring, a self-help computer lab, and individual academic skills counseling provide learning assistance.

Computer software, printed materials, and video/audio tapes are available in mathematics, English, study skills, and other specific subject areas. Test preparation guides are available for the GRE, GMAT, TOEFL, LSAT, and MCAT. Additionally, study skills and other academic topic presentations are available to faculty and campus organizations. Located in 205 West Hall, the Learning Center is free to all Texas Tech students and open during the fall and spring semesters from 8 a.m. to 8 p.m. Monday through Thursday and 8 a.m. to 5 p.m. Friday. Summer hours are 8 a.m. to 5 p.m. Monday through Friday. Departmental information is available at www.pass.ttu.edu.

PASS Supplemental Instruction

Under direction of Programs for Academic Support Services (PASS), Supplemental Instruction (SI) offers regularly scheduled modified forms of discussion sections in a select number of historically difficult courses. Persistent attendance with SI has proven to assist students in increasing their final course grade as compared to students who do not use SI. For a full list of courses that include SI, go to www.pass.ttu.edu and follow the Supplemental Instruction link.

PEGASUS Program for First Generation College Students

If neither of your parents earned a four-year (bachelor's) degree, then the PEGASUS Program exists for you. You are set to accomplish what no one in your immediate family has ever done. As a member of PEGASUS, you will have access to an advisor who works specifically with first generation college (FGC) students and to an academic advisor who specializes in your major. You can also take advantage of POWER-Up Workshops to achieve scholarship and unprecedented success in the following important areas:

- Transitioning to the university environment
- Securing financial aid
- Improving study skills
- Managing your time and your style of procrastination
- Overcoming personal struggles

You will benefit from one-to-one relationships with FGC PEGASUS Mentors. They have successfully navigated the challenges you are now facing and are ready to help you excel at Texas Tech. Their friendships and experiences will provide meaningful help and real-world advice on how to be successful during your first year of college.

PEGASUS is built around giving back to others. As a member, you are proof of access to higher education for FGC families, foster children, and other historically underrepresented populations. From conducting outreach events to building ongoing relationships, PEGASUS students inspire, inform, and nurture pre-college students to prepare for and enroll in college.

FGC advisors, peer mentors, and PEGASUS members engage in community where common goals will encourage your own academic efforts. PEGASUS students who qualify as scholars also receive scholarships.

Contact information: 79 Holden Hall, 806.742.2189, www.fgc.ttu.edu, pegasus@ttu.edu

Study Abroad Program

In today's globalized job market, students who participate in a study abroad program or internship are more marketable and competitive in almost every field. An overseas education allows students to gain an international perspective that helps them to function objectively and comfortably in the global marketplace while earning credit towards their degree. Scholarships and financial aid are available to offset additional costs.

The Study Abroad Program, part of the Office of International Affairs, coordinates all study abroad programs for Texas Tech

University. The Texas Tech Sevilla Center offers students the opportunity to take Texas Tech catalog classes and receive direct TTU credit since the center serves as a satellite campus in Spain. Students may elect a concentrated Spanish program (equivalent of four semesters of Spanish in one semester) or take other courses that meet general education requirements. Students in Sevilla live with host families and are immersed in the language and culture.

Texas Tech students may participate in a program that ranges from two weeks to a full year. Many departments offer their own faculty-led study abroad programs during the summer. The Study Abroad Program assists students with choosing a program that fits their individual needs and provides guidance during the application and orientation process. All Texas Tech students participating in the university's Study Abroad Program must go through the Office of International Affairs.

Students participating in any Texas Tech study abroad programs are qualified to apply for the "Study Abroad Competitive Scholarship" and remain eligible for Texas Tech financial aid to help finance the curriculum.

Contact information: Sandra Crosier, Director; Study Abroad Program; International Cultural Center; 806.742.3667; www.iaff.ttu.edu (click on "Study Abroad")

TECHniques Center

The TECHniques Center is a fee-for-service academic enhancement program that is the only one of its kind in Texas. The program provides supplemental academic support services to meet the needs and promote the retention of undergraduate students with documented evidence of learning disabilities and attention deficit disorders.

Student participants are undergraduates majoring in degree programs that they have chosen. They are expected to meet the same academic requirements and have the same curricula as other students. Qualified staff members work closely with students enrolled in this program to provide support, assistance, and guidance. Certified tutors provide interactive study skills and content tutoring and are trained to work with each student's individual learning style.

Contact information: 250 West Hall, 806.742.1822, www.techniques.ttu.edu, techniques.center@ttu.edu

University Writing Center

The University Writing Center assists writers during the various stages of their writing projects without regard to their status as either a student (undergraduate or graduate) or faculty member, their level of proficiency, or their particular college.

The center strives to create a supportive environment in which writers and their tutors can work effectively one-to-one either in person or on-screen and online. In addition, the center trains writing tutors to become knowledgeable, effective readers of and responders to texts from various disciplines. Tutors read and respond to texts at any stage of the writing process and address sentence-level issues as well as global issues involving focus, organization, and development. They do not proofread or edit documents for clients but help clients learn to proofread and edit for themselves.

The University Writing Center is located in Room 175 of the English/Philosophy Complex and is open from 9 a.m. to 5 p.m. each weekday. Writers may call the center to make appointments for 30-minute sessions. They also may bring their writing projects as either a hard copy or texts on discs. To submit texts electronically, writers may access the University Writing Center through its Web site at <http://english.ttu.edu/uwc01>.

Student Services

Alumni Association

Started in 1927 by the first graduating class, the Texas Tech Alumni Association has grown to a membership of more than 27,000 alumni, current students, and friends of Texas Tech.

Located in the Merket Alumni Center, which is part of the original President's Home, the Alumni Association provides academic support to the university through scholarships, professorships, and faculty and staff awards, as well as by sponsoring Red Raider Camp for entering freshmen. In addition, the organization sponsors many on-campus activities, including class reunions, homecoming events, and pregame parties at the Frazier Alumni Pavilion.

A national and international alumni chapter network helps members stay in touch with the university. The association also publishes the bimonthly *Texas Techsan* magazine, hosts ceremonies for The Official Texas Tech Class Ring, and provides lapel pins to all graduates at commencement.

Contact information: 806.742.3641, www.TexasTechAlumni.org

Campus Bus System

The campus bus system, funded by the Transportation Fee, provides transportation throughout the campus and to nearby off-campus residential areas. On-campus routes provide service from the residence halls and commuter parking lots to the interior of the campus. Off-campus service runs from 7:25 a.m. until 6:45 p.m. Students can access Citibus van shuttle service from 7 p.m. until 3:18 a.m. by calling 806.742.NITE (6483). Students also can ride any Citibus route in Lubbock using their Texas Tech ID.

Career Center

The Career Center provides a number of services designed to assist all Texas Tech students and alumni with their career development and job search efforts. Representatives from hundreds of organizations visit the Career Center each year to conduct employment interviews with students in an effort to fill internship, Co-Op, and full-time positions. To obtain interviews and submit a resume, stu-

dents may register at www.careercenter.ttu.edu. To assist students who are undecided about their majors or career plans, the Career Center offers career assessment inventories, including Strong Interest Inventory, MBTI, and Strengths Quest Program.

The Career Center also sponsors various job fairs that include graduate and professional schools, school districts, summer camps, and two large career expos. Resources at the Career Center include job listings, internship information, mock interviews, resume assistance, and an extensive career library. Counselors are available to meet individually with students to discuss job-related topics (resumes, cover letters, etc.).

Contact information: Career Center, 150 Wiggins Complex, 806.742.2210

Center for Campus Life

The Center for Campus Life promotes each student's learning experience by offering programs and services that focus on student transitions, connecting students to the university and campus traditions, establishing positive relationships with students and families, and maintaining collaborative partnerships. The center offers services related to the following areas:

- First Year Experience
- Community Engagement
- Leadership Development
- Texas Tech Spirit and Traditions
- Student Organizations
- Diversity Involvement
- Campus Events and Programs

Contact information: Center for Campus Life, 201 Student Union, 806.742.5433, www.campuslife.ttu.edu

Check Cashing / ATM Services

The Texas Tech Credit Union has free check cashing services for members of the credit union at three on-campus locations: 166 Administration Building; 1A-99 Health Sciences Center; and the main office at 18th and Knoxville (west of Indiana Avenue). ATMs are available 24 hours a day at the main office and the SUB.

The Student Union has four automatic teller machines available for student use. Anyone having ATM access cards honored by financial institutions may use these machines for a variety of transactions. The ATMs are normally accessible 24 hours a day in the east lobby of the Student Union.

Cocurricular Activities

Students attending Texas Tech have an endless array of experiential opportunities. The Student Union and Activities Department boasts nearly 400 registered student organizations representing academic, professional, honorary, graduate, religious, service, athletic, and special interest groups. Additionally, students can gain volunteer leadership experience through involvement in the Homecoming Committee, the Tech Activities Board and the Annual Arbor Day event. Students can enroll in leadership programs, participate in Greek letter organizations, and experience multicultural programs through the Center for Campus Life. The value of these experiences is immeasurable as students enjoy the luxury of having a practical forum in which to cultivate leadership skills and develop peer and faculty staff/networks.



Student participation in an off-campus activity is strictly voluntary. Students are responsible for their own safety and welfare. Participation in off-campus activities is at the student's own risk and the university assumes no responsibility. Students are responsible for making their own individual arrangements with instructors for classwork missed while participating in an on-campus or off-campus activity. For students involved in Big 12 sports, eligibility rules for the Big 12 Conference are administered by the Texas Tech Athletics Council.

Contact information: Student Union and Activities, 203 Student Union, 806.742.3636; Center for Campus Life, 201 Student Union, 806.742.5433

Greek Life

Fraternities and sororities have been an active part of university life since 1952 by complementing the academic and co-curricular activities of the university's community life. With more than 40 chapters recognized at Texas Tech University, about 3,600 students are involved in Greek life at Texas Tech. The university promotes a self-governing community, reaffirming an attitude of cooperation, support, and encouragement. The Center for Campus Life is the liaison between Greek-letter organizations, their alumni, and the university administration. **Contact information:** Center for Campus Life, 201 Student Union Building, T 806.742.5433, greeklife@ttu.edu

Grievance Procedures

Opportunities are available to students for redress of grievances. Generally, students wishing to review the action of a faculty or staff member or a department should direct their questions to the supervisor responsible for the department in the university organizational structure. Procedures for handling specific problems have been established to expedite the filing and hearing of student concerns. Questions involving academic matters should first be directed to the appropriate academic college or department office. Grievance procedures are described in the *Student Handbook* and questions may be directed to the Ombudsman, 237 Student Union, 806.742.4791.

Intercollegiate Speech, Debate

Students who meet general eligibility requirements may participate in intramural and intercollegiate debate and the full range of individual events, both public address and oral interpretation. Both contest and noncontest events are held on campus and at other colleges. The Forensics Union (administered in the Communication Studies Department) is active in sponsoring campus-wide speech activities. The Red Raider speech and debate team ranks among the top teams nationally and has won four national titles in recent years. In the fall of 2004, Tech won state championships in debate, persuasive speaking, and impromptu speaking. Texas Tech teams actively compete in both debate and individual event competitions across the country. **Contact information:** Director of Forensics, 806.742.1328

Music Organizations

The university is represented by the following official touring musical organizations: University Choir, Symphonic Wind Ensemble, Marching Band, Jazz Ensemble, Music Theatre, and Symphony Orchestra. Students may also participate in the University Singers, Chamber Singers, Women's Chorale, Men's Glee Club, Lubbock Chorale, Court Jesters, Symphonic Band, Concert Band, University Band, Jazz Bands and Combos, Brass Choir, Chamber Ensembles, Chamber Orchestra, Woodwind Ensemble, String Ensemble, Harp Ensemble, Flute Ensemble, Clarinet Choir, Horn Ensemble, Trombone Ensemble, Trumpet Choir, Tuba Ensemble, Percussion Ensemble, Steel Drum Bands, New Music Ensemble, Early Music Ensemble, Celtic Ensemble, and piano accompanying. Each organization is under the

direction of a faculty member of the School of Music and is open to any student who is officially enrolled in the university and meets academic and audition requirements. Each group studies a broad repertoire and gives a number of public performances annually.

Ombudsman for Students

The Ombudsman for Students provides informal, neutral, and confidential dispute resolution services for students and can assist with interpersonal misunderstandings as well as with concerns about academic or administrative issues. The Ombudsman's Office operates independently as a supplement to existing administrative or formal grievance procedures and has no formal decision-making authority. The Ombudsman does not act as an advocate for either side in a dispute. Instead, the Ombudsman acts as an advocate for fairness for all parties involved. The Ombudsman's Office is a safe place for students to bring concerns and find solutions. Services are available from 8 a.m. to 5 p.m. on weekdays and at other times by appointment. Walk-in visitors are welcome. **Contact information:** 237 Student Union, 806.742.4791, www.ttu.edu/ombudsman

Parent Relations Office, Texas Tech Parents Association

The mission of the Parent Relations Office is to promote each student's learning by providing programs, services, and activities designed to meet the educational, informational, and constructive involvement needs of their parents and families. The office is also home to the Texas Tech Parents Association and serves all parents, families, and students.

The purpose and mission of the association is to build bridges of mutual support and serve as a network for parents to share their concerns. One of the most significant activities of the association is the annual awarding of 56 scholarships made possible by contributions and memberships to the association. Applications are available to all students after December 1 and are due by February 1. As an incorporated non-profit organization, the association provides valuable programs and services.

The Parent Relations/Tech Parents partnership provides a toll-free hotline and email for parent questions and concerns, the parent Web site, transition programs for parents at new student orientation, publication of *The Parent's Guide*, move-in program for parents, publication of *The Extension Cord* for parents, "Road Raiders" Safe Travel Parent Network to promote student safety and serve as an emergency network, Family Weekend in the fall, Spring Scholarship Weekend, faculty awards for excellence, 12 annual student academic-citizenship awards, a Distinguished Visiting Professor program to bring Nobel Laureates to campus, Junior Raiders for family members 12 and under, summer area/chapter Red Raider Rally send-offs for Texas Tech students, and the Annual Tuition Draw.

Contact information: East Basement, Student Union Building; 806.742.3630, toll free 888. 888.7409; fax 806.742.0330; email parent@ttu.edu, or Web site www.parent.ttu.edu

Red Raider Student Employment Center (RRSEC)

The Student Financial Aid Office administers a student part-time employment service to assist students in financing their education. This service is available to currently enrolled students at Texas Tech and provides a listing of on- and off-campus employment opportunities available to students. Students seeking employment through this service are encouraged to check openings at any time via the internet at www.financialaid.ttu.edu. To learn more about other forms of financial assistance, see "Student Financial Assistance" in the Finances section of this catalog.

RaiderGate

Sponsored by the Student Government Association and the Student Union Building, RaiderGate is the university's premier student tailgating event. For students it is the most exciting on-campus activity for Texas Tech football's pregame entertainment. **Contact information:** Student Government Association, 806.742.3631; Student Union Building, 806.742.3636

Red to Black Program

Red to Black is a group of volunteer students offering free and confidential financial counseling, planning, and education. Peer Financial Planners are Personal Financial Planning (PFP) majors in the College of Human Sciences trained to provide financial help through presentations and seminars as well as individual counseling sessions. All volunteers are supervised and are trained regarding general financial questions as well as specific issues such as paying off debt, creating a budget, choosing a credit card or bank, comparing job offers by looking over employer benefits, reading a credit report, and starting a financial plan. The program also provides many useful online financial tools and resources to help individuals find answers to general questions and download helpful worksheets (www.r2b.ttu.edu). **Contact information:** 806.742.9781, redtoblack@ttu.edu

Student Counseling Center

The Student Counseling Center provides professional psychological services to address the variety of concerns affecting a college student's personal life and academic performance. Services are provided by doctoral-level psychologists who are licensed to practice psychology in the state of Texas and by their supervisees.

College life is brimming with new challenges and choices. Counseling focuses on the common issues students frequently encounter in this process. This can involve relationship loss, coping with grief, body image concerns, depression, anxiety, stress/time management, alcohol or other substance abuse, gay/lesbian/bisexual identity concerns, communication skills, general adjustment to college, or simply help in understanding oneself better.

Counseling can be conducted on an individual, couple, or group basis. The Student Counseling Center offers a variety of topic-specific groups to meet the needs of Texas Tech students, including cutting-edge biofeedback technology to expand students' stress management techniques. Relationship counseling for students and their partners or family is available during select evening hours as well as the daytime. Student Counseling Center therapists also educate the campus community about strategies for positive mental health through outreach presentations to classes, residence halls, and on-campus organizations. Topics of these presentations span the wide range of issues that students experience. Student Counseling Center services are available to enrolled students and on a consultation/referral basis to faculty and staff. All information is strictly confidential within limits of the law. To make an appointment or request an outreach presentation for a campus group, contact the Student Counseling Center from 8 a.m. to 5 p.m. Monday through Friday. **Contact information:** 214 West Hall, 806.742.3674, www.depts.ttu.edu/SCC.

Student Government

The Student Government Association (SGA) provides students with opportunities to excel through involvement with SGA and university-wide committees; Freshmen Council; Freshmen Advisory Board; Student Senate; and executive offices. The SGA also provides many services to students, including SafeRide (806.742.RIDE), night shuttle (806-742-NITE), housing guides, the *WORD* magazine, new student guide, information maps about Citibus routes, and other programs and publications.

The Student Government Association also supports student organizations through a funding process that allocates a portion of student services fees to registered student groups. The four executive officers—President, Internal Vice President, External Vice President, and Graduate Vice President—work to represent the views and needs of students to the administration as well as local and state governments. The SGA is always receptive to new programs and practices that can benefit students. **Contact information:** Student Government Association, 302 Student Union, 806.742.3631, www.sga.ttu.edu

Student Health Insurance

Optional student health insurance is available for all students registered at Texas Tech University. For information contact Student Health Services, Thompson Hall, 806.743.2830.

Student Health Services

Student Health Services is a primary care clinic staffed with licensed physicians, nurses, nurse practitioners, health educators, and support staff that provide care for illnesses and injuries, as well as mental health issues. Student Health Services is located in the Student Wellness Center at the corner of Main and Flint on the west side of the campus. Services are available by appointment by calling 806.743.2848. Appointment hours are 8:30 a.m. to 6 p.m. weekdays.

Students generally pay a medical services fee that entitles them to access clinic and pharmacy services. A valid Texas Tech ID is required to access the clinic services. More than 200 primary care appointments are available each day. A student who is unsure about a medical issue or problem may call 806.743.2860 and speak confidentially to the triage nurse. If all appointments are filled for the day, the triage nurse will advise on care until the student can be seen. Students are not given excuses for missed classes or exams due to a clinic visit. Students experiencing a lengthy illness that may affect their academic performance may consult their Student Health Services physician about obtaining a letter explaining the situation.

Student Health Services includes a primary health care clinic and several sub-specialty clinics. The nursing staff provides blood pressure and cholesterol checks, immunizations, and advice about self-care. Lab tests and x-rays ordered by Student Health Services providers and performed at Student Health are also covered by the medical service fee. Prevention services include lifestyle and weight management consultations; confidential/ anonymous HIV testing; and comprehensive alcohol, tobacco, and other drug prevention, intervention, and education.

Pharmacy services are also conveniently located in the Student Wellness Center and can be contacted at 806.743.2636. The pharmacy can fill most prescriptions, including those written by an outside physician or transferred from another pharmacy. Over-the-counter medications are available at reduced prices. Pharmacy purchases may be charged to major credit cards, TechExpress, and prescription insurance cards.

The medical services fee does not cover after-hours care, hospital emergency room visits, hospitalization, and referrals to providers outside of Student Health Services. Students who are between semesters in the summer and want to continue to use Student Health Services may do so by paying a bridge fee. Please contact Student Health Services at 806.743.2860 for more information and eligibility.

Student Health Services is not a substitute for major medical insurance. Students should have their own insurance policies or coverage on their parents' insurance. Students who are thus covered should carry an insurance card in case they need medical care not covered by the medical services fee. Students who do not have insurance or who are not covered by a family policy may purchase student injury and sickness insurance through a plan endorsed

by Texas Tech University. Contact Student Health Services at 806.743.2860 for enrollment information.

The university requires that all students born after December 31, 1956, provide proof of two MMR immunizations in their lifetime. The first immunization must have been received on or after the first birthday. The two immunizations must have been received at least 30 days apart. Students must meet this requirement by providing documentation of the immunization by the fifth week of the first semester of enrollment. Failure to comply with this requirement will result in a hold being placed on the student's records. Documentation may be mailed to Student Health Services, Medical Records, 3601 4th Street, Lubbock TX 79430-7208 or faxed to 806.743.2122. Include your birth date or ID number on all documentation. Students may obtain the immunization by appointment at Student Health Services. Questions regarding MMR status should be directed to Student Health Services at 806.743.2860 ext. 240.

The university also requires that non-U.S. residents from countries with a high prevalence of tuberculosis receive a Mantoux skin test for tuberculosis. This requirement is in accordance with recommendations from the American College Health Association and the Center for Disease Control (CDC). The tuberculosis screen test must be administered either by Student Health Services or a U.S. health care provider. The test will be at the student's expense. Student Health Services can administer this test. Required students should provide documentation of the test and results or receive the test at Student Health Services by the fifth week of the first semester of enrollment. Failure to comply with this requirement will result in a hold being placed on the student's records.

Non-U.S. residents from the following countries are exempt from this requirement: **American Region:** Canada, Jamaica, Saint Kitts and Nevis, Saint Lucia, and Virgin Islands. **European Region:** Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, San Marino, Sweden, Switzerland, and United Kingdom. **Western Pacific Region:** American Samoa, Australia, and New Zealand. Non-U.S. residents from any country not listed above are required to have a Mantoux skin test.

The Center for Disease Control (CDC) and the American College Health Association recommend that all college students living in residence halls consider obtaining the meningococcus vaccine. Meningococcus is a bacterial infection usually infecting young children and the elderly; however, young adults living in close quarters such as residence halls are also at an increased risk of infection. The risk for residence hall students is increased from 1 chance in 100,000 to 3 chances in 100,000. Students living off campus have no increased risk. Students interested in getting this vaccine should check with their insurance carriers to see if the cost of this vaccine is covered. If you have any questions or would like to receive the vaccination for bacterial meningitis, please contact Student Health Services at 806.743.2860.

In recent years, Hepatitis B vaccinations have been added to required childhood immunizations. Many young adults missed receiving this vaccination. Hepatitis B is a chronic infection of the liver transmitted through sex and/or contact with blood and/or body fluids. Students can obtain this immunization through Student Health Services.

In accordance with state law, a student's medical information is kept completely confidential and cannot be released to anyone, including parents and/or guardians, without the student's written permission unless otherwise authorized by law. Student Health Services brochures are available in several locations on campus. **Contact information:** 806.743.2860, www.depts.ttu.edu/studenthealth

Student Judicial Programs

Student Judicial Programs is responsible for maintaining and adjudicating alleged violations of the "Code of Student Conduct" as it is found in the *Student Handbook*. It is the responsibility of this office to ensure that student rights are afforded to all students and that

due process is part of every judicial hearing. In addition to adjudicating alleged violations of university policy, this office also serves as the clearinghouse for **academic integrity** issues at Texas Tech.

The Student Judicial Programs office works in conjunction with the Texas Tech Police Department and Housing and Residence Life to provide accurate information for Clery Act reporting. The office provides background checks for current and previous students as well as notary services. **Contact information:** 020 Student Union, 806.742.1714, www.depts.ttu.edu/studentjudicialprograms

Student Legal Services

Student Legal Services is a program designed to bring legal advice and guidance within the reach of students. It was inaugurated at Texas Tech in 1973 and is staffed by three licensed attorneys, a legal secretary, a clerical specialist, law clerks, and student interns from the Texas Tech School of Law. Appointments are encouraged.

The primary objectives of the program are to provide students with confidential legal advice on individual problems and to establish an educational office designed to inform students of their obligations and duties as well as their rights as defined by a system of law. Informal lectures on legal topics of concern are conducted on request. Mediation services are also available.

The attorneys for students are able to represent students in court under limited circumstances; however, most cases are resolved through negotiation, advice, and proper direction. The office is dedicated to the concept of preventive law. **Contact information:** 307 Student Union, 806.742.3289

Student Media

The Daily Toreador, the university student newspaper, is published daily, Monday through Friday. *La Ventana* is the university yearbook, published annually. KTXT-FM is licensed as a noncommercial educational radio station at 88.1 MHz. The publications and the radio station are staffed with paid personnel from the student body. The Student Media Committee, a student-faculty-staff committee, selects the student editors and station manager and reviews the annual budgets.

Student Organization Advisory Congress (SOAC)

The Student Organization Advisory Congress (SOAC) is a melting pot of all registered student organizations on campus. It allows students to have a fair and equal say in university-related matters, to promote the events of their organization, to educate and diversify the campus, and to promote events sponsored by the Student Government Association (SGA). **Contact information:** SGA, 806.742.3631

Transcript Service

Copies of a student's transcript are available free of charge upon written request to the Registrar's Office. Please allow 72 hours for transcript processing. To request a transcript, contact the Office of the Registrar, Box 45015, Texas Tech University, Lubbock, Texas 79409-5015 or visit online at www.depts.ttu.edu/registrar. Official transcripts may be withheld from students who have administrative holds on their records until the holds have been released. For information about administrative holds and the status of holds on students' records, refer to the section on "Administrative Holds" in the Academic Information section of this catalog. Transcripts furnished from other institutions become the property of Texas Tech University.

Distance, Off-Campus Learning

Texas Tech University offers both semester-based and non-semester-based, independent study courses and programs at a distance or off-campus. If more than half of a course/program is delivered electronically, it is considered a distance course; if more than half is delivered face-to-face, it is considered an off-campus course/program.

Semester-based courses and programs are administered by the colleges; non-semester-based independent study offerings are administered by the **Division of Outreach and Distance Education**. The **Division of Off-Campus Sites** manages Coordinating-Board recognized sites in Abilene, Amarillo, Fredericksburg, Highland Lakes, and Junction. Electronic, face-to-face, and blended courses may be taken at these sites and at other sites throughout Texas that do not require recognition by the Texas Higher Education Coordinating Board.

Texas Tech University offers the following degrees, certificate and certificate preparation programs at a distance or through off-campus instruction. Some programs require face-to-face meetings.

Undergraduate Degrees

- Bachelor of General Studies
- Bachelor of Science in Horticulture

Graduate Certificate Programs

- Autism (Texas Tech University)
- Dual Sensory Impairments (Texas Tech University)
- Gerontology (offered through the Great Plains Interactive Distance Education Alliance [GPIDEA])

Graduate Certification Preparation Programs

- Deaf Education (Texas State Board for Educator Certification)
- Educational Diagnostician (Texas State Board for Educator Certification)
- Generic Special Education (Texas State Board for Educator Certification)
- Master Reading Teacher
- Orientation and Mobility (National Certification in Orientation and Mobility through the Association for Education and Rehabilitation of the Blind and Visually Impaired [AER])
- Superintendent Professional
- Visual Impairment (Texas State Board for Educator Certification)

Master's Degrees

- Master of Agriculture
- Master of Agriculture with Principal Professional Certification
- Master of Art Education
- Master of Arts in Technical Communication
- Master of Education in Educational Leadership with Principal Professional Certification
- Master of Education in Instructional Technology
- Master of Education in Language Literacy Education
- Master of Education in Special Education (emphasis available in Deaf Education, Dual Sensory Impairments, Educational Diagnostician, Generic Special Education, Orientation and Mobility, and Visual Impairment)
- Master of Engineering
- Master of Science in Agricultural Education
- Master of Science in Computer Science
- Master of Science in Crop Science
- Master of Science in Family and Consumer Science Education (offered through the Great Plains Interactive Distance Education Alliance [GPIDEA])
- Master of Science in Horticulture

- Master of Science in Human Development & Family Studies (emphasis in Gerontology – offered through the Great Plains Interactive Distance Education Alliance [GPIDEA])
- Master of Science in Software Engineering
- Master of Science in Systems and Engineering Management

Doctoral Programs

- Ed.D. in Agricultural Education (joint program with Texas A&M)
- Ed.D. in Educational Leadership
- Ph.D. in Computer Science
- Ph.D. in Technical Communication and Rhetoric
- Ph.D. in Systems and Engineering Management

Additional distance and off-campus offerings are available through the Division of Off-Campus Sites (DOCS) and through the Division of Outreach and Distance Education. For more information, visit www.de.ttu.edu or call 800.692.6877, ext. 293 or 276.

Division of Outreach, Distance Education

Rosslyn Smith, Ph.D., Vice Provost for Outreach and Distance Education

Division of Outreach and Distance Education
9th Street and Indiana Ave. | Lubbock, TX 79413
T 806.742.7200 | toll-free 800.692.6877
F 806.742-7222 | www.ode.ttu.edu, distlearn@ttu.edu

The Division of Outreach and Distance Education (ODE) administers print and web-based distance learning programs that include college and K–12 courses for credit, a Bachelor of General Studies degree, and an accredited K–12 diploma-granting program—the Texas Tech University Independent School District (TTUISD). ODE also offers non-credit community outreach programs for both students and adults through the Institute for the Development and Enrichment of Advanced Learners (IDEAL), the Intensive English Program (IEP), and the Osher Lifelong Learning Institute (OLLI) at Texas Tech University. Customized employee training and program/conference registration services are available to academic departments through ODE. ODE also assists academic departments in developing and delivering non-credit short courses, certificate programs, or workshops to professionals.

The main offices of the Division of Outreach and Distance Education are located at 9th Street and Indiana Ave. adjacent to the International Cultural Center. IDEAL is located on the third floor of the Administration Building, and the Intensive English Program is located on the second floor of the Foreign Language Building.

College Offerings

The Bachelor of General Studies (B.G.S.) degree is offered by the College of Arts and Sciences through the Division of Outreach and Distance Education. The curriculum consists of the typical liberal arts education as based on Bachelor of Arts general-degree requirements, and can prepare a student to pursue an intellectual interest, a career goal, or graduate or professional study. The BGS degree fea-

tures three core areas of concentration in lieu of a major and minor, each of which meets the minimum requirements of an existing departmental or interdisciplinary minor (e.g., English, psychology, etc.).

A Texas Tech resident student may not enroll in or complete an ODE course during the last semester or summer term before graduation unless his or her academic dean approves the enrollment. A student who has failed a course taken in residence may take that course or a degree-plan alternative through ODE with approval of the academic dean.

Students must take a final exam at least 30 days before the semester ends to receive a grade for that semester. Final examinations are administered after all graded lessons have been returned to the ODE office. Exceptions require instructor approval.

College-level credit courses are offered in an asynchronous, print-based format or, when available, online. The self-paced design of the courses allows many students to stay on track with their degree plans when scheduling conflicts occur with resident classes. Academic departments ensure that all ODE college credit courses are equivalent in quality to courses taken in residence.

To enroll in an ODE distance education course, complete the enrollment form located in the back of the *Outreach and Distance Education Catalog* or on the Web site (www.ode.ttu.edu). **All Texas Tech students must have the signature of their academic dean on the enrollment form.** For information on the cost per semester credit hour and fees for a college-level course taken through Outreach and Distance Education, please go to <http://www.depts.ttu.edu/ode/>.

University students may take elective courses through ODE on a pass-fail basis under the same regulations governing resident students. ODE must receive the pass-fail form, signed by the student's dean, before the first course lesson may be submitted. Once a lesson has been submitted, a student cannot switch from the pass-fail option to a letter grade option. Students enrolling in ODE college courses must adhere to the provisions outlined in the Graduate and Undergraduate Catalog concerning the Texas Success Initiative (formerly known as the TASP test). Contact the Texas Success Initiative Office in Admissions, 116 West Hall, for additional information.

On occasion, ODE courses are used to fulfill full-time student status. To petition use of such course hours toward full-time status (for financial aid, scholarships, health services, student services, etc.), obtain a computer printout of resident courses from the Registrar's Office, attach a receipt for ODE courses, and submit documentation to the appropriate department (e.g., Financial Aid, Student Business Services) for a decision on the petition.

The following courses are available through ODE:

College of Agricultural Sciences and Natural Resources

Agricultural and Applied Economics (AAEC)

3303. Cooperatives in Agriculture

Plant and Soil Science (PSS)

1411. Principles of Horticulture

4335. Soil Fertility Management

College of Arts and Sciences

Anthropology (ANTH)

2302. Cultural Anthropology

Communication Studies (COMS)

2300. Public Speaking

Economics (ECO)

2301, 2302. Principles of Economics I, II

English (ENGL)

1301. Essentials of College Rhetoric

1302. Advanced College Rhetoric

2305. Introduction to Poetry

2307. Introduction to Fiction

2311. Technical Writing

3325. Modern and Contemporary American Literature

3366. Style in Technical Writing

3387. Multicultural Literatures of America

3389. Short Story

Geography (GEOG)

1401. Physical Geography

2351. Regional Geography of the World

History (HIST)

1300, 1301. Western Civilization I, II

2300. History of the United States to 1877

2301. History of the United States Since 1877

3310. History of Texas

3328. History of Religion in America

3338. History of Sports and Recreation in the U.S.

3339. The History of Baseball: A Mirror on America

4301. The Founding of the American Colonies

Mathematics (MATH)

1320. College Algebra

1330, 1331. Introductory Mathematical Analysis

1351, 1352. Calculus I, II

2300. Statistical Methods

2345. Introduction to Statistics with Application to Business

2350. Calculus III

Political Science (POLS)

1301. American Government, Organization

2302. American Public Policy

3325. Political Parties

3351. The Judicial Process

Psychology (PSY)

1300. General Psychology

3304. Introduction to Social Psychology

3306. Personality

4300. Psychology of Human Sexual Behavior

4305. Abnormal Psychology

4325. Drugs, Alcohol, and Behavior

Sociology (SOC)

1301. Introduction to Sociology

1320. Current Social Problems

Spanish (SPAN)

1501. A Beginning Course in Spanish I

1502. A Beginning Course in Spanish II

Rawls College of Business

Accounting (ACCT)

2300. Financial Accounting

2301. Managerial Accounting

Business Law (BLAW)

3391. Business Law I

Marketing (MKT)

3350. Introduction to Marketing

College of Education**Educational Instructional Technology (EDIT)**

2318. Computing and Information Technology

College of Engineering**Engineering (ENGR)**

4392. Engineering Ethics and Professionalism

College of Human Sciences**Human Development and Family Studies (HDFS)**

2303. Life Span Human Development
 2322. Partnering: The Development of Intimate Relationships
 3301. Theories of Human Development and the Family
 3320. The Contemporary Family
 3324. Dynamics of Family Interaction

Nutritional Sciences (NS)

1325. Nutrition, Foods, and Healthy Living
 1410. Science of Nutrition

Restaurant, Hotel, and Institutional Management (RHIM)

2312. Introduction to Beverage Management
 3321. Hospitality Control I
 3322. Hospitality Control II
 3350. Travel and Tourism
 3460. Food Systems Management I

College of Mass Communications**Electronic Media and Communications (EM&C)**

3310. Introduction to Electronic Media and Communications

Journalism (JOUR)

3350. History of American Journalism

Mass Communications (MCOM)

1300. Introduction to Mass Communications
 3300. Mass Media Theories and Society
 3320. Mass Communications Law

College of Visual and Performing Arts**Music History and Literature (MUHL)**

2309. Heritage of Music

Music Theory (MUTH)

1300. Songwriting

Theatre Arts (TH A)

2304. Introduction to Cinema

To check course availability, please contact the Outreach and Distance Education office at 9th Street and Indiana Ave. (adjacent to the International Cultural Center), call toll-free 800.692.6877, 806.742.7200, or visit our Web site at www.ode.ttu.edu.

Division of Off-Campus Sites**Bob Hickerson, Chief Operating Officer**

Division of Off-Campus Sites
 P.O. Box 186 | 254 Red Raider Lane | Junction, TX 76849
 T 325.446.2301 ext. 234 | F 325.446.4011 |

Texas Tech University operates off-campus educational sites at Abilene, Amarillo, Fredericksburg, Highland Lakes, and Junction. Students entering the TTU programs at these locations are held to the same entrance requirements as students at the main campus. Courses, curriculum, and graduation requirements at each site meet the same standards as those on the main campus.

Texas Tech University at Abilene

Texas Tech University established an off-campus educational site in Abilene in 2002 for the purpose of delivering a graduate program in computer science and software engineering. Students have access to funded research and assistantships, allowing them to work closely with Abilene and Lubbock-based professors as well as with agencies such as NASA. In concert with the three private universities in Abilene, TTU at Abilene is planning additional graduate programs to meet the educational needs of the region.

TTU at Abilene is located at 302 Pine Street and is a 27,000-square-foot, three-story facility with a mezzanine between the first and second floors. The second and third floors are the primary location of the Abilene offices, classrooms, and state-of-the-art research computer labs.

Contact information: Visit www.abilene.ttu.edu or call 325.677.1112 or 806.742.6446. TTU at Abilene computer science and software engineering students are advised by the graduate advisor in the Department of Computer Science at Texas Tech in Lubbock. Dr. Jack Barnes is the associate chairperson and academic director in Abilene. Tom Dolan is associate director.

Texas Tech University at Amarillo

Texas Tech University established an off-campus educational site in Amarillo in 2002 for the purpose of delivering master's level engineering education. TTU at Amarillo became a recognized higher education teaching site in 2003 with graduate engineering degree programs. In 2004, master's level education program and certificate courses were added to the offerings at the site. In 2006, a Ph.D. program in systems engineering management (SEM) was approved by the Texas Higher Education Coordinating Board.

TTU at Amarillo is located at 1616 S. Kentucky Avenue, Suite C150, in the Wellington Square office building. The 6,000-square-foot area is on the first floor and provides state-of-the-art technology. It is partitioned into six offices, a reception area, a conference room, a kitchen area, and two classrooms. Both classrooms are equipped with video conferencing equipment.

Contact information: Visit www.amarillo.ttu.edu or call 806.742.6460 or 806.356.4702. Dr. Milton Smith is the director and Dr. Wallace Johnston is the associate director of TTU at Amarillo.

Texas Tech University at Fredericksburg

Texas Tech established a recognized higher education teaching site in Fredericksburg in 2002 for the purposes of delivering undergraduate and graduate programs to the region. Academic programs include the Bachelor of General Studies with three areas of concentration and a variety of graduate education degree and certification preparation

programs. The Texas Tech University Health Sciences Center School of Nursing offers undergraduate and graduate nursing programs.

Administrative offices are located at 102 E. San Antonio St., and classrooms are in dedicated buildings near the Fredericksburg

Primary School at 1110 S. Adams St. Two interactive video classrooms, a traditional classroom, and an Internet lab are used for classroom instruction. All facilities have state-of-the-art technology. Austin Community College is the partner offering first- and second-year Core Curriculum courses in the Fredericksburg area.

Contact information: Visit www.fredericksburg.ttu.edu or call 830.990.2717 or 806.742.6440. Dr. James Morris is the director.

Texas Tech University at Highland Lakes

Texas Tech established a recognized higher education teaching site in Marble Falls in 2002 for the purposes of delivering undergraduate and graduate programs to the region. Academic programs include the Bachelor of General Studies with three areas of concentration and a variety of graduate education degree and certification preparation programs. The Texas Tech University Health Sciences Center School of Nursing offers undergraduate and graduate nursing programs.

The administrative and classroom facilities provide state-of-the-art technology and are located at 806 Steve Hawkins Parkway, directly off Highway 281 on the south side of Marble Falls. Three interactive video classrooms (two classroom and one conference room), two regular classrooms, and an Internet lab are available for classroom instruction. Central Texas College is the community college partner offering first- and second-year Core Curriculum courses in the Highland Lakes area.

Contact information: Visit www.highlandlakes.ttu.edu or call 830.798.9548 or 806.742.6450. Dr. Will Cohen is director.

Texas Tech University Center at Junction

Texas Tech University Center at Junction is an educational center that encompasses 411 acres on the South Llano River in the Texas Hill Country two miles south of Junction on FM 2169. In addition to degree programs and continuing education opportunities, the TTU Center at Junction offers undergraduate and graduate courses in intensive two-week sessions during May (Intersession) and during the holiday break (WinterSession) as well as two three-week summer sessions. Courses and programs offered at TTU at Fredericksburg and Highland Lakes are available at Junction as well. The community college partner for Junction is Howard College.

The facilities at Junction include an interactive video conferencing classroom and traditional classrooms, a lecture hall, offices, laboratories, a library, a darkroom, Mac and PC computer labs with T1 Internet connections, wireless access, and specialized art facilities.

In 2002, TTU opened a Field Research Station at Junction to support a research focus on aquatic and watershed management. Dr. Tom Arsuffi is director.

Texas Tech University Center at Junction is available to Texas Tech student organizations, faculty groups, researchers, and other groups for workshops, retreats, and other special activities. A wide range of housing accommodations and full meal service are available year round for groups from 20 to 200 people. The Junction facility is home to Red Raider Camp, a freshman spirit and orientation camp that operates from mid to late summer. Recreational opportunities include river activities, hiking and nature trails, a sand volleyball court, and a large swimming pool.

Contact information: Visit www.junction.ttu.edu or call 325.446.2301, 806.742.6434. Dr. Grant Hall is director.

Texas Tech University Center at Junction



Graduate School

John Borrelli, Ph.D., Dean

Graduate School | 02 Holden Hall | Box 41033
Lubbock, TX 79409-1033 | T 806.742.2787
F 806.742.1746 | gradschool@ttu.edu
www.gradschool.ttu.edu

About the Graduate School

Graduate study is much more than a continuation of undergraduate work. It is distinguished by a spirit of inquiry and the desire to increase human knowledge. Graduate study should be contemplated, therefore, only by students who have demonstrated in their undergraduate programs unusual intellectual ability and the capacity for independent thought and investigation. For this reason, the Texas Tech University Graduate School exercises selectivity in its admission of students. Selective entrance requirements are partly for the maintenance of high standards that must characterize graduate study and partly for the benefit of students in helping them decide whether they should undertake such work.

The Graduate School of Texas Tech University recognizes its obligations to the standards mentioned above and to the citizens of Texas by requiring appropriate evidence of an applicant's intellectual ability and reserves the right to decline to accept any applicant whose admission would not be in his or her best interest or that of the university.

Mission Statement

The Graduate School facilitates graduate education by ensuring standards of excellence; promoting diverse programs; and assisting and supporting the recruitment, retention, and graduation of quality students.

Academic Diversity

Established in 1923, Texas Tech is one of the youngest major research universities in the country. Consistent dedication to quality and research has earned numerous graduate programs national and international respect. From a creative writing program to an advanced ceramics program, from a nationally recognized personal financial planning program to a semi-conductor processing program, the Texas Tech University Graduate School offers unlimited opportunity for the aspiring scholar.

The Graduate School is remarkable for its diversity, offering 106 master's programs and 57 doctoral programs, outnumbering those available at most other multipurpose universities. The number of doctorates awarded during the last five years averaged more than 175, placing Texas Tech in close degree-granting competition with many of the nation's other major research universities. Last year the university conferred 1,052 master's degrees and 213 doctoral degrees.

The Graduate School strives to maintain flexibility through a combination of options from traditional degree programs to progressive interdisciplinary and multidisciplinary choices. The Graduate School values the student's interests, personal research aims, and career goals. In keeping with that spirit, many outstanding facilities for interdisciplinary research are located at Texas Tech, including 64 specialized research centers and institutes. Some interdisciplinary programs are housed within specific colleges or a cluster of departments, while others are headquartered in the Graduate School. All of these programs are defined by the topic rather than by traditional disciplinary boundaries. In addition to approved stu-

dent-designed options, interdisciplinary subjects include comparative literature, ethnic studies, fine arts, linguistics, museum science, neuroscience, plant physiology, public administration, sports health, women's studies, and many more.

Administrative Staff

Graduate School

William M. Marcy, Ph.D., Provost and Professor of Computer Science

John Borrelli, Ph.D., Dean and Professor of Civil Engineering

Wendell Aycock, Ph.D., Associate Dean and Professor of English

Clifford B. Fedler, Ph.D., Associate Dean and Professor of Civil Engineering

Ralph Ferguson, Ph.D., Associate Dean

Graduate Admissions

Duane W. Crawford, Ph.D., Associate Dean and Associate Professor of Human Development and Family Studies

Graduate Council

The Graduate Council is composed of 14 members. The graduate faculty elects 11 of the members, the dean appoints two, and the Faculty Senate elects one from its graduate faculty membership. All 14 are voting members of the Graduate Council. The dean is *ex officio* chairperson of the council; associate deans, the provost (or a designated representative), and others appointed by the dean are *ex officio* and nonvoting members of the council.

Elected members other than the Faculty Senate representative serve for a three-year period and are not eligible for immediate reelection unless they have been chosen to fill an unexpired term. Appointed members serve for two years. By a system of rotation, some new members join the council each year, replacing those whose terms of office have expired. The dates listed below indicate the year of expiration of term of office. In addition, the dean appoints a student representative each year.

The Graduate Council, assisted by the graduate faculty, is charged with the responsibility of formulating the policies of the Graduate School and the requirements for graduate degrees. The dean administers these policies.

- Terry Collins (2008), Ph.D., Engineering
- Pat Delucia (2009), Ph.D., Social Sciences
- Stephen Ekwaro-Osire (2007), Ph.D., Engineering
- Nora Griffin-Shirley (2007), Ph.D., Education
- Saif-ul Haq (2007), Ph.D., Architecture
- Gary Harris (2008), Ph.D., Sciences and Mathematics
- Scott Hein (2008), Ph.D., Business Administration
- Janice Killian (2009), Ph.D., Visual and Performing Arts
- David Lawver (2007), Ed.D., Agricultural Sciences
- Madonne Miner (2008), Ph.D., Humanities
- Arturo Olivarez Jr. (2006), Ph.D., Faculty Senate Representative
- Mike Parkinson (2007), Ph.D., J.D., Mass Communication
- Comfort Pratt (2008), Ph.D., Classical and Modern Languages
- Mariam Muslow (2009), Ph.D., Human Sciences

Graduate Degrees

In addition to this list of graduate degrees, many departments offer specializations or concentrations in various fields.

• Agricultural Sciences and Natural Resources

Agribusiness, M.A.B.
Agricultural and Applied Economics, M.S., Ph.D.
Agricultural Communications, M.S.
Agricultural Education, M.S., Ed.D.
Agriculture, M.Ag.
Agronomy, Ph.D.
Animal Science, M.S., Ph.D.
Crop Science, M.S.
Entomology, M.S.
Fisheries Science, M.S., Ph.D.
Food Science, M.S.
Horticulture, M.S.
Landscape Architecture, M.L.A.
Range Science, M.S., Ph.D.
Soil Science, M.S.
Wildlife Science, M.S., Ph.D.

• Architecture

Architecture, M.Arch., M.S.
Land-Use Planning, Management, and Design, Ph.D.

• Arts and Sciences

Anthropology, M.A.
Applied Linguistics, M.A.
Applied Physics, M.S.
Atmospheric Science, M.S.
Biological Informatics, M.S.
Biology, M.S., Ph.D.
Chemistry, M.S., Ph.D.
Classics, M.A.
Communication Studies, M.A.
Economics, M.A., Ph.D.
English, M.A., Ph.D.
Environmental Toxicology, M.S., Ph.D.
Exercise and Sport Sciences, M.S.
Geosciences, M.S., Ph.D.
German, M.A.
History, M.A., Ph.D.
Mathematics, M.A., M.S., Ph.D.
Microbiology, M.S.
Philosophy, M.A.
Physics, M.S., Ph.D.
Political Science, M.A., Ph.D.
Psychology, Clinical, Ph.D.
Psychology, Counseling, M.A., Ph.D.
Psychology, Experimental, M.A., Ph.D.
Public Administration, M.P.A.
Romance Languages (French or Spanish), M.A.
Sociology, M.A.
Spanish, Ph.D.
Sports Health, M.S.
Statistics, M.S.
Technical Communication, M.A.
Technical Communication and Rhetoric, Ph.D.
Zoology, M.S., Ph.D.

• Business

Accounting, M.S.A.
Business Administration, M.B.A.
Business Administration, M.S., Ph.D.
Business Administration–Telecom and Network Management, M.S.
International Business, I.M.B.A.

• Education

Bilingual Education, M.Ed.
Counselor Education, M.Ed., Ph.D.
Curriculum and Instruction, M.Ed., Ed.D., Ph.D.
Educational Leadership, M.Ed., Ed.D.
Educational Psychology, M.Ed., Ph.D.
Elementary Education, M.Ed.
Higher Education, M.Ed., Ed.D., Ph.D.
Instructional Technology, M.Ed., Ed.D.
Language Literacy Education, M.Ed.
Multidisciplinary Science, M.S.
Multidisciplinary Studies, M.S.
Secondary Education, M.Ed.
Special Education, M.Ed., Ed.D.

• Engineering

Chemical Engineering, M.S.Ch.E., Ph.D.
Civil Engineering, M.S.C.E., Ph.D.
Computer Science, M.S., Ph.D.
Electrical Engineering, M.S.E.E., Ph.D.
Engineering, M.Engr.
Environmental Engineering, M.Env.E.
Environmental Technology Management, M.S.E.T.M.
Industrial Engineering, M.S.I.E., Ph.D.
Manufacturing Systems and Engineering, M.S.M.S.E.
Mechanical Engineering, M.S.M.E., Ph.D.
Petroleum Engineering, M.S.P.E., Ph.D.
Software Engineering, M.S.
Systems and Engineering Management, M.S.S.E.M., Ph.D.

• Health Sciences

Athletic Training, M.A.T.
Audiology, Au.D.
Biotechnology, M.S.
Cell and Molecular Biology, M.S., Ph.D.
Clinical Practice Management, M.S.
Communications Sciences and Disorders, Ph.D.
Biochemistry and Molecular Genetics, M.S., Ph.D.
Medical Microbiology, M.S., Ph.D.
Medicine, M.D.
Molecular Pathology, M.S.
Nursing, M.S.N., Ph.D.
Occupational Therapy, M.O.T.
Pharmaceutical Sciences, M.S., Ph.D.
Pharmacology and Neuroscience, M.S., Ph.D.
Physical Therapy, M.P.T., D.Sci.
Physician Assistant Studies, M.P.A.S.
Physiology, M.S., Ph.D.
Rehabilitation Counseling, M.R.C.
Speech-Language Pathology, M.S.

• Human Sciences

Environmental Design, M.S.
Environmental Design and Consumer Economics, Ph.D.
Family and Consumer Sciences Education, M.S., Ph.D.
Hospitality Administration, Ph.D.
Human Development and Family Studies, M.S., Ph.D.
Marriage and Family Therapy, M.S., Ph.D.
Nutritional Sciences, M.S., Ph.D.
Personal Financial Planning, M.S.
Restaurant, Hotel, and Institutional Management, M.S.

• Mass Communications

Mass Communications, M.A., Ph.D.

• Visual and Performing Arts

Art, M.F.A.
Art Education, M.A.E.
Fine Arts (Art, Music, Theatre Arts), Ph.D.
Musical Arts (Composition, Conducting, Performance, Piano Pedagogy), D.M.A.
Music Composition, M.M.
Music Education, M.M.Ed.
Music Musicology, M.M.
Music Pedagogy, M.M.
Music Theory, M.M.
Performance (Music), M.M.
Theatre Arts, M.A., M.F.A.

• Interdisciplinary Programs

Biotechnology, M.S.
Heritage Management, M.S.
Interdisciplinary Studies, M.A., M.S.
Museum Science, M.A.

• Joint Programs

Business Administration/Architecture, M.B.A.–M.Arch.
Business Administration/Environmental Toxicology, M.B.A.–M.S.
Business Administration/Personal Financial Planning, M.B.A.–M.S.
Business Administration/Personal Financial Planning, M.S.–M.S.
Business Administration/Medicine, M.B.A.–M.D.
Business Administration/Foreign Languages, M.B.A.–M.A.
Law/Accounting, J.D.–M.S.A.
Law/Agricultural and Applied Economics, J.D.–M.S.
Law/Biotechnology, J.D.–M.S.
Law/Business Administration, J.D.–M.B.A.
Law/Crop Science/Horticulture/Soil Science/Entomology, J.D.–M.S.
Law/Environmental Toxicology, J.D.–M.S.
Law/Personal Financial Planning, J.D.–M.S.
Law/Public Administration, J.D.–M.P.A.
Physiology/Health, Exercise, and Sport Sciences, Ph.D.
Public Administration/Economics, M.P.A.–M.A.

Graduate Faculty

Members of the graduate faculty participate in all phases of the graduate program, assist in determining policy, and vote on candidates for graduate degrees. Membership is a means of recognizing the members of the faculty for scholarly activities, creativity, direction of graduate research and study, and other contributions to the graduate programs of the university and the Health Sciences Center. Except in special cases approved by the graduate dean, only graduate faculty may serve as instructors of graduate courses, conduct graduate examinations, and serve on thesis and dissertation committees.

Research Opportunities

With a full range of graduate programs presently in place, Texas Tech offers advanced study not only in the complete spectrum of basic disciplines, but also in many unique areas. Every department has its own particular strengths, with each college possessing special resources, centers of investigation, and research opportunities. For example, Texas Tech's renowned College of Engineering is deeply involved in research and provides exciting opportunities through both traditional programs and more specialized initiatives such as the Wind Science and Engineering Research Center, the Center for Pulsed Power and Power Electronics, and the Water Resources Center. The college also supports the Nano Tech Center, the Space Science Research Institute, and the National Institute for Engineering Ethics—all of which have attracted national interest.

The Natural Science Research Laboratory, an archive of representative recent fauna of the American Southwest and other areas, functions as a natural history library for studies of biodiversity, biogeography, ecology, evolution, genetics, molecular biology, parasitology, systematics, and virology. The collections, extensively used for investigations worldwide, include specimens of 72,000 mammals; 4,500 birds; more than 15,000 reptiles, amphibians, and fish; 250,000 insects; and 75,000 cryogenically preserved tissue samples, providing hands-on training for graduate students in biology and museum sciences.

The Plant Stress and Water Conservation research program in the College of Agricultural Sciences and Natural Resources investigates plant growth and development under conditions of thermal and water stress to aid in creating new crop varieties and management systems that will minimize the impact of climatic extremes. Students can explore other specializations through the Thornton Agricultural Finance Institute and the Wildlife and Fisheries Management Institute, among numerous additional options.

The Health Sciences Center has developed major research strengths in reproductive biology, neuroscience, hematology and immunology, the mysteries of sleep, and Alzheimer's disease. Texas Tech's innovative Sports Health program combines the resources of personnel from the Health Sciences Center and the Department of Health, Exercise, and Sport Sciences, as well as related sciences.

An internal VAX-11/750 system, microcomputer labs, and a remote-access center linked to the university's central computing facilities permit students to train with state-of-the-art resources located in the College of Business Administration. Research facilities include the Center for Professional Development, and the Institute for Banking and Financial Studies.

The nationally top-ranked College of Human Sciences boasts a spacious and attractive learning environment together with many special research programs and centers. Community support services are offered through the Institute for Child and Family Studies, and the Child Development Research Center, which in turn enhance ongoing research. Other centers within the College of Human Sciences include the Curriculum Center for Family and Consumer Sciences, the Texas Wine Marketing Research Institute and the Center for the Study of Addiction and Recovery.

The Center for Environmental Radiation Studies, the Psychology Clinic, and the innovative Center for Forensic Studies—which has

attracted state and regional media attention for its work in criminology—figure among a broad spectrum of prominent research endeavors within the College of Arts and Sciences. The Institute for Studies in Pragmatism is one of two national focal points for investigations of the thought of American philosopher Charles S. Peirce.

Special study and research opportunities in Arts and Sciences include the Center for Public Service and the Institute for Communications Research. Many such programs have their own specialized libraries or collections and nearly all are linked to the professional achievements and scholarly contributions of a distinguished faculty.

The Biotechnology and Genomics Center, established to encourage and support multidisciplinary research in biochemistry, cell biology, genetics, molecular biology, and related areas, offers a training program for Ph.D. students interested in interdisciplinary research in plant stress, including research teams in areas of cotton improvement and drug design. The institute's sophisticated core instrument facility provides services such as DNA sequencing.

ICASALS, Texas Tech's International Center for Arid and Semiarid Land Studies, was established over a quarter century ago and encourages study of arid and semiarid environments as well as the human problems peculiar to such areas. As a part of its special goal, ICASALS hosts numerous international visitors to the Texas Tech campus. The center operates an international data exchange and coordinates research in a variety of regional and global land-use programs.

The Vietnam Center has become a nationally recognized research center. The Vietnam Archives have made Texas Tech a major center for studies of that country, with Texas Tech having become a focus for doctoral dissertations on Vietnam studies.

Some unique research opportunities are independent of specific programs. Examples include the Archive of Turkish Oral Narrative, the one-of-a-kind collection of Modernist periodicals in the library of the Instituto de Estudios Hispánicos, and the nationally known Comparative Literature Symposium, which has existed for nearly four decades.

Reflecting many of the university's research strengths, the publications of the Texas Tech University Press appeal to academic tastes and those of the general reader. They range from cutting-edge scholarship to award-winning popular books.

The Graduate School is justifiably proud of the many outstanding teachers, honored scholars, and internationally known experts who are part of the graduate faculty at Texas Tech. Graduate students in every college have the opportunity to work with a distinguished group of professors; interact with present and future leaders of their respective disciplines; and, most importantly, enjoy the rap-



port that comes from mutual enthusiasm for learning, research, and shared interests. Comments from present and former students indicate their deep appreciation for faculty whose doors are always open and who are easily accessible for consultation and assistance despite research and editorial involvements, activities in professional organizations, and the daily demands of an expanding curriculum. The quality of graduate faculty-student interaction is enhanced by a small class size that allows a professor to devote personal attention to each student. Standards for graduate students are continually rising and many programs have admissions requirements that exceed the university-wide standard. At the same time, the Graduate School uses a holistic process for determining admission into the various programs.

Research Centers and Institutes

In addition to extensive research activity on the part of its individual faculty, the university sponsors the following institutes and centers that conduct both basic and applied research and provide various services to the public:

Agricultural Sciences and Natural Resources

- CASNR Water Center
- Center for Agricultural Technology Transfer
- Center for Feed and Industry Research and Education
- Cotton Economics Research Institute
- Fire Ecology Center
- International Center for Food Industry Excellence
- International Textile Center
- Pork Industry Institute for Research and Education
- Thornton Agricultural Finance Institute
- Wildlife and Fisheries Management Institute

Architecture

- Architecture Research Center

Arts and Sciences

- Center for Environmental Radiation Studies
- Center for Geospatial Technology
- Center for Historic Preservation and Technology
- Center for Public Service
- Institute for Studies in Pragmaticism
- Leather Research Institute
- Southwest Center for German Studies
- The Vietnam Center

Business Administration

- Center for Advanced Analytics and Business Intelligence
- Center for Entrepreneurship and Family Business
- Center for Health Care Leadership and Strategy
- Center for Professional Development
- Institute for Banking and Financial Studies
- Institute for Internet Buyer Behavior
- Institute for Leadership Research
- Texas Center for Innovative Organizations

Education

- The Burkhart Center for Autism Education and Research
- Center for Diversity Leadership in Education
- Center for Integration of Science Education and Research
- Virginia Murray Sowell Center for Research and Education in Visual Impairment

Engineering

- Center for Advanced Intelligent Systems
- Center for Applied Petrophysical Studies and Reservoir Studies
- Center for Engineering Outreach
- Center for Pulsed Power and Power Electronics
- Institute for Ergonomics Research
- MRI Petrophysical Applications Center
- Murdough Center for Engineering Professionalism
- Nano Tech Center (Sensor Systems)
- National Institute for Engineering Ethics

- Space Science Research Institute
- Water Resources Center

Human Sciences

- Center for Development and Resiliency
- Center for Financial Responsibility
- Center for the Study of Addiction and Recovery
- Child Development Research Center
- The Curriculum Center for Family and Consumer Sciences and Education
- Institute for Child and Family Studies
- Texas Wine Marketing Research Institute

Law

- Center for Biodefense, Law and Public Policy
- Center for Military Law and Policy
- Center for Water Law and Policy

Mass Communication

- Center for Communications Research
- Institute for Hispanic and International Communications
- Survey Research Institute

Other

- Center for Biotechnology and Genomics
- Institute for the Development and Enrichment of Advanced Learners (IDEAL)
- The Institute of Environmental and Human Health
- International Center for Arid and Semiarid Land Studies (ICASALS)
- Northwest Texas Small Business Development Center
- Teaching, Learning, and Technology Center
- Wind Science and Engineering Research Center
- Texas Tech Center for the Southwest

Finances

Texas Tech offers graduate study opportunities that are affordable when compared to other institutions. Texas Tech is outstanding among the state's universities for its reasonable costs and its ability to help many graduate students with some form of financial assistance. With the below-average cost of living in Lubbock, graduate education at Texas Tech is an exceptional investment value.

Graduate Program Tuition. A complete explanation of tuition and fees is available online at www.sbs.ttu.edu.

Residency Status Determination. Texas Higher Education Coordinating Board rule 21.731 requires each U.S. citizen/immigrant permanent resident applying to enroll at an institution to respond to a set of core residency questions for the purpose of determining the person's eligibility for classification as a resident. For rules governing the determination of residency status as defined by the Texas Higher Education Coordinating Board, see www.theccb.state.tx.us/Rules/tac3.cfm?Chapter_ID=21&Subchapter=X.

Academic Common Market

Texas Tech participates in the Academic Common Market, an interstate agreement that provides reciprocal higher education opportunities to citizens of states declared as parties to the Southern Regional Education Compact. Graduate students who are from these states and are admitted into approved out-of-state programs qualify for resident tuition if the program of study is not offered in their home state.

Approved programs at Texas Tech University and the member states from which qualified students may gain resident tuition are as follows:

- **Master of Architecture** (Alabama, Kentucky)
- **Master of Science, Doctor of Philosophy—Range Science** (Arkansas, Louisiana)
- **Doctor of Philosophy—Fine Arts** (Arkansas, Louisiana, Tennessee, Virginia)

- **Doctor of Philosophy—Home Economics Education** (Kentucky)
- **Doctor of Philosophy—Land-Use Planning, Management, and Design** (Alabama, Arkansas, Kentucky, Louisiana, Virginia)
- **Doctor of Philosophy—Marriage and Family Therapy** (Kentucky)
- **Doctor of Philosophy—Technical Communication and Rhetoric** (Tennessee)

Two steps are necessary to qualify for these programs: (1) Applicants must be accepted into a program for which an interstate agreement has been arranged, and (2) applicants must submit to Student Business Services proof of legal residency in a member state by providing documentation from the qualifying state's Coordinating Board or Board of Regents.

A list of state coordinators is available from the Southern Regional Education Board, 1340 Spring Street, N.W., Atlanta, GA 30309. For information about the ACM program in Texas, contact the Program Development Division of Senior Colleges and Universities, Texas Higher Education Coordinating Board, Box 12788, Capitol Station, TX 78711.

Graduate Admission

The Graduate School of Texas Tech University aspires to have a diverse student body. Although all students are admitted to the university by the dean of the Graduate School, applications for degree programs also must be evaluated by the department to which the student is applying.

Three general categories of criteria are used as part of a holistic process to evaluate all applicants for admission and competitive scholarships:

1. **Academic Records**—All academic records may be considered.
2. **Test Scores**—Official scores on the General Test of the Graduate Record Examination (GRE) or, for programs in the College of Business Administration, the Graduate Management Admission Test (GMAT) must be no more than five years old. Each score is considered separately with percentile scores viewed by broad major. Check with the individual program to determine whether it requires the GRE or GMAT. In accordance with Texas Education Code §51.842, the applicant's performance on a standardized test may not be used in the admissions or competitive scholarship process as the sole criterion for consideration of the applicant or as the primary criterion to end consideration of the applicant. International students must submit official scores on the TOEFL (Test of English as a Foreign Language) or IELTS (International English Language Testing Service) examinations. TOEFL and IELTS results must be no more than two years old.
3. **Individual Profiles**—Profiles may include recommendations, research background, motivation, multilingual proficiency, undergraduate institution, presentations, portfolios, interviews, work experience, demonstrated commitment to a particular field of study, community involvement, and family and socioeconomic background. The department to which the student applies may have additional requirements, including a separate application form.

For information about services for students with disabilities, contact Student Disability Services, 335 West Hall or Box 45007, Texas Tech University, Lubbock, TX 79409-5007, 806.742.2405.

Domestic and Permanent Resident Student Admissions

Admission to any graduate degree program is granted by the dean of the Graduate School upon the recommendation of the department of proposed study. The applicant must have been in good standing in the school last attended. Applications will not be evaluated until all admission requirements have been met. All materials submitted become the property of Texas Tech University and are

not returnable or refundable. Submit the following information to the Office of Graduate Admissions:

1. **Application**—Applications should be submitted at least three months prior to date of intended enrollment. The applications are available at www.gradschool.ttu.edu. Falsification of application information will void admission to Texas Tech University.
2. **\$50 Nonrefundable Application Fee**—Acceptable methods of payment are credit card, money order, cashier's check and traveler's check. Full-time Texas Tech employees, their spouses, and dependents under age 25 are exempt from this fee. The faculty/staff fee waiver form may be obtained from the Office of Graduate Admissions.

3. Official Transcripts

- The applicant must have earned a bachelor's degree from a regionally accredited college or university.
- The applicant must submit an official transcript from each college or university attended. All degrees earned must appear on an official transcript.
- The applicant who, because of current enrollment, cannot provide final transcripts at the time of application must submit transcripts of all completed study. Consideration may then be given for tentative admission upon the condition that final transcripts are provided within the initial semester of enrollment at Texas Tech.

The applicant must have been in good standing in all schools attended at final matriculation.

4. **Official GRE Score Report**—The GRE must not be more than five years old. This is a requirement of most degree programs. Check with the individual graduate program if you are not certain if the GRE is required. Information about the GRE may be obtained from the Educational Testing Service, P.O. Box 6000, Princeton, NJ 08541-6000. All test scores are received by Graduate Admissions, not the department. The institution code for Texas Tech is 6827.

GRE — 866.473.4373 (U.S., U.S. Territories and Canada), 609.771.7670 (all other locations), www.gre.org

Send all official documents to the following address:

Office of Graduate Admissions
Texas Tech University
P.O. Box 41030
Lubbock, TX 79409-1030

5. **Official GMAT score report (for College of Business Administration and other select programs)**—The GMAT must not be more than five years old. Check with the individual program if you are not certain if the GMAT is required. Information about the GMAT may be obtained from Pearson VUE, P.O. Box 581907, Minneapolis, MN 55458-1907. All test scores are received by the Office of Graduate Admissions, not the department. The institution code for Texas Tech is 6827.

GMAT— 800.717.4628, 952. 681.3680, Fax 952.681.3681, www.mba.com, GMATCandidateServicesAmerica@pearson.com

GFS-3F-17 Master's in Accounting
GFS-3F-24 M.B.A., Flexible Part Time
GFS-3F-05 M.B.A, Full Time
GFS-3F-64 Ph.D. Program
GFS-3F-96 M.S. in Business Administration
GFS-3F-29 Other Programs

Send all official documents to the following address:

Office of Graduate Admissions
Texas Tech University
P.O. Box 41030
Lubbock, TX 79409-1030

Contact Your Department. Prospective students must also contact the department in which they are planning to study to obtain information regarding any special admission requirements, such as additional tests, applications, or letters of recommendation. You may find online applications at the Web sites of each department by viewing the main Texas Tech Web site at www.ttu.edu and selecting “Academics.” You also may call Texas Tech directory assistance at 806.742.2011 and ask for the department of interest to you.

Evaluating Applications. Application files will not be evaluated until all of the above requirements have been met. Applicants will be notified by the Office of Graduate Admissions when an admissions decision has been made. Some departments that operate with a limited number of spaces for students will make final decisions for the fall semester in early spring. U.S. or permanent resident applicants who, for whatever reason, cannot provide all documents required for admission to a degree program by the time of planned initial enrollment may request permission to register for graduate courses through temporary non-degree admission (GTMP).

Admission to a Second Graduate Degree Program. Permission to work toward a second graduate degree of the same level is granted only upon approval by the relevant department and review by the graduate dean. In addition, the applicant is subject to all requirements as a new student. While there is no guarantee that any work from the first degree may apply to the second, at least one full year (24 semester hours) must be taken specifically for the new degree program.

International Student Admissions

Over the years, Texas Tech has been fortunate to attract numbers of highly qualified and talented international students. Recognizing the difficulties involved in moving from their home countries and home schools to a new environment and new scholarly procedures and expectations, Graduate Admissions is committed to helping international students in this important transition.

The following procedures should be followed carefully in order for international students to be admitted to a master’s or doctoral degree program at Texas Tech University. Applications will not be evaluated until all admission requirements have been met. All materials submitted become the property of Texas Tech and are not returnable or refundable.

1. Application—Applications may be obtained from the Web site www.gradschool.ttu.edu. Falsification of application information will void admission to Texas Tech University. The applicant’s name must be the same as it appears on the passport.

2. \$60 Nonrefundable Application Fee—Acceptable methods of payment are credit card, money order, cashier’s check and traveler’s check. Full-time Texas Tech employees, their spouses, and dependents under age 25 are exempt from this fee. The faculty/staff fee waiver form may be obtained in the Office of Graduate Admissions.

3. Official Transcripts

- The applicant must have earned a bachelor’s degree from a regionally accredited institution in the United States or its equivalent from a foreign institution. Foreign institutions must be recognized by their government/governmental ministry as a degree-granting institution.
- The applicant must submit an official transcript from each college or university attended. All degrees earned must appear on an official transcript.
- The applicant who, because of current enrollment, cannot provide final transcripts at the time of application must submit transcripts of all completed study. Consideration may then be given for tentative admission upon the condition that final transcripts are provided within the initial semester of enrollment at Texas Tech. Applicants must submit at least six semesters of coursework to be eligible for admission consideration.

The applicant must have been in good standing in all schools attended at final matriculation.

In addition to these standard requirements, international applicants must also provide an official English translation of all transcripts or marksheets if the documents are not provided in English. Certification of the translation must be made by an official government translator with the original signature and/or the university issuing the transcript or marksheets with original signature and seal. Graduate Admissions will not accept a public notary certification. If the applicant has not completed his/her degree at the time of application, six semesters or three years of coursework are required to complete an evaluation. Once the degree is completed, a final transcript showing the degree awarded must be submitted.

If an international student has attended another U.S. university and wishes to transfer to Texas Tech, an official transcript from that university is required.

4. Degree—An official degree certificate, diploma, or statement that the degree has been granted is required, including an official English translation. Certification of the translation must be made by an official government translator with the original signature and/or the university issuing the degree with original signature and seal. Graduate Admissions will not accept a public notary certification.

5. Official GRE (or GMAT for College of Business Administration and Other Select Programs) Score Report—The GRE/GMAT must not be more than five years old. This is a requirement of most degree programs. Check with the individual program if you are not certain if the GRE/GMAT is required. Programs may also occasionally allow other standardized tests to substitute for the GRE/GMAT. Information about the GRE or GMAT may be obtained from the Educational Testing Service, P.O. Box 6000, Princeton, NJ 08541-6000. All test scores are received by Graduate Admissions, not the department. The institution code for Texas Tech is 6827.

GRE — 866.473.4373 (U.S., U.S. Territories and Canada), 609.771.7670 (all other locations), www.gre.org
GMAT — 800.462.8669 and/or 609.771.7330, www.gmat.org

6. Official TOEFL/IELTS—TOEFL/IELTS score reports must not be more than two years old. The TOEFL score must be received directly from the Educational Testing Service (ETS), and the IELTS score must be received directly from ielts.org. All test scores are received by Graduate Admissions, not the department. Photocopies are not considered official. The minimum TOEFL score required is 550 (paper-based version), 213 (computer-based version), or 79 (internet-based version); the minimum IELTS required score is an overall band score of 6.5. The TOEFL/IELTS examinations are not waived unless an applicant has a degree from a U.S. university or from a university in a country where English is the native language. Countries Texas Tech University considers to have English as the native language include Australia, Canada (except the Province of Quebec), Commonwealth Caribbean Countries (Anguilla, Antigua, the Bahamas, Barbados, Belize, British Virgin Islands, Bermuda, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent, Trinidad and Tobago, and Turks and Caicos Islands), Ireland, Liberia, New Zealand, United Kingdom (England, Northern Ireland, Scotland, Wales), and the United States.

Information about the TOEFL may be obtained from the Educational Testing Service, P.O. Box 6151, Princeton, NJ 08541-6151. The institution code for Texas Tech is 6827.

TOEFL — 877.863.3546 (U.S., U.S. Territories and Canada), 609.771.7100 (all other locations), www.toefl.org

IELTS — Information about the IELTS may be obtained from IELTS International, 100 East Corson Street, Suite 200, Pasadena, CA 91103, T 626.564.2954, F 626.564.2981, www.ielts.org, ielts@ieltsintl.org. The institution code for Texas Tech is 6827. There is no IELTS institution code for Texas Tech University.

To determine whether additional English training is required along with graduate coursework, further evaluation of English proficiency will be given after the student arrives on campus. If a student is accepted by a department, the Office of Graduate Admissions will then determine if there is enough financial information to issue an I-20. If there is, the I-20 will be issued by the Office of Graduate Admissions and mailed to the student. If financial information is needed it should be in the form of a bank statement converted to U.S. currency. This statement should not be sent to the department. A statement of support from the sponsor must accompany the bank statement. Students should check with Graduate Admissions about the current amounts needed in their bank accounts. These amounts include tuition, books, living expenses, etc. Amounts will vary depending upon the financial assistance awarded by the department.

Students should be certain to give their full names on the envelope return address. Correspondence should include the full name and date of birth. All entries into the records system are made by family name (last name), first name, middle name.

Send all official documents to the following address:

Office of Graduate Admissions
Texas Tech University
PO. Box 41030
Lubbock, TX 79409-1030

Evaluating Applications. Applications will not be evaluated until all of the above requirements have been met. Applicants will be notified by the Office of Graduate Admissions when an admissions decision has been made. Some departments, operating with a limited number of spaces for students each year, make final decisions for the fall semester in early spring.

Deadlines. Deadlines for international applicants are as follows:

- March 1 for fall semester
- September 1 for spring semester
- February 1 for summer session

Contact Your Department. Prospective students must also contact the department in which they are planning to study to obtain information regarding any special admission requirements, such as additional tests, applications, or letters of recommendation. You may find online applications at the Web sites of each department by viewing the main Texas Tech Web site (www.ttu.edu) and select “Academics.” You may also do so by calling the main university switchboard number 806.742.2011 and asking for the department in which you are interested.

SEVIS—International students, exchange visitors and scholars attending school or conducting research in the United States are required to pay a \$100 SEVIS fee prior to obtaining their visas. The fee is associated with the Student Exchange and Visitor Information System (SEVIS) and took effect September 1, 2004. The \$100 SEVIS fee will be refunded as a stipend upon entrance and enrollment in a graduate program at Texas Tech University.

Admission to a Second Graduate Degree Program. Permission to work toward a second graduate degree of the same level is granted only upon approval by the relevant department and review by the graduate dean. In addition, the applicant is subject to all requirements as a new student. While there is no guarantee that any work from the first degree may apply to the second, at least one full year (24 semester hours) must be taken specifically for the new degree program.

Non-Degree Student Admission Procedures

Admission to a non-degree program is not a guarantee of admission to a graduate degree program at a later date, nor does it guarantee that credits earned in a non-degree program will count toward a graduate degree.

- **PGRD (Post Graduate)**—PGRD category is for students who have earned an undergraduate degree and desire to take only undergraduate courses. In this status, a student may register indefinitely as a non-degree graduate student but may not be appointed to teaching assistantships or research assistantships. Students in this category may not register for graduate courses.
- **GTMP (Graduate Temporary)**—A student in this category is considered a temporary non-degree student and may enroll for no more than 12 hours.
- **CERT (Teacher Certification), FCSC (Teacher Certification/Human Sciences)**—A student who desires to earn certification through the College of Education or the College of Human Sciences may apply for this type of non-degree status. Graduate courses may be taken, but if the student wishes to pursue a degree at a later time, only 12 graduate hours completed before admission to a degree program can be counted toward a degree. The student must also apply through the College of Education or the College of Human Sciences, in addition to Graduate Admissions.
- **CPED (Continuing Professional Education Development)**—CPED is designed to meet the needs of professionals such as engineers, certified public accountants, architects, social workers, teachers, and others who require continuing professional educational development. In addition to applying to Graduate Admissions, students must request permission for this non-degree status from the graduate advisor or faculty administering the program in their department. The GRE will be waived as long as a GPA of 3.0 or greater is maintained as a non-degree student.
- **GCRT (Graduate Certificate Program)**—GCRT is intended to meet the supplemental educational needs of professionals. A graduate certificate program is comprised of a set of courses that provide a coherent knowledge base. These courses may be derived from more than one academic program and may be more practice-oriented than the courses in a graduate academic program. Students applying for a graduate certificate program are not required to submit GRE or GMAT scores but must meet all other requirements for graduate admission.

Applicants seeking non-degree admission in any category must provide the following:

1. **Application**—Applications should be submitted at least three months prior to date of intended enrollment. The online forms are available at www.gradschool.ttu.edu. Falsification of application information will void admission to Texas Tech University.
2. **\$50 Nonrefundable Application Fee**—Acceptable methods of payment are credit card, money order, cashier's check and traveler's check. Full-time Texas Tech employees, their spouses, and dependents under age 25 are exempt from this fee. The faculty/staff fee waiver form may be obtained in the Office of Graduate Admissions.
3. **Official Transcripts**—The bachelor's degree must be equivalent to one from Texas Tech. A student who, because of current enrollment, cannot provide final transcripts at the time of application must submit transcripts of all completed study, as well as incomplete transcripts from the current institution. Consideration may then be given for tentative admission upon the condition that final transcripts are provided within the initial semester of enrollment at Texas Tech. Official transcripts showing the prospective student is in good standing from all higher education institutions attended are required.

Graduate School Readmission / Deferment

Students who fail to register or who leave school during a spring or fall semester must fill out and submit the Returning Student Form. The returning student form may be found online at www.gradschool.ttu.edu. Select "Forms." Student should check the box labeled "Request to Re-Admit." Automatic readmission is not guaranteed; departments will consider students on a case by case basis. The Office of Graduate Admissions will notify the student of the department's decision.

Previously enrolled students who do not enroll for more than 12 months must fill out and submit a new application.

International and domestic students who defer admission to a semester for which they did not originally apply must fill out and submit the Request to Change the Initial Entry Date form and check the box labeled "Request to Change the Initial Entry Date." The form can be found online at www.gradschool.ttu.edu. Automatic readmission is not guaranteed; departments will consider students on a case-by-case basis. The Office of Graduate Admissions will notify the student of the department's decision.

Enrollment

Students who have been granted admission to the Graduate School are expected to register for coursework whether or not they contemplate degree work. Failure to register in the term for which admission is granted requires the student to reapply for admission. The details of registration are under the jurisdiction of the registrar's office, which furnishes each enrollee complete instructions for all steps in the procedure. Students should follow carefully such instructions and those found in this section of the catalog. Graduate students are permitted to register at any time beginning with the first day of advance registration. Advance registration usually begins in April for the summer and fall sessions and in November for the spring semester. Online registration is available to all admitted students. Instructions for Web registration and add-drop can be found at www.techsis.admin.ttu.edu/student.

Departmental Approval of Courses. Students should have a schedule of courses approved by an official representative of their major department at the time of registration. It is the student's responsibility to see that the registrar's printout corresponds exactly to the courses for which the student has registered.

Enrollment of a graduate student in any course that carries graduate credit is automatically considered to be for graduate credit and affects relevant grade point averages accordingly.

Full-Time Study. Normal full-time enrollment varies between 9 and 13 hours for doctoral students and 9 and 16 hours for other graduate students in the regular semester. The minimum enrollment for full-time graduate status is 9 hours in the regular semester. Full-time enrollment in a summer term is from 3 to 6 hours. Students on fellowships, assistantships, or other appointments designed for the support of graduate study should enroll for 9 hours in each regular semester and at least 3 hours in a summer term.

If a student is devoting full time to research, using university facilities and faculty time, the schedule should reflect at least 9 hours enrollment (6 hours in each summer term). Doctoral students who have completed coursework, passed qualifying exams, been admitted to candidacy, and accumulated at least 85 doctoral hours may register as full-time students for one semester, taking the number of hours (not less than 3) that will bring the total to 93 hours. Then they may register as full-time students for up to two more semesters of 3 hours each, thus constituting full enrollment for employment purposes only. (Two summer terms will count as one semester.) Such lower enrollment may affect financial aid status; students are encouraged to check with financial aid, scholarship, and loan officers before taking the 3-hour option.

Normally, the maximum allowable hours per semester is 13 for doctoral students, 16 for other graduate students, and 6 in a six-week summer term. The general rule is that a student may not earn more than 1 hour of credit for each week of the enrollment period. Any exceptions to this rule must have the prior approval of the graduate dean.

Registration in an individual study, research, or similar course implies an expected level of effort on the part of the student comparable to that associated with an organized class with the same credit value.

A doctoral student shall not be required to register for more than 9 credit hours during any long semester or 6 credit hours during a summer term and may not register for more than 13 and 6 hours, respectively, without the prior permission of the dean of the Graduate School.

A doctoral student who is required to register solely for the purpose of satisfying a continuous enrollment requirement need not register for more than 1 credit hour during each term. However, a doctoral student who is involved in internship, research, or another type of academic study should register for credit hours in proportion to the teaching effort required of the program faculty.

Leave of Absence. Any student who fails to register during a fall or spring semester and who does not have an official leave of absence from study is subject to review for readmission by the standards in effect at the time of reconsideration. Official leave of absence, which is granted by the dean of the Graduate School upon departmental recommendation, may be requested only in case of serious medical conditions and other exceptional reasons. Normally, leaves of absence will not exceed one year. Leaves of absence do not extend the maximum time allowed for completion of the degree.

Continuous Enrollment. Students who have begun thesis or dissertation research must register for 6000 or 8000 courses in each regular semester and at least once each summer until all degree requirements have been completed, unless granted an official leave of absence from the program for medical or other exceptional reasons. Off-campus students may register for 1 hour of 6000 or 8000 with departmental approval until their final semester, at which time they must enroll for at least 3 hours. Students receiving financial assistance must register for the number of hours required by Financial Aid. Approval of a leave of absence will not extend the allowed time for completion of the degree.

Registration for Thesis or Dissertation Hours. Registration for at least 6 hours of 6000 is required for the master's thesis and at least 12 hours of 8000 for a doctoral dissertation. Once the project is begun, a student must be enrolled in such courses every semester until completion. A student should enroll under the committee chairperson; however, in those instances in which other professors on the committee are making substantial contribution to the student's research, it is permissible for the student to enroll proportionally under those professors. Students certified as off-campus may enroll for as little as 1 hour until their final semester, at which time 3 hours minimum are required.

Students may not enroll in thesis or dissertation courses before formal admission to a degree program by the graduate dean.

Enrollment for thesis or dissertation courses is permitted only during a regular registration period. Students away from the campus may, however, register for such courses by mail, provided arrangements are made with the registrar's office by telephone or electronically prior to the beginning of a registration period.

Students are required to register for appropriate courses in every semester or summer term in which they expect to receive assistance, use the facilities of the university, or take comprehensive examinations.

The number of hours for which students must enroll in each semester depends on their level of involvement in research and their use of university facilities and faculty time. Students in residence who are devoting full time to research should enroll for 9 to 12 hours.

Registration in Session of Graduation. There are three official graduation dates: December, May, and August. Every candidate for a graduate degree must be registered in the Graduate School in the session of graduation for at least 3 hours of 6000/8000, if all requirements are not met, or 1 hour of 7000 individual study for nonthesis, if all requirements are met. Failure to graduate at the expected time requires such additional registrations as may be necessary until graduation.

Maximum Allowable Doctoral Hours. Students not making timely progress toward completion of the doctoral degree are subject to termination by the graduate dean. The Texas Legislature has capped fundable graduate study at 99 doctoral hours for most programs and may impose sanctions upon universities permitting registration for excess hours. Graduate students with more than 99 doctoral hours will be required to pay out-of-state tuition, regardless of residence status. The maximum time allowed for completing the doctoral degree is eight years from the first doctoral semester or four years from admission to candidacy, whichever comes first. The graduate dean must approve exceptions or extensions in advance.

Maximum Allowable Graduate Hours. Students who are in programs other than doctoral programs and are not making timely progress toward completion of their degree are subject to termination by the graduate dean. Graduate students beyond the maximum allowable graduate hours as determined by the Texas Legislature may be required to pay out-of-state tuition, regardless of residence status. The maximum time allowed for completing a master's degree is six years. The graduate dean must approve exceptions or extensions in advance.

Changes in Schedule and Withdrawal. A graduate student who wishes to add or drop a course must initiate such action with the graduate advisor for his or her program. A student who quits a course without official withdrawal is likely to receive an F in that course.

Enrollment by Faculty and Staff. Full-time members of the faculty and staff of Texas Tech University may enroll for courses by permission of the department chairperson concerned. In registering for graduate work, they become subject to the regulations of the Graduate School. However, no member of the faculty who has held rank higher than instructor at Texas Tech is eligible to pursue a graduate degree program at this institution unless prior approval of the graduate dean is given.

Enrollment by Undergraduates. An undergraduate student who is within 12 hours of graduation and who has at least a B average in the major subject may enroll for courses carrying graduate credit, subject to the approval and certification of an acceptable grade point average by the dean of the instructional college and the approval of the dean of the Graduate School. This approval must be obtained on special forms available in the Graduate School at the time of registration. No course taken without this approval may be counted for graduate credit. With the approval of the dean of the instructional college and the dean of the Graduate School, students may take graduate courses for undergraduate credit. Students may not, however, receive both graduate and undergraduate credit for the same course, except for up to 9 hours for an approved joint undergraduate and graduate degree program.

The maximum amount of work that may be scheduled by an undergraduate taking courses for graduate credit is 16 hours in a semester or 6 hours in a summer term, including graduate and undergraduate work. Undergraduates permitted to enroll for graduate work are expected to receive their bachelor's degree within a year of their first graduate enrollment.

An undergraduate may not receive credit for more than 12 semester hours of graduate work completed prior to admission to the Graduate School as an applicant for a graduate degree.

Students not attending Texas Tech University must be admitted to the undergraduate program prior to being allowed to enroll in graduate classes. No one should apply to graduate school that does not anticipate undergraduate graduation prior to beginning graduate classes.

Continuation in Graduate School

Every student enrolled in the Graduate School, whether working toward a degree or not, is required to maintain a high level of performance and to comply fully with policies of the institution. The Graduate School reserves the right to place on probation or to suspend any post-baccalaureate or graduate student who does not maintain satisfactory academic standing or who fails to conform to the regulations of the university.

Students who are admitted to the Graduate School or to a degree program on condition of maintaining a required GPA are automatically admitted on a probational basis. Failure to fulfill the conditions stipulated at the time of admission will result in termination from the Graduate School.

Academic Probation and Suspension

If a student's graduate GPA for a particular semester falls below 3.0, the student will be placed on academic probation. (A 3.0 average is the minimum requirement of the Graduate School; individual academic areas may, and often do, impose a higher grade point average for continuation in their academic programs.) A student must make a 3.0 GPA or better in the next semester in which he or she is enrolled. Failure to do so, or to maintain a 3.0 current GPA in each succeeding semester, will result in academic suspension from further enrollment as a graduate student or in graduate courses at Texas Tech. Regulations governing scholastic probation are based on semester grade point averages and will be applied regardless of overall grade point average. Any student who has been suspended must appeal to the Graduate School if reinstatement is desired.

Appeal of suspension may be made in writing to the dean of the Graduate School. If the graduate dean rejects the student's appeal, the student may request a hearing before the Student Affairs Committee of the Graduate Council. This committee will render a decision as to whether or when the student may be readmitted to graduate study.

A student may be suspended for unprofessional conduct such as cheating or plagiarism. Any appeal is subject to the provisions of the Code of Student Conduct. See the *Student Handbook* for further information.

General Information

The Graduate School, like other colleges and schools of Texas Tech, reserves the right to institute, after due notice and during the course of a student's work toward a degree, any new ruling that may be necessary for the good of the university and therefore, ultimately, of its degree recipients. Normally a student may graduate under the provisions of the catalog in effect the semester of admission into the degree program.

Responsibility of Students. Each graduate student is expected to become thoroughly familiar with both departmental and Graduate School regulations and with the requirements for degrees. Failure to follow the regulations and requirements almost inevitably results in complications for which the Graduate School cannot assume responsibility.

To facilitate communications, graduate students should promptly notify the Graduate School of changes of address.

Graduate Advisors. The dean of the Graduate School is the general advisor for all graduate students, but, insofar as the particular courses are concerned, students are counseled by the chairpersons of their major and minor departments or by other professors designated for such counseling. Advisement in matters pertaining to teachers' certificates is the responsibility of the director of teacher certification in the College of Education.

Extracurricular Activities. Graduate students may participate in extracurricular activities within university policies. They are encouraged to participate in honor societies for which they may be qualified.

Prerequisites for a Graduate Major. For a graduate major, an applicant must have completed, or must take, sufficient undergraduate work to ensure adequate background for successful graduate work in the proposed field. With approval of the department, the student may receive credit by examination for such leveling requirements. Any department may specify additional prerequisites if they are considered necessary and may require an applicant to pass an examination before being accepted.

Transfer Credit and Distance Courses. There is no automatic transfer of credit from another university toward a graduate degree at Texas Tech. In general, all such work is subject to review and approval by the student's department and by the graduate dean. No work completed with a grade of less than B will be considered.

Graduate credit may be granted for courses taken by distance learning at another university. Distance learning completed through Texas Tech's Division of Outreach and Distance Education may be considered if the student had been officially admitted to the Graduate School prior to enrolling for the courses (see discussion of distance learning in master's program requirements). Graduate credit is **not** granted for courses taken by correspondence.

Grades. The grades used in the Graduate School are the same as those used in undergraduate work (A, B, C, D, and F), but graduate credit is allowed only for courses completed with grades of A, B, and C, although grades of D and F are used in computing grade point averages. Instructors may choose to add a plus or a minus to the grade. These will be entered on the transcript but will not be used in calculating the grade point average.

Departments have the option to use pass-fail grades (P and F) for individually arranged courses, professional seminars, and certain other courses. No more than one-fourth of a student's program coursework may be graded pass-fail, however.

No final grade assigned for a graduate-level course may be raised unless an error has been made. Substituting another course for one completed with a low grade is not permitted.

Work completed at another graduate school with a grade less than B will not be accepted, nor will grades of pass or satisfactory. Grades on transferred work will not raise the grade point average on courses completed at Texas Tech.

Symbols CR, NC, I, and W. The symbol CR (credit) or NC (no credit) normally is assigned for every enrollment for a master's thesis or doctor's dissertation until the completed document has been approved by the student's committee and accepted by the dean of the Graduate School. At that time a grade of A or B will be entered for the final enrollment.

CR may be given by a professor when a student's work in other individual research courses is not finished but is satisfactorily in progress at the end of a semester. When the research is completed, a standard letter grade should be entered for the final semester. PR is not an appropriate grade for any graduate course.

The symbol I (incomplete) may be given by a professor when a student's work in a course has not been completed at the end of a semester and when failure to complete the work has been due to causes beyond the student's control. It is not used as a substitute for F. When the I is given, the instructor should file a form with the Graduate Office specifying the reasons for the grade and the work remaining to be done.

Students may officially drop a course through the 45th class day of a long semester or the 15th class day of a summer term and receive the grade of W regardless of their progress in the class. After this time period, students must complete all courses and receive a grade.

Proficiency in English. An international student found deficient in English may be required to complete certain specified courses in English usage (without graduate credit) satisfactorily before being considered for admission to candidacy for a graduate degree.

Statement of Intention to Graduate. A student planning to graduate must file in the Graduate School's office a "Statement of Intention to Graduate" at the beginning of the semester of intended graduation. A list of deadlines will be sent to all students who indicate a current-semester graduation date on their program forms. No candidate's name will be placed on the "Tentative List of Graduates" for any graduation date unless this statement has been received at the Graduate Office by the specified deadline.

A candidate who fails to graduate at the expected time is required to file a new "Statement of Intention to Graduate" for any subsequent graduation.

Teacher Certification. Prospective students should understand that the material in this catalog applies only to requirements for graduate degrees and has no direct relation to certificates for public school teachers. The Graduate School gives no assurance that a program for a graduate degree and a program for a certificate will coincide. Students interested in certificates should confer with the director of teacher certification in the appropriate program at the outset of their work.

Master's Program

General Requirements

The degree requirements set forth here are in addition to those listed on previous pages of the graduate studies section of the catalog.

Prerequisites. Admission to a master's degree program is dependent upon the applicant's undergraduate record; scores on the Aptitude Test of the Graduate Record Examination or, for business applicants, the Graduate Management Admissions Test (except in programs in which either test has been waived); other relevant information; and the recommendation of the proposed major department.

A substantial body of undergraduate work in the major subject and considerable breadth of background are essential for graduate study. Therefore, students whose undergraduate programs are considered deficient in breadth or depth may be required to complete additional preparatory work without degree credit. Such undergraduate "leveling" courses must be completed with a grade of C or better. Some programs may require a grade better than a C.

Major Subject. Every program for a master's degree not granted special exception must embody a major comprising at least 18 semester hours of graduate work (which may include a thesis) in a subject that has been approved for major work and for which the student has, or completes without degree credit, the necessary prerequisites for a graduate major.

Minor. Programs for a master's degree may include two or three courses outside the major area. Departments offering master's programs may permit students to take all of their work for the degree within the department. A minor may be completed in a single department or in several departments, but the courses comprising the minor are subject to the following limitations: (1) must carry graduate credit, (2) must be acceptable to the student's major department, and (3) must be approved for the student by the department offering the course. This approval is indicated in the degree plan by the signature of the department chairperson (or graduate advisor). The purpose of this process is to make sure that a student is properly prepared for a course prior to enrollment.

Basic Plans for the Master's Degree

There are two basic plans for master's degree work:

1. A minimum of 24 hours of graduate coursework plus 6 hours of thesis (6000). The courses for the master's degree with a thesis should be approved by the research advisor and not the graduate advisor.
2. A minimum of 36 hours of graduate coursework without a thesis. (Some degrees have a greater minimum hour requirement. An example is the Master of Fine Arts degree program, which

requires 60 hours of graduate coursework and a thesis or an exhibition.)

The option to offer thesis or nonthesis programs is a departmental decision. In addition, no more than 6 hours of individual study courses (aside from the thesis) ordinarily will be permitted in the master's program.

Filing the Official Degree Program. During the first semester of enrollment, the student should submit to the dean of the Graduate School a "Program for the Master's Degree and Application for Admission to Candidacy" as prepared by an official representative of the proposed major department and of other departments as indicated under "Minor" in the preceding section. Delay in submission of a degree program may result in postponement of admission to candidacy and graduation. Forms for the "Program for the Master's Degree and Application for Admission to Candidacy" are available at the Graduate Office or www.gradschool.ttu.edu.

When the student receives an approved copy of the "Program" from the Graduate Office, he or she is expected to follow it as the basis of all subsequent enrollments. Substitution of courses can be made only on the written recommendation of the department or departments concerned and approval of the graduate dean.

Approval of a "Program for the Master's Degree" does not, however, constitute admission to candidacy for a master's degree. It merely signifies that the proposed program will be acceptable if the student satisfies all Graduate School regulations and all of requirements connected with the degree program.

Annual Review. The Graduate School strongly encourages faculty of master's programs to conduct a formal review of the progress of their students at least once a year. Any student not making satisfactory progress toward the degree may be placed on probation and given conditions to stay in the program. Continued unsatisfactory progress in any area of graduate work will be cause for dismissal.

Minimum Residence. The minimum residence for any master's degree is ordinarily a full academic year or its equivalent of graduate work carrying residence credit. Part-time enrollment is evaluated on an individual basis.

Transferred Work. There is no automatic transfer of credit toward a master's degree, but, in general, work completed in residence at another accredited graduate school may, on the recommendation of the departments concerned, be accepted for as much as 6 semester hours toward a master's degree. Exceptions to this rule are granted in the case of the Master of Engineering degree and in certain other instances upon agreement between the college or department concerned and the Graduate School. Work completed at another graduate school with a grade less than B will not be accepted. Transfer credit will not alter a student's grade point average at Texas Tech.

Extension. A maximum of 6 semester hours of extension work completed through Extended Studies at Texas Tech may be credited on the coursework for a master's degree (or a maximum of 9 hours on a 36-hour program) if the student had been officially admitted to the Graduate School prior to enrolling for the extension work. Graduate credit is not granted for courses taken by extension at another university or taken by correspondence.

Grade Requirement for Graduation. For the master's degree, the minimum requirement for graduation is an average of 3.0 in the major subject and an overall average of 3.0 on all courses, exclusive of the thesis, comprising the official program for the degree. Individual departments or colleges may have higher standards.

Admission to Candidacy. Every applicant for a master's degree is required to make formal application for admission to candidacy for the master's degree as soon as 9 to 12 semester hours of the master's degree work, excluding leveling courses, have been completed. This application is submitted to the dean of the Graduate School on the form entitled "Program for the Master's Degree and Application for Admission to Candidacy."

Admission to candidacy will be granted at such time as all of the following requirements have been met:

1. All conditions relating to admission to the program have been met.
2. At least 9 semester hours of the graduate work required for the master's degree have been completed (exclusive of transfer and extension courses).
3. All required leveling work has been completed with C or better grades.
4. An average grade of 3.0 or better has been maintained in all courses comprising the official program exclusive of leveling work.
5. Proficiency in a foreign language or tool subject required for the particular degree has been acceptably demonstrated.
6. The general field of the thesis has been stated and approved.
7. Work to date is acceptable to the departments concerned, as attested by their approval of the application for admission to candidacy.
8. The entire program conforms with the general requirements of the Graduate School and the requirements of the particular degree.

Time Limit. With the exception of certain specially approved programs, work credited toward a master's degree must be completed within six years. Students whose graduate study at Texas Tech is interrupted by military service will be granted an extension of time for the period of their military duty, not exceeding five years.

Language, Tool Subject Requirements

Language Requirement. Many departments require a reading knowledge of one or more foreign languages, although it is not a school-wide requirement. When this requirement exists, see the appropriate departmental section in this catalog for further information. The essential purpose for a language requirement is to assure that the student gains access to scholarly literature of his or her field in more than one language. Foreign students may use their native language (if it is not English) to meet this requirement if this essential purpose is served thereby and their major department approves. Foreign students must provide official documentation of acceptable grades in languages taken abroad or be tested as described below.

To qualify for Admission to Candidacy in a program that requires knowledge of a foreign language, the applicant must demonstrate proficiency in one of the following ways (as specified by the department) not more than seven years prior to submission of an official program of study: (1) passing with a C- or better the second course of the sophomore sequence of the required language; (2) passing with a B- or better the second half of one of the special 6-hour programs for graduate students offered in French, German, and Spanish; (3) passing a standardized examination in French, German, Spanish, or Latin given in the Department of Classical and Modern Languages and Literatures or one of the examinations in French, German, or Spanish furnished by the Educational Testing Service and administered by the university's Testing Center. Arrangements for these examinations should be made in the applicable unit. The Department of Classical and Modern Languages and Literatures will administer the examinations in any other foreign language in which instruction is offered by the department. Arrangements for testing for other foreign languages will be approved by the graduate dean.

Students majoring or minoring in foreign languages in the Department of Classical and Modern Languages and Literatures are subject to higher performance levels in satisfying the master's requirement. Students should consult the graduate advisor of the appropriate language for guidelines.

Tool Subject Requirement. Some departments require a tool subject in lieu of or in addition to the language requirement. When this requirement exists, further information can be found in the appropriate departmental section within this catalog. When this provision can be satisfied by a formal course(s), a grade of B or better is required either in a single course or in the last of a sequence of such courses.

Master's Thesis

The master's thesis should represent independent work by the student, be conducted under the supervision of an advisory committee, and be written clearly and concisely in standard English (or another language when appropriate). As soon as the student's area for thesis research has been determined, the graduate dean will appoint an advisory committee upon recommendation of the major department. The committee must consist of at least two members of the graduate faculty, including one from the department granting the degree. All members of the committee must sign the Thesis/Dissertation Approval Form and the ETD Signature Form printed by the student from the thesis/dissertation Web page. The student must earn a grade of B or better on thesis work to qualify for graduation.

A manual entitled *Texas Tech University Graduate School Formatting Guidelines (Revised 2007)* is available at the university Web site www.depts.ttu.edu/gradschool/current/THDGuidelines.php. All manuscripts must conform to published policies. The final copy of the thesis must be submitted electronically in PDF file format as an ETD to the University Library's server. Deadlines and more information on this process are available through the Graduate School Web site. The Graduate Council mandates that students must provide their committee chairperson with a bound paper copy of the thesis unless a waiver form is submitted by the student and signed by the chairperson. The waiver form is available on the Graduate School Web site. Paper copies may be required by the academic unit in which the student pursues the degree.

During the semester of graduation, the candidate will pay Student Business Services a document fee to cover the cost of electronically storing the official copy (ETD) of the thesis. This fee is paid only once. The Document Fee is posted to students' accounts by the Graduate School after Intent to Graduate forms have been processed for the graduating semester. Payment due dates are listed under the current semester's deadlines at the Web site www.depts.ttu.edu/gradschool/current/Deadlines.php. Fees for Health Sciences Center students are slightly higher because two bound paper copies of the thesis are required.

Final Comprehensive Evaluation

The Graduate School requires a final comprehensive evaluation for all students in each program. The comprehensive evaluation is most often administered in the semester of intended graduation. This should be in a format most appropriate to the major field. At departmental discretion, the evaluation format may differ for thesis and nonthesis or professional and predoctoral students. The final evaluation should require a synthesis and application of knowledge acquired during the course of study and research leading to the master's degree; no student should expect the evaluation to be based solely on performance in the classroom.

A student is eligible to undergo evaluation only after having been admitted to candidacy by the graduate dean. As soon as possible after the evaluation, a written report of the outcome should be sent to the graduate dean. A student who does not receive a satisfactory evaluation may be assessed once again after an interval of three months or more. At the discretion of the program concerned, a student who receives a satisfactory evaluation but who does not graduate within 12 months may be required to repeat the assessment.

Doctoral Program

General Requirements

The degree requirements set forth here are in addition to those listed on previous pages of the graduate studies section of the catalog.

Admission to Doctoral Study. Admission to doctoral study is restricted to applicants whose backgrounds show definite promise of success on this, the highest level of academic endeavor. Each

doctoral department has its own requirements that applicants must satisfy for admission. It is essential that the student communicate with departmental advisors on this matter.

Years of Study. A minimum of three years of graduate study beyond the bachelor's degree is required for the doctorate. Work completed for the master's degree may be considered as a part of this period if it forms a logical sequence in the entire program. Credit ordinarily will not be given for work completed more than seven years prior to admission to the doctoral program at Texas Tech University. Exceptions to this policy will require written justification through the student's department and approval by the graduate dean.

Work completed in the doctoral program of another recognized graduate school will be considered on the recommendation of the departments concerned, but no assurance can be given that such work will reduce the course or residence requirements here. In no case can transferred credit reduce the minimum residence (see "Residence Requirement" in next column).

Doctoral study cannot be calculated solely in terms of credit hours, but the program for the doctorate requires completion of at least 60 or more semester hours of work beyond the bachelor's degree, exclusive of credit for the dissertation. No more than 6 hour of course credit will be given for individual study course or research hours. Prior approval by the dean is required for any exceptions.

Grade Requirement. For the doctor's degree, the minimum requirement for graduation is a grade point average of 3.0 in the major subject, exclusive of credits for the doctoral dissertation, and a grade point average of 3.0 in all other courses taken for graduate credit outside the major. Individual departments and colleges may have higher standards than this minimum, school-wide requirement.

Major and Minor. The doctorate requires at least 60 semester hours of graduate work, exclusive of the dissertation. The Graduate School does not require a formal minor. However, the student may pursue a minor or one may be required by the student's advisory committee or by the program faculty in which the major is taken. If a minor is taken, it must include at least 15 graduate hours in a program outside the student's major. The minor will be declared in the student's "Program for the Doctoral Degree" (see "Filing a Doctoral Degree Plan"). If a minor is taken, the major requires a minimum of 45 semester hours.

Courses listed for the major will be primarily in one academic program. However, courses from other academic programs may be included (other than courses for a minor, if one is declared) if they provide coherent support for the program courses in the major. The courses for the doctoral degree will be approved by the research advisor and not the graduate advisor.

If a formal minor is declared, it must be represented on the student's doctoral committee (see "Advisory Committee") and must be covered on the qualifying examination (see "Qualifying Examination"). Programs at variance with this description may be approved in exceptional circumstances. The advisory committee and the program faculty must approve such proposed exceptions before they are submitted to the Graduate School for consideration.

Residence Requirement. The purpose of residence in a doctoral program is to ensure the intellectual immersion of students in a research and learning environment with faculty, peers, and staff. This intellectual immersion can take place in forms other than those of a full-time student on campus. Recognizing that there are several ways to acquire the benefits of residence, programs are allowed to set the residence requirements that best fits their particular program. Students are expected to consult their departments about specific residence requirements for their degree.

If a doctoral program does not specify a residence requirement, then the residence requirement for that program is fulfilled by the completion of a full schedule (at least 12 semester hours) of graduate coursework in each of two consecutive terms. Students holding half-

time graduate assistantships may satisfy the requirement by taking at least 9 hours of coursework in each of the two long terms and 6 hours in the summer. Other patterns require approval of the graduate dean.

The plan for fulfilling the residence requirement must be indicated on the doctoral program form (Program for the Doctoral Degree) submitted to the Graduate School in the first year of doctoral study and must be approved in advance of the beginning of the residence year. (For any program variations in this requirement, see the college or department sections in this catalog.)

Filing a Doctoral Degree Plan. Early in a student's doctoral studies a formal evaluation will be made of his or her background preparation in the major field. This evaluation may vary according to the academic unit involved; in some cases it may consist of a formal written or oral exam, in others, a review meeting with a committee or graduate advisor; in still another, the successful passing of a key course or courses. On the basis of this evaluation, whatever form it takes, the student's course of study will be projected and submitted to the Graduate School on the appropriate form. This evaluation will occur during the student's first year of doctoral study and the "Program for the Doctoral Degree" will be submitted to the Graduate School before the second year of work has begun. Revisions of the plan are permitted as needed.

Transfer of Coursework. There is no automatic transfer of credit toward the doctorate degree. On the recommendation of the department or program, the graduate school may review transfer courses for acceptance. Transfer credit will not alter the grade point average at Texas Tech University. No more than 30 semester credit hour of an earned master's degree from another institution may be transferred. Grades from transfer courses will not appear on Texas Tech University's transcripts. Doctorate students may take approved courses at another approved institution and transfer up to 12 semester credit hours into their degree program.

Advisory Committee. As soon as the course of study for an applicant has been determined, an advisory committee of at least three members of the graduate faculty (including the minor area, if a minor is declared) will be appointed by the graduate dean on the recommendation of the advisor concerned. This committee will meet as often as necessary with the applicant and will direct his or her work at all stages. Either the chair or the co-chair of a student's committee must be a regular member of the department or program faculty from which the student will receive the doctorate.

Annual Review. The Graduate School strongly encourages faculty in each doctoral program to conduct a formal review of their students' progress at least once each year. From the third year onward, such review is required. Any student not making satisfactory progress may be placed on probation and given conditions to meet to stay in the program. Continued unsatisfactory progress in any area of a student's work will be cause for dismissal.

Time Limit. All requirements for the doctoral degree must be completed within a period of eight consecutive calendar years or four years from admission to candidacy, whichever comes first. Graduate credit for coursework taken at Texas Tech more than eight calendar years old at the time of the final oral examination may not be used to satisfy degree requirements. Absent an extension, the student may be permitted to retake the qualifying examination, and, upon passing that examination, be readmitted to candidacy by the Graduate Council for some period of time not to exceed four years.

Final corrected copies of the dissertation must be received in the Graduate School no later than one year after the final examination or within the eight-year or four-year time limit, whichever occurs first. Failure to complete this step will result in the degree not being awarded.

Admission to Candidacy. Authority for admitting an applicant to candidacy for a doctor's degree is vested in the Graduate Council. Upon receipt of a recommendation from the advisory committee, the graduate dean will submit it to the Graduate Council for approval. By written communication, the graduate dean will transmit the

results of the council's action to the applicant, to the chairperson of the advisory committee, and to the chairperson of the department concerned. A student must be admitted to candidacy for the doctorate at least four months prior to the proposed graduation date.

Language, Tool Subject Requirements

Doctor of Philosophy. Each department offering a doctoral program determines its language requirements, subject to the approval of the Graduate Council. Language requirements, if any, are described in the sections of this catalog devoted to instructional departments. To qualify for admission to candidacy in those programs that have a language requirement, applicants must demonstrate their competence in one of the following ways:

1. Students may fulfill the reading knowledge requirement by passing with a C- or better the second course of the sophomore sequence of the required language. Those seeking to present a high level of competency will pass with a B- or better any literature course at the third-year level or beyond.
2. Students may satisfy the standard competency level by enrolling in one of the special 6-hour programs for graduate students offered in French, German, and Spanish by the Department of Classical and Modern Languages and Literatures. The second half of such a program must be passed with a grade of B- or better.
3. The third method of fulfilling the language proficiency requirement is by passing a standardized examination in French, German, Spanish, or Latin given in the Department of Classical and Modern Languages and Literatures or by passing one of the examinations in French, German, or Spanish, furnished by the Educational Testing Service and administered by the university's Testing Center. Arrangements for these examinations should be made in the applicable unit. The Department of Classical and Modern Languages and Literatures will administer the examinations in any other foreign language in which instruction is offered by the department. Arrangements for testing for other foreign languages will be approved by the graduate dean.

Students majoring or minoring in foreign languages in the Department of Classical and Modern Languages and Literatures are subject to higher performance levels in satisfying the doctoral requirement. Students should consult the graduate advisor of the appropriate language for guidelines.

Some departments require a tool subject in lieu of or in addition to the language requirement. When this requirement exists, see the appropriate departmental section in this catalog for further information. If this provision is satisfied by formal courses, a grade of B or better is required either in a single course or in the last of a sequence of such courses passed not more than seven years prior to the student's approval for doctoral work.

Doctor of Education. To qualify for admission to candidacy, applicants for the Ed.D. degree are required to show competency in educational research methods and educational statistics as well as a foreign language if their research requires such competency.

Qualifying Examination, Final Examination

Qualifying Examination. The Qualifying Examination for Admission to Candidacy for the doctor's degree is one of the major features of the doctoral program and will be administered in both the major and minor areas of study (if a formal minor has been declared). The examination requires a synthesis and application of knowledge acquired during the course of study for the doctoral degree; consequently, satisfactory performance in coursework does not necessarily guarantee successful performance on the qualifying examination. A student is eligible to stand for this examination after receiving approval of the doctoral degree plan from the dean of the Graduate School, completing all language and tool requirements, and completing most of the coursework prescribed by the approved plan. Students must take this examination within one

calendar year of completing all requirements listed on the degree plan. Failure to do so will be cause for dismissal from the program.

The qualifying examination normally is prepared and administered by the candidate's advisory committee and any other professors the committee or the graduate dean may consider necessary. In some instances the department or college may administer the examination. The major portion of the examination is ordinarily a written exam requiring at least six hours. It usually also includes an oral examination under the supervision of the committee and any other professors who may be invited to participate.

Satisfactory Examination. If the qualifying examination is considered satisfactory and the requirements in languages (including English) and/or tool subjects have been met, the chairperson of the advisory committee will send to the graduate dean, for consideration by the Graduate Council, a formal written recommendation that the applicant be admitted to candidacy for the doctor's degree. The letter also will state the date of the examinations and whether the student passed both the major and minor portions (if an official minor is involved). This recommendation will be forwarded as soon as all the above requirements have been met.

Unsatisfactory Examination. If the qualifying examination is not satisfactory, the chairperson of the advisory committee will relay this information in writing to the graduate dean. An applicant who does not pass the qualifying examination may be permitted to repeat it once after a time lapse of at least four months and not more than 12 months from the date of the unsatisfactory examination. Failure to pass the qualifying examination within the specified time will result in dismissal from the program irrespective of performance in other aspects of doctoral study.

Final Examination. At least four months must intervene between the qualifying examination and the final examination. A final public oral examination, usually over the general field of the dissertation, is required of every candidate for the doctorate. The oral examination must be scheduled by the student and his advisory committee on an appropriate class day prior to the graduating semester's defense deadline and after the committee has read the completed dissertation. The Graduate School requires three weeks notification prior to the oral examination. The required Defense Notification Form noting the time, place, and other information concerning the examination is available on the thesis/dissertation Web site (www.depts.ttu.edu/gradschool/current/thd.php).

The advisory committee and the graduate dean or a professor designated to act in place of the graduate dean conduct the examination. All members of the committee participate fully in the examination and cast a vote. Professors other than members of the committee, including the graduate dean's representative, may participate in the examination but have no vote in determining the outcome. At the conclusion of the examination, the chairperson of the advisory committee will send a written notice to the Graduate School giving the result of the examination.

Dissertation

Except for the Doctor of Musical Arts, a dissertation is required of every candidate for a doctoral degree. This requirement is separate and apart from other requirements in doctoral programs; consequently, successful performance in other areas does not necessarily guarantee acceptance of a dissertation. The dissertation work must earn a grade of at least B to qualify the student for graduation. The Graduate School strongly recommends that each student be required to present and defend a dissertation proposal before his or her committee early in the course of the research.

The advisory committee and the graduate dean must approve the subject of the dissertation at least four months before the candidate's proposed date of graduation. The dissertation must demonstrate a mastery of the techniques of research, a thorough understanding of the subject matter and its background, and a

high degree of skill in organizing and presenting the materials. The dissertation should embody a significant contribution of new information to a subject or a substantial reevaluation of existing knowledge presented in a scholarly style. The work on the dissertation is constantly under the supervision of the advisory committee and any other professors the committee or the graduate dean may consider necessary.

All manuscripts must conform to published policies that can be found at www.depts.ttu.edu/gradschool/current/THDGuidelines.php. The final copy of the thesis must be submitted electronically in PDF file format as an ETD to the University Library's server. Deadlines and more information on this process are available through the Graduate School Web site. The Graduate Council mandates that students must provide the committee chairperson with a bound paper copy of their dissertation unless a waiver form is submitted by the student and signed by the chairperson. The waiver form is available on the Graduate School Web site. Paper copies may be required by the academic unit in which the student pursues the degree. All copies of a dissertation, electronic or paper, must be accompanied by an abstract of no more than 350 words.

Dissertation Fees. During the semester of graduation, the candidate will pay Student Business Services a document fee to cover the cost of electronically storing and microfilming the official copy (ETD) of the dissertation. This fee is paid only once. The Document Fee is posted to students' accounts by the Graduate School after Intent to Graduate forms have been processed for the graduating semester. Payment due dates are listed under the current semester's deadlines at www.depts.ttu.edu/gradschool/current/Deadlines.php. Fees for Health Sciences Center students are slightly higher because two bound paper copies of the thesis are required.

Graduate Certificate Programs

Graduate certificates are intended to meet the supplemental post-baccalaureate education needs of professionals. A graduate certificate program is a set of courses that provides in-depth knowledge in a subject matter. The set of courses provides a coherent knowledge base.

A student applying for a graduate certificate program will be admitted with a "GCRT" designation and will not be required to take the GRE or GMAT but will need to meet all other requirements for graduate admission. To take any graduate course, all prerequisite courses (including undergraduate courses) must be taken and necessary background obtained before attempting the course. A student will be required to have a baccalaureate degree to start a graduate certificate program. There is only one exception to having a baccalaureate degree. If an undergraduate student from Texas Tech University has a 3.00 GPA or better and is within 12 hours of completion of a baccalaureate degree, the student may start taking graduate courses toward a graduate certificate. The student must have a baccalaureate degree to receive a graduate certificate.

Graduate credits earned while the student is enrolled in a graduate certificate program may not be applied toward a graduate degree unless the student completes the GRE or GMAT and enrolls as a fully accredited graduate student. After taking the GRE or GMAT and fulfilling all other admission requirements, a student may use the courses taken for a graduate certificate degree if the courses fulfill the requirements of the program of study for the degree.

Graduate students may pursue a graduate certificate that is outside their graduate program of study.

No more than one transfer course (if approved by the advisor of the graduate certificate program and the Graduate School) will be allowed for a graduate certificate program. If a graduate student is in good standing and is dropping out of the graduate program, the student may receive a graduate certificate if the necessary courses have been taken. To receive a graduate certificate, a student must have a GPA of 3.00 or better. No grade lower than a C will be accepted.

Current graduate certificate offerings include:

- Graduate Certificate in Autism
- Graduate Certificate in Linguistics
- Graduate Certificate in Dual Sensory Impairment
- Graduate Certificate in Women's Studies
- Graduate Certificate in Personal Financial Planning
- Graduate Certificate in Addictions and the Family
- Graduate Certificate in Mental Health Counseling
- Graduate Certificate in Piano Pedagogy
- Graduate Certificate in Historic Preservation
- Graduate Certificate in Visualization
- Graduate Certificate in Teaching English in International Contexts
- Graduate Certificate in Community Design and Development
- Graduate Certificate in Ethics
- Graduate Certificate in Software Engineering
- Master Mentor Teacher Certificate

Publication of Student Work

Research is an integral facet of graduate study, and students are encouraged to seek publication of work done in pursuit of advanced degrees. Many theses and dissertations completed at Texas Tech are eventually published. In research involving close collaboration with faculty advisors, it is appropriate in some disciplines for publications to be co-authored. In disciplines in which authorship order is not always alphabetical, the student will generally be first author in publications resulting from a thesis or dissertation. In cases of considerable revision or addition of other data, order of authorship should be subject to mutual agreement and based on the nature and extent of contribution by the parties concerned and in accordance with accepted practice in the discipline.

The faculty member may choose to use the data in pursuing publication when the student was supported in full or in part by the university or through a faculty grant to do the research involved or when the faculty member contributed to the work in a way that was substantially above and beyond that normally expected of a major advisor and the student elects not to pursue publication within a reasonable time. The faculty member must list the student as co-author according to the conventions of the discipline involved and the relative extent of contribution or additional work required.



Opportunities for Interdisciplinary Master's Degrees

The Graduate School of Texas Tech encourages interdisciplinary study and research, believing that our nation's complex society and the world's rich cultural heritage can be understood best from the perspective of many academic disciplines. Few settings offer a better opportunity for such study than the university with its graduate programs, libraries, laboratories, and diversely trained faculty. Although academic specialization is the common pattern in such an environment, the Graduate School is committed to building bridges and facilitating movement across the disciplines for those who are interested. As a result, opportunities for interdisciplinary work have increased through the years as a testimony to the university's commitment academic diversity.

Several formal interdisciplinary options appear on the following pages. However, students should be aware of innumerable informal options that exist because the programs have been designed by individual students in conjunction with their advisors for the Interdisciplinary Studies degree programs. Such flexibility in custom-designing programs affords maximum adaptability for the rapidly changing global marketplace.

In addition to the graduate programs listed in this section, the following interdisciplinary programs are discussed in other sections related to the college or department responsible for administering each program: **Applied Linguistics; Comparative Literature; Ethnic Studies; Fine Arts; Land-Use Planning, Management, and Design; Latin American and Iberian Studies; Multidisciplinary Science; Public Administration; and Sports Health.**

Biotechnology

Co-Directors: Dr. David B. Knaff, Horn Professor of Chemistry and Biochemistry; Dr. Daniel M. Hardy, Associate Professor of Cell Biology and Biochemistry.

Texas Tech University and the Texas Tech Health Sciences Center jointly offer an interdisciplinary Master of Science in Biotechnology degree designed to prepare students for a laboratory research career in biotechnology. In addition, the School of Law and the Graduate School offer a joint program leading to the degrees of Doctor of Jurisprudence (J.D.) and Master of Science in Biotechnology.

Master of Science in Biotechnology. Students may pursue either of two tracks within the program: the biomedical track or the applied sciences track. The Graduate School of Biomedical Sciences (GSBS) at the Health Sciences Center administers the biomedical track, and the Texas Tech Center for Biotechnology and Genomics administers the applied sciences track.

The applied sciences track is a two-year program, with the first two semesters consisting of required and elective coursework. The second year (nine to 12 months) is devoted in its entirety to full-time laboratory research. Students may satisfy the research requirement in either of two ways. They may complete an M.S. thesis, based on research carried out in the laboratory of a participating faculty member in one of the following departments: Animal and Food Sciences, Biological Sciences, Chemistry and Biochemistry, or Plant and Soil Science. Alternatively, students may complete a nonthesis internship in a biotechnology laboratory. The internship may be carried out at an industrial research laboratory, a government laboratory, or a not-for-profit foundation laboratory.

The biomedical track is a 21-month program consisting of two semesters (nine months) of coursework and 12 months of full-time laboratory research. It is anticipated that students in this track will complete all of their coursework during their first year, with the second year devoted completely to the research component of the degree plan. The research component may be completed either at the HSC campus or through an internship at a biotechnology laboratory. Internship locations are similar to those described for the applied sciences track. Students who choose to do their research at the HSC campus will work with a member of the biotechnology graduate faculty and will have the option of writing an M.S. thesis. All biotechnology graduate faculty members have active research programs that emphasize use of molecular biology methods.

First-year students in both tracks take a common core curriculum consisting of a seminar course (BTEC 6101), an introductory lecture course (BTEC 6301), an introductory lab course (BTEC 5338), a course on the ethics of research (GSBS 5101), and a bioinformatics course (BINF 5301). The biomedical track requires a series of lab rotations during the second semester of the first year, while the applied sciences track requires a second, more advanced lab course. The remaining coursework requirements for the biomedical track consist of specific HSC courses, while the remaining coursework requirements for the applied sciences track are satisfied by selections from a broad list of approved electives.

Students interested in the program should have an undergraduate science degree that provides a sound background in biological sciences, preferably from a molecular perspective. A minimum of one semester of organic chemistry is required. A second semester of organic chemistry and at least one semester of physical chemistry are highly recommended. Admission will be based on the student's undergraduate record and GRE scores and on other considerations such as previous research experience and letters of recommendation. Applications from students interested in the applied sciences track should be submitted through the Texas Tech Office of Graduate Admissions, and applications from students interested in the biomedical track should be submitted through the Graduate School of Biomedical Sciences at the Health Sciences Center.

J.D.–M.S. in Biotechnology. The joint degree candidate must choose to pursue both degrees by the end of the third or fourth semester in law school and must meet admission requirements for the M.S. degree. Typically, if all prerequisites are met, both degree programs can be finished within four and one-half years, including summer sessions.

The joint degree program is designed principally for the student with an interest in intellectual property law in the area of biotechnology. A candidate for the J.D./M.S. in Biotechnology may credit up to 12 nonlaw hours of approved courses toward the J.D. degree and 12 law hours may be credited toward the M.S. degree.

Biotechnology (BTEC)

(To interpret course descriptions, see page 8.)

Graduate Courses

5302. **Advanced Cell Biology (3:3:0).** Prerequisite: 8 hours of biology, 8 hours of chemistry, plus at least one semester of organic chemistry; or consent of instructor. Structure and function of cells with introduction to modern techniques for cell study. Offered to graduate students with no formal training in cell biology. (BIOL 5302)
5304. **Growth and Development (3:3:0).** A study of differentiation, development, growth, and fattening of domestic animals and hereditary and environmental influences and interactions. SS. (ANSC 5304)
5321. **Plant Breeding Theory (3:3:0).** Breeding and plant improvement presented at an advanced level. S, even years. (PSS 5321)
5325. **Transgenic and Plant Cell Genetics (3:3:0).** Genome organization in plants, interspecific hybridization, cytoplasmic male sterility, self-incompatibility, tissue culture, in-vitro screening, and transformation technologies. F, odd years. (PSS 5325)

5337. **Enzymes (3:3:0).** Prerequisite: CHEM 3311, 3312 or CHEM 4303 or equivalents. Structure, mode of action, and kinetics of enzymes. (CHEM 5337)
5338. **Biochemical Methods (3:1:6).** Prerequisite: CHEM 4303 or 3311 or equivalent. Methodology for the isolation and characterization of macromolecules and metabolites. (CHEM 5338)
5339. **Nucleic Acids (3:3:0).** prerequisite: CHEM 3312 or 4303 and BIOL 4320 or 5320. Eukaryotic and prokaryotic DNA cloning strategies, DNA sequence analysis and manipulation, recombinant DNA expression. (CHEM 5339)
5403. **Biometry (4:3:2).** Introduction to biological statistics. Observation, probability, "t" test, analysis of variance, mean separation procedures, linear regression and correlation, and chi-square. Introduction to computerization of statistical analyses. F. (ANSC 5403)
5408. **Microbial Genetics (4:3:3).** Prerequisite: MBIO 5301 or consent of instructor. Topics include current techniques of genetic analysis, molecular biology, molecular genetics, nucleic acid metabolism, and gene regulation in microorganisms, with emphasis on bacteria and bacteriophages. May not be taken for credit by students who have taken MBIO 4406. F. (MBIO 5408)
5414. **Advanced Plant Biotechnology (4:3:2).** Prerequisite: Consent of instructor. Principles of biotechnology and genetic engineering. Genetic manipulations applied to problems in agricultural research and practice. F, odd years.
6000. **Master's Thesis (V1-6).** (GBTC 6000)
6001. **Biotechnology Internship (V1-9).** Research and training in a private-sector or government laboratory. Consent of program director required. For nonthesis students.
6101. **Biotechnology Seminar (1:1:0).** Presentation of current research topics in areas directly relevant to biotechnology. (GBTC 6101)
6301. **Introduction to Biotechnology (3:3:0).** Prerequisite: CHEM 3311, 3312, 3313. Scientific bases of biotechnology techniques. Applications of biotechnology and ethical and social impact. (GBTC 6301)
6315. **Regulation of Gene Expression (3:3:0).** Prerequisite: BIOL 5320 or 4320. An advanced, in-depth analysis of current research on mechanisms that regulate eukaryotic gene expression at transcriptional and post-transcriptional levels. (BIOL 6315)
6322. **Advanced Plant Breeding (3:3:0).** Qualitative and quantitative inheritance, heterosis, selection theory and breeding methodology for crop plant improvement, genotype by environment interaction, and application of cellular and molecular techniques to plant breeding. S, odd years. (PSS 6322)
6424. **Molecular, Genetic, and Plant Genomics (3:3:0).** Genome mapping in plants, gene structure and expression, recombinant DNA and gene cloning methods, molecular markers, QTL analysis, physical mapping, DNA chip technology, and functional genomics. S, even years. (PSS 6424)
7000. **Research in Biotechnology (V1-9).** Full-time laboratory research under the direct supervision of a TTU or TTUHSC graduate faculty member. For thesis-option students. (GBTC 7000)

Fibers and Textiles

Dr. M. Dean Ethridge, Managing Director, International Textile Center; Adjunct Faculty in Agricultural and Applied Economics and in Merchandising, Design, and Consumer Economics.

Known internationally for its expertise in cotton, the International Textile Center (ITC) focuses on research, education, and technology transfer pertinent to fibers and textiles. In collaboration with the Colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Engineering, and Human Sciences, the ITC offers opportunities for students to execute special projects and thesis research. The ITC also teaches several graduate-level courses within the College of Agricultural Sciences and Natural Resources.

The ITC is located on Lubbock's East Loop 289 in a 110,000-square-foot facility with a multimedia classroom, materials library, and executive conference room. The center contains laboratories for materials evaluation, short staple spinning, nonwovens, weaving, chemical processing and finishing, chemical analysis, and fabric care. In addition, the ITC engages in multidisciplinary research with diverse units of Texas Tech University, the Health Sciences Center, the Texas Agricultural Experiment Station, and the Agricultural Research Service.

Heritage Management

Coordinator: Gary F. Edson, Professor of Museum Science and Executive Director, Museum of Texas Tech University

The Master of Science in Heritage Management degree program emphasizes extensive investigation in the field of heritage management. Graduates from the program are prepared to enhance local, regional, and national sociological and scientific values; encourage preservation and stewardship of cultural and natural heritage; advocate public service; and direct educational programming designed to derive maximum advantage from innovative technology without the loss of cultural identity and biodiversity.

The program is configured to allow individual students to emphasize areas of special interests such as heritage administration, conservation, interpretation, education, and use (ecotourism). The program offers both theoretical and practical coursework designed to prepare graduates to be leaders in the heritage management field.

Applicants will be considered for admission to the Heritage Management program after the following materials are received: two letters of recommendation from persons knowledgeable of the student's professional abilities and a career summary statement. Forms will be furnished on request.

Prior to being considered for admission to the program, students must complete the appropriate application forms and satisfy the requirements of the university, including official transcript of complete undergraduate coursework and GRE scores. Once that process is concluded, program admission and competitive scholarship awards are based on three general categories of criteria.

- **Academic Record:** All academic records may be considered—60 hours, total, major, post-baccalaureate, etc.
- **Test Scores:** Scores on the General Test of the Graduate Record Examination (GRE) should be no more than five years old. Each score is considered separately, with percentile scores viewed by broad major. No test score will be considered the sole criterion.
- **Individual Profile:** Profiles may include recommendations, research background, motivation, multilingual proficiency, undergraduate institution, presentations, and interviews. Other information that admission and scholarship committees may consider is work commitment, demonstrated commitment to a particular field of work or study, and community involvement.

Interested persons should contact the Museum of Texas Tech University for a comprehensive packet of information about the program. The program is administered by the Executive Director of the Museum.

The Heritage Management program uses a variety of existing courses offered by various departments within the university to address individual educational and career goals. All students must develop competency in the core courses taught by selected members of the graduate faculty. (Competency is construed to mean an understanding of professional practices.)

A student majoring in the program must take at least 12 hours from the Heritage Management core curriculum, a minimum of 15 hours prescribed elective courses, 12 of elective graduate-level courses, plus 6 hours of thesis or internship. Required core courses for the program are MUSM 5327, MUSM 5331, HMG 5323, HMG 5327. (Internships are to be at locations approved by the student's advisory committee.) A total of 45 credit hours of graduate-level work is required for graduation. In addition, each student must pass a qualifying exam prior to beginning either the internship or thesis and must pass comprehensive written and oral exams at the conclusion of his or her studies. Students pursuing the thesis option must write and defend the thesis.

Following the first 9 credit hours of graduate study, each student's curriculum will be formalized through consultation with a graduate faculty advisory committee that consists of at least three members and reflects the student's area of emphasis. This degree plan will be approved by the program coordinator and the Executive Director of the Museum and will then be submitted to the Graduate School.

When approved, it will serve as a tool for advising and review to assure completion of degree requirements.

A minor at the master's level in heritage management consists of 9 approved credit hours in the core curriculum; a minor at the doctoral level consists of 15 hours of heritage management courses, at least 9 of which must be from the core curriculum.

Core Courses

HMG 5323	Principles of Heritage Management (3:3:0)
HMG 5327	Heritage Planning (3:3:0)
MUSM 5327	Museum Collection Management (3:2:3)
MUSM 5331	Museum Interpretation and Communication (3:2:3)

Prescribed Elective Courses

HMG 5324	Heritage Resource Management (3:3:0) or NRM 5312 Ecology of Renewable Natural Resources (3:3:0)
MUSM 5330	Museum Law, Ethics, and Standards (3:3:0) or LAW 6025 Land-Use Planning Law (3:3:0)
MUSM 5340	Museum Data Management (3:1:6) or C S 5356 Advanced Database Management Systems (3:3:0)
HMG 7000	Research (3) or MKT 5360 Marketing Concepts and Strategies (3:3:0)
MUSM 5325	Museum Field Methods (3:1:6) or MUSM 5328 Museum Practicum (3:1:6)

Heritage Management (HMG)

(To interpret course descriptions, see page 8.)

Graduate Courses

5321. **Park Management (3:3:0).** Prerequisite: Consent of instructor. Review of techniques and processes to instill an understanding of the legal and ethical responsibilities associated with the care, management, and operation of heritage properties.
5323. **Principles of Heritage Management (3:3:0).** Prerequisite: Consent of instructor. Provides a theoretical framework and examines issues of evaluation, legislation, sustainability, socioeconomic impact, and communication to foster global responsibility and present integrative approaches to managing heritage.
5324. **Heritage Resource Management (3:3:0).** Prerequisite: Consent of instructor. Provides core knowledge in the principles, methods, laws, stewardship, and governance of heritage resources as a foundation for leadership in the heritage management field.
5327. **Heritage Planning (3:3:0).** Prerequisite: Consent of instructor. Explores practical approaches and methods to heritage planning with emphasis on the integration of related disciplines to attain environmentally sound and socially responsible preservation, management, and development initiatives.
6000. **Master's Thesis (V1-6).**
6001. **Internship (V1-6).** Prerequisite: Advancement to candidacy status. Internship carried out under the supervision of the student's major advisor. Internship at the Lubbock Lake Landmark or similar approved location to provide practical experience for the heritage management profession.
7000. **Research (V1-12).**

Interdisciplinary Studies

Coordinators: Dr. Wendell Aycock, Professor of English and Comparative Literature, Associate Dean of the Graduate School; Dr. Clifford Fedler, Professor of Civil Engineering, Associate Dean of the Graduate School

The Master of Arts or Master of Science degree program in Interdisciplinary Studies is intended for students who wish to continue education at the graduate level but do not seek specialized training concentrated in a major area. This program is not a substitute for the traditional master's degree; rather, it is designed for students with broader interests in several fields or for those whose career goals do not match fully with a single identifiable academic unit or department. Emphasis is placed on continued intellectual and cul-

tural development in a constantly changing society in which new career interests may extend over several traditional specializations.

Each program, exclusive of those tracks with required courses, is developed individually according to the student's interests and background. Among the few restrictions are the requirements that work be taken in at least three different subject areas and that no more than 12 hours be presented in any one area. Also, no more than 18 hours may be taken within a single college, except Arts and Sciences. No more than 12 hours can be taken in the Rawls College of Business. Most students pursue the 36-hour nonthesis plan, but the thesis option (24 hours of graduate coursework plus 6 hours of thesis [6000]) may be appropriate in occasional circumstances when the student's previous work seems to qualify him or her for research. For the 36-hour nonthesis option, students may choose either the master's examination or the portfolio as their terminal project.

The standard admission policy for applicants to other degree programs will apply to those seeking admission to the interdisciplinary master's program. Applicants must submit satisfactory GRE or GMAT scores and undergraduate records. Students must have a 3.0 GPA on previous graduate work. For further information, contact the coordinator of the program in the Graduate School office.

Students normally select areas of study that meet their own educational and career requirements, as described above. However, a number of study themes are identified in the following paragraphs that provide somewhat more specialized focus, while maintaining the interdisciplinary nature of the program as originally approved.

Arid-Land Studies and International Development. Students may devise a plan of study focusing on aspects of international development in various parts of the world. This theme will be oriented to applied knowledge and international issues in general. Another theme addresses specifically the problems of arid and semi-arid lands. Students may take courses in several departments to satisfy the requirements in either of these areas. For further details, contact Dr. A.C. Correa, director of the International Center for Arid and Semi-Arid Land Studies, 806.742.2218.

Environmental Evaluation. Students may gain a holistic view of environmental evaluation by taking courses that focus upon problems and techniques relating to natural resources and their utilization. Work in geography, geology, land and water management, atmospheric sciences, and other disciplines is tailored to each student's interests. Persons interested in this plan should contact Dr. Jeff Lee in the Department of Geography.

Fine Arts Management. Courses relating to management in the fine arts may be taken in a plan leading to the degree in Interdisciplinary Studies. Courses in public administration and business administration as well as in the arts develop management leadership for fine arts institutions and governmental agencies. For details, contact the Associate Dean for Graduate Studies in the College of Visual and Performing Arts.

Applied Linguistics. Courses relating to theoretical, descriptive, historical, and applied study of language structure and use may be selected in a plan leading to the degree in Interdisciplinary Studies. Studies in anthropology, bilingual education, psychology, and speech communication as well as in various languages (American Sign Language, Arabic, Chinese, English, French, German, Japanese, Spanish) will provide a comprehensive understanding of the discipline. Interested students may contact Dr. Sharon A. Myers, Department of Classical and Modern Languages and Literatures. See also "Applied Linguistics" in this section of the catalog.

International Affairs. This interdisciplinary concentration focuses on problems that are international in scope. Students may focus on problems that are global in nature, such as international business/economics or international security/conflict, or they may focus on problems that are regional in scope. The regions available for emphasis in this program are as follows: Asia, Africa, Latin America, Europe, and Post-Soviet Europe. Students will have the

Department of Political Science as their home department but will also take courses in and work with faculty from the Department of History, the Department of Economics and Geography, or any other department that matches their interests. Interested students should contact Dr. Dennis Patterson, Department of Political Science, 806.742.4050.

Peirce Studies. Charles Sanders Peirce (1839-1914), a true American genius, made major contributions to logic, mathematics, language studies, history of science, specific areas of science such as chemistry and physics, and philosophy, among others. His ideas are being explored in fields as diverse as semeiotic and artificial intelligence. Students enrolled in Peirce studies will normally take 6 to 9 hours of PRAG 5000 and at least 30 additional hours in several defined areas, depending upon each student's future educational or occupational goals. For details, contact Dr. Kenneth Laine Ketner, Director, Institute for Studies in Pragmaticism, 806.742.3128.

Women's Studies. The interdisciplinary concentration of graduate work focuses on the changing position of women in society. Selected courses are offered in history, sociology, anthropology, and psychology with related work available in business administration, the humanities, and other areas of the social sciences. An emphasis on women's studies may be pertinent to careers in education, management, and personnel relations as well as in the administration and delivery of social services to families, women, and children. Interested students should contact Dr. Charlotte Dunham, Director, Women's Studies, 213 Administration Building.

Other Options. Studies of an interdisciplinary nature offer almost limitless combinations. Students may select from graduate offerings in almost the entire catalog and from the graduate offerings of the School of Law and Health Sciences Center. Those interested in a customized program should contact Associate Deans Clifford Fedler or Wendell Aycock in the Graduate School.

Interdisciplinary Studies (I S)

(To interpret course descriptions, see page 8.)

Graduate Courses

- 5000. **Graduate Directed Studies (V1-12).** Prerequisite: Consent of Coordinator. Advanced studies in developing cultural understanding. Projects to be assessed by faculty committee.
- 5001. **Graduate Studies Abroad (V1-12).** Prerequisite: Consent of Office of International Affairs. Advanced individual studies in interdisciplinary, international, and /or multicultural experiences.
- 5301. **The Nature of Science for Teachers (3:3:0).** Interdisciplinary course for teachers providing an overview of science and scientific inquiry. Special emphasis on research methods.
- 6000. **Master's Thesis (V1-6).**
- 7000. **Research (V1-12).**

Legal Studies

Coordinator: Dr. Marilyn E. Phelan, Horn Professor of Law and Professor of Museum Science

Through arrangement with the School of Law, graduate students may take certain courses in law to supplement their programs or, in some cases, to meet the requirements for a formal minor. Enrollment of graduate students in individual law courses is subject to the availability of space and approval of the professor in charge. Graduate students should consult their advisor before enrolling in such courses to ensure that the courses are applicable to their program. Courses that may be appropriate for a minor in legal studies also are available in such areas as political science, history, business administration, and sociology.

Texas Tech also offers joint programs of study leading not only to a master's degree but also to a Doctor of Jurisprudence (J.D.). They include the following:

- J.D./Master of Business Administration
- J.D./Master of Public Administration

- J.D./Master of Science in Agriculture and Applied Economics
- J.D./Master of Science in Accounting (Taxation)
- J.D./Master of Science in Environmental Toxicology
- J.D./Master of Science in Personal Financial Planning
- J.D./Master of Science in Biotechnology
- J.D./Master of Science in Crop Science/Horticulture/
Soil Science/Entomology
- J.D./Law and Science Certificate Program

These joint degree programs are of benefit to students who contemplate careers in professional management or public service or those who envision careers in such narrowly specialized areas such as tax accounting, banking, real estate, collective bargaining, or international business. The program enables students to study, compare, and relate simultaneously the special subject matter areas and the law, completing the requirements for both degrees in three years instead of the four years required if pursued separately.

Museum Science

Coordinator: Gary F. Edson, Professor of Museum Science and Executive Director, Museum of Texas Tech University

The Master of Arts in Museum Science emphasizes thorough preparation in the broad spectrum of museum theory and practice. Graduates from the program have a comprehensive background in museum studies, preparing them as generalists. In addition, students may elect to become specialists in a number of subdisciplines, including collection management and care; exhibitions and interpretation; museology; museum management; and curatorship in anthropology, art, ethnology, history, paleontology, and the natural sciences.

Applicants will be considered for admission to the museum science program after the following materials are received: two letters of recommendation from persons knowledgeable of the student's professional abilities and a career summary statement. Forms will be furnished on request. Prior to admission consideration, students must complete the appropriate application forms and satisfy the requirements of the university, including an official transcript of complete undergraduate coursework and GRE scores. Once that process is concluded, program admission and competitive scholarship awards are based on three general categories of criteria:

- **Academic Record:** All academic records may be considered—60 hours, total, major, post-baccalaureate, etc.
- **Test Scores:** Scores on the General Test of the Graduate Record Examination (GRE) should be no more than five years old. Each score is considered separately, with percentile scores viewed by broad major. No test score will be considered the sole criterion.
- **Individual Profile:** Profiles may include recommendations, research background, motivation, multilingual proficiency, undergraduate institution, presentations, and interviews. Other information that admission and scholarship committees may consider is work commitment, demonstrated commitment to a particular field of work or study, and community involvement.

Interested persons should contact the Museum of Texas Tech University for a comprehensive packet of information about the program.

The Museum Science program uses a variety of existing courses offered by various departments within the university to address individual educational and career goals. All students must develop competency in the core courses taught by selected members of the graduate faculty and the museum staff. (Competency is construed to mean an understanding of professional museum practices.)

A student majoring in the program must take at least 24 hours from the museum science core curriculum, a minimum of 15 hours of elective graduate-level courses, plus 6 hours of thesis or internship and special project. (Internships are normally at approved museums and facilities other than the Museum of Texas Tech University.) Required core courses for the program include MUSM 5321, 5326, 5327, 5330, 5331, 5332, 5333, and 5340. A total of 45 credit hours of graduate-level work is required for graduation. In addition, each

student must pass a qualifying exam prior to beginning either the internship or thesis and must pass comprehensive written and oral exams at the conclusion of his or her studies. Students pursuing the thesis option must write and defend the thesis.

Following the first 9 credit hours of graduate study, each student's curriculum will be formalized through consultation with a graduate faculty advisory committee, consisting of at least three members, which reflects the student's area of emphasis. This degree plan will be approved by the program coordinator and the Executive Director of the Museum and will then be submitted to the Graduate School. When approved, it will serve as a tool for advising and review to assure completion of degree requirements.

A minor at the master's level in museum science consists of 9 approved credit hours in the core curriculum; a minor at the doctoral level consists of 15 hours of museum science courses of which at least 9 must be from the core curriculum.

Museum Science (MUSM)

(To interpret course descriptions, see page 8.)

Graduate Studies

- 5321.* Museology (3:3:0).** Prerequisite: Consent of instructor. Establishes a historical and theoretical framework for museum science, promotes a global perspective of museums, and acquaints students with the broad-based implications of museum work as a science.
- 5325. Museum Field Methods (3:1:6).** Prerequisite: Consent of instructor. Problems of collecting museum artifacts, specimens, and samples in the field and methods of handling material before it reaches the museum. Sections will allow work in anthropology, history, paleontology, and vertebrate biology.
- 5326.* Museum Administration (3:3:0).** Prerequisite: Consent of instructor. Instruction and investigation in aspects of museum management and administration including policies and procedures, personnel management, budget formulation, governance, and interaction with support organizations.
- 5327.* Museum Collection Management (3:2:3).** Prerequisite: Consent of instructor. Defines the roles of museum collections and focuses on general museum concepts, procedures, and issues related to the management and care of collections. Instruction in art, humanities, and natural science collections.
- 5328. Museum Practicum (3:1:6).** Prerequisite: Consent of instructor. Individual instruction course of supervised experiences involving hands-on activities in museum administration, collections, education, and exhibitions. Sections will allow work in all areas of the Museum of Texas Tech.
- 5329. Material Culture (3:3:0).** Discussion of major trends in historical, psychological, philosophical, anthropological, and art historical literature in terms of their application to the interpretation of the past through its material culture.
- 5330.* Museum Law, Ethics, and Standards (3:3:0).** Prerequisite: Consent of instructor. Addresses the ethical considerations and legal obligations of museum collections, administration, and operations. Attention given to international concerns as well as to state and national issues.
- 5331.* Museum Interpretation and Communication (3:2:3).** Prerequisite: Consent of instructor. Investigates the theories and methods of museum exhibitions and interpretation. Includes planning, developing, and evaluating strategies of exhibitions, publications, and interpretive programs.
- 5332.* Museum Preventive Conservation (3:1:6).** Prerequisite: Consent of instructor. A course designed to give future museum workers an awareness of the need for specialized care of artifacts. Introduction of current methods and theories pertaining to museum collection care.
- 5333.* Museum Education (3:3:0).** Prerequisite: Consent of instructor. Examination of the role of education in museums, with emphasis on the theory and practice of program development, teaching strategies, and off-site resources.
- 5335. Geology of National Parks (3:3:0).** Prerequisite: Consent of instructor. Course employs a plate tectonic framework to interpret the development of national parks, mountains, and seashores.

* Indicates required course

- 5340.* **Museum Data Management (3:1:6)**. Prerequisite: Consent of instructor. Introduction of traditional and electronic management of museum collection data emphasizing the philosophy of data preservation and retrieval.
6000. **Master's Thesis (V1-6)**.
6001. **Museum Internship (V1-6)**. Internship at an approved museum to include a special project approved by the student's advisory committee. Written documentation of project to provide practical information for the museum profession.
7000. **Research (V1-12)**.

Neural and Behavioral Sciences

Coordinator: Dr. James A. Carr, Professor of Biological Sciences and Chairperson, Neural and Behavioral Sciences Advisory Committee

Neural and Behavioral Sciences is offered as an interdisciplinary minor for graduate students who wish to broaden their knowledge of the neural and behavioral sciences while gaining a sound academic background in basic areas such as the structure and function of the nervous system.

The Neural and Behavioral Sciences Advisory Committee supervises this program and coordinates related activities on campus such as seminars, student research, and consultation for students interested in further training in the neural and behavioral sciences. The committee is composed of faculty from the College of Arts and Sciences, the College of Agricultural Sciences and Natural Resources, and the School of Medicine.

A doctoral minor normally consists of GIDN 5910 (Integrated Neurosciences: 9 semester hours) plus 9 semester hours outside the student's major field (selected from the list below). A master's minor normally consists of GIDN 5910. In special cases the committee may substitute other courses for GIDN 5910.

Program Courses

- | | |
|-----------|--|
| GANM 5313 | Selected Topics in Cell and Developmental Biology (3:3:0) |
| GIDN 5910 | Integrated Neurosciences (9:8:1). |
| GPHM 5326 | Pharmacology of the Autonomic Nervous System (3:3:0) |
| GPHM 5337 | Neuropsychopharmacology (3:3:0) |
| GPHY 6314 | Membrane Biophysics (3:3:0) |
| PHIL 5330 | Philosophy of Science (3:3:0) |
| PHIL 5331 | Philosophical Psychology (3:3:0) |
| PSY 5309 | Clinical Neuropsychology (3:3:0) |
| PSY 5353 | Seminar in Physiological Psychology (3:3:0) |
| PSY 5385 | Life Span Development: Psychobiological and Cognitive Processes in Aging (3:3:0) |
| ZOOL 5304 | Comparative Endocrinology (3:3:0) |
| ZOOL 5312 | Advanced Animal Behavior (3:3:0) |
| ZOOL 6320 | Comparative Neuroanatomy (3:2:3) |

Risk-Taking Behavior

Coordinator: Dr. Nancy J. Bell, Professor of Human Development and Family Studies (www.hs.ttu.edu/hdfs/risk.htm)

Risk-Taking Behavior is offered as an interdisciplinary minor at the master's or doctoral level. The 15-hour minor consists of an introductory course (Seminar in Risk Taking), which examines the concept of risk taking from a developmental perspective. Students then choose the additional 12 hours from courses covering substance abuse and vulnerability to chemical dependency, family problems associated with risk taking, deviance, and criminology. At least two of these courses must be outside the student's home department.

The minor is administered by the Committee for Multidisciplinary Research on Adolescent and Adult Risk-Taking Behavior. The committee is composed of faculty in Human Development and Family Studies; Psychology; Education; and Sociology, Anthropology, and Social Work. The purposes of the committee are to foster collaborative research on risk taking and to serve as a resource for Texas Tech and the community. Research interests of participants include substance

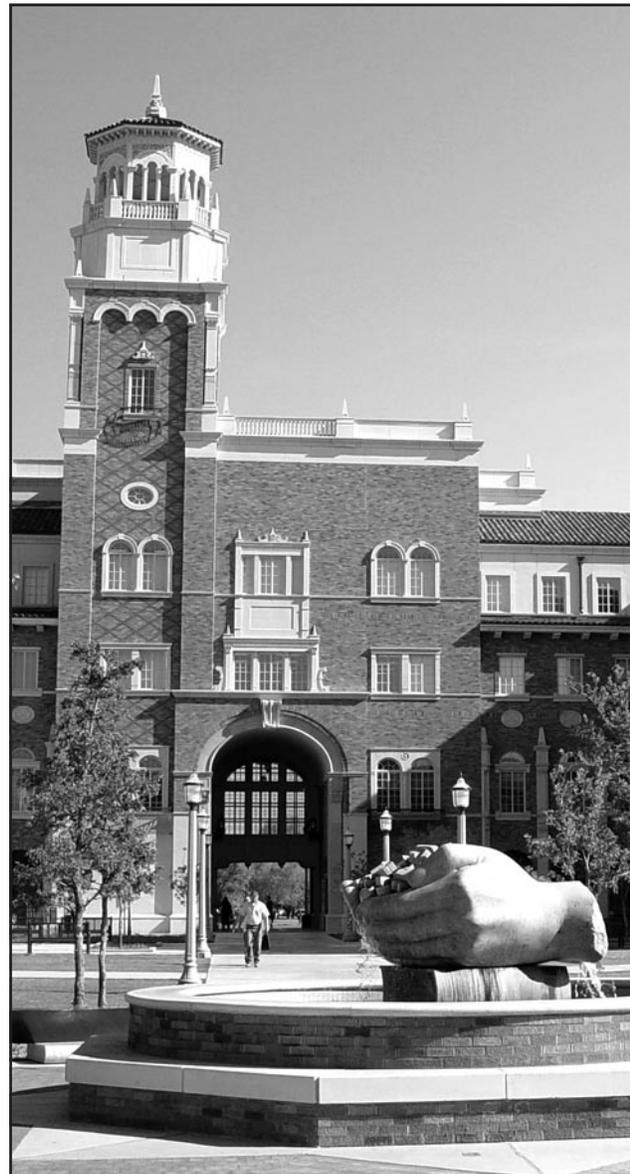
abuse, codependency, decision processes associated with adolescent sexual behavior, coping and social support, gender issues in risk taking, and developmental processes associated with risk taking.

This minor should be useful for students interested in research on risk-taking behavior or for those planning to work in applied settings with adolescents and young adults or with families. Consult the program coordinator or individual departments for information on course scheduling. In addition to the courses listed below, special topics courses related to risk taking may be included with the approval of the coordinator.

Program Courses

- | | |
|-----------|---|
| EPCE 5372 | Addictions: An Overview for School and Community Counselors (3:3:0) |
| HDFS 5341 | Socialization Processes and Addiction (3:3:0) |
| HDFS 6320 | Seminar in Risk Taking (3:3:0) |
| HDFS 6330 | Family Problems (3:3:0) |
| HDFS 6371 | Practicum in Human Development and Family Studies (3:3:0) |
| PSY 5382 | Psychopharmacology of Psychoactive Drugs (3:3:0) |
| SOC 5311 | Seminar in Criminology (3:3:0) |
| SOC 5325 | Seminar in Deviant Behavior (3:3:0) |

English / Philosophy Building



School of Law

Walter B. Huffman, J.D., Dean

1802 Hartford Ave. | Lubbock, TX 79409-0004
T 806.742.3791 | F 806.742.1629
www.law.ttu.edu | admissions@law.ttu.edu

About the School of Law

With a consistently high pass rate on the State Bar Exam, the School of Law at Texas Tech University has always been a leader among Texas law schools. A small student body, a diverse faculty, and a low student–faculty ratio (15.3:1) are only a few of the factors that promote learning and encourage interaction between students and professors at the law school.

Because Texas Tech is the only campus in the state that is home to a major university, law school, and medical school, students benefit from this unique combination by not only being able to obtain a Doctor of Jurisprudence (J.D.) but also by being allowed to pursue one of the following joint degree or certificate programs:

- J.D./Master of Business Administration
- J.D./Master of Public Administration
- J.D./Master of Science in Agricultural and Applied Economics
- J.D./Master of Science in Accounting (Taxation)
- J.D./Master of Science in Environmental Toxicology
- J.D./Master of Science in Personal Financial Planning
- J.D./Master of Science in Biotechnology
- J.D./Master of Science in Crop Science/Horticulture/
Soil Science/Entomology
- J.D./Law and Science Certificate Program

Applying for Admission

An applicant for admission to the School of Law must have received or completed all requirements for a baccalaureate degree from a college or university of approved standing prior to beginning study at the School of Law (unless enrolled under the “3+3” program described in the Honors College section of this catalog). An applicant’s record must be of sufficiently high quality to demonstrate that the applicant is qualified for the study of law.

An applicant also must take the Law School Admission Test, which is administered four times a year throughout the United States and in many foreign countries by the Law School Admission Council.

The School of Law cooperates with the Texas Tech University Honors College, the College of Arts and Sciences, and the College of Visual and Performing Arts to provide special admission programs for exceptional undergraduates. Consult the Honors College section of this catalog or view www.honr.ttu.edu for more information.

The School of Law does not prescribe a specific prelegal curriculum for its applicants. The wide range of lawyer tasks and the difference in offerings from school to school preclude such an approach. However, all students should strive toward the following goals when planning their college program: acquire the ability to read, write, and speak the English language well; gain a critical understanding of human values and institutions—political, economic, and social; and develop the power to think creatively.

Applications should be submitted to the School of Law at the earliest opportunity after October 1. The deadline for the Early Decision Program is November 1, and the deadline for the Regular Decision Program is February 1.



Administration and Faculty

Dean: Huffman

Associate Deans: Lewis, Shannon, Torres

Assistant Deans: Cook, Fletcher, Jarmon, Ramos

Director of Clinical Programs: Spain

Director of International Programs: Ramírez

Director of the Legal Practice Program: Soonpaa

Director of Center for Biodefense, Law and Public Policy: Sutton

Director of Center for Water Law and Policy: Eckstein

Director of Center for Military Law and Policy: Rosen

Director of Criminal Justice Clinic: Roque-Jackson

Director of Health Care and Bioethics Mediation Clinic: Fortney

Director of Low-Income Tax Clinic: Phelan

Director of Innocence Project: Blackburn

Deputy Director of Center for Military Law and Policy: Phillips

Deputy Director of Center for Water Law and Policy: Jeffery

Foundation Professor of Commercial Law: Krahmer

Horn Professors: Benson, Casto, Phelan

Charles Thornton Professor: Shannon

George Herman Mahon Professor: Fortney

George R. Killam Jr. Chair of Criminal Law: Loewy

George McCleskey Professor of Water Law: Eckstein

Governor Preston Smith Professor: Beyer

J. Hadley Edgar Professor: Weninger

Maddox Professor: Cochran

Robert H. Bean Professor: Sutton

W. Frank Newton Professor: Huffman

Professors: Bard, Camp, James, Myhra, Pawlowic, Ramírez, Soonpaa, Spain, Torres

Associate Professors: Gonzalez, Graham, Hatfield, Jeffery, Laughlin, Lewis, Roque-Jackson, Rosen, Ross

Assistant Professors: Bruner

Legal Practice Associate Professor: Jones

Legal Practice Assistant Professors: Dillon, Horn, Phillips

Adjunct Faculty: Baker, Benson, Blackburn, Bubany, Conboy, Eissing, Hensley, Hunt, Mateja, Terrell

All-University and Preprofessional Programs

All-University Programs

Cooperative Education

The Cooperative Education program integrates classroom study with paid, practical, and supervised work training in public and private employment situations. By applying their academic training in a work setting, students not only enhance their self-confidence while earning wages, but they also gain career direction and may receive offers for future full-time employment.

Co-op programs include both the alternating and parallel patterns. The alternating option allows students to alternate semesters of work and school, working a minimum of two semesters. The parallel plan permits students to work at least 15 to 20 hours per week concurrently with their academic progression.

Students considering a Co-Op experience should consult with an advisor in the Career Center as early as possible. In addition, the student must obtain approval from his or her departmental advisor before enrolling. Ordinarily a student must have completed the sophomore year to be considered for the program.

Cooperative Internship (COIN)

3000. Cooperative Internship (V1-6). Supervised internship in an approved industrial or professional establishment. Approval of enrollment by Co-op program required.



Institute for Studies in Pragmaticism

The Institute for Studies in Pragmaticism offers an undergraduate course and a graduate-level course on methods and logical problems associated with interdisciplinary endeavors in science. The only prerequisite is approval of the instructor. Students in any branch of Texas Tech University or Texas Tech University Health Sciences Center are eligible to enroll.

Contact information: Kenneth L. Ketner, Director, Institute for Studies in Pragmaticism, Box 40002, Texas Tech University, Lubbock, TX 79409-0002, 806.742.3128.

Pragmaticism (PRAG)

- 4000. Independent Research in Peirce Studies (V1_6).** Prerequisite: Consent of instructor. Directed study of selected interdisciplinary problems in Peirce Studies. May be repeated for credit.
- 5000. Independent Research in Peirce Studies (V1-6).** Prerequisite: Consent of instructor. Directed interdisciplinary inquiry in Peirce studies. May be repeated for credit.

Interdisciplinary Studies (Freshman Seminar)

“Tech Transition: The Freshman Seminar” is designed to smooth the advance of students from high school to the university. The one-hour Interdisciplinary Studies course (I S 1100) is taught by regular faculty from throughout the university in a collaborative approach to major concerns of incoming students.

This is a general university course with sections composed of 20 to 25 students from the freshman class without regard to college or major. It cannot be taken pass-fail.

The course has a major focus on learning theory and application, the development of critical thinking skills as they apply to the nature of a university, the purposes and values of a university education, and a wide variety of campus issues. Practical concerns covered in the seminar include time management, essay writing, effective notetaking, choosing a major, test taking, and campus resources.

The goals of this course are to help students take charge of their education by developing a profound understanding of the philosophy and scope of higher education and to foster development of a life of learning.

Interdisciplinary Studies (I S)

- 1100. Tech Transition: Freshman Seminar (1:1:0).** Introduces students to philosophy, history, and applications of higher education and critical thinking.
- 1200. Life Skills for Student Athletes (2:2:0).** Prerequisite or corequisite: I S 1100. Designed to assist first-year student athletes with a variety of life-skill components, including personal, athletic, academic, and career development.
- 4100. Strengths-Based Senior Seminar (1:1:0).** Designed for college seniors to help ease their transition from college to the workplace, including understanding job market trends and developing skills in job interviewing, budgeting, and negotiation.

Introduction to Library Research

Introduction to Library Research is a one-hour course designed to introduce students to lifelong information literacy skills and establish tools for effective and efficient research in a university library. Because information comes in many forms, students sometimes find the multitude of printed publications, Internet resources, and microform and audiovisual materials overwhelming. They need

to know how to identify, find, evaluate, and use resources that are most appropriate for their assignments.

Introduction to Library Research has four main objectives: to present the arrangement and services of the Texas Tech University Libraries; to provide an introduction to resources and search strategies; to outline a transferable, systematic plan for critical evaluation and use of these resources in a variety of ways; and to promote the effective use of information to accomplish specific tasks.

Course content (readings, quizzes, and activities) is accessed through WebCT for onsite and distance students. Onsite students will meet for lecture and hands-on sessions. All students will prepare a portfolio throughout the semester that will count as the final project.

Contact information: Jon Hufford, 806.742.2236.

Library Research (LIBR)

1100. Introduction to Library Research (1:1:0). Designed to introduce students to life-long information literacy skills and establish the tools for effective and efficient research in a university library.

Women's Studies

The university offers an interdisciplinary minor in women's studies. Goals of the minor include helping students reinterpret traditional views of women's nature and role, training individuals for careers with a special focus on women, and encouraging research dealing with the experience of women.

The program is administered by the Women's Studies Council and the Director of Women's Studies. A minor consists of 18 hours of women's studies electives. Three of the courses must be Introduction to Women's Studies (W S 2300), Feminist Thought and Theories (W S 4310), and Women's Studies Seminar (W S 4399). Courses counted toward the major will not count toward the minor. Courses without a W S prefix may be used toward the minor at the discretion of the Director or Coordinator of Women's Studies.

Women's Studies (W S)

Undergraduate Courses

- 1305. Human Sexuality (3:3:0).** Examination of the structural and functional traits of sexuality and how they affect well-being; covers relationships, reproduction, and life-style alternatives. (HLTH 1305)
- 2300. Introduction to Women's Studies (3:3:0).** Basic survey of concepts and theories related to the study of women and to the analysis of gender roles. Fulfills Core Curriculum humanities requirement.
- 2301. Gender Roles: Life Span Developmental Perspective (3:3:0).** Introduction to gender role concepts and to the impact of gender and gender role systems on individual and family developmental processes. (HDFS 2300)
- 2331. The Sociology of Marriage (3:3:0).** History, present status, and current problems of the marriage institution. (SOC 2331)
- 3306. Women in Culture and Society (3:3:0).** A comparative study of sex and gender in human society; biological and cultural factors that influence women's roles, status, and their contributions to cultural institutions. (ANTH 3306)
- 3307. Gender Issues in Sport (3:3:0).** Examination of the ways sport experiences differ for males and females emphasizing historical, social, behavioral, and physiological dimensions. (ESS 3352)
- 3312. Gender and Communication (3:3:0).** A study of the similarities and differences of important communication variables for males and females, with practical communication applications. May be applied toward the social-behavioral science requirement for the B.A. degree. (Writing Intensive) (COMS 3334)
- 3321. Human Sexuality Through the Family Life Cycle (3:3:0).** Human sexuality from a life cycle perspective, with an emphasis on developmental, familial, and societal factors that influence individual sexuality. (HDFS 3321)

- 3323. The History of Women in America (3:3:0).** Examines the gender expectations from 1607 to the present that have produced for women and men entirely different experiences, strengths, and perceptions of American history. (HIST 3323)
- 3325. Gendered Lives (3:3:0).** Prerequisite: SOC 1301. Course treats women as a group with unique sex role socialization, work, family, and political experience. Emphasis on women in contemporary United States. (SOC 3325)
- 3326. Women in Politics (3:3:0).** A study of female political participation in the United States, including voting, campaign activity, interest group activity, and office holding. (POLS 3326)
- 3331. Sociology of the Family (3:3:0).** Changing family life styles, mate roles, parent-child relationships, adoption, abortion, population control, technical industrial impact on American family unit. (SOC 3331)
- 3332. Feminism and Philosophy (3:3:0).** Discussion of issues involving women in moral, political, and legal philosophy, including the ethic of care, sexual harassment and discrimination, gender neutrality, and meaning of equality. (PHIL 3332)
- 3337. Inequality in America (3:3:0).** Inequality as expressed in occupational, class, ethnic, and sexual hierarchies is examined from varying sociological perspectives. (SOC 3337)
- 3340. Gender and Sexuality in the Classical World (3:3:0).** Examination of social and cultural dimensions of gender and sexuality in the ancient Greco-Roman world. Readings in English. (CLAS 3340)
- 3341. Women in European Civilization (3:3:0).** What women were supposed to do; what women did, from prehistory to the vote in 1920. (HIST 3341)
- 3342. Introduction to Research in Human Geography (3:3:0).** Introduction to research methods in geography. (GEOG 3340)
- 3382. Women Writers (3:3:0).** Significant works by women. (ENGL 3382)
- 4302. Psychology of Human Sexual Behavior (3:3:0).** Prerequisite: PSY 2306 and junior standing. Study of human sexual behavior from a psychological viewpoint with emphasis on contemporary research methods and findings. (PSY 4300)
- 4305. Directed Studies (3).** Prerequisite: Junior or senior standing or consent of instructor. Independent study under the guidance of the instructor.
- 4310. Feminist Thought and Theories (3:3:0).** Prerequisite: Junior standing or consent of instructor. An examination of important theoretical writings and perspectives in women's studies, including the contributions of feminist theory and analysis to traditional disciplines. (Writing Intensive)
- 4327. Gender, Race, and Class in U.S. Law (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines law's treatment of gender, race, and class; legal impact of struggles of women, African-Americans, and workers; meaning of liberty, citizenship, public-private spheres. (Writing Intensive) (HIST 4327)
- 4355. Let's Talk Women, Let's Talk War: Women in Conflict in the 20th Century. (3:3:0).** Prerequisite: Junior standing or consent of instructor. The course will examine the involvement and reactions of European women to situations of war and revolution in the 20th Century. (HIST 4355)
- 4374. Love, Death, and Magic in Europe, 1500 - 1800 (3:3:0).** Prerequisite: Junior standing or consent of instructor. Topics in social and cultural history. Underside of civilization, population, social structure, family and household, economic growth, and crisis. Attitudes toward love and death, popular religion and culture, witchcraft, violence, revolt. (Writing Intensive) (HIST 4374)
- 4399. Women's Studies Seminar (3:3:0).** Prerequisite: W S 2300, junior standing, or consent of instructor. An exploration of women's experience and gender definitions from the perspective of several disciplines, including biology, psychology, anthropology, human development, communication studies, history, literature, art, sociology, political science, and economics.

Graduate Courses

- 5000. Practicum in Women's Studies (V1-6).** Practicum experience involving women-centered projects, activities, or artistic expressions that are socially and/or communally relevant.
- 5300. Directed Studies (3:3:0).** Prerequisite: Consent of instructor and the Director of Women's Studies. Content will vary to meet the needs of students. May be repeated three times for credit, as topic varies.

5310. **Feminist Thought and Theories (3:3:0).** An examination of important theoretical writings and perspectives in Women's Studies, including the contributions of feminist theory and analysis to traditional disciplines.
5320. **Feminist Research Methodologies (3:3:0).** Prerequisite: W S 5310 or consent of instructor. An interdisciplinary study of methods, analyses, and critiques used by feminist scholars to study feminist issues within and between a range of traditional disciplines.
5340. **Special Topics in Women's Studies (3:3:0).** This interdisciplinary course is structured around a specific topic or issue relevant to Women's Studies and feminism.
5360. **Foundations of Women's Studies (3:3:0).** Interdisciplinary introduction to the fundamental concepts and issues addressed by Women's Studies scholarship and feminist activism, including gender, race, sexual orientation, and class.

Preprofessional Programs

Prelaw Studies

The discipline of law is for students who are interested in combining precision in thinking, researching, and writing with a desire to work with people. While many choose to practice law in the courtroom, many law graduates leverage their newly developed skills to excel in other fields. A law education equips students for success in a law practice, public service, teaching, and business.

Through a structured four-year process, the TTU Prelaw Program cultivates the undergraduate to become a confident and articulate law school applicant bearing exceptional qualifications. Participants will focus on the three essential areas identified by law school professionals nationwide:

1. Writing and speaking with comprehension and clarity
2. Understanding social institutions and human nature
3. Thinking creatively and analytically

To excel in these areas, students in the program will:

- Connect one to one with an academic advisor who specializes in preparing students for the challenges of law school
- Establish professional relationships with faculty and mentors
- Determine their best-fit academic major
- Rigorously pursue excellence and academic challenges
- Explore service learning and undergraduate research opportunities
- Develop strong time management practices
- Identify options for financing their law school education
- Prepare for and practice taking the LSAT exam
- Prepare and submit law school applications

Prospective law students need a four-year bachelor's degree in the academic discipline of their choice prior to applying for admission. Law schools are generally most interested in applicants who exhibit intellectual maturity and have the foundation of a broad-based liberal arts education. They consider exceptional applicants from diverse disciplines and backgrounds, often providing programs for early admission to qualified applicants. The Texas Tech University School of Law offers four such programs:

- **Early Decision Program**

The Early Decision Program is binding. Applicants admitted under this program commit to attend the Texas Tech School of Law, will withdraw all other applications, and will not apply to other law schools.

- **Summer Entry Program**

The Summer Entry Program is designed to prepare students with lower academic predictors for the rigors of the first year of law school. Applicants designated for the Summer Entry Program are those whose backgrounds, activities, and accomplishments indicate they are outstanding candidates for admission, but their LSAT scores or grade point averages fall below the mean scores for entrance to law school.

- **Honors College "3+3" Early Admission Program**

This joint program between the College of Arts and Sciences, the College of Visual and Performing Arts, the Honors College, and the Texas Tech University School of Law allows exceptional, qualified applicants with a minimum of 100 semester hours of baccalaureate study to seek acceptance to the Law School during the fall of their third year of undergraduate study and take the LSAT by December of that year. Students who accept early admission must enroll at the Texas Tech School of Law and may not apply to other law schools. The applicant for an undergraduate degree under this plan must submit an official transcript from the Texas Tech School of Law after completion of the first year of law school. Successfully completed coursework (totaling 29 hours) at the Law School will substitute for the 18 hours required for the undergraduate minor and any electives needed (totaling up to 11 hours) for the baccalaureate degree.

- **Honors College Early Decision Plan**

Under this plan, exceptional students with a minimum of 90 semester hours of baccalaureate study can seek and receive notification of their acceptance to the Law School during their third year of undergraduate study.

Applicants must meet strict criteria for acceptance under any of the above programs. Visit www.prelaw.ttu.edu/earlyadmit for more information. Students can join the TTU Prelaw Program at any time, but it is best to start as soon as possible. **Contact information:** 79 Holden Hall, 806.742.2189, prelaw@ttu.edu, www.prelaw.ttu.edu

Preprofessional Health Careers

Professional health schools include dentistry, medicine, nursing, optometry, pharmacy, and allied health sciences. Most professional schools in the field of health care require the completion of specific college level science and general education courses prior to admission. The Preprofessional Health Careers Office maintains a collection of related information on various health careers. **Contact information:** Preprofessional Health Careers Office, 340 Chemistry Building, 806.742.3078.

Individual advising regarding preparing students for admission to professional health schools is done by advisors in the Preprofessional Health Careers Office up to the time students file a degree plan. Most professional health schools do not specify particular majors as part of their admission requirements. Texas Tech does not offer degrees in premedicine, predentistry, or other prehealth areas. Each preprofessional health career student who intends to earn a baccalaureate degree must choose a major by the junior year and complete the courses required for admission into the professional health school. Preprofessional health career students are advised to choose a major offered within any of the colleges at the university. The major should suit the student's individual interests and abilities and offer alternative career options in the event initial career plans change.

Courses listed as prerequisites for professional schools must be college-level courses taken for letter grades. However, credit by examination, using the standardized tests described in this catalog, is also acceptable for certain courses. Science courses required by professional health schools are those required of science majors. Students are responsible for knowing any special requirements of the professional schools they plan to attend. The Preprofessional Health Careers Committee will assist Texas Tech University students in coordinating their evaluation packets for application to schools of dentistry, medicine, optometry, or podiatry. Evaluation forms are available in the Preprofessional Health Careers Office.

Pre dentistry

The minimum admission requirements for most dental schools in the United States are 16 semester hours of biology, 8 semester hours of general chemistry, 8 semester hours of organic chemis-

try, 8 semester hours of physics, and 6 semester hours of English. Applicants to dental schools are required to take the Dental Admission Test and submit their applications approximately one year prior to the planned matriculation. For admission requirements of a specific dental school, students should consult the latest edition of *Admission Requirements of United States and Canadian Dental Schools* or the dental school Web site. A formal minimum of 90 semester hours is stated for some schools. However, students should plan to complete a baccalaureate degree in the field of their choice before entering dental school.

Premedicine

The minimum admission requirements for most medical schools in the United States are at least 90 semester hours in an accredited college or university, including 6 semester hours of English, 3 semester hours of calculus, 14 semester hours of biology, 8 semester hours of general chemistry, 8 semester hours of organic chemistry, and 8 semester hours of physics.

All applicants to medical schools are required to take the Medical College Admission Test and submit their applications to the schools approximately one year prior to the date of the planned matriculation. For admission requirements of medical schools, students should consult the latest edition of *Medical School Admission Requirements* or the medical school Web site.

Students should plan to complete a baccalaureate degree in the field of their choice before entering medical school. Premedical and pre-dental students may obtain a baccalaureate degree in one of two ways:

Option A. The degree may be obtained by completing the requirements as stated in the catalog for the degree desired. The major selected depends on the interest of the student. This major will usually be in one of the sciences; however, other majors are acceptable and may be chosen in colleges other than the College of Arts and Sciences.

Option B. The Arts and Sciences B.A. or B.S. degree may be obtained by completing coursework totaling a minimum of 100 semester hours in the College of Arts and Sciences and then graduating from an accredited U.S. or Canadian school of medicine, osteopathy, or dentistry. The following regulations apply:

- Of the 100 semester hours of preprofessional work, at least the last 30 must be completed in residence at Texas Tech. 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.
- The three years of work must satisfy all graduation requirements for the B.A. or B.S. degree at Texas Tech, with the exception of requirements in the major.
- The applicant for a degree under this plan must submit properly approved credentials from an accredited U.S. or Canadian school of medicine, osteopathy, or dentistry to the effect that the applicant has completed satisfactorily the work leading to a degree of Doctor of Medicine or Doctor of Dental Surgery. Evidence of the degree will substitute for the baccalaureate degree requirements in a major field.

Any student selecting Option B should plan carefully in consultation with the associate dean at least one year prior to leaving the university to begin professional school.

Preoptometry

Admission requirements differ among the various optometry schools. These courses fulfill requirements in general: 8 semester hours of biology; 4 semester hours of human anatomy; 4 semester hours of physiology; 4 semester hours of microbiology; 8 semester hours of general chemistry; 4 semester hours of organic chemistry; 3 semester hours of biochemistry; 8 semester hours of physics; 6 semester hours minimum of mathematics including algebra and trigonometry, analytical geometry, or precalculus and 3 semester hours of calculus;

3 semester hours of statistical methods in psychology; and 3 semester hours of general psychology. For the admission requirements of a specific optometry school, students should consult the Association of Colleges and Colleges of Optometry or the optometry school Web site. Applicants to optometry school are required to take the Optometry Admission Test and submit all admissions-related documents in a timely manner. Some optometry schools require the completion of a baccalaureate degree prior to matriculation.

Prepharmacy

The specific admission requirements for schools of pharmacy differ, but most include 8 semester hours of biology; 8 semester hours of general chemistry; 8 semester hours of organic chemistry; 4 semester hours of physics; 4 semester hours of microbiology; 3 semester hours of calculus; 3 semester hours of statistical methods; 6 semester hours of English; 3 semester hours of literature; 3 semester hours of economics, 3 semester hours of public speaking; and 15 semester hours spread across humanities and social sciences. For the admission requirements of pharmacy schools, students should consult the Web sites of the pharmacy schools and take the Pharmacy College Admission Test before applying to the professional schools.

Allied Health

Before being admitted to the professional level within a school of allied health, a student must complete 60 to 90 semester hours of preprofessional coursework in either a preclinical laboratory science; prespeech, language, and hearing sciences; preoccupational therapy; prephysical therapy; or prephysician assistant program. Most programs require a minimum of 6 to 9 semester hours of English, 6 semester hours each of U.S. history and political science, and 8 semester hours each of biology, chemistry, and physics. Requirements for additional courses in advanced biology and chemistry, zoology, computer science, mathematics, anthropology, psychology, sociology, speech, and statistics vary with each program and with each school of allied health. For the admission requirements of allied health programs, students should consult the Web sites of the schools of allied health.

Prenursing

Admission requirements differ among the various nursing schools. These courses fulfill requirements in general: 6 semester hours of English, 3 semester hours of statistics, 8 semester hours of human anatomy and physiology, 4 semester hours of general chemistry, 4 semester hours of microbiology, 3 semester hours of nutritional sciences, 3 semester hours of visual and performing arts, 3 semester hours of humanities, 6 semester hours each of U.S. history, and political science, 3 semester hours of psychology, 3 semester hours of sociology or cultural anthropology, and 3 semester hours of lifespan growth and development. Contact information to obtain admission requirements of a specific school of nursing can be found on the Web sites of the nursing schools.

Applicants to schools of nursing are required to submit all documents related to admission and take the Nurse Entrance Test in a timely manner.

Other Preprofessional Health Careers

Students who plan to apply to other professional programs (e.g., dental hygiene, radiologic technology, and respiratory therapy) should consult an advisor in the Preprofessional Health Careers Office for further information and the Web sites of the professional schools.

Reserve Officer Training Corps

The Department of Military Science and the Department of Aerospace Studies conduct senior division Reserve Officer Training Corps (ROTC) programs under the auspices of the College of Arts and Sciences. These programs provide students the opportunity to learn more about the United States military and its place in American society today. They also allow qualified students to pursue a program of studies and learning experiences leading to an officer's commission in either the Army or Air Force.

The first two years of courses in the Army and Air Force ROTC programs are open to all students. No military commitment or obligation is incurred with these courses unless the student has an ROTC scholarship. The courses may be substituted for the College of Arts and Sciences health and physical fitness course requirements.

Army ROTC offers a two-, three-, and four-year commissioning program. To enter the junior and senior level Army Advanced Course, students must have completed the freshman and sophomore level basic course or have received constructive credit by having completed either a four-year JROTC program, the Army ROTC Leader's Training Course, Armed Forces Basic Training, or be an honorably discharged veteran.

Air Force ROTC offers four- and two-year commissioning programs. Four-year students competing for selection to the Air Force Professional Officer Course (POC) must have completed the freshman and sophomore level General Military Course (GMC) or have received constructive credit by having completed Junior ROTC, Civil Air Patrol, or prior active duty. Four-year cadets normally attend four-week field training. Qualified one- and two-year applicants without the GMC, JROTC, CAP, or active duty will attend an extended field training. Attendance at field training is contingent upon selection to the Professional Officer Course and is normally scheduled between the sophomore and junior years.

Detailed information about the alternative programs is available from the chair of the respective departments. Advanced Course, Professional Officers Course, and scholarship students receive a monthly allowance. In addition to completing the above requirements, students who wish to enroll in the ROTC commissioning program must be citizens of the United States, be not less than 17 years of age, and be able to complete work for a baccalaureate degree and all other requirements for commissioning prior to their 30th birthday (34th birthday with waiver). For the Air Force, students must finish their baccalaureate degree and all other requirements for commissioning by the time they are 29.5 years old if they are programmed for flight training; up to 34 years old with waiver if programmed for other than flight training. All ROTC program students must have a cumulative GPA of 2.0 or better, pass all military aptitude tests as required, be physically qualified, be enrolled as a full-time student, and be approved by the Professor of Military Science, or Professor of Aerospace Studies, as appropriate. Upon admission into the Advanced Course or Professional Officers Course, students sign a contract to seek a commission as a second lieutenant.

Scholarships. The department of Army ROTC offers competitive three- and four-year ROTC scholarships to selected high school seniors. Additionally, the Army offers four-, three-, and two-year scholarships to outstanding students selected by faculty in the program. Air Force ROTC offers four-, three-, and two-year scholarships that are based on merit, not need. Though scholarship awards vary, most pay all tuition, books, and approved university fees. High school seniors who are interested in the four-year scholarship must apply at www.armyrotc.com and www.afrotc.com.

Cadets not on scholarship may apply for three- and two-year scholarships during their freshman and sophomore years. Both Army and Air Force ROTC scholarships provide textbook reimbursement, tuition, and fees as well as a monthly allowance of \$300 for freshmen, \$350 for sophomores, \$450 for juniors, and \$500 for seniors.

Commissioning. Upon receiving a commission, the Army ROTC lieutenant will enter full-time active duty service or part-time service with the U.S. Army, the Army Reserve, or the Army National Guard. Selection for active duty is competitive. For those who wish to combine a career with part-time military service, contracts are available guaranteeing that cadets can serve all of their commitments in the Army Reserve or National Guard. Cadets may also apply for educational delays for graduate training. Air Force cadets agree to serve 4 years on active duty if in a non-flying career field, 10 years upon completion of undergraduate pilot training, or 6 years upon completion of undergraduate navigator training. Air Force commissions are for active duty service only.

Military Studies Minor. A Military Studies minor is available in the College of Arts and Sciences and the College of Business Administration with the General Business major. It consists of 18 semester hours taken in Aerospace Studies, Military Science, Military History, or a combination of the choices.

Department of Aerospace Studies

Faculty

Col. David J. Lewis, Chairperson

Professor: Col. Lewis

Assistant Professors: Maj. Hippel, Capt. Knight, Capt. DeWitt

About the Program

The Air Force Reserve Officer Training Corps (ROTC) curriculum is designed to educate university men and women for careers as Air Force officers and to develop quality graduates with a sense of professionalism and 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.

ROTC–Air Force

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The purposes and specific objectives of the Air Force ROTC program are as follows: (a) select and motivate cadets to serve as career officers in specialty areas required by the U.S. Air Force; (b) develop in cadets by example, discussion, and participation the character, personality, and attitudes essential for leadership; (c) develop in cadets an interest in and understanding of the Air Force mission, organization, operations, and techniques; and (d) provide military education that will give cadets a general background and sound foundation on which to build an officer career.

General Military Course. This course is designed for freshman and sophomore students who wish to explore the opportunity to pursue an Air Force officer's commission while studying the historic development and use of air power; the role of air power in today's society; the organizational structure and missions of selected Air Force organizations; and professionalism and officership. Each General Military Course has a requisite leadership lab course each semester.

Professional Officer Course. The Professional Officer Course (POC), which is normally taken during the cadet's junior and senior years, is designed to commission highly qualified junior officers for the United States Air Force. This course concentrates on two main themes: (1) concepts of leadership and management and (2) national security forces in contemporary society. Enrollment in the Professional Officer Course is open to all students who have met prerequisite screening, testing, and physical examination; have completed the general military course or the pre-enrollment field training or received credit for prior military service; have four semesters of school remaining (may include graduate studies); and have been competitively selected by HQ AFROTC. Please consult the department for details.

Cadets enrolled in the program are paid a minimum tax-free subsistence allowance of up to \$400 per month. Those who complete the Air Force ROTC Professional Officer Course are commissioned upon graduation and enter active duty as Air Force second lieutenants.

Awards and Recognition. A number of awards, trophies, and decorations are presented each year to outstanding Air Force ROTC cadets during a suitable military ceremony by military and civilian leaders. The awards, presented to recognize achievement and encourage competition, are given to recipients chosen by the Professor of Aerospace Studies, detachment staff, and the Cadet Staff. 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 or her university career. The Colonel Bernard F. Fisher Leadership Awards are awarded each regular semester to the freshman, sophomore, junior, and senior cadets who have demonstrated outstanding leadership within the Cadet Corps. The recipients are rewarded with jet aircraft incentive rides.

Sabre Flight Drill Team. The Sabre Flight Drill Team is an integral part of the program, and its basic mission is to promote interest in the Air Force ROTC. Members of the flight participate regularly in color and honor guard formations and precision drill activities.

Arnold Air Society. This professional honorary service organization of selected Air Force ROTC 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 within the Air Force ROTC and to promote interest in the Air Force.

Silver Wings. The Silver Wings is a national, coed, professional organization dedicated to creating proactive, knowledgeable, and effective leaders through community service and education about national defense.



Air Force ROTC Field Training. Field training is offered during the summer months at selected Air Force bases throughout the United States. Students in the four-year program participate in four weeks of field training during the summer, usually between the sophomore and junior year. The major areas of study in the field training program include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions and Air Force environment, and physical conditioning. There are numerous program opportunities available for cadet participation on a voluntary basis within the Professional Development Training (PDT) Program. PDT is a collection of summer programs available for Air Force ROTC cadets. These programs are conducted at a variety of locations in the United States and overseas. Travel to training location is provided. Room and meals are provided during training. Cadets can expect to shadow Air Force officers to see their day-to-day responsibilities. There are numerous opportunities to interact with flying, engineering, medical, legal, and many other career fields. Flying and parachuting opportunities are available for freshman cadets.

Leadership Laboratory. Instruction is within the framework of an organized cadet corps with a progression of experiences designed to develop each student's leadership potential. Leadership Laboratory involves a study of Air Force customs and courtesies; drill and ceremonies; career opportunities in the Air Force; and the life and work of an Air Force junior officer. Students develop their leadership potential in a practical, supervised laboratory that typically includes field trips to Air Force installations and visits by Air Force officers in various job specialties. Students who enroll in aerospace studies courses must also enroll in a corresponding Leadership Laboratory section. Contact the Aerospace Studies Department for details.

Aerospace Studies (AERS)

(To interpret course descriptions, see page 9.)

Undergraduate Courses

- 1105. Foundations of the United States Air Force I (1:1:2).** A survey course that deals with the mission, organization, and function of the American military, especially as it applies to the United States Air Force.
- 1106. Foundations of the United States Air Force II (1:1:2).** A survey course that deals with the Air Force in the contemporary world through a study of the total force structure, strategic offensive and defensive forces, general purpose forces and aerospace support forces.
- 2103, 2104. The Evolution of USAF Air and Space Power I and II (1:1:2 each).** A survey course designed to examine general aspects of air and space power through a historical perspective. Historical examples are provided to analyze the development of the Air Force capabilities and missions as well as to demonstrate the evolution of today's air and space power. Students also focus on basic verbal and written communication skills and USAF core values.
- 3305. Air Force Leadership Studies I (3:1:2).** Prerequisite: Acceptance into the Professional Officer Course. An introductory management course emphasizing the individual as a manager in the Air Force. Individual motivation and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for the development of the junior officer's professional skills as an Air Force leader.
- 3306. Air Force Leadership Studies II (3:1:2).** Prerequisite: Acceptance into the Professional Officer Course. Leadership theory and management practice are amplified through study of management of forces in change, organizational power, managerial strategy and tactics, and leadership ethics.
- 4303, 4304. National Security Affairs and Preparation for Active Duty I and II (3:1:2 each).** Prerequisite: Acceptance into the Professional Officer Course. AS 400 examines the national security process, regional studies, advanced leadership ethics, and Air Force doctrine. Special topics of interest focus on the military as a profession, officership, military justice, civilian control of the military, preparation for active duty, and current issues affecting military professionalism. Within this structure, continued emphasis is given to the refinement of communication skills.

Department of Military Science

Faculty

Lt. Col. Robert Buscher, Chairperson

Professor: Lt. Col. Buscher

Assistant Professors: Lt. Col. Ott

Instructors: Master Sgt. Burt, Sgt. 1st Class Lusk

About the Program

The Army Reserve Officer Training Corps (ROTC) program of instruction is designed to prepare university students for commissioning as officers for the active Army, the Army Reserve, and the Army National Guard. This is an integral aspect of our national security because Army ROTC provides over 70 percent of the commissioned officers serving in the Army Reserve components and the active Army. It is for this reason that Army ROTC seeks quality men and women who are willing to accept the responsibilities inherent with officership. The training program is designed to

teach military skills and enhance the individual's abilities in communications, leadership, and physical aptitude.

The four-year Army ROTC program is divided into the basic course (first two years) and the advanced course (the last two years). Students who are not scholarship winners incur no military obligation during the first two years.

Basic Course. Enrollment in the basic course is open to all full-time students who are U.S. citizens or immigrant aliens. During the first two years, students are trained in military leadership and problem-solving techniques that will assist them in their adjustment to the university environment. ROTC also provides a tutorial program to assist students in making the academic transition to higher education. Course content including wilderness survival skills, land navigation with a compass and topographic map, weapons marksmanship, safety, first aid, rappelling, and physical conditioning are taught both in the classroom and in outdoor settings. It also includes the structure of the Army and its relationship to American society, the customs and courtesies of the Army, leadership, values, and interpersonal communications. Eligible students may be able to test out of basic courses (MILS 1101, 1102, 2201, and 2202) and receive credit for the courses. Eligibility requirements include prior military service, completion of the leader's training course, or similar qualifications that would illustrate mastering basic skills and content. Consent of the instructor must be obtained prior to attempting to test out of a military science course.

Advanced Course. The junior and senior level courses offer an in-depth study of leadership and individual and group behavior. During the junior year the emphasis is on individual- and small-unit combat tactics, physical training, and basic soldier skills. This culminates with attendance at the Leadership Development and Assessment Course between the junior and senior years. During the senior year, students study ethics and leadership and prepare for becoming a lieutenant. In addition, they participate in planning and executing training for the other cadets. Students are required to develop skills in oral and written communications as well as techniques of instruction.

Military Science Organizations. This department sponsors the local chapter of Scabbard and Blade, the national military honor society. It also sponsors intramural athletic teams and the following organizations:

- **Ranger Challenge Team.** This six-member team represents the Texas Tech Army ROTC program at competitive meets. The purpose of the Ranger Challenge Team is to test the abilities of the top cadets in small-unit competition designed to promote exciting, challenging training and the opportunity to compete with the top cadets from other schools. Team members are selected competitively based on physical fitness, endurance, and proficiency in basic soldier skills.
- **Ranger Company.** Members of the unit are afforded the opportunity to apply leadership and tactics instruction in realistic situations. In addition to weapons and tactics instruction, participation in the unit develops confidence in each member's leadership ability, teamwork, and spirit. Membership is open to all Army ROTC students who meet unit and university standards.
- **Grey Scouts.** The club offers students the opportunity to participate in a self-paced, recreational shooting sports program that recognizes and rewards skill development from a basic performance-level Marksman rating up to a nationally recognized performance-level Distinguished Expert. Membership is open to all interested students.
- **Pershing Rifles.** Students in this organization are trained to proficiency in dismounted drill and ceremonies. Members of the color guard routinely participate in opening ceremonies of sporting and formal events. Membership is open to all Army ROTC cadets who meet membership requirements.

Awards and Recognition. Awards and decorations are presented each semester to Military Science students in recognition of outstanding performance in academics, military science, athletics, and physical training. Awards range from cadet ribbons and certificates to organization decorations and scholarships.

Simultaneous Membership Program (SMP). Advanced course students who are eligible to enlist in either an Army Reserve or Army National Guard unit may serve in both ROTC and the reserve component simultaneously. The financial benefits generally exceed \$1,200 per month.

Field Training Exercises. Field Training Exercises (FTXs) are conducted during one weekend each semester. FTX includes such activities as rappelling, land navigation, marksmanship, and small-unit tactics. These weekend activities are optional for basic course students but are required for advanced course cadets and intended to reinforce skills learned in the classroom and lab environment.

Leadership Laboratory. All students enrolled in Military Science are required to enroll in the Leadership Lab 501. Students are given the opportunity during lab to practice skills learned in the classroom. Each student is assigned to a specific cadet company within the cadet battalion and is normally advanced in leadership position in accordance with class level and experience. The laboratory location will vary from the classroom to a field training area. Lab training includes such activities as rappelling, rope bridging, poncho rafting, land navigation, and first aid training. With approval of the department chairperson, those students whose schedules conflict with Leadership Lab 501 may enroll in Leadership Lab 502.

Summer Training

Leaders Training Course. Students who desire to enter the Military Science program, have no prior military service, and have only 2 to 2.5 years remaining until graduation may choose to attend a five-week ROTC Leaders Training Course at Ft. Knox, Kentucky. Satisfactory completion of this camp satisfies the requirements for the basic course. Upon completion of Leaders Training Course, students may then contract and enter the advanced course. Transportation, room and board, and an allowance are paid for the 5-week period.

ROTC-Army

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Leadership Development and Assessment Course. All advanced course students must complete this five-week camp at Ft. Lewis, Washington, between their junior and senior years or immediately following completion of their senior year. Transportation, room and board, and an allowance are paid for the period. The program of instruction is designed to be the culmination of the military education up through and including the junior year.

Nurses Summer Training Program. Students seeking a B.S.N. and a commission in the Army Nurse Corps attend the regular Leadership Development and Assessment Course. Students can then be assigned to an Army hospital for four weeks. During this time, nursing students work one-on-one with an Army nurse putting into practice the clinical skills learned in college. Students participating in this program can receive college credit from the TTUHSC School of Nursing.

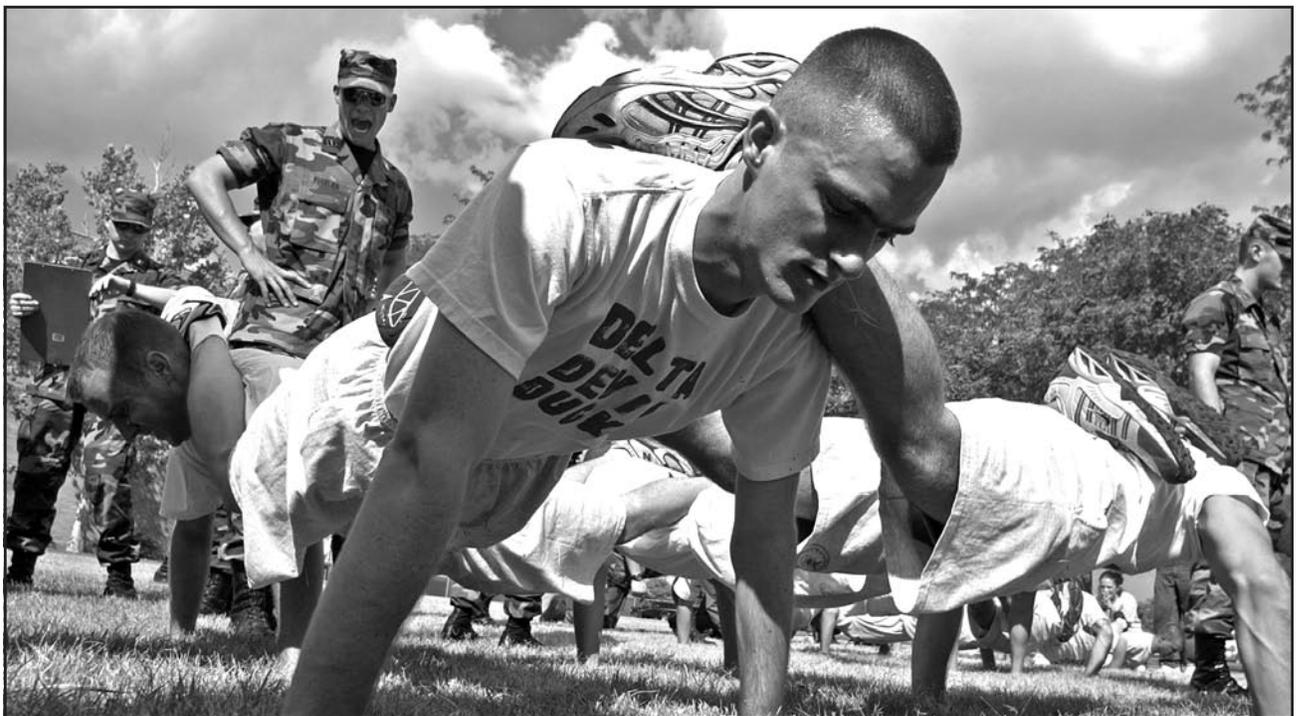
Special Schools. Army ROTC students may apply for summer training in Army Airborne, Air Assault, or Northern Warfare Schools. Junior level students also may request assignment to a Cadet Troop Leadership Training (CTLT) position for experience training with an active Army unit. CTLT training is normally for 3 weeks; however, a few positions may be available for extended training (5 weeks) overseas.

Military Science (MILS)

(To interpret course descriptions, see page 9.)

Undergraduate Courses

1101. **MSI Foundations of Officership I (1:1:1).** Introduction to the Army profession, the role of the Army officer, and military leadership. Instruction on time management and physical fitness, as well as general military skills. Survey of pre-commissioning program requiring no military obligation. F
1102. **MSI Foundations of Officership II (1:1:1).** Introduction to the Army profession, the role of the Army officer, and military leadership. Instruction on time management and physical fitness, as well as general military skills. Survey of pre-commissioning program requiring no military obligation. S
2201. **MSII Individual Leadership Studies – Leadership and Teamwork I (2:2:1).** Prerequisite: MILS 1101 and 1102 or consent of instructor. Introduction to decision-making and group processes relating to military leadership. Focus on character development, role of the officer, and Army values. F
2202. **MSII Individual Leadership Studies – Leadership and Teamwork II (2:2:1).** Prerequisite: MILS 1101 and 1102 or consent of instructor. Introduction to decision-making and group processes relating to military leadership. Focus on character development, role of the officer, and Army values. S
2203. **MSII Independent Studies in Leadership and Teamwork (2).** Prerequisite: Consent of department chairman. Individualized studies in military leadership and teamwork. Select lab and/or class participation may be required. This class may be repeated and may substitute for 2201 or 2202 credit. F and S.
3301. **MSIII Leadership and Problem Solving I (3:3:1).** Prerequisite: MILS 2201 and 2202, basic training, or consent of the instructor. Prepares student for summer completion of the Leadership Development and Assessment Course. Emphasis on small-unit tactics, troop leading procedures, field training, and basic soldiering skills such as land navigation and rifle marksmanship. F
3302. **MSIII Leadership and Problem Solving II (3:3:1).** Prerequisite: MILS 2201 and 2202, basic training, or consent of the instructor. Prepares student for summer completion of the Leadership Development and Assessment Course. Emphasis on small-unit tactics, troop leading procedures, field training, and basic soldiering skills such as land navigation and rifle marksmanship. S
3303. **MSIII Independent Studies in Leadership and Problem Solving (3).** Prerequisite: Consent of Department Chairman. Individualized studies in military leadership and problem solving. Select lab and/or class participation may be required. This class may be repeated and may substitute for 3301 or 3302 credit. F and S.
4301. **MSIV Officership I (3:3:1).** Prerequisite: MILS 3301 and 3302. Focus on transition from cadet to lieutenant with an introduction to military law and ethics, leadership case studies, hands-on practice sessions, and a Senior Leadership Project. F
4302. **MSIV Officership II (3:3:1).** Prerequisite: MILS 3301 and 3302. Focus on transition from cadet to lieutenant with an introduction to military law and ethics, leadership case studies, hands-on practice sessions, and a Senior Leadership Project. S
4303. **MSIV Independent Studies in Officership (3).** Prerequisite: Consent of department chairman. Individualized studies in military officership and professional development. Select lab and/or class participation may be required. This class may be repeated and may substitute for 4301 or 4302 credit. F and S.



College of Agricultural Sciences and Natural Resources

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About the College

The College of Agricultural Sciences and Natural Resources is dedicated to providing programs of excellence in teaching, research, and outreach. These educational programs are designed to prepare the student for the dynamic agricultural and renewable natural resources industry—an industry that encompasses five closely related segments: (1) producing agricultural products; (2) supplying agricultural chemicals, feed, seed, and other production resources; (3) processing, storing, distributing, and other marketing functions for agricultural products; (4) planning and managing programs for renewable natural resources; and (5) providing technical assistance, financing, services, education, research, and communications in all sectors of the food, feed, fiber, and natural resource complex.

As the size and complexity of farms and ranches continue to increase, students who plan careers as producers of agricultural products need more technology and management information. Through proper selection of courses, students have the opportunity to train in the business aspects of agriculture in several subject-matter departments. Most students interested in scientific aspects of the industry will receive more training in mathematics, computers, and the basic sciences, followed by well-planned courses in agricultural technology. Students interested in natural resource use will receive training in the ecology and conservation of natural resources, various facets of environmental quality, and issues involving food safety and quality. Microcomputer laboratories allow students to use the latest information-processing technology for class exercises and research projects.

Teaching and Research Facilities

The college provides excellent teaching, research, and outreach facilities. These include a large number of well-equipped laboratories, design studios, and classrooms. A research-teaching land site adjacent to the campus, a livestock arena, a meat laboratory, a campus greenhouse-experimental garden complex, and an equestrian center are used as teaching laboratories as well as for research in plant and soil science, animal science, plant biotechnology, horticulture, and range management. The agricultural field laboratories in northeast Lubbock County include the Burnett Cen-

ter for Beef Cattle Research and Instruction; a 980-acre experimental farm; and facilities for teaching and research in swine, horses, sheep, feed manufacturing, and crop production. Laboratory facilities also include a 15,822-acre unit at the Texas Tech University Center at Amarillo. Field trips and participation in intercollegiate contests are also a part of the training program.

The research program in agriculture and renewable natural resources complements the teaching mission of the college by providing the information and knowledge necessary to keep faculty members current in their respective fields. Research projects provide essential training for graduate students and advanced undergraduates as well as solutions to problems facing the industry. Various forms of outreach are provided by the College of Agricultural Sciences and Natural Resources through numerous short courses, conferences, and workshops conducted throughout the year.

Undergraduate Program

Core Curriculum Requirements. The university has established Core Curriculum requirements for all students in order to ensure breadth in each academic program. Students may consult their academic dean regarding specific Core Curriculum requirements; however, these requirements are incorporated in each major in the college. Students may find a listing of Core Curriculum requirements in the Undergraduate Academics section of this catalog.

Academic Counseling. Each student in the college is assigned an academic advisor. Students who have not selected a major will be assigned an academic counselor by the dean's office.

Selecting a Major. If students know which course of study they wish to pursue, they should select that major field when they enroll initially. Students who are undecided about a major will be classified as agriculture-undecided but will be assigned to a department and an academic advisor. During the first semester, several introductory courses in agricultural sciences and natural resources should be selected to assist in determining or confirming the preferred area for a major. Students who enter as freshmen should select a major by the end of their fourth semester. Transfer students will be required to make a major selection within two semesters after entering Texas Tech. Some departments offer the opportunity for a dual major program. Students interested in such a program should contact the chairperson of the specific departments involved.

Selecting a Minor. Minors are available in all departments for students with majors in the College of Agricultural Sciences and Natural Resources as well as those majoring in other colleges within the university. Minors are offered in the following areas: agribusiness management, agricultural leadership, animal science, food science, landscape studies, agronomy, horticulture, plant biotechnology, and natural resource management. A minimum of 18 hours is required for a minor. At least 9 hours in a minor must consist of upper division courses. The maximum number of transfer hours in any minor is 9. Courses in a major but outside a student's department may be used in the minor. A student must earn a grade of C or better in each course counted toward a minor. Students are encouraged to seek early advisement from the chair of the minor department to plan for courses that will best meet their educational and career objectives.

General Standards and Requirements. Minimum standards and requirements of the College of Agricultural Sciences and Natural Resources are the same as those for the university, with certain additions. In addition to the requirements stated in the Undergraduate Academics section of this catalog, other requirements include the following:

1. Students must file an application for a senior audit with the dean's office before or during the semester in which they are enrolled for their 90th semester hour. Substitution and elective sheets also must be filed prior to or during the semester the students are enrolled for their 90th semester hour.

2. Transfer students who plan to request the use of provisional elective transfer courses as a substitution for required courses must make such a request by the end of their first semester in the College of Agricultural Sciences and Natural Resources.
3. Any deviation from the approved curriculum for a particular degree must have prior approval from the chairperson of the department and the dean of the College of Agricultural Sciences and Natural Resources.

New Students. All new students should carefully read the catalog sections entitled Undergraduate Admissions and Registration. Entering freshmen should give special attention to course credit that can be obtained by the College Level Examination Program (CLEP) examinations usually given prior to the beginning of the fall semester. Transfer students should read the paragraphs dealing with admission of transfer students and transfer of credits from other colleges and universities in the Undergraduate Admissions section of this catalog.

Undergraduate Research Program. The undergraduate research program consists of a two-course series. AGSC 4300 (Research Methodology) is offered during the fall semester, and the second course is offered during the spring semester as a Special Problems course under the guidance of a faculty mentor. This course provides opportunities to gain an understanding of and experience in applied research. Both courses are designated as honors courses and, with Honors College approval, the two-course series (6 semester hours) may be the basis for Honors College students to earn the "Highest Honors" designation from the Honors College. In addition, any undergraduate student who completes the course series and has a CASNR major may apply for competitive research grants, as well as participate in undergraduate research presentations and awards. Coursework completed will apply to individual degree programs. For more information contact a CASNR faculty advisor or the dean's office.

Distance Degree Program. One program is available at the undergraduate level as a Bachelor of Science degree in horticulture and is detailed in the catalog under the Department of Plant and Soil Science.

Agricultural Science (AGSC)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 2300. [AGRI 1309] Computers in Agriculture (3:2:2).** Introduction to information technology in agricultural applications. Includes applications in spreadsheet data analysis, word processing, and database management. F, S.
- 2301. Computers in Agriculture II (3:2:2).** Prerequisite: AGSC 2300 or satisfactory performance on placement exam. Introduction to data base management applications, extended application of spreadsheet software, and networked systems. F, S.
- 3301. Agricultural Leadership Principles (3:3:0).** Leadership principles with emphasis on styles of leadership, types of management, group dynamics, managing change, and the adoption process as applied to agriculture and agribusiness.
- 4300. Research Methodology in Agricultural Sciences and Natural Resources (3:3:0).** Prerequisite: Junior or senior standing. Introduction to conceptual issues for organizing, planning, designing, and conducting research in agricultural disciplines.

Graduate Courses

- 5303. Ecology of Grazing Lands Systems (3:3:0).** A field oriented course on ecology, management, and research in forage-live-stock systems.

Graduate Program / Agricultural Sciences and Natural Resources

Programs in the College of Agricultural Sciences and Natural Resources lead to the following graduate degrees:

- **Master of Science** with majors in agricultural and applied economics, agricultural education, animal science, crop science, entomology, fisheries science, food science, horticulture, range science, soil science, and wildlife science.
- **Master of Agriculture** with a major in agriculture with concentrations available through the various departments. The Master of Agriculture degree program is designed to prepare students and professionals as leaders, managers, and executives in the agricultural sciences and natural resources areas. Because the program is multidisciplinary and includes a wide choice of professional courses, it prepares graduates for diverse careers. A student may select an emphasis in the following departments: Agricultural and Applied Economics, Agricultural Education and Communications, Animal and Food Sciences, and Plant and Soil Science.

Courses for the Master of Agriculture degree program may be taken from offerings in the College of Agricultural Sciences and Natural Resources and from other colleges within the university. A minimum of 36 semester hours of graduate coursework is required for this nonthesis degree. For a specific option a student would normally take 18 hours in the department concerned with the emphasis area and the balance in at least two other areas. An oral or written comprehensive exam as specified by the emphasis department is required.

- **Master of Landscape Architecture** is a terminal professional degree for students with a Bachelor of Landscape Architecture degree or equivalent and a first professional degree for students with any other professional degree.
- **Doctor of Education** with a major in agricultural education.
- **Doctor of Philosophy** with majors in agricultural and applied economics, agronomy, animal science, fisheries science, range science, and wildlife science.

The graduate program also offers a university-wide interdisciplinary program leading to the Ph.D. degree in land-use planning, management, and design. A Doctor of Education degree is available from

the College of Education for students who wish to have agricultural education as a support area.

Applicants who meet the admission standards of the Graduate School also must receive formal approval from a departmental committee. Admission standards of some departments exceed those of the Graduate School.

Advisory committees for the M.S., M.Ag., and M.L.A. degrees consist of at least three faculty members. Advisory committees for the Ph.D. degree in agricultural and applied economics consist of four or five faculty members. Advisory committees for Ph.D. degrees in the Departments of Natural Resources Management; Plant and Soil Science; and Animal and Food Sciences consist of five faculty members.

A preliminary examination is required of all doctoral students before the end of the second semester of work. The student's progress will be evaluated and recommendations will be made concerning continuation of graduate studies and leveling work necessary to remove any deficiencies revealed by the examination.

No specific language or tool requirements exist for the graduate programs. However, such requirements may be incorporated when deemed appropriate. Other requirements for the degree programs are specified in other sections of this catalog.

Distance degree programs are offered at the graduate level in agriculture, agricultural education, horticulture, and crop science. The Master of Agriculture program is discussed in this section of the catalog. The Master of Science degrees in horticulture and crop science are detailed in the catalog under the Department of Plant and Soil Science. The Department of Agricultural Education and Communications offers two distance degree programs: Master of Science in Agricultural Education and Doctor of Education in Agricultural Education. The Doctor of Education is delivered as a joint program with Texas A&M University. Both degree programs are referenced in the catalog under the department.

Department of Agricultural and Applied Economics

Faculty

Eduardo Segarra, Ph.D., Chairperson

Professors: D.E. Ethridge, P. Johnson, Knight, Misra, Segarra
Associate Professors: Elam, Farmer, Lyford, Malaga, Mohanty
Assistant Professors: Chidmi, J. Johnson, Rejesus
Instructors: Middleton, Murova
Adjunct Faculty: M.D. Ethridge, Harman, Phillips, Smith

About the Program

This department administers the following degree programs:

- Bachelor of Science in Agribusiness
- Bachelor of Science in Agricultural and Applied Economics
- Master of Agribusiness
- Master of Science in Agricultural and Applied Economics
- Doctor of Philosophy in Agricultural and Applied Economics

The department also participates in the interdepartmental program leading to the Master of Agriculture degree and cooperates with the College of Business Administration in a Master of Business Administration degree with a concentration in agricultural business management. This M.B.A. program is administered by the College of Business Administration.

Agricultural and applied economics applies economic methods to contemporary problems in production, distribution, and consumption of commodities and resources. This field is concerned with decision making in the public sector and in firms that provide materials and services, credit, processing, marketing and distribution of products, as well as analysis of economic behavior in the food and fiber industries, including the effects of government policies.

The major objective of the department is to teach students to think analytically and base decisions on economic principles. Students develop skills in economics, mathematics, statistics, and communication. Training in policy, price analysis, and marketing is also provided. The department prepares graduates to manage business and financial firms, farms, ranches, and related organizations and direct land and property development and real estate activities.

Undergraduate Program

The B.S. degree in agricultural and applied economics provides a strong foundation in economics and mathematics and emphasizes writing and communication skills. There is enough flexibility in the program to allow students to earn a minor in areas such as general business and personal financial planning. Minors are also available in other departments in the College of Agricultural Sciences and Natural Resources as well as in economics and other fields. The department offers a B.S. in agribusiness in conjunction with the College of Business Administration. This degree program combines the core courses in agricultural and applied economics with those in business administration to provide a strong foundation for careers in businesses related to agriculture. In addition, a dual degree is offered in combination with the College of Business Administration. This program leads to a B.S. in agricultural and applied economics and a B.B.A. in general business. Students may also prepare to study toward advanced degrees in economics, law, business administration, and other related areas.

The department's programs also emphasize international economics, particularly with respect to trade in commodities. Students completing these plans of study will be better educated for the world economy of the future and will have opportunities for a wide range of careers. Local, regional, and national processing and marketing firms offer many applied economists their first positions. Others become self-employed business operators or managers. State Cooperative Extension Services, financial institutions, the United States Department of Agriculture, utility companies, and many state and government agencies also hire graduates.

The opportunity to participate in the Honors College is available to agricultural and applied economics students who demonstrate high academic achievement and are accepted into the Honors College. AAEC students wishing to earn an Honors College designation may take AGSC 4300 for honors credit. In addition, honors students may contract for honors credit with AAEC 4301. Admission criteria and other information about the Honors College can be found in the "Honors College" section of this catalog.

The department offers a minor in agribusiness management for non-departmental majors. The agribusiness minor consists of 18 hours of coursework, including AAEC 2305, 9 hours from 3000-level AAEC courses, and 6 hours from 4000-level AAEC courses. Students must satisfy course prerequisites before registering for courses.

Bachelor of Science in Agribusiness

The Bachelor of Science Degree in Agribusiness is a joint program administered by the College of Agricultural Sciences and Natural Resources and the Rawls College of Business.

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
Lab. Science*	4	Lab. Science*	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1330, Intro. Math. Anal. I	3	MATH 1331, Intro. Math. Anal. II	3
POLS 1301, Amer. Govt., Org.	3	AAEC 2305, Fund. of AAEC	3
Ag. Elective***	3	Ag. Elective***	3
TOTAL	16	TOTAL	16

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
ECO 2302, Prin. of Eco. II	3	AGSC 2301, Computers in Ag. II	3
HIST 2300, History of U.S. to 1877	3	AAEC 3401, Ag. Stat.	4
ACCT 2300, Elem. Acct. I	3	HIST 2301, History of U.S. Since 1877	3
Sophomore English†	3	ACCT 2301, Elem. Acct. II	3
POLS 2302, Amer. Publ. Pol.	3	Visual & Performing Arts**	3
TOTAL	15	TOTAL	16

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
AAEC 3315, Ag. Price or ECO 3312, Inter. Eco.	3	AAEC 3100, Seminar	1
FIN 3320, Corp. Finance I	3	ECO 3311, Int. Macro.	3
MGT 3373, Mgt. Comm.	3	AGBS Group 2#	3
MGT 3350, Intro. to Mkt.	3	FIN 3323, Mo., Bank., and Cr.	3
BLAW 3391, Bus. Law I	3	MGT 3370, Org. and Mgt.	3
TOTAL	15	ISQS 3344, Prod. Op. Mgt.	3
		TOTAL	16

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
AGSC 4300, Res. Meth.	3	AAEC 4301, Problems	3
AGBS Group 1#	3	AAEC 4316, Ag. Fin. Anal.	3
MGT 4380, Strategic Mgt. or AAEC 4315, Agribus. Mgt.	3	AAEC 4302, Stat. Meth. or AAEC 4312, Appl. Opt. Meth.	3
MKT 4358, International Mkt.	3	FIN 4328, Inter. Finance	3
MGT 4375, Inter. Mgt.	3	TOTAL	12
TOTAL	15		

Minimum hours required for graduation—121

- * Laboratory Science—at least 4 of the 8 hours of natural laboratory science must be selected from PSS 2401 and 1411; the remaining hours must be selected from university Core Curriculum requirements.
- ** Choose from university Core Curriculum requirements.
- *** Ag. Electives must be selected from PSS 1321, NRM 2301, 2302, or ANSC 1401.
- † Sophomore English—Choose one course from ENGL 2305, 2306, 2307, 2308, or 2351.
- # AGBS Curriculum Groups: Select 1 course from Group 1—AAEC 4305, 4306, or 4313; select 1 course from Group 2—AAEC 4303, or 4317.
- Departmental CORE Policy: Includes AAEC 3315 and 3401. All students expecting to graduate on schedule are strongly advised to complete the CORE with grades of C or better before they reach 90 hours of completed coursework. Students failing to do so may delay their graduation date.
- All courses in AAEC, MATH, ECO, ENGL, B A and AGSC 2301 must be completed with a grade of C or better.
- Minimum hours required for graduation—121. (Students will fulfill the university multicultural requirement by completing FIN 4328, MGT 4375, or MKT 4358.)
- To advance to the upper division of the business administration program, satisfactory completion of the first and second year courses and a cumulative 2.75 GPA at Texas Tech are required.
- 2.75 GPA required for ACCT 2300 and 2301.

Bachelor of Science in Agricultural and Applied Economics

FIRST YEAR			
Fall		Spring	
Lab. Science*	4	Lab. Science*	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1330, Intro. Math. Anal. I	3	MATH 1331, Intro. Math. Anal. II	3
POLS 1301, Amer. Govt., Org.	3	AAEC 2305, Fund. of AAEC	3
Ag. Elective	3	AGSC 2301, Comp. in Agr. II	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
ECO 2302, Prin. of Economics II	3	AAEC 3301, Agribus. Marketing	3
POLS 2302, Amer. Pub. Pol.	3	AAEC 3302, Agribus. Finance	3
ENGL 2311, Technical Writing	3	HIST 2301, History of U.S. Since 1877	3
HIST 2300, History of U.S. to 1877	3	COMS 2300, Public Speaking	3
Hum., Multi., or Vis. & Perf. Arts†	3	Hum., Multi., or Vis. & Perf. Arts†	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
AAEC 3315, Ag. Price Theory	3	ACCT 2301, Elem. Acct. II	3
AAEC 3304, F. & R. Bus. Mgt.	3	ECO 3311, Int. Macro.	3
ACCT 2300, Elem. Acct. I	3	AAEC 3401, Ag. Stat.	4
Electives	6	AAEC 3100, Seminar	1
TOTAL	15	Elective	3
		TOTAL	14
FOURTH YEAR			
Fall		Spring	
AAEC Group 1**	6	AAEC Group 2**	6
AAEC 4312, Appl. Opt. Meth. or AAEC 4302, Stat. Meth.	3	Electives	9
Electives	6	TOTAL	15
TOTAL	15		

Minimum hours required for graduation—121

* Laboratory Science—8 hours must be from PSS 1411, 2401, ATMO 1300-1100, BIOL 1401, 1402, CHEM, PHYS, or any other 4-hour natural science course from the university Core Curriculum.

† Humanities, Multicultural, and Visual and Performing Arts: There are three university Core Curriculum requirements for these subjects. The requirements may be met individually or by completing a course that satisfies more than one. A list of approved courses is available from the Dean's office.

** AAEC GROUPS: Select 2 courses from Group 1—AAEC 4305, 4306, 4313, and 4320; select 2 courses from Group 2—AAEC 4303, 4315, 4316, and 4317.

- Departmental CORE Policy: Includes AAEC 3315 and 3401. All students expecting to graduate on schedule are strongly advised to complete the CORE with grades of C or better before they reach 90 hours of completed coursework. Students failing to do so may delay their graduation date.
- Minimum hours required for graduation—121.
- Agriculture electives must be selected from PSS 1321, NRM 2301, 2302, or ANSC 1401.
- All courses in AAEC (except required electives) and MATH must be completed with a grade of C or better.
- Electives: The degree program consists of 24 elective hours including 9 hours of required electives chosen from upper-level B A, ECO, or AAEC courses not required elsewhere (this may include AGSC 4300 and AAEC 4301 for students wanting undergraduate research experience), and 15 hours of free electives chosen from any other courses not used elsewhere in the degree program. Suggested courses for students interested in specific areas are as follows:

Agricultural Business Management: Choose electives from AAEC 3303, 4317, and appropriate upper level courses in B A or ECO, such as B A 3301, 3303, 3304, or 3305, ECO 3320. (To take B A courses, students may need to declare a business minor.)

Agricultural Production (Farm or Ranch) Management: Select electives from AAEC 4317 and appropriate courses in PSS, ANSC, NRM, and BLAW.

- 2.75 GPA required for ACCT 2300 and 2301.
- Students may earn a minor by using electives carefully.

Dual-Degree Curriculum: Bachelor of Science in Agricultural and Applied Economics and Bachelor of Business Administration

This unique and progressive program leads to two undergraduate degrees—Bachelor of Science in Agricultural and Applied Economics and Bachelor of Business Administration in General Business. Students completing this program will be better educated for the world economy of the future and will have enhanced marketability for a wide range of careers. Students will also be prepared to enter the Master of Business Administration program with a concentration in agricultural business management if desired. The following curriculum provides a common body of knowledge for students in agricultural and applied economics and business administration. Students must complete lower division BA courses before taking upper division BA courses and must have a 2.75 GPA.

FIRST YEAR			
Fall		Spring	
Lab. Science*	4	Lab. Science*	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1330, Intro. Math. Anal. I	3	MATH 1331, Intro. Math. Anal. II	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Public Pol.	3
Ag. Elective††	3	AGSC 2301, Comp. in Agr. II	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
ECO 2302, Prin. of Economics II	3	AAEC 3301, Agribus. Marketing	3
AGSC 3301, Ag. Lead. Princ.	3	AAEC 3401, Ag. Statistics	4
ENGL 2311, Technical Writing	3	HIST 2301, History of U.S. Since 1877	3
ACCT 2300, Elementary Acct. I	3	ACCT 2301, Elem. Acct. II	3
AAEC 2305, Fund. of AAEC	3	Sophomore English**	3
HIST 2300, History of U.S. to 1877	3	Elective	2
TOTAL	18	TOTAL	18
SUMMER			
FIN 3320, Corp. Finance I	3	MKT 3350, Intro. to Marketing	3
MGT 3373, Managerial Comm.	3	MGT 3370, Organ. and Mgt.	3
TOTAL	6	TOTAL	6
THIRD YEAR			
Fall		Spring	
ISQS 3344, Intro. Prod. Oper.	3	AAEC 3100, Seminar	1
AAEC 3315, Ag. Price Theory	3	AAEC 3304, Farm & Ranch Mgt.	3
BLAW 3391, Business Law I	3	ECO 3311, Int. Macroeconomics	3
FIN 3323, Prin. of Mon. Bank, Cre.	3	FIN 4328, International Fin.	3
MGT 4375, International Mgt.	3	MKT 4358, International Mkt.	3
TOTAL	15	AAEC 4316, Ag. Fin. Anal.	3
		TOTAL	16
FOURTH YEAR			
Fall		Spring	
Upper Level BA Elective	3	AAEC 4301, Prbs. Appl. Eco.	3
AGSC 4300, Research Meth.	3	AAEC 4302, Stat. Meth.	3
AGGB Group***	12	AGGB Group***	3
TOTAL	18	MGT 4380, Strategic Mgt.	3
		Visual & Performing Arts†	3
		TOTAL	15

Minimum hours required for graduation—144

* Select at least 4 hours of lab science courses from PSS and the other 4 hours from Core Curriculum requirements.

** Sophomore English must be from ENGL 2305, 2306, 2307, 2308, or 2351.

*** AGGB Curriculum Group: Select 5 courses from AAEC 4303, 4305, 4306, 4312, 4313, 4315, and 4317.

† Choose from university Core Curriculum requirements.

†† Ag. Electives must be selected from PSS 1321, NRM 2301, 2302, or ANSC 1401.

- Departmental CORE Policy: Includes AAEC 3315 and 3401. All students expecting to graduate on schedule are strongly advised to complete the CORE with grades of C or better before they reach 90 hours of completed coursework. Students failing to do so may delay their graduation date.
- Both degrees may be granted on completion of all 144 hours.
- All courses in AAEC, MATH, ECO, ENGL, B A, and AGSC 2301 must be completed with a grade of C or better.
- See the College of Business Administration section of the catalog for information on lower division requirements. Students interested in pursuing a B.B.A. degree in majors other than general business should visit with a COBA advisor about additional course requirements.
- Satisfactory completion of the first and second year courses and a cumulative 2.75 GPA at Texas Tech are required to advance to the upper division of the business administration program.
- 2.75 GPA required for ACCT 2300 and 2301.

Graduate Program

Master's Programs

Master's programs in agricultural and applied economics require a minimum of 30 hours of graduate credit for the M.S. thesis option or 36 hours for the M.S. nonthesis option, the Master of Agribusiness degree, and the Master of Agriculture degree. A student seeking a M.S. degree in agricultural and applied economics may choose courses to emphasize agribusiness and trade or resource policy and development.

Doctoral Programs

The doctoral program in agricultural and applied economics is designed to develop a broad-based competence in advanced economic theory, techniques of quantitative analysis, and public administration of agricultural and economic issues. Two options are offered for the Doctor of Philosophy degree in the agricultural and applied economics program. The first option allows graduate students to select a minor of their choice in business administration, finance, mathematics, public administration, statistics, sociology, or other possible areas of study. The program has been designed to take advantage of the strengths of the department and areas of interest to students. The second option allows graduate students to select a minor in personal financial planning, a joint Ph.D. program between the department and the College of Human Sciences. Completion of the doctoral program in agricultural and applied economics with a minor in personal financial planning qualifies graduates to take a test administered by the Certified Financial Planning Board of Standards to become Certified Financial Planners.

Each Ph.D. candidate is expected to demonstrate competency by satisfactorily completing (1) a comprehensive written examination in each specialty field chosen, (2) a dissertation research project that demonstrates original independent scholarly research, and (3) a final oral exam.

Before being recommended for admission to a degree program with a major in agricultural and applied economics, the student may be required to take (without graduate credit) undergraduate leveling courses as specified by the department.

Joint M.S.–J.D. Degree Program

The School of Law and the Graduate School of Texas Tech University offer a joint degree program that allows students to complete the requirements for the Master of Science degree in Agricultural and Applied Economics and the Doctor of Jurisprudence degree. This joint program can be completed one year sooner than when each is pursued separately. The M.S. component is administered by the Department of Agricultural and Applied Economics on behalf of the Graduate School, while the J.D. component is administered by the School of Law.

The joint degree program is of particular benefit to students who are interested in practicing law in a rural setting or who want to pursue certain types of careers in agribusiness finance or natural resource law. Students must be admitted to both programs separately but the LSAT test will suffice for both applications.

Agricultural and Applied Economics (AAEC)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

2305. [AGRI 2317] **Fundamentals of Agricultural and Applied Economics (3:3:0)**. Fundamental economic principles and their application to problems and issues in the food, fiber, and natural resource sectors of the economy. F, S, SS.
3100. **Seminar (1:1:0)**. Prerequisite: Junior standing. Assigned readings, informal discussion, outside speakers, and written and oral reports on subjects relating to agricultural and applied economics. F, S.
3301. **Agribusiness Marketing (3:2:3)**. Prerequisite: AAEC 2305 and ENGL 1302. Marketing of raw materials and processed products from the management perspective. Market structure, conduct, performance. Marketing channels. F, S. (Writing Intensive)
3302. **Agribusiness Finance (3:3:0)**. Prerequisite: AAEC 2305 and MATH 1320 or 1330. Basic principles of finance emphasizing the mathematics of finance, credit, and financial analysis. F, S.
3303. **Cooperatives (3:3:0)**. Prerequisite: AAEC 3301. Organization and operation of agricultural and other cooperatives. S or by correspondence. (Writing Intensive)
3304. **Farm and Ranch Business Management (3:2:3)**. Prerequisite: AAEC 2305 or equivalent. Organization and management of the individual small business including farms, ranches, input suppliers, commodity processors, etc. F, S.
3305. **Introduction to Sales (3:3:0)**. Prerequisite: Sophomore standing. Principles and methods used in professional selling for the business environment. Includes concepts of human behavior and professional selling techniques. F, S.
3315. **Agricultural Price Theory (3:3:0)**. Prerequisite: AAEC 2305, MATH 1331, and junior standing. Basic economic principles with applications to agricultural pricing problems and resource allocations. F, S, SS.
3401. **Agricultural Statistics (4:3:3)**. Prerequisite: College algebra or higher 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. F, S, SS.
4000. **Internship in Agricultural and Applied Economics (V1-12)**. Prerequisite: Sophomore standing and approval. Supervised study providing in-service training and practice in business and organizations. F, S, SS.
4101. **Current Problems in Agricultural and Applied Economics (1)**. Prerequisite: Senior standing. Topics may vary. May be repeated twice for credit. F, S, SS.
4301. **Special Problems in Applied Economic Analysis (3)**. Prerequisite: AGSC 4300 or approval. Individual instruction in analysis of a research problem. May be repeated with the approval of the department. S. (Writing Intensive)
4302. **Statistical Methods in Agricultural Research (3:3:0)**. Prerequisite: AAEC 3401 and MATH 1331. 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. S, SS.
4303. **Property Appraisal (3:3:0)**. Prerequisite: AAEC 2305 and sophomore English or ENGL 2311. Factors governing property prices and valuation. Appraisal of property for use, sale, and other purposes. F. (Writing Intensive)
4305. **Agricultural and Public Policy (3:3:0)**. Prerequisite: AAEC 3315. Historical development and economic analysis of public programs and policies affecting the food and fiber sector and the environment. F. (Writing Intensive)
4306. **International Agricultural Trade (3:3:0)**. Prerequisite: Junior standing and AAEC 3315. Economic principles of interregional and international trade, location, and inter-area competition in products and services. S. (Writing Intensive)
4309. **Sustaining Global Ecology, Natural Resources and Economy (3:3:0)**. Prerequisites: MATH 1330 or equivalent; recommend one BIOL or ECO course. Challenges to global markets and environment across diverse systems and histories.
4312. **Applied Optimization Methods (3:3:0)**. Prerequisite: AAEC 3315 or equivalent. Study of techniques applicable to economic optimization problems, including mathematical optimization and linear programming. Emphasis on problem solving. F.
4313. **Natural Resource Economics (3:3:0)**. Prerequisite: AAEC 3315 and junior standing. Economics of natural resource use and allocation including land economics, economics of water development, and environmental economics. S. (Writing Intensive)
4315. **Agribusiness Management (3:3:0)**. Prerequisite: AAEC 3315 and 3401. Case studies emphasizing managerial techniques applied to decision-making problems of business firms. F. (Writing Intensive)
4316. **Agricultural Financial Analysis (3:3:0)**. Prerequisite: AAEC 3302 or FIN 3320. Principles and procedures in managing

- financial and credit resources; nature, purposes, and use of financial statements, budgets, and credit instruments; and criteria for decision making in borrowing and lending. S.
4317. **Commodity Futures Trading and Analysis (3:3:0)**. Prerequisite: Junior standing and AAEC 2305. History and characteristics of commodity futures markets, hedging and speculation, and use of futures as a management tool. F, S.
4320. **Agribusiness Law (3:3:0)**. Prerequisite: AAEC 2305 and junior standing. Federal regulatory programs, market orders, Packers and Stockyards Act, bankruptcy. Administrative, environmental, antitrust law, Uniform Commercial Code, in an agribusiness context. F.

Graduate Courses

5000. **Professional Internship (V1-6)**. Supervised study providing in-service training and practice in a professional setting, including businesses and non-profits.
5301. **Special Study in Agricultural and Applied Economics (3)**. Individual and group study in advanced topics not covered in other graduate courses. May be repeated for credit. F, S, SS.
5302. **Food and Agriculture Sector Public Policy (3:3:0)**. Prerequisite: AAEC 4305. Analysis of public policies affecting the food and fiber sector; commodity programs, environmental laws, and trade policy. F.
5303. **Advanced Production Economics (3:3:0)**. Prerequisite: AAEC 3315. Criteria for resource use optimality under price and yield certainty and uncertainty. F.
5307. **Applied Econometrics I (3:3:0)**. Prerequisite: AAEC 4302. Advanced statistical methods, including multiple regression analysis, for applied economic problems; constructing econometric models; multicollinearity, autocorrelation, heteroscedasticity, and related problems. F.
5308. **Natural Resource Economics (3:3:0)**. Prerequisite: ECO 5312 or consent of instructor. Economic theory and empirical investigations of resource utilization with special emphasis on arid and semi-arid land areas and environmental issues. F.
5309. **International Economic Development in Food and Fiber Sectors (3:3:0)**. Prerequisite: AAEC 3315. World food and development issues; economic development of the food and fiber sector in industrialized and developing economies. F.
5310. **Advanced Market Analysis (3:3:0)**. Prerequisite: ECO 5312 and AAEC 5307. Theoretical and empirical approaches to market structures and market price behavior. S.
5312. **Agribusiness Analysis (3:3:0)**. Prerequisite: AAEC 3315. Application of economic theory and methods to management problems of the business firms in the food and fiber sector. F.
5313. **Microcomputer Applications in Agribusiness and Research (3:2:2)**. Use of microcomputers, software, and design of software for agricultural business and research purposes. Not open to majors. F, S.
5314. **Environmental Economics and Policy Analysis (3:3:0)**. Familiarize students with economic techniques and their use in analyzing natural resources and environmental policy issues. For non-majors only.
5315. **Property Appraisal (3:3:0)**. Factors governing land prices, valuation. Appraisal for use, sale, lending, condemnation, estate settlement, taxation. Not open to students with AAEC 4303 or equivalent. F.
5316. **International Agricultural Trade (3:3:0)**. Economic theory dealing with the international movement of goods, services, and capital; welfare and distributional aspects of trade; and policy issues in international agricultural trade. S.
5317. **Financial and Commodity Futures and Options (3:3:0)**. Mechanics of futures trading, history and functions of futures market. Role of futures and options markets in managing risks. Not open to students with AAEC 4317 or equivalent. F, S.
5318. **Finance and the Agribusiness Sector (3:3:0)**. Prerequisite: FIN 5320. Applications of financial theory for the agribusiness sector. Risk, capital structure, business structure, investment analysis. S.
5320. **Agribusiness Law (3:3:0)**. Federal regulatory programs, market orders, bankruptcy. Administrative, environmental, antitrust law, Uniform Commercial Code in agricultural context. Not open to students with AAEC 4320 or equivalent. F.
5321. **Research Methodology in Economics (3:3:0)**. Review of philosophical and conceptual basis of economic research and study of the procedural aspects of designing, planning, and conducting research in economics. S.
5393. **Economics and Policies of the Global Cotton/Textile Complex (3:3:0)**. Development and current state of production, processing, and marketing; impacts of government policies; alternative competitive structures of cotton and textile industries and impacts on performance.
6000. **Master's Thesis (V1-6)**.
6301. **Advanced Special Problems in Agricultural and Applied Economics (3)**. Individual study in advanced topics not covered in other graduate courses. F, S, SS.
6302. **Food, Agriculture, and Natural Resource Policy Analysis (3:3:0)**. Prerequisite: AAEC 4305. Analysis of policies, programs affecting food, agricultural commodities, trade, and natural resources. Includes policies in the U.S. and other countries. F.
6305. **Economic Optimization (3:3:0)**. Prerequisite: AAEC 5303. Development and use of mathematical economic models emphasizing static and stochastic linear, nonlinear and dynamic processes. F.
6308. **Advanced Natural Resource Economics (3:3:0)**. Prerequisite: ECO 5312. Advanced economic theory and analysis of environmental and natural resource issues, both domestic and global. F.
6310. **Demand and Price Analysis (3:3:0)**. Prerequisite: ECO 5312. Applied price and demand analysis including complete demand systems and hedonic-characteristic price analysis. S.
6311. **Applied Econometrics II (3:3:0)**. Prerequisite: AAEC 5307. Methods and applications of single and multi-equation models in agricultural economics; logit and probit models, nonstructural models and related methods. S.
7000. **Research (V1-12)**.
7200. **Teaching Practicum (2:3:0)**. Prerequisite: Doctoral student in the program and previous or concurrent enrollment in a higher education teaching methods course. Supervised teaching at the university level.
8000. **Doctor's Dissertation (V1-12)**.



Department of Agricultural Education and Communications

Faculty

Mathew T. Baker, Ph.D., Chairperson

Professors: Baker, Briers, Cepica, Dooley, Frazee, Larke, Lawver, Lindner, Shinn

Associate Professors: Akers, Boyd, Doerfert, Elbert, Murphy, Smith, Vestal, Wingenbach

Assistant Professors: Brashears, Burris, Cummings, Davis, Harlin, Murphrey, Roberts, Stedman

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Interdisciplinary Agriculture
- Bachelor of Science in Agricultural Communications
- Master of Science in Agricultural Education
- Master of Science in Agricultural Communications
- Doctor of Education in Agricultural Education

The department participates in the interdepartmental program leading to the Master of Agriculture degree with an option in agricultural communications, agricultural extension education, or agricultural education.

Undergraduate Program

Students majoring in interdisciplinary agriculture for the B.S. degree may choose from two tracks: teacher certification or agricultural leadership. The teacher certification track involves courses from many departments in the college. Elective courses can be selected in areas of special interest. Job placement in high schools, cooperative extension, and community colleges offers a life-long career for many graduates and alternative employment opportunities for others. Students seeking teacher certification also may receive a degree in another agricultural area and, with proper planning, receive certification in agricultural education. Students seeking teacher certification also should refer to the College of Education section of this catalog. The agricultural leadership track prepares students to enter a broad array of careers either in the public sector (legislature assistants, agricultural agencies) or private sector (training and development, management, or sales in agricultural, food, and natural resource industries). This degree is also recommended for students interested in continued studies in professional schools such as law or business.

The department has two new partnerships related to teacher certification. The first partnership is a dual B.S. degree program with Angelo State University (ASU). Students in the program complete three years in ASU's Animal Science program and spend an additional three semesters in the Department of Agricultural Education and Communications at Texas Tech completing certification. At the conclusion of the program, students will receive both a B.S. in Animal Science from ASU and a B.S. in Interdisciplinary Agriculture from Texas Tech. The second partnership involves dual B.S. degree programs with Lubbock Christian University (LCU). Students in this program complete approximately three years in LCU's agriculture business, animal science or plant science programs and spend an additional three semesters of certification completion in the Department of Agricultural Education and Communications at Texas Tech. At the conclusion of the program, students will receive both a B.S. in Agriculture Business, Animal Science or Plant Sci-

Graduate Program

Master's Program

The department offers two Master of Science programs, one in agricultural education and one in agricultural communications. These programs may be completed with 30 hours of graduate courses plus a thesis or 36 hours of graduate courses. The Master of Agriculture degree is a 36-hour program. Public school teachers may have a particular interest in the Master of Agriculture degree with an agricultural education concentration and an educational leadership emphasis. Courses in this unique program count toward the 42-hour Texas Tech Principalship Professional Certification Program. Students in this program must have at least two years of Texas Education Agency-approved experience and apply for admission into the certification program during the first semester of enrollment in this program.

Doctoral Program

The Doctor of Education program is available as an on-campus program. This 64-hour program (beyond a master's degree) requires a 25-hour disciplinary core, 9 hours in research and evaluation, 6 hours in statistics, 12 hours in an area of specialization, and 12 hours of dissertation.

The department also participates in a unique distance-delivered doctoral degree in agricultural education that is awarded by both Texas Tech University and Texas A&M University. Students in this program must apply for admission at both universities. Most coursework associated with this joint doctoral degree is delivered via the ITV and the World Wide Web. Students in this program take a 40-hour disciplinary core, 12 hours in an area of specialization, and 12 hours of dissertation or record of study.

Each doctoral candidate (whether on-campus or distance) is expected to demonstrate competency by satisfactorily completing (1) a comprehensive written examination, (2) a dissertation or record of study research project that demonstrates original, independent scholarship, and (3) a final oral examination.

ence from LCU and a B.S. in Interdisciplinary Agriculture from Texas Tech. For additional information on either the ASU or LCU program, contact the department chair.

Agricultural communications allows students to specialize in both mass communications and agriculture. The communications component consists of prescribed courses in journalism, speech, telecommunications, photography, and advertising. Students must select one of three areas for concentration: electronic media, print media, or public relations/marketing. Selection of technical agriculture courses allows students to specialize in areas of interest and to reinforce their general knowledge in agriculture.

This department offers an 18-hour minor in agricultural leadership for students majoring outside the department. Required courses include AGSC 3301, AGED 3315, AGED 3314 or AGED 4308, and nine hours from the following courses: ACOM 2301, ACOM 2302, ACOM 3300, AGED 2300, AGED 3330, AGED 4000 (3 hours only), AGED 4303, or AGED 4309.

Agricultural Education (AGED)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 2300. Introduction to Agricultural Education (3:3:0).** History and principles of vocational education, community assessment of agricultural programs planning, and development of agricultural youth organization. (Writing Intensive)
- 2302. Principles of Effective Technology Use in Teaching Agricultural Science (3:3:0).** Computer hardware and software used in the modern teaching environment. Teaching and learning theory in relation to multimedia presentations and their effective construction. (Writing Intensive)
- 3313. Management of Supervised Agricultural Experience Programs (3:3:0).** Provide students with the theory and application for working with youth in the selection, management, and record keeping procedures used with supervised agricultural experience programs and youth projects. (Writing Intensive)
- 3314. Team Leadership Development in Agriculture and Natural Resources (3:3:0).** Prerequisite: AGSC 3301. Exploration of strategies and techniques for successful teams, including conflict management, facilitation, and negotiation, skill building, and experimental activities in agriculture and natural resources. (Writing Intensive)
- 3315. Personal Leadership Development in Agriculture Sciences and Natural Resources (3:3:0).** Prerequisite: AGSC 3301. Principles, theories and application of interpersonal skills required to develop strong leadership in the agricultural and natural resource context. (Writing Intensive)
- 3330. Interrelationships of Agricultural Agency Information Systems (3:2:2).** Utilization of agricultural service systems to disseminate information to traditional and nontraditional agricultural clientele. Emphasis on USDA organizations. (Writing Intensive)
- 3331. Agricultural Youth Leadership Organizations (3:3:0).** Principles and application of leadership skills commonly taught in youth agricultural organizations. Emphasis on youth leadership development events and seamlessly integrating activities and curriculum. (Writing Intensive)
- 4000. Internship (VI-12).**
- 4301. Agricultural Education Problems (3).** Prerequisite: Senior standing and approval of department chairperson. Individual investigation. May be repeated for credit. F, S, SS.
- 4302. Transfer of Agricultural Technology (3:3:0).** Examination of processes by which professional agriculturalists influence the introduction, adoption, and diffusion of technological change. F (Writing Intensive)
- 4304. Methods of Teaching Agriscience in the Secondary School (3:2:3).** F, S. (Writing Intensive)
- 4306. Student Teaching (3).** Prerequisite: Senior standing in agricultural education.
- 4308. Organizational Leadership Development in Agriculture and Natural Resources (3:3:0).** Prerequisite: AGSC 3301. Human behavior in organizations, the role of leadership in organizational performance, and the process of organizational change and improvement. (Writing Intensive)
- 4309. Contemporary Issues in Agricultural Leadership (3:3:0).** Prerequisite: AGSC 3301. An evaluation of current issues pertaining to leadership in agriculture and natural resources including a historical look at leadership and its impact on producers and consumers. (Writing Intensive)

Graduate Courses

- 5001. Contemporary Issues in Agricultural and Extension Education (VI-6).** Study current issues and trends in agricultural and extension education and develop plans to improve the disciplines. May be repeated for up to 6 hours credit. F, S, SSI, SSII.
- 5301. Special Problems (3:3:0).** Investigation of problems in agricultural education or extension education of special interest to the student. May be repeated for credit. F, S, SSI, SSII.
- 5302. Research Methods and Analysis in Agricultural Education and Communications (3:3:0).** Application of research techniques in the education and communications aspects of agriculture, including proposal preparation, literature review, research design, data analysis, and reporting of results.
- 5304. Advanced Methods in Agricultural Leadership (3:3:0).** Theory of motivation and behavior, leadership and management styles, change agents, and the adoption process. Practical application regarding agricultural occupations. SSI, SSII.

**Interdisciplinary Agriculture Curriculum
Agricultural Leadership Track**

		FIRST YEAR		
		Fall	Spring	
BIOL 1401 or 1402	4	PSS 1321, Agronomic Plant Sc.	3	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3	
MATH 1320, Coll. Algebra	3	HIST 2300, History of U.S. to 1877	3	
ANSC 1401, Gen. Animal Sci.	4	CHEM 1305, Ess. Chem. I	3	
TOTAL	14	CHEM 1105, Exp. Gen. Chem. I	1	
		MATH 2300, Statistical Methods	3	
		TOTAL	16	
		SECOND YEAR		
		Fall	Spring	
ACOM 2301, Intro. to Ag. Comm.	3	COMS 2300, Public Speaking	3	
AGSC 3301, Prin. of Ag. Leadership	3	PSS 1411, Prin. of Horticulture	4	
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Pol.	3	
HIST 2301, History of U.S. Since 1877	3	AGED 2302, Tech. Use in Teaching	3	
PSS 2432, Prin. and Pract. of Soils	4	AAEC 2305, Fund. Ag., Appl. Eco.	3	
TOTAL	16	TOTAL	16	
		THIRD YEAR		
		Fall	Spring	
AGED 2300, Intro. to Ag. Ed.	3	ANSC 3305, Appl. Animal Nutrition	3	
ACOM 2302, Sci. Communications	3	ACOM 3300, Comm. Ag. to Public	3	
AGED 3315, Personal Leadership	3	AGED 3314, Team Leadership	3	
Visual and Performing Arts†	3	AGED 3330, Ag. Agencies	3	
Humanities	3	Ag. Elective	3	
TOTAL	15	TOTAL	15	
		FOURTH YEAR		
		Fall	Spring	
ANSC 3402, Animal Genetics or PSS 3421, Plant Genetics	4	AGED 4000, Internship	9	
AGED 4302, Transfer of Ag. Tech.	3	AGED 4309, Cont. Issues in Ag. Leadership	3	
AGED 4308, Org. Leadership	3	TOTAL	12	
ACOM 4300, Web Design in Ag.	3			
Advanced Ag. Elective	3			
TOTAL	16			

Minimum hours required for graduation—120

† Choose from Core Curriculum requirements.

**Interdisciplinary Agriculture (Agricultural
Education) Curriculum—Teacher Certification**

		FIRST YEAR		
		Fall	Spring	
BIOL 1401 or 1402	4	PSS 1321, Agronomic Plant Sc.	3	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3	
MATH 1320, Coll. Algebra	3	HIST 2300, History of U.S. to 1877	3	
ANSC 1401, Gen. Animal Sci.	4	CHEM 1305, Ess. Chem. I	3	
TOTAL	14	CHEM 1105, Exp. Gen. Chem. I	1	
		MATH 2300, Statistical Methods	3	
		TOTAL	16	
		SECOND YEAR		
		Fall	Spring	
ACOM 2302, Sci. Communications	3	COMS 2300, Public Speaking	3	
AGED 2302, Tech. Use in Teaching	3	AAEC 2305, Fund. Ag. & Appl. Eco.	3	
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Pol.	3	
HIST 2301, History of U.S. Since 1877	3	Ag. Elective	3	
AGSM 2303, Welding & Metalwork	3	Vis. & Perf. Arts and/or Multicul.†	3	
TOTAL	15	TOTAL	15	
		THIRD YEAR		
		Fall	Spring	
AGED 2300, Intro. to Ag. Ed.	3	ANSC 3305, Appl. Animal Nutrition	3	
PSS 2432, Prin. & Pract. Soils	4	AGSM 3303, Engine Theory	3	
PSS 1411, Prin. of Hort.	4	AGED 3313, Mgt. of SAEPs	3	
ANSC 3402, Animal Genetics or PSS 3421, Plant Genetics	4	ENGL 2307, Intro. to Fiction	3	
TOTAL	15	Advanced Ag. Elective	3	
		TOTAL	15	
		FOURTH YEAR		
		Fall	Spring	
EDSE 4322, Diversity Learn. Envir.	3	AGED 4304, Meth. of Tch. Ag. Sci.	3	
EDSE 4310, Learn. Cogn. & Instr.	3	AGED 4306, Student Teaching	9	
AGED 3331, Ag. Youth Leadership	3	EDSE 4311, Curr. Development	3	
EDLL 4382, Read & Write Sec.	3	TOTAL	15	
AGSM 4302, Ag. Bldgs.	3			
TOTAL	15			

Minimum hours required for graduation—120

† Choose from Core Curriculum requirements.

Agricultural Communications Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
BIOL 1401 or 1402	4	Basic Ag. Elective	3
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, College Algebra	3	HIST 2300, History of U.S. to 1877	3
ACOM 2301, Intro. Ag. Com.	3	AAEC 2305, Fund. Ag. & Appl. Eco.	3
ACOM 2305, Digital Comm. in Ag.	3	MATH 2300, Statistics	3
TOTAL	16	TOTAL	15

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
Basic Ag. Elective	3	JOUR 2310, News Writing**	3
CHEM 1305, Chem. & Society	3	POLS 1301, Amer. Govt. Org.	3
CHEM 1105, Exp. Gen. Chem. I	1	ADV 3310, Prin. Of Advertising	3
ACOM 2302, Sci. Communications	3	AGED 2300, Intro to Ag.	3
HIST 2301, History of U.S. Since 1877	3	Basic Ag. Elective	3
Humanities Elective*	3	TOTAL	15
TOTAL	16		

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
POLS 2302, Am. Public Pol.	3	ACOM 3300, Comm. Ag. to Public	3
COMS 2300, Public Speaking	3	AGSC 3301, Ag. Leadership Prin.	3
P R 3310, Prin. of Public Relations	3	Specialized Elective	6
Advanced Ag. Elective	3	PHOT 2310, Basic Photography	3
EM&C 3300, Elec. Media & Society	3	TOTAL	15
TOTAL	15		

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
ACOM 3301, Video Prod. In Ag.	3	Specialized Elective	3
Specialized Elective	3	Advanced Ag. Elective	6
Visual & Performing Arts Elective*	3	ACOM 4310, Dev. of Ag. Pub.	3
Advanced Ag. Elective	3	ACOM 4300, Adv. Computer	3
ACOM 4100, Sem. in Ag. Comm.	1	TOTAL	15
TOTAL	13		

Minimum hours required for graduation—120

* Choose from Core Curriculum requirements, one from Category E and one from Category F

** Must pass GSP before enrolling in JOUR 2310

Specialization Areas: (12 Hours)

Electronic Media – JOUR 3314, EM&C 3380, 3370 or 3360, 4320

Print Media – JOUR 3312, 3316, 3380, 4370

Public Relations/Marketing – PR 3312, MCOM 3380, AAEC 3301, 3305

- 5305. **Program Development in Agricultural and Extension Education (3:3:0).** Development of a total agricultural education program in communities and counties using all available resources. SSI, SSII.
- 5306. **History and Philosophy of Agricultural Education and Communications (3:3:0).** Historical and philosophical foundations of education, communications, and extension education in agriculture.
- 5308. **Foundations of Adult Education (3:3:0).** Study and investigation of adult learning theories, methods, and procedures to implement changes in adult behavior.
- 5309. **Evaluation of Programs in Vocational, Technical, and Extension Education (3:3:0).** Techniques in evaluating vocational, technical, and extension education programs. Principles and procedures of evaluation with emphasis on focusing, designing, reporting, and managing evaluation. SSI, SSII.
- 5310. **College Teaching in Agriculture (3:3:3).** Methods and techniques of teaching agriculture at the college level. Includes self-assessment, student assessment, course development, lesson planning, presentations, and evaluation. F
- 5311. **Human Dimensions of International Agricultural Development (3:3:0).** Study current issues and trends in the human dimension of international agricultural development.
- 5312. **Assessing Program Effectiveness in Agriculture and Extended Education (3:3:0).** Assessment of programs in agriculture and extended education based on programming theories, concepts, and research. Emphasizes assessing client need, monitoring programs based on objectives, and determining program effectiveness and efficiency.
- 5340. **Educational Law (3:3:0).** Introduction to the legal aspects of educational organizations, focusing on the school building level and emphasizing the rights and responsibilities of stakeholders. (EDLD 5340)

- 5391. **School and Community (3:3:0).** Explores the development of collaborative culture at school and how to enlist community support to form partnerships with stakeholders. (EDLD 5391)
- 6000. **Master's Thesis (V1-6).**
- 7000. **Research (V1-12).**
- 7100. **Graduate Seminar (1).** Group study and discussion of current developments in agricultural behavioral sciences. May be repeated for credit.
- 7200. **Professional Internship (2).** An on-the-job supervised experience program conducted in the area of the student's specialization. May be repeated for credit.
- 8000. **Doctor's Dissertation (V1-12).** Initiation and completion of research for advanced degree.

Agricultural Communications (ACOM)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 2301. **Introduction to Agricultural Communications (3:3:0).** An overview of information systems and media associated with the agricultural industry. (Writing Intensive)
- 2302. **Scientific Communications in Agriculture and Natural Resources (3:3:0).** Improve written, visual, and oral communications. Development of press releases, scientific papers, popular press articles, poster presentations, technical presentations, and grant applications. (Writing Intensive)
- 2305. **Digital Communications in Agriculture (3:2:1).** Examination of the use of computers in agricultural communications with emphasis on graphic art production, photo manipulation, and elements of design.
- 3300. **Communicating Agriculture to the Public (3:2:2).** Principles and procedures in communicating agricultural news and information to general and specialized audiences through presentations and various media. S. (Writing Intensive)
- 3301. **Video Production in Agriculture (3:3:0).** Basics in producing an agricultural video. Students learn scripting, shooting, and digital video editing.
- 4000. **Internship in Agricultural Communications (V1-12).**
- 4001. **Agricultural Communications Problems (V1-3).** Individual study of advanced application of principles of agricultural communications.
- 4100. **Seminar in Agricultural Communications (1:1:0).** Overview and analysis of the history, development, issues, and trends of traditional agricultural and related information outlets. May be repeated once for credit. F. (Writing Intensive)
- 4300. **Web Design in Agricultural Sciences and Natural Resources (3:2:1).** Basic understanding of web design principles. Promote experimental learning through a project requiring students to develop a web site for a client in the agriculture industry.
- 4310. **Development of Agricultural Publications (3:2:2).** Prerequisite: JOUR 2310. Students integrate various skills including writing, editing, and layout in producing agricultural publications. Emphasis upon computer software applications in agricultural publishing. (Writing Intensive)

Graduate Courses

- 5001. **Contemporary Issues in Agricultural Communication (V1-3).** Group study and discussion of current developments, trends, and issues in agricultural communications. May be repeated for credit.
- 5303. **Advanced Computer Applications in Agricultural Communications (3:3:0).** Study of computer software for document production and photo manipulation (bitmap and vector) and desktop publishing in the context of agriculture issues and needs.
- 5307. **Methods of Technological Change (3:3:0).** Dynamics of cultural change as theoretical framework for planned technological change; methods of planning and implementing change, its effect, and how it can be predicted. SSI, SSII.

Agricultural Systems Management (AGSM)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 2302. **Agricultural Surveying and Land Conservation (3:2:3).** Basics of traversing; computing of curves, land areas, construction layout and staking; and establishing grades and elevations for landscape architecture and agricultural purposes. Includes

- uses and care of equipment, application of stadia measurement, and the rudiments of land measurement systems. F.
2303. **Welding and Metalwork (3:2:3).** Metal fabrication and repair using hand tools, power tools, and welding equipment. Includes metallurgy pertaining to welding processes and heat treating.
3303. **Internal Combustion Engine Theory and Operation (3:2:3).** Fundamentals of internal combustion engines, principally small gasoline engines. Emphasis on adjustments, repair, and routine maintenance to include tractors and other power units. F, S.
4301. **Agricultural Mechanization Problems (3).** Individual study of an advanced phase of agricultural mechanization. Research report required. F, S, SS.

4302. **Agricultural Buildings and Environmental Control (3:2:3).** Determining agricultural building requirements, materials, design, and construction. Includes construction, tools and equipment, framing, environmental control, and necessary utilities. S.
4305. **Conducting Agricultural Mechanics Programs (3:2:2).** Organizing, equipping, and managing agriscience laboratories.

Graduate Course

5301. **Investigations in Advanced Agricultural Mechanics (3).** Individual study or investigation of an advanced phase of mechanized agriculture. May be repeated for credit. F, S, SSI, SSII.

Department of Animal and Food Sciences

Faculty

Kevin R. Pond, Ph.D., Chairperson

Horn Professor and Thornton Chair: Galyean

San Antonio Livestock Exposition Chair: M.F. Miller

Professors: Albin, McGlone, Pond, Prien, Thompson

Associate Professors: Brady, Brashears, Jackson, Kim, R. Miller

Assistant Professors: Alvarado, C. Brooks, Johnson, Takhar, Vizcarra, Wilson

Instructors: Brock, T. Brooks, C. Guay, K. Guay, Speer

Adjunct Faculty: Allen, Blodgett, Brown, Carroll, Cole, Davis, Dowd, Hentges, Kubricht, Loneragan, Lyte, Mandrell, McAdams, Shome, Wheeler, Wu

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Animal Science
- Bachelor of Science in Food Science
- Master of Science in Animal Science
- Master of Science in Food Science
- Doctor of Philosophy in Animal Science

Two areas of concentration in food science are offered: science and industry. The department also participates in the interdepartmental program leading to the Master of Agriculture degree.

This department offers minors in animal science or food science for students majoring outside the department. For more information on requirements for completing a minor, refer to "Selecting a Minor" in the introductory information about this college or contact the departmental chair.

Undergraduate Program

Animal Science Program

Students majoring in animal science for the B.S. degree may choose from four emphases: animal business, production, science, or meat science. The business option prepares students for careers in all facets of livestock production and subsidiary support services by blending animal science with business and economics courses. The production option provides the latest scientific principles for efficient livestock production, marketing, and processing. The science option provides training in advanced basic sciences to prepare students for study towards an advanced degree. The meat science option prepares students in meat processing, science, and safety. The department also directs the preprofessional course preparation for veterinary medicine.

All students are required to take a 3-hour internship or a 3-hour research experience to fulfill graduation requirements.

Students must earn a grade of C or better in all animal science courses required for graduation. All electives are subject to departmental approval. Degree requirements are listed here.

Graduate Program

The Department of Animal and Food Sciences offers flexible degree programs preparing graduates for a wide array of positions in agriculture and allied fields. Students with bachelor's degrees in a variety of fields are welcome to study in the department.

Master's Programs

The nonthesis, 36-hour Master of Agriculture or Master of Science degrees are offered with concentrations in agricultural product processing (meats or feeds), feedlot management, formula feed production, livestock production, and ranch management. An internship is required for the Master of Agriculture.

Master of Science degree students may pursue studies in animal breeding (physiology or genetics), animal nutrition (ruminant or monogastric), animal science, food science, or meat science. A thesis, along with at least 24 semester hours of coursework, is required.

The master's degree in food science emphasizes the scientific and technological aspects of food handling. Knowledge of the physical and biological sciences, economics, marketing, and engineering is applied to and coordinated with food development, processing, packaging, quality control, and distribution. Research programs involve food safety and microbiology, chemistry, and commodity products.

Consumer demands for a variety of highly nutritious and convenient foods of uniformly high quality create many and varied career opportunities in the food and allied industries. These careers include management, research and development, process supervision, quality control, procurement, distribution, sales, and merchandising.

Doctoral Program

Candidates for the Doctor of Philosophy degree in Animal Science may specialize in one of several areas of interest such as animal genetics, animal nutrition, reproductive or environmental physiology, or meat science. No foreign language requirement exists, but such a requirement may be instituted at the discretion of the student's advisory committee.

Interested persons should contact the department graduate advisor. Additional general degree requirements may be found in other sections of the catalog.

Students who receive stipends have special responsibilities in research and teaching. These awards include waiver of nonresident tuition.

Bachelor of Science in Animal Science Curriculum

FIRST YEAR	
<i>Fall</i>	<i>Spring</i>
ANSC 1401, Gen. Anim. Sci. 4	AAEC 2305, Fund. Ag. Appl. Eco. 3
CHEM 1307, Prin. of Chem. I 3	CHEM 1308, Prin. Chem. II 3
CHEM 1107, Prin. Chem. I (Lab.) 1	CHEM 1108, Prin. Chem. II (Lab.) 1
ENGL 1301, Ess. Coll. Rhetoric 3	ENGL 1302, Adv. Coll. Rhetoric 3
MATH 1321, Trigonometry 3	ANSC 2301, Lvstk. & Meat Eval. I 3
TOTAL 14	MATH 2300, Statistical Methods 3
	TOTAL 16

SECOND YEAR	
<i>Fall</i>	<i>Spring</i>
POLS 1301, Amer. Gov. Org. 3	POLS 2302, Amer. Pub. Pol. 3
BIOL 1402, Biol. of Animals 4	HIST 2300, History of U.S. to 1877 3
ENGL 2311, Patt. of Reports or ACOM 2302 3	CHEM 3306, Org. Chemistry 3
CHEM 3305, Organic Chemistry 3	CHEM 3106, Org. Chem. Lab. 1
CHEM 3105, Organic Chemistry Lab. 1	Humanities/Multicultural* 3
FDSC 2300, Prin. Food Tech. 3	ANSC 2306, Prin. of Physio. Dom. Ani. 3
ANSC 2202, Prin. Anat. Dom. Animals 2	TOTAL 16
TOTAL 19	

THIRD YEAR	
<i>Fall</i>	<i>Spring</i>
ANSC 3401, Repro. Physiol. 4	HIST 2301, History of U.S. Since 1877 3
ANSC 3301, Prin. Nutr. 3	ANSC 4000, Internship 3
COMS 2300, Public Speaking 3	ANSC 3307, Feeds & Feeding 3
ANSC 3402, Animal Genetics 4	Fine Arts/Multicultural* 3
ANSC 3403, Sel., Proc. Meats 4	TOTAL 12
TOTAL 18	

FOURTH YEAR	
<i>Fall</i>	<i>Spring</i>
Production Elective 4	Production Electives 8
Elective 1	MBIO 3400 or FDSC 3309 3-4
Approved Electives† 6	Electives 6
ANSC 3100, Animal Sci. Seminar 1	TOTAL 17-18
TOTAL 12	

Minimum hours required for graduation—124
 * Choose from Core Curriculum requirements.
 † Select 16-17 hours from the following: ANSC 3306, 4000, 4201, 4202, 4203, 4301, 4303, AGSC 2300, PSS 2432, MBIO 3400, 3401, BIOL 1401, 3302, 3420, ZOO 2405, 3401, 4304, 4306, 4312, 4409, PHYS 1403, 1404, CHEM 3310, 3311, 3312, 3402, plus other approved courses.

Animal Business Curriculum

FIRST YEAR	
<i>Fall</i>	<i>Spring</i>
ANSC 1401, Gen. Anim. Sci. 4	AAEC 2305, Fund. Ag. & Appl. Eco. 3
CHEM 1305, Chem. and Society I 3	CHEM 1306, Chem. and Soc. II 3
CHEM 1105, Gen. Exp. Chem. (Lab.) 1	CHEM 1106, Gen. Chem. II (Lab.) 1
ENGL 1301, Ess. Coll. Rhetoric 3	ENGL 1302, Adv. Coll. Rhetoric 3
MATH 1330, Intro. Math Ana. 3	ANSC 2301, Lvstk. & Meat Eval. I 3
TOTAL 14	MATH 2300, Statistical Methods 3
	TOTAL 16

SECOND YEAR	
<i>Fall</i>	<i>Spring</i>
AAEC 3301, Agribusiness Mkt. 3	POLS 1301, Amer. Gov't. Org. 3
ANSC 2202, Prin. Anat. Dom. Animals 2	HIST 2300, History of U.S. to 1877 3
ENGL 2311, Patt. of Reports or ACOM 2302 3	ANSC 2306, Prin. of Physio. Dom. Ani. 3
CHEM 2303, Intro. Org. Chem. 3	AAEC 3302, Ag. Finance 3
CHEM 2103, Intro. Org. Chem. Lab. 1	ACCT 2300, Financial Accounting 3
FDSC 2300, Prin. Food Tech. 3	TOTAL 15
TOTAL 15	

THIRD YEAR	
<i>Fall</i>	<i>Spring</i>
ANSC 3401, Repro. Physiol. 4	HIST 2301, History of U.S. Since 1877 3
ANSC 3301, Prin. Nutr. 3	Approved Electives† 3
AAEC 3304, Farm & Ranch Mgt. 3	ANSC 3307, Feeds & Feeding 3
COMS 2300, Public Speaking 3	POLS 2302, American Pub. Pol. 3
ANSC 3402, Animal Genetics 4	ANSC 3403, Sel., Proc. Meats 4
TOTAL 17	TOTAL 16

FOURTH YEAR	
<i>Fall</i>	<i>Spring</i>
Production Elective 4	Production Electives 8
ANSC 3100, Animal Sci. Seminar 1	Fine Arts/ Multicultural 3
AAEC 3303, 3305, 4303, 4317, or 4320 3	Electives 3
BLAW 3391, Business Law I or AAEC 4320, Agribus. Law 3	ANSC 4000, Internship 3
Humanities/Multicultural* 3	TOTAL 17
TOTAL 14	

Minimum hours required for graduation—124
 * Choose from Core Curriculum requirements.

Animal Production Curriculum

FIRST YEAR	
<i>Fall</i>	<i>Spring</i>
ANSC 1401, Gen. Anim. Sci. 4	AAEC 2305, Fund. Ag. Appl. Eco. 3
CHEM 1305, Chem. and Society I 3	CHEM 1306, Chem. and Soc. II 3
CHEM 1105, Gen. Chem. (Lab.) 1	CHEM 1106, Gen. Chem. II (Lab.) 1
ENGL 1301, Ess. Coll. Rhetoric 3	ENGL 1302, Adv. Coll. Rhetoric 3
MATH 1320, College Algebra 3	ANSC 2301, Lvstk. & Meat Eval. I 3
TOTAL 14	MATH 2301, Trigonometry 3
	TOTAL 16

SECOND YEAR	
<i>Fall</i>	<i>Spring</i>
FDSC 2300, Prin. Food Tech. 3	ANSC 2306, Prin. of Physio. Dom. Ani. 3
POLS 1301, Amer. Gov't. Org. 3	HIST 2300, History of U.S. to 1877 3
ENGL 2311, Patt. of Reports or ACOM 2302 3	BIOL 1402, Biology of Animals 4
CHEM 2303, Intro. Org. Chem. 3	POLS 2302, American Pub. Pol. 3
CHEM 2103, Intro. Org. Chem. Lab. 1	TOTAL 13
Fine Arts/Multicultural* 3	
ANSC 2202, Prin. Anat. Dom. Ani. 2	
TOTAL 18	

THIRD YEAR	
<i>Fall</i>	<i>Spring</i>
ANSC 3401, Repro. Physiol. 4	HIST 2301, History of U.S. Since 1877 3
ANSC 3301, Prin. Nutr. 3	ANSC 3306, Animal Diseases 3
Humanities/Multicultural* 3	ANSC 3307, Feeds & Feeding 3
ANSC 3403, Sel., Proc. Meats 4	ANSC 4000, Inernship 3
ANSC 3402, Animal Genetics 4	COMS 2300, Public Speaking 3
TOTAL 18	TOTAL 15

FOURTH YEAR	
<i>Fall</i>	<i>Spring</i>
Production Elective 4	Production Electives 8
ANSC 3100, Animal Sci. Seminar 1	Electives 6-8
Approved Electives† 6-7	TOTAL 14-16
MBIO 3400 or FDSC 3309 3-4	
TOTAL 14-16	

Minimum hours required for graduation—122
 * Choose from Core Curriculum requirements.
 † Select 12-13 hours from the following: ANSC 2201, 2302, 2303, 2304, 3202, 3203, 3204, 3205, 3303, 3308, 3309, 4000, 4001, 4202, 4302, 4303, 4306, 4309, 4310, AAEC 3301, 3302, 3303, 3304, 3305, 3401, 4304, 4317, PSS 2432, 3321, 4421, or NRM 3303.

Meat Science Curriculum

FIRST YEAR	
<i>Fall</i>	<i>Spring</i>
ANSC 1401, Gen. Anim. Sci. 4	AAEC 2305, Fund. Ag. & Appl. Eco. 3
CHEM 1305, Chem. and Society I 3	CHEM 1306, Chem. and Soc. II 3
CHEM 1105, Gen. Chem. (Lab.) 1	CHEM 1106, Gen. Chem. II (Lab.) 1
ENGL 1301, Ess. Coll. Rhetoric 3	ENGL 1302, Adv. Coll. Rhetoric 3
MATH 1330, Intro. Math Analysis 3	ANSC 2301, Lvstk. & Meat Eval. I 3
TOTAL 14	MATH 2300, Contemporary Math. 3
	TOTAL 16

SECOND YEAR	
<i>Fall</i>	<i>Spring</i>
POLS 1301, Amer. Gov't. Org. 3	FDSC 2302, Elem. Ana. of Foods 3
Humanities/Multicultural* 3	HIST 2300, History of U.S. to 1877 3
ENGL 2311, Patt. of Reports or ACOM 2302 3	BIOL 1402, Biology of Animals 4
CHEM 2303, Intro. Org. Chem. 3	COMS 2300, Public Speaking 3
CHEM 2103, Intro. Org. Chem. Lab. 1	ANSC 2306, Prin. of Physio. Dom. Ani. 3
FDSC 2300, Prin. Food Tech. 3	TOTAL 16
ANSC 2202, Prin. Anat. Dom. Ani. 2	
TOTAL 18	

THIRD YEAR	
<i>Fall</i>	<i>Spring</i>
ANSC 3401, Repro. Physiol. 4	HIST 2301, History of U.S. Since 1877 3
ANSC 3301, Prin. Nutr. 3	ANSC 4400, Meat Science 4
ANSC 3402, Animal Genetics 4	ANSC 4000, Internship 3
POLS 2302, American Pub. Pol. 3	ANSC 3100, Animal Sci. Seminar 1
ANSC 3403, Sel., Proc. Meats 4	MBIO 3400, Microbiology 4
TOTAL 18	TOTAL 15

FOURTH YEAR	
<i>Fall</i>	<i>Spring</i>
Production Elective 8	FDSC 3301, Food Microbiology 3
(Select 2 from ANSC 4401, 4403, 4406) 3	FDSC 4303, Food Chemistry 3
ANSC 4404, Proc. Cured Meats or 4407, Poultry Prod. 4	FDSC 3303 or 3309 3
Fine Arts/Multicultural* 3	FDSC 4306, Dairy Products 3
TOTAL 15	Approved Electives† 4
	TOTAL 16

Minimum hours required for graduation—128
 * Choose from Core Curriculum requirements.
 † Select 7 hours from the following: AAEC 3301, 3302, 3303, 3304, 3305, 3401, 4317, 4320, ACOM 2301, 3300, 4300, ANSC 2302, 3203, 3204, 3306, 3307, FDSC 3302, 3304, 4304, 4305, PSS 2432, 3321, 3322, 4421, or NRM 3303.

Food Science Program

Food science provides the basic coursework for a comprehensive background in the processing and preservation of foods. Food science graduates may be employed in areas concerned with food systems management, design and development of new food products, strategies for quality control/assurance and food safety, or research in basic constituents of food. The increasing pressure of world population growth on available food supply assures a stable, growing job market for food science students. Positions in private industry, educational institutions, and governmental agencies offer excellent potential for rapid advancement. The food science section provides coursework suggested by the Institute of Food Technologists and emphasizes processing and quality control aspects. A pilot plant and associated chemical and microbiological laboratories allow students practical experience in development, manufacture, and analysis of food products. Degree requirements appear on the following pages. All students are required to take a 3-hour internship or 3-hour research experience to fulfill graduation requirements.

Bachelor of Science in Food Science Curriculum

FIRST YEAR			
Fall		Spring	
BIOL 1402, Biol. of Animals	4	AAEC 2305, Fund. Ag. & Appl. Eco.	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1308, Prin. Chem. II	3
MATH 1330 or 1351 (Math 1320 or 1330 req. for Ind.)	3	CHEM 1108, Prin. Chem. II (Lab.)	1
CHEM 1307, Prin. Chem. I	3	ENGL 1302, Adv. Coll. Rhetoric	3
CHEM 1107, Prin. Chem. I (Lab.)	1	Approved Electives**	3
TOTAL	14	ANSC 1401, Gen. Anim. Science	4
		TOTAL	17
SECOND YEAR			
Fall		Spring	
CHEM 3305, Org. Chem.	3	Approved Electives**	6
CHEM 3105, Org. Chem. Lab. (CHEM 2303, 2103 may be used for Industry Emphasis)	1	FDSC 2302, Elem. Anal. Foods	3
MATH 1331 or 1352 (MATH 1321 or 1331 req. for Ind.)	3	HIST 2301, History of U.S. Since 1877	3
FDSC 2300, Prin. Food Tech.	3	Humanities and/or Multi.*	3
COMS 2300, Public Speaking	3	ENGL 2311, Patt. of Repts.	3
HIST 2300, History of U.S. to 1877	3	TOTAL	18
TOTAL	16		
THIRD YEAR			
Fall		Spring	
POLS 1301, Amer. Govt., Org.	3	Approved Elective**	8
NS 3340, Nutrition in Life Cycle	3	POLS 2302, Amer. Pub. Pol.	3
FDSC 3100, Food Tech. Seminar	1	FDSC 3301, Food Microbiology or	3
FDSC 3302, Adv. Food Anal. or FDSC 4303, Food Chemistry	3	FDSC 4305, Proc. Oilseed & Cer. Grains	3
MBIO 3400, Microbiology	4	FDSC 3303, Food Sanitation or	3
Approved Elective**	3	FDSC 3309, Food Safety	3
TOTAL	17	TOTAL	17
FOURTH YEAR			
Fall		Spring	
FDSC 4303 or FDSC 3302	3	FDSC 4306, Dairy Prod. Mfg.	3
FDSC 4304, Field Studies	3	FDSC 4305, Proc. Oilseed & Cer. Grains	3
AAEC 3401, Ag. Statistics	4	or FDSC 3301, Food Microbiology	3
Visual & Performing Arts*	4	Approved Elective**	3
Electives	5	Elective	8
TOTAL	18	TOTAL	17

Minimum hours required for graduation—134

* Choose from Core Curriculum requirements.

** Students will select an emphasis listed below according to their area of interest:

Science: 26 hours of the 36 hours of electives must be selected from Adv. CHEM, PHYS 1403, CHEM 3341 and 3141, 9 hours of approved science electives, 3 hours of approved departmental electives, and 3 hours of basic agriculture courses.

Industry: 24 hours of the 36 hours of electives must be selected from ACCT 2300 or Adv. CHEM, FDSC 3304; ANSC 3403, 6 hours of basic agriculture courses; and 8 hours of approved departmental electives.

Preveterinary Medicine Option

Although Texas Tech does not offer a degree in preveterinary medicine, students may still prepare for veterinary school by completing the minimum admission requirement of 58 credit hours. The following courses are included in the minimum admission requirement: ANSC 3301; BIOL 1402; CHEM 1307, 1107, 1308, 1108, 3305, 3105, 3306, 3106, 3310, 3312 or 3314; COMS 2300; ENGL 1301, 2311 or ACOM 2302, a 2000- or 3000-level English literature course; MATH 2300 or 1351; MBIO 3401; PHYS 1403, 1404; PSS 3421 or BIOL 3416; and at least 11 credit hours of electives. A preveterinary medicine advisor is available to assist students in selecting courses and degree programs.

Preveterinary Medicine Curriculum

The curriculum is designed to qualify students for entrance into schools of veterinary medicine. 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 university. The minimum course requirements for enrollment in a professional veterinary medicine curriculum will normally be 77 semester hours of acceptable credit. The following is a suggested sequence of courses to complete these requirements.

FIRST YEAR			
Fall		Spring	
BIOL 1402, Biology of Animals	4	CHEM 1308, Prin. Chem. II	3
CHEM 1307, Prin. Chem. I	3	CHEM 1108, Prin. Chem. II (Lab.)	1
CHEM 1107, Prin. Chem. I (Lab.)	1	ENGL 1302, Adv. Coll. Rhetoric	3
ENGL 1301, Ess. Coll. Rhetoric	3	MATH 1351 or 2300	3
MATH 1321, Trigonometry	3	COMS 2300, Public Speaking	3
ANSC 1401, Gen. Animal Sci.	4	TOTAL	13
TOTAL	18		
SECOND YEAR			
Fall		Spring	
CHEM 3305, Org. Chemistry	3	CHEM 3306, Org. Chemistry	3
CHEM 3105, Org. Chem. Lab.	1	CHEM 3106, Org. Chem. Lab.	1
ENGL 2311 or ACOM 2302	3	PHYS 1404, Gen. Physics	4
PHYS 1403, Gen. Physics	4	HIST 2301, History of U.S. Since 1877	3
HIST 2300, History of U.S. to 1877	3	PSS 3421 or BIOL 3416	4
TOTAL	14	TOTAL	15
THIRD YEAR			
Fall		Spring	
ANSC 3301, Prin. Nutr.	3	POLS 2302, American Pub. Pol.	3
CHEM 3310, Biol. Chem. I	3	Electives	7
MBIO 3401, Prin. Microbiology	4	English Literature	3
POLS 1301, American Govt. Org.	3	CHEM 3312 or 3314	3
TOTAL	13	TOTAL	16

Animal Science (ANSC)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1401. [AGRI 1419] General Animal Science (4:3:3).** The application of basic scientific principles to the efficient production of domestic animals. Students must enroll in lecture, lab, and discussion concurrently. F, S.
- 2201. Animal Science Practicum (2:0:4).** Hands-on management practices for farm animal care. Students will develop proficiency in care, handling, and routine procedures for swine, sheep, beef cattle, and horses. F, S, SS.
- 2202. Principles of Anatomy of Domestic Animals (2:1:2).** Introduction to anatomy of domesticated animals with emphasis on bones, muscles, organs, vascular and nervous systems. F.
- 2205. Introduction to Animal Science Industries (2:2:0).** Study of current opportunities in the animal science industry. Includes field trips, speakers, and class demonstrations.

2301. [AGRI 2322] **Livestock and Meat Evaluation I (3:2:3)**. Evaluation and selection of breeding and market animals, carcass evaluation and grading, breed characteristics. Field trips to ranches and meat packing plants. S.
2302. **Livestock and Meat Evaluation II (3:1:6)**. Advanced training in evaluating, selecting, pricing, and grading of breeding and market livestock, carcasses, and wholesale cuts. Field trips to ranches and meat packing plants. Livestock and meat judging teams originate from this course. May be repeated for credit. F.
2303. **Care and Management of Companion Animals (3:3:0)**. Principles and practices of proper selection, feeding, and care of companion animals, with emphasis on the dog and cat. Nutrition, health care, behavior, training, and reproduction are discussed. F, S.
2304. **Selection and Evaluation of Horses (3:2:3)**. Criteria for evaluation and selection of breeding and show animals. Evaluation of breed types and show ring characteristics. Field trips to various breed operations. Horse judging teams will originate from this course. S.
2305. **Introductory Horse Nutrition (3:3:0)**. Introduction to basic nutrition and feeding of horses. Emphasis on practical applications and feeding management guidelines. F.
2306. **Principles of Physiology of Domestic Animals (3:3:0)**. Prerequisite: ANSC 2202. Introduction to physiological principles of domesticated animals, including major systems. S.
3100. **Animal Science Seminar (1:1:0)**. Information to prepare students to function in a competitive work environment or professional/graduate school. F, S.
3203. **Livestock and Meat Judging (2:0:6)**. In-depth special training in livestock and meat judging, grading, and evaluation for students who wish to become members of the livestock or meat judging teams. May be repeated for credit. S. (Writing Intensive)
3204. **Advanced Livestock, Horse, and Meat Judging (2:0:6)**. Advanced training in judging, grading, and evaluating performance for members of the senior livestock, horse, or meat judging teams. May be repeated for credit once. F. (Writing Intensive)
3301. **Principles of Nutrition (3:3:0)**. Prerequisite: ANSC 1401, CHEM 2303, 2103, or 3305, 3105. Nutritional roles of carbohydrates, proteins, lipids, minerals, vitamins, and water. Digestion, absorption, and use of nutrients and their metabolites. F.
3302. **Livestock Production (3:3:0)**. The application of scientific and technological advances to production practices in range beef cattle, sheep and goats, swine production, and feedlot practices. Not open to animal science majors. S.
3303. **Introductory Horse Management (3:3:0)**. An introduction to all aspects of equine management including selection, herd health, reproduction, nutrition, behavior, and marketing. F.
3304. **Management and Training of Horses (3:0:6)**. Prerequisite: Consent of instructor. Practical application of the science of equine behavior to training young ranch horses. Emphasis on training, communication, and progressive learning of ranch skills.
3305. **Applied Animal Nutrition (3:3:0)**. Prerequisite: ANSC 1401, CHEM 1305, 1306. The fundamental metabolic principles of nutrition will be developed into concepts applicable to problem solving and situation use in the field. Nutrition-disease involvement. Not open to animal science majors. Will not qualify as prerequisite to ANSC 3307. S, SSI.
3306. **Animal Diseases (3:3:0)**. Diseases of farm animals, both infectious and noninfectious, parasites, parasitic diseases, and the establishment of immunity through the use of biological products. S.
3307. **Feeds and Feeding (3:2:2)**. Prerequisite: ANSC 3301. Characteristics of feedstuffs used in livestock enterprises. Ration formulation and nutritional management of beef and dairy cattle, sheep, goats, swine, and horses. Methods of processing and evaluating feeds. S.
3308. **Quality Control and Management of Feed Manufacturing (3:1:3)**. Application of scientific principles and practices to quality control and management of feed manufacturing with respect to their effects on animal performance. F.
3309. **Principles of Hippotherapy (3:2:2)**. An interdisciplinary overview of hippotherapy with primary emphasis on the use of the horse in therapy for children with physical, cognitive, and other disabilities. F, S, SS.
3310. **Principles of Equine Sales Preparation and Marketing (3:2:2)**. Prerequisite: ANSC 3303. Principles of equine management as related to fitting, presentation, and marketing of horses.
3311. **Domestic Animal Behavior (3:2:2)**. Prerequisite: ANSC 1401 or BIOL 1402. Behavioral principles and applications of behavioral concepts in domesticated animals. Course will focus on companion animals and farm animals. S, odd years.
3314. **Introduction to Equine-Assisted Psychotherapy (3:2:2)**. A comprehensive course in the basic principles and concepts of livestock growth and development.
3316. **Animal Growth and Development (3:3:0)**. An introduction to therapeutic intervention using horses to address behavioral, relational, and emotional issues for clients.
3401. **Reproductive Physiology (4:3:3)**. Prerequisite: ANSC 2202 and 2306 or 3405. Physiological approach to reproductive processes in farm animals. Study includes anatomy, endocrinology, estrous cycles, egg and sperm physiology, fertilization, gestation, parturition, and artificial insemination. F.
3402. **Animal Breeding and Genetics (4:3:2)**. Prerequisite: ANSC 1401, MATH 1320 or higher, and junior or senior standing. Fundamental principles of cellular, population, and quantitative genetics applied in selection and mating systems to make genetic improvements in farm animals. F. (Writing Intensive)
3403. **Selection, Care, Processing, and Cooking of Meats (4:3:3)**. A general course in selecting, preserving, inspecting, grading, and cooking meats. S.
3404. **Consumer Selection and Utilization of Meat Products (4:3:3)**. A course for nonmajors who desire general knowledge of meat purchasing, selection, and cookery. Aspects of hazard analysis, food safety, and sanitation will be studied. F, S, SS.
3405. **Advanced Physiology of Animals (4:3:1)**. Prerequisite: ANSC 2202 and honors student status or consent of instructor. Physiology of domestic animals for advanced or honors students. Lecture and laboratory emphasizing whole animal physiology. S.
4000. **Internship (V1-12)**. Prerequisite: Consent of instructor. A supervised study course providing in-service training and practice in the various areas of animal science. F, S, SS.
4001. **Special Problems in Animal Science (V1-6)**. Prerequisite: Approval of instructor. Individual investigation. May be repeated for credit. F, S, SS.
4202. **Artificial Insemination of Livestock (2:1:3)**. Prerequisite: ANSC 3401 and consent of instructor. Anatomy and physiology of reproductive organs, palpation, insemination techniques, handling frozen semen, estrous detection, synchronization of estrus and ovulation, and pregnancy determination. S.
4302. **Beef Cattle Feedyard Management (3:3:0)**. Prerequisite: Junior or senior standing. The analysis of feedyard operations, design, economics, projections, bank relationships, procurement, and marketing. Customer relations and commodity hedging techniques. F.
4305. **Advanced Therapeutic Riding (3:2:2)**. Prerequisite: ANSC 3309. Skills and theories of therapeutic riding, including lesson plan development, knowledge of disabilities, and ground work for instructor certification. F, S, SSII.
4310. **Contemporary Issues in Animal Agriculture (3:3:0)**. In-depth discussion, lecture, and seminars on contemporary issues facing animal agriculture and the meat industry. F.
4400. **Meat Science and Muscle Biology (4:3:3)**. Prerequisite: ANSC 3403 or consent of instructor. Study of meat components, their development, and their effect on meat characteristics and processing properties. Emphasis on industry issues. F.
4401. **Swine Production (4:3:2)**. Prerequisite: ANSC 3307, 3401, 3402 (majors only) or consent of instructor; may take only one of the above concurrently. Understanding pig biology, management of the pig's environment and genetics to maximize profits. Include genetics, nutrition, reproduction, housing, herd health, and management practices. Laboratory and field trips. F. (Writing Intensive)
4402. **Horse Production (4:3:2)**. Prerequisite: ANSC 3401. An advanced study of equine anatomy, reproductive physiology, nutrition, disease, and management. S. (Writing Intensive)
4403. **Beef Production (4:3:3)**. Prerequisite: ANSC 3307, 3401, 3402 (majors only) or consent of instructor, and junior or senior standing; may take only one of above concurrently. The breeding, feeding, and managing of beef herds for profitable production of slaughter cattle. Emphasis on commercial cow-calf herds. Field trips to ranches. S.
4404. **Processed and Cured Meat Science (4:3:3)**. Prerequisite: ANSC 3403, 4400, or consent of instructor. Introduction to manufactured meat products and muscle ingredients, processing technologies, storage conditions, and stability of cured muscle foods. S.
4406. **Sheep and Goat Production (4:3:3)**. Prerequisite: ANSC 3307, 3401, 3402 (majors only) or consent of instructor; may

take only one of above concurrently. Sheep, goat, wool, and mohair production management and marketing practices. Field trips to ranches and feedlots. S.

4407. **Poultry Production (4:3:3)**. Prerequisite: ANSC 3307, 3401, 3402 or consent of instructor. Poultry production including layers, broiler and turkey management. F

Graduate Courses

5000. **Professional Internship (V1-6)**. Prerequisite: Consent of instructor. Supervised study providing advanced training for Master's of Agriculture and Master's of Science (nonthesis) students. Emphasis is on creative and technical abilities.
5001. **Problems in Animal Science (V1-6)**. Prerequisite: 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.
5100. **Seminar (1:1:0)**. Analysis of significant research. Oral presentations and discussions; enrollment required each semester of student's residence. F, S.
5201. **Ethical Behavior and Integrity in Scientific Research (2:2:0)**. Combination of lecture presentations and student analysis of behavior in science to explore aspects of scientific integrity and conduct. SS.
5301. **Advanced Contemporary Issues in Animal Agriculture (3:3:0)**. Lecture, discussion, and seminar on current society issues facing animal and meat science. F.
5302. **Advanced Beef Production (3:3:0)**. Advanced study of beef production and management. Emphasis on the application of current research to improve the efficiency of beef production. SS, even years.
5303. **Advanced Beef Cattle Feedyard Management (3:3:0)**. Emphasis on the application of recent research to improve the management of cattle feedyard operations. Special emphasis will be placed on risk and resource management within the feedyard. F.
5304. **Growth and Development (3:3:0)**. A study of differentiation, development, growth, and fattening of domestic animals and hereditary and environmental influences and interactions. SS.
5305. **Advanced Livestock Production (3:3:0)**. Prerequisite: ANSC 3302. Advanced study of current research and on-farm practices of livestock production. Not open to animal science majors. S, SS.
5306. **Advanced Animal Breeding (3:3:0)**. Prerequisite: ANSC 3402 or equivalent. Advanced topics in selecting and mating farm animals with the objective of making genetic improvement. Emphasis on breeding value estimation and crossbreeding. S, odd years.
5307. **Research Methods in Agricultural Sciences (3:2:3)**. Prerequisite: ANSC 5403 or equivalent. Computer programming, data inputs, and interpretation. Covers examples that relate to experimental designs in agricultural research. SSI
5308. **Minerals and Vitamins in Animal Nutrition (3:3:0)**. An in-depth study of vitamin and mineral chemistry, metabolism, interrelationships, and requirements for production. S, odd years.
5309. **Advanced Topics in Reproduction (3:3:0)**. A review of current literature and demonstrated techniques of the current procedures being used in assisted reproduction. S.
5310. **Advanced Quality Control and Management in Feed Manufacturing (3:3:0)**. Scientific principles and practices of quality control and management of feed manufacturing with respect to their effects on animal performance. F.
5311. **Ruminant Nutrition (3:3:0)**. A study of the digestive physiology of ruminants. Emphasis on rumen fermentation and its relationship to practical nutrition. Individual topics and current research information. F, even years.
5312. **Advanced Sheep and Goat Production (3:3:0)**. Advanced study of sheep and goat production and management. Application of research in genetics, reproduction, nutrition, health, management, wool, mohair, and marketing. S.
5313. **Nutritional Biochemistry in Animals (3:3:0)**. Prerequisite: ANSC 3301, CHEM 3305. Integrate metabolic pathways with nutrition and physiology of animals and understand intermediary metabolism of nutrients and its regulation in animals. S.
5314. **Animal Protein and Energy Utilization (3:3:0)**. An in-depth study of nitrogen, amino acid metabolism, and energy utilization in animals. Evaluation of sources and requirements for production. F, odd years.
5315. **Animal Endocrinology (3:2:3)**. Prerequisite: Consent of instructor. Course will address current research on hypothalamic-pituitary regulation of physiological systems including reproduction, growth, immune function, digestion, and behavior. S.
5316. **Muscle Chemistry, Ultrastructure, and Physiology (3:3:0)**. A study of muscle structure, composition, growth mechanisms of contraction, and rigor as related to livestock.
5317. **Agricultural Systems Modeling (3:3:0)**. An introductory modeling course for biological and agricultural systems. No special mathematical or programming skills needed. SS.
5318. **Topics in Animal Stress, Welfare, and Behavior (3:3:0)**. Students will write and discuss each topic online. Topics include animal rights philosophy and applications, stress mechanisms, measuring behavior and welfare, and other current topics.
5319. **Chromatographic Analysis in Animal and Food Research (3:2:3)**. This class teaches the principles and methods of chromatographic analysis using HPLC and GC in animal and food research.
5400. **Advanced Meat Science and Muscle Biology (4:3:3)**. Advanced study of meat components, their development, and effect on meat characteristics and processing properties. Emphasis on industry issues and the current scientific literature. Not for students who have taken ANSC 4400. SSII.
5401. **Experimental Techniques in Meat Chemistry and Muscle Biology (4:3:3)**. Histological, chemical, and biological properties of meat. Experimental techniques in meat science and muscle biology will be studied in lecture and individual lab study.
5403. **Biometry (4:3:2)**. Introduction to biological statistics. Observations, probability, "t" test, analysis of variance, mean separation procedures, linear regression and correlation, and chi-square. Introduction to computerization of statistical analyses. F, S.
5404. **Physiology of Reproduction (4:3:3)**. Anatomy of reproductive systems, physiological regulations of reproductive processes, estrous cycle, gonadal functions, semen evaluation, fertilization, embryology, pregnancy, parturition, lactation, reproductive efficiency, and research techniques. SSII, odd years.
5405. **Advanced Processed and Cured Meat Science (4:3:3)**. Advanced application of scientific principles and practices to manufactured meat products. Interrelationships among muscle ingredients, processing technologies, storage conditions, and stability of cured muscle foods. S.
6000. **Master's Thesis (V1-12)**.
6001. **Supervised Teaching (V1-3)**. Supervised teaching experience at the university level.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Food Science (FDSC)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

2300. [AGRI 1329] **Principles of Food Technology (3:3:0)**. Basic information necessary to understand technological aspects of modern industrial food supply systems. A fundamental background in food classification, modern processing, and quality control. F, S, SS.
2302. **Elementary Analysis of Foods (3:2:3)**. Basic laboratory practice in food product testing. Should have had a course in chemistry or other lab science. S. (Writing Intensive)
3100. **Food Technology Seminar (1:1:0)**. Information to prepare students to function in a competitive work environment or professional/graduate school. F, S.
3301. **Food Microbiology (3:2:3)**. Prerequisite: MBIO 3400 or permission of instructor. Microorganisms important in food spoilage and in food preservation. Study of methods for preservation of food with respect to control of microbiological growth and activity. S, even years. (Writing Intensive)
3302. **Advanced Food Analysis (3:2:3)**. Prerequisite: CHEM 3305, 3105, FDSC 2302, or permission of instructor. Study of laboratory techniques fundamental to establishing the nutritional value and overall acceptance of foods. Investigation of food constituents and methods used in their analysis. F, even years. (Writing Intensive)
3303. **Food Sanitation (3:3:0)**. Principles of sanitation in food processing and food service applications. Chemical, physical, and microbiological basis of sanitation. Equipment and food product care. F, S, and SSII.
3304. **Fruit and Vegetable Processing (3:2:3)**. Practice in preserving fruits and vegetables. Suitable for nonmajors. F.
3305. **Principles of Food Engineering (3:2:3)**. Prerequisite: MATH 1320 and 1321 or higher-level math. Course provides students

exposure in using food-engineering principles for improving the commonly used unit operations in the food processing industry.

3309. **Food Safety (3:3:0)**. Food safety and sanitation in food manufacturing and/or processing. Topics include FDA and USDA regulations, HACCP principles, and good manufacturing practices. F
4001. **Food Technology Problems (V1-6)**. Taught on an individual basis. May be repeated for credit with permission. F, S, SS.
4303. **Food Chemistry (3:2:3)**. Prerequisite: CHEM 3305, 3105 or permission of instructor. Chemical and physiochemical properties of food constituents. A comprehensive study of food components, their modification, and technology applications in food. F, odd years. (Writing Intensive)
4304. **Field Studies in Food Processing and Handling (3:1:4)**. Visits to food processing and handling facilities and discussions of operations. F
4305. **Processing Oilseeds and Cereal Grains for Foods (3:2:3)**. Physical and chemical characteristics of oilseeds and grains and their effects on processing. Introduction to processing principles and techniques. S, odd years.
4306. **Dairy Products Manufacturing (3:2:3)**. Physical and chemical characteristics of milk and milk products. Principles involved in processing dairy foods. S.
4307. **Poultry Processing and Products (3:2:3)**. Poultry meat and egg processing including functional properties, meat quality and value-added products. S.

Graduate Courses

5210. **Grant Writing (2:2:0)**. Prerequisite: Ph.D. program or consent of instructor. Development of grant proposals for submission to funding agencies. Agency identification, proposal development, budgets, project management and agency relations.
5301. **Study in Food Microbiology (3:2:3)**. Isolation and identification of organisms surviving process treatment of food products. Techniques in maintaining culture and shelf-life quality for fermented foods. Organized lecture and individualized laboratories. S, even years.
5302. **Chemical and Instrumental Analyses of Agricultural Products (3:2:3)**. Application of chemical, chromatographic, and spectroscopic methods in analysis of agricultural products. F, even years.
5303. **Study in Food Chemistry (3:2:3)**. Analysis of food components and changes in their characteristics due to processing treatments. Laboratory techniques in instrumental analysis. Organized lectures and individualized lab study. F, odd years.
5304. **Rheological Properties of Food Materials (3:3:0)**. Students will learn rheological properties of food and biomaterials as well as their applications in the food industry. Rheological characterizations of both solid and liquid foods will be covered. SSI
5305. **Research and Study Related to Cereal and Oilseed Products (3:2:3)**. Advanced practice in processing cereals and oilseeds. Particular emphasis on processing techniques involving new product development. S, odd years.
5307. **Topics in Food Technology (3:3:0)**. Students work on subjects of individual interest but opportunity is given for interaction with fellow students in the course. May be repeated for credit. F, S, SS.
5309. **Current Topics in Food Microbiology (3:3:0)**. Understand and discuss current topics in food microbiology. Focus on current scientific literature, current methodologies and data evaluation and interpretation. May be repeated for credit. F
5310. **Food Sanitation Management (3:3:0)**. Food-borne pathogens and their control in a foodservice and retail setting. Topics include sanitation, food hygiene, FDA Model Food Code, and HACCP. Provides certification in applied food service sanitation management. F, S, SSII.
6000. **Master's Thesis (V1-12)**.
6001. **Supervised Teaching (V1-3)**. Supervised teaching experience at the university level.

Department of Landscape Architecture

Faculty

Alon Kvashny, Ed.D., Chairperson

Professor: A. Kvashny

Associate Professors: Billing, Hamed, Kavanagh, Mills

Assistant Professors: Klein, Sherrod

Instructor: S. Kvashny (Visiting)

About the Program

This department offers the following accredited degree programs:

- Bachelor of Landscape Architecture
- Master of Landscape Architecture

The department also participates in the interdisciplinary Land Use Planning, Management, and Design program leading to the Doctor of Philosophy degree (See College of Architecture section).

The landscape architecture program instills in students the basic skills and knowledge required to enter the profession in the public or the private sector. The program emphasizes physical design and planning in both the natural and urban environments. Students are required to intern in the offices of registered landscape architects, planners, or allied professionals during at least one summer prior to the student's senior year. Offices and classroom facilities are located in the Plant Science Building and studios are in the Agriculture Pavilion and the old Animal Science Building.

Landscape Architecture (LARC)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1302. **Introduction to Landscape Architecture (3:3:0)**. An introduction to the multidisciplinary field of landscape architecture exploring its historical evolution, highlighting its interaction with arts and science, and examining its contemporary leaders.
1401. **Landscape Architecture Drawing and Drafting (4:1:6)**. Prerequisite: LA majors only. Introduction to drafting equipment, drafting and drawing. Construction of one-point and two-point perspective, shade and shadow, elements of visual composition. F
1402. **Landscape Architecture Graphics (4:1:6)**. Prerequisite: LARC 1401, LA majors only. Develop knowledge and skills for effective graphic expression of design. Emphasis on scaled drawings, three-dimensional representation and color graphics. S.
2100. **Landscape Architecture Portfolio Preparation (1:1:0)**. Prerequisite: LARC 2401. Introduction to professional portfolio development for landscape architecture and preparation of individual portfolio for faculty review. S.
2308. **Computer-Aided Design in Landscape Architecture (3:1:4)**. Prerequisite: LARC 1402, LA majors only or consent of instructor. Hands-on introduction to current computer-aided design technology most applicable to landscape architecture. F.
2309. **Advanced Computer-Aided Design in Landscape Architecture (3:1:4)**. Prerequisite: LARC 2308, LA majors only. Exploration of contemporary applications of three dimensional CAD in the profession of landscape architecture. S.
2401. **Basic Design in Landscape Architecture (4:1:6)**. Prerequisite: LARC 1402. LA majors only. A basic course in landscape architecture incorporating the principles of art and landscape architecture in design. F
2402. **Landscape Architecture Design Process (4:1:6)**. Prerequisite: LARC 1402, 2401 and PSS 2330. A continuation of basic design with emphasis on site inventory, analysis, and programming in relationship to the design process. S.
2404. **Landscape Architecture Grading and Drainage (4:2:4)**. Prerequisite: CTEC 2301 and LARC 2402. Introduction to site layout, grading and drainage, earthwork and runoff computations, and site implementation drawing techniques. F
3302. **Development of Landscape Architecture (3:3:0)**. History of landscape architecture. Design as expression of culture and society's

Landscape Architecture Curriculum

FIRST YEAR				
Fall		Spring		
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3	
MATH 1320, Coll. Algebra	3	MATH 1321, Trig.	3	
HIST 2300, History of U.S. to 1877	3	BIOL 1305, Eco. & Environ. Prob.	3	
LARC 1401, L.A. Drawing	4	BIOL 1113, Environ.Prob. Lab.	1	
LARC 1302, Intro. to Land. Arch.	3	LARC 1402, LA Graphics	4	
TOTAL	16	TOTAL	14	
SECOND YEAR				
Fall		Spring		
HIST 2301, U.S. History Since 1877	3	PSS 1411, Prin. of Horticulture	4	
CTEC 2301, Surveying & Surveys	3	LARC 2402, LA Design Process	4	
PSS 2330, Urban Soils	3	LARC, 2100, LA Portfolio Prep.	1	
LARC 2401, Basic Design Land. Arch.	4	AAEC 2305, Fund. Ag. & Appl. Eco. or		
LARC 2308, Comp. Aid. Des. in LA	3	Ind. or Group Behavior	3	
TOTAL	16	LARC 2309, Adv. CAD in LA	3	
		TOTAL	15	
THIRD YEAR				
Fall		Spring		
LARC 3302, Dev. of Landscape Arch.	3	ENGL 2311, Technical Writing	3	
PSS 3318, Woody Plants	3	LARC 3402, Master Planning	4	
LARC 3401, LA Site Design	4	LARC 3403, Planting Design	4	
LARC 2404, LA. Grading & Drainage	4	LARC 3404, LA Site Cons. & Dev.	4	
TOTAL	14	TOTAL	15	
FOURTH YEAR				
Fall		Spring		
GEOG 3300, Geo. Info. Systems	3	COMS 2300, Public Speaking	3	
LARC 4401, Urban Design	4	LARC 4402, Reg. Plan & Design	4	
LARC 4404, LA Materials & Details	4	Directed Electives	6	
LARC 4302, Env. Planning	3	LARC 4100, Seminar	1	
TOTAL	14	TOTAL	14	
FIFTH YEAR				
Fall		Spring		
POLS 1301, Am. Gov. Org.	3	POLS 2302, Am. Gov. Policy	3	
NRM 4403, Aerial Photo. Interp.	4	LARC 4507, Lan. Ach. Sen. Project	5	
LARC 4506, Collaboration Studio	5	Directed Electives	6	
LARC 4311, Professional Practice	3	TOTAL	14	
LARC 4101, Proposal Writing in LA	1			
TOTAL	16			

Minimum hours required for graduation—148

- Students will fulfill the university multicultural requirement by completing LARC 3302.
- An internship, approved in the previous semester, must be completed prior to graduation.
- No LARC or required prerequisite may be taken pass-fail.
- Directed electives are subject to approval of the academic advisor and department chairperson.
- Overall academic GPA of 2.50 is required after the third year or faculty approval.

- relationship to nature. Geographical, historical, and cultural context of major movements in landscape architecture. F.
- 3401. Landscape Architecture Site Design (4:1:6).** Prerequisite: LARC 2100 and 2402. Site analysis and design as they apply to projects of various scale, scope, and resolution. F.
- 3402. Master Planning (4:1:6).** Prerequisite: LARC 3401 and LARC 2404. Comprehensive design problems integrating aspects of site design, planting design and construction. S.
- 3403. Planting Design (4:1:6).** Prerequisite: LARC 3401 and PSS 3318. Theory and practice including plants in site design, planting design techniques, planting plans and technical specifications. S.
- 3404. Landscape Architecture Site Construction and Development (4:2:4).** Prerequisite: LARC 2404. Complex grading and drainage, drainage structures, horizontal and vertical circulation alignment in large scale site development. S.
- 4000. Internship (V1-6).** Minimum 8 weeks, prior departmental approval, and must be completed for graduation.
- 4001. Landscape Architecture Problems (V1-4).** An investigation of a problem in the profession of special interest to the student. Open to all advanced students.
- 4100. Seminar (1:1:0).** Prerequisite: Senior standing. Assigned readings, informal discussions, oral reports, and papers. F.
- 4101. Proposal Writing in Landscape Architecture (1:1:0).** Prerequisite: LARC 4402 and ENGL 2311. Comprehensive writing for landscape architecture final project thesis. The course includes program development methodology and the framework for proposal writing. F.

Graduate Program

The Master of Landscape Architecture degree is designed as a first professional degree for students with a baccalaureate degree in a discipline other than landscape architecture. It is an advanced professional degree for students with the Bachelor of Landscape Architecture degree or its equivalent. The advanced professional degree requires a minimum of 36 credit hours. The first professional degree requires 36 hours and up to 37 additional hours of leveling courses.

This is a flexible program designed to meet a variety of professional interests as well as individual needs and career objectives. Universal design, therapeutic landscape design, land use and regional planning, geographic information systems, and cultural landscape design are a few of the program offerings.

Multidisciplinary research in environmental design and management and outdoor recreation in the department has had support from federal, state, and local agencies. The National Park Service, U. S. Army Corps of Engineers, the Forest Service, the Bureau of Land Management, Texas Parks and Wildlife Department, the Office of the Governor, and southwestern cities and counties have all supported these research efforts.

All of the admission requirements established by the Graduate School must be met to enter this program. Also, the department requests a letter of intent, which should address how the program fits the applicant's career goal, and transcripts of all previous coursework. A portfolio of graphic work, if available, is desirable. Nonresident tuition is waived with half-time assistantships. Students with this support have special responsibilities in research projects.

- 4302. Environmental Planning for Sustainable Development (3:3:0).** Prerequisite: BIOL 1305 and 1113. An introduction to environmental planning issues with emphasis on the integration of related disciplines to attain environmentally and socially sustainable development. F.
- 4303. Environmental Management for Sustainable Development (3:3:0).** Prerequisite: LARC 4302. Environmental management principles and procedures. An investigation of land planning, environmental law, resource economics, and public policy to achieve sustainable development. S.
- 4311. Professional Practice (3:3:0).** Prerequisite: Fifth-year standing. Methods, procedures, and ethics of professional practice of landscape architecture. F.
- 4401. Urban Design (4:1:6).** Prerequisite: LARC 3402, LARC 3403 and LARC 3404. Public urban spaces and their surrounding built edges. Organization, form, and character of streets, parks, and plazas. F.
- 4402. Regional Planning and Design (4:1:6).** Prerequisite: LARC 2309, 4401, and GEOG 3300. Regional landscape planning and design in landscape architecture based on natural and cultural resource factors. S. (Writing Intensive)
- 4404. Landscape Architecture Materials and Details (4:2:4).** Prerequisite: LARC 3404. Introduction of landscape architecture construction systems, materials, irrigation, retaining walls, lighting, structures, joining of materials, and implementation drawings. F.
- 4506. Collaboration Studio (5:1:9).** Prerequisite: LARC 2309 and 4402. An interdisciplinary studio for the design professions which address the process and skills necessary for collaboration and teamwork. Field trip required. F.
- 4507. Landscape Architecture Senior Project (5:1:6).** Prerequisite: LARC 4506 and 4101. Individual design demonstration project representing comprehensive skilled synthesis of knowledge and professional skills developed in study of landscape architecture. S. (Writing Intensive)

Graduate Courses

- 5001. Special Problems in Landscape Architecture (V1-4).** Selected problems based on student's needs and interests not included in other courses. May be repeated for credit with approval of department.

5201. **Landscape Architecture Graphics (2:1:4).** Introduction to drafting and landscape graphics. Developing skills for effective graphic expression of design in two and three-dimensional representation. F
5302. **Advanced Environmental Planning for Sustainable Development (3:3:0).** An introduction to environmental planning issues with emphasis on the integration of related disciplines to attain environmentally and socially sustainable development. F
5303. **Advanced Environmental Management for Sustainable Development (3:3:0).** Prerequisite: LARC 5302. Environmental management principles and procedures and their relations to land-use planning, environmental laws and public policy to achieve sustainable development.
5304. **Introduction to Natural Resources and Design (3:3:0).** Overview of the evolution of human attitudes toward the environment as evidenced in designs on the land throughout history to the present day.
5308. **Computer-Aided Design in Landscape Architecture (3:1:4).** Hands-on introduction to computer-aided design technology that is currently most applicable to the needs of the profession of landscape architecture. F
5309. **Advanced Computer-Aided Design in Landscape Architecture (3:1:4).** Prerequisite: LARC 5308. Advanced application of CAD in landscape architecture. S
5310. **History of Landscape Architecture (3:3:0).** Investigation of the issues, work, and personalities in landscape architecture as expressed through design and their relationship to and influence on society and nature. F
5312. **Planting Design (3:1:2).** Prerequisite: PSS 6001. The characteristics of plants with their forms in the landscape. Special emphasis on preparation of planting plans. S
5314. **Landscape Architecture Grading and Drainage (3:2:2).** Introduction to site grading and drainage, earthwork and runoff computations and site implementation drawing techniques. F
5315. **Landscape Architecture Site Construction and Development (3:2:2).** Prerequisite: LARC 5314. Complex grading and drainage, drainage structures: storm water management, and horizontal and vertical circulation alignment in large scale site development. S
5316. **Landscape Architecture Materials and Details (3:2:2).** Prerequisite: LARC 5315. The study of landscape architecture site construction and materials, products and their application and integration to the man-made environment. F
5401. **Landscape Architecture Principles and Process (4:1:6).** An accelerated course emphasizing professional drafting and graphics, design principles and theory and the introduction of site analysis. F
5402. **Site Design (4:1:6).** Prerequisite: LARC 5201, 5314, and 5401. An accelerated course emphasizing landscape site analysis process, and conceptual design and theory, with a continuation of professional graphics techniques. S
6000. **Master's Thesis (V1-6).** Prerequisite: LARC 6203.
6100. **Landscape Architecture Seminar (1:1:0).** Critical readings, discussion and writing on a range of disciplinary and interdisciplinary planning, design, management, and environmental issues. F
6203. **Thesis Research, Preparation, and Organization (2:2:0).** Prerequisite: LARC 6301. Preparation of thesis project content, selection of the thesis committee, and the proposal submission to the Graduate Studies Committee for approval.
6301. **Research Methodology for Planning and Design (3:3:0).** Introduction to the research process and methods used in the design-planning field. F
6302. **Administrative Aspects of Landscape Architecture (3:3:0).** The methods, procedures, and organizational structure of professional practice in landscape architecture. F
6306. **Special Problems (3:3:0).** Prerequisite: Consent of instructor. Methods of interpretation of planning and designing projects that influence the historical, ethnic, and cultural aspects of a region.
6401. **Urban Design (4:1:6).** Prerequisite: LARC 5402, LARC 5315. Analysis, planning and design of urban environments with emphasis on urban development theories, municipal regulations, and master plan development.
6402. **Regional Landscape Planning (4:1:6).** Prerequisite: LARC 5308, LARC 6401. Theory of planning and design for large scale regional landscape, including an intensive geographic information system (G.I.S.) seminar.
6406. **Collaboration Design (4:1:9).** Prerequisite: LARC 5308, LARC 6402. An interdisciplinary studio for landscape architects, architects, and interior designers addressing the process and skills necessary for collaboration and teamwork. F
7000. **Research (V1-12).**

Department of Plant and Soil Science

Faculty

Thomas L. Thompson, Ph.D., Chairperson

Bayer CropScience Regents' Endowed Professor: Wilkins

B.L. Allen Endowed Professor: Hudnall

Leidigh Professor: Zartman

Piper Professor: Hopper

Rockwell Professor: Auld

Thornton Chair and Horn Professor: V. Allen

Professors: R.D. Allen, Bronson, Green, Dotray, Maas, Peffley,

Thompson, Thorvilson

Associate Professors: Bednarz, Hellman, McKenney, Montague,

Parajulee, Xu

Assistant Professors: Burow, Henry, Nansen, Woodward, Wright

Research Associate Professor: Hequet

Research Assistant Professor: Abidi, Krifa

Instructor: Light

Adjunct Faculty: Acosta-Martinez, Baughman, Boman, Bouton,

Brashears, Burke, Calhoun, Cantrell, Franks, Gannaway, Gitz,

Hopkins, Keeling, Lascano, Leser, Mahan, Mauget, Maunder,

McMichael, Oliver, Payton, Peterson, Porter, Rosenow, Rush,

Schubert, Sheetz, Sledge, Stout, Trolinder, Trostle, Upchurch, Velten,

Wallace, Wanjura, Wheeler, Zobeck

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Agronomy
- Bachelor of Science in Horticulture
- Bachelor of Science in Plant Biotechnology
- Master of Science in Crop Science
- Master of Science in Entomology
- Master of Science in Horticulture
- Master of Science in Soil Science
- Doctor of Philosophy in Agronomy

A minimum of 120 hours is required for a B.S. degree. The department also participates in the interdepartmental program leading to the Master of Agriculture degree. Students seeking a master's or doctor's degree in the department should consult the chairperson about their programs before enrolling for any courses.

Undergraduate Program

Students in the departmental areas of agronomy, horticulture, and plant biotechnology investigate the basic biological, physical, and social sciences. More importantly, they bring such knowledge to focus on problems in pest control and plant development through genetics; plant growth through management; and plant material use for food, fiber, or the aesthetic good of humankind.

Agronomy includes the study of soil, plant genetics, breeding, biotechnology, molecular biology, physiology, biochemistry, weed and pest control, and crop management as applied to the efficient and economical production of field crops. Students study how to use and manage soils, which includes the application of biological, chemical, and physical sciences with regard to natural and man-affected environments.

Horticulture today is the application of basic scientific information to the growing and use of edible (fruits, nuts, and vegetables) and ornamental plants (annual and perennial flowers and woody plants). Today's horticulture students focus on the challenges and practices of genetics and breeding, propagation, biotechnology, production, management, handling and storage, marketing, and use of horticultural plants. A resident program and a distance program are offered requiring 120 semester hours. For the distance program, students will need to complete some of their general

coursework at another institution and the last 30 semester credit hours at Texas Tech University.

Plant biotechnology students learn how insects, weeds, and pathogens impact plant growth in an environmentally benign manner. Increased modification of the plant genome is a focus of this discipline.

Students taught in the Department of Plant and Soil Science are educated to meet the challenges of efficiently producing plants for food, fiber, and aesthetic beauty while preserving our natural resources and environmental integrity. Graduates serve in a vast array of responsible positions in private industry, as well as with local, state, and federal agencies.

This department offers a choice of minors in agronomy, horticulture, or plant biotechnology for students majoring outside the department. For more information on requirements for completing a minor, refer to "Selecting a Minor" in the introductory information about this college or contact the departmental chair. Students must earn a grade of C or better in all departmental courses required for graduation.

Plant and Soil Science (PSS)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1321. [AGRI 1307, 1407] **Agronomic Plant Science (3:3:0)**. Importance, distribution, and use of major world agronomic crops. Fundamentals of growth, structure, and improvements are also stressed.
1411. [AGRI 1415, HORT 1401] **Principles of Horticulture (4:3:2)**. Principles and practices of growth and development, structure, nomenclature, use of horticultural plants and how they are affected by the environment. Fulfills laboratory science requirement.
2130. **Urban Soils Laboratory (1:0:2)**. Prerequisite: PSS 2330 or concurrent. Discussion and practical experience with soils in the urban environment.
2210. **Floral Design (2:1:2)**. Floral design as a commercial enterprise. Emphasis on principles of floral design, patterns of arrangements, and elements of color composition. Field trips required.
2311. **Vegetable Crops (3:2:3)**. Principles and practices in home vegetable gardening, with an introduction to commercial production and marketing of major vegetable crops. Fulfills science and technology requirement.
2312. **Propagation Methods (3:2:2)**. Prerequisite: PSS 1411. Propagation techniques of commercial nurseries and greenhouse ranges; study of the physiological reaction and cutting material. (Writing Intensive)
2313. **Herbaceous Plant Materials (3:2:2)**. Prerequisite: PSS 1411. Study of the principal herbaceous plants and plant families, palms, roses, and subtropical landscape plants.
2330. **Urban Soils (3:3:0)**. Utilization of soils in urban environments with emphasis on nutrients, water management, and physical properties. (Credit not given for PSS 2432)
- 2401 [AGRI 1413] **Introductory Entomology (4:3:2)**. An introduction to the arthropods with major emphasis on the insects. Insect structure, function, identification, and relationships to man, plants, and animals will be discussed.
2432. **Principles and Practices in Soils (4:3:2)**. Prerequisite: CHEM 1305 and 1105. Formation and composition, physical and chemical properties, hydraulic and thermal relationships of soil. Role of soil in ecosystems. (Writing Intensive)
3309. **Turf Culture and Management (3:3:0)**. Prerequisite: PSS 1411. Study of the principal turfgrass species and their cultural management. Field trips required.
3317. **Interior Plants (3:2:3)**. Selection and maintenance of interior plants and planting facilities.
3318. **Woody Plants (3:2:2)**. Prerequisite: PSS 1411. Discussion and selection of woody plants used for ornamental purposes in the landscape setting. The course will be divided between deciduous and evergreen plants.
3321. **Forage and Pasture Crops (3:3:0)**. The production and use of forage and pasture crops.
3322. **Grain, Fiber, and Oilseed Crops (3:3:0)**. History, distribution, use, plant form, growth and development, and cultural and production practices of important agronomic crops.

Graduate Program

The department offers Master of Science degrees in crop science, entomology, horticulture and soil science and the Doctor of Philosophy degree in agronomy. Before being recommended for admission to a master's degree program with a major in this department, the student may be requested to provide evidence of proficiency in background for graduate work or may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the department.

Master of Science degree students may pursue either the thesis or nonthesis option. The thesis option (24 hours of graduate coursework plus six hours of thesis research) is designed for students who intend to pursue a Ph.D. An oral exam over the research is required for the thesis option. The nonthesis option (36 hours of graduate coursework) is considered a terminal degree. An oral exam is required during the graduating semester for the nonthesis option. A Master of Science degree at a distance is available in both horticulture and crop science; each requires a minimum of 36 hours of graduate coursework without a thesis. Students must take the last 6 semester credit hours from Texas Tech and an oral exam is required during the graduating semester. The department also participates in the 36-hour Master of Agriculture program. Additionally, the department participates in joint degree programs with the Law School. These unique combinations of programs allow not only for students to pursue a Doctor of Jurisprudence (J.D.) degree but also a Master of Science degree in crop science, entomology, horticulture or soil science.

If the preliminary examination for admission to doctoral studies reveals weaknesses in the student's subject matter background, the student may be required to take remedial courses designated by the graduate faculty of the department. The student's advisory committee will make recommendations concerning language requirements and basic work in other sciences. A Ph.D. candidate in the department is required to take written and oral comprehensive qualifying examinations prepared and conducted by the graduate committee. The purpose of these examinations is to determine whether or not a candidate possesses a depth of knowledge in their area of specialization, a breadth of knowledge in supporting areas, understanding of the scientific method, and the ability to communicate knowledge in an organized and scholarly manner.

Research, teaching, and scholarship stipends are often awarded to qualified applicants. Nonresident tuition is often waived with the award. Students having this support have special responsibilities in research and/or teaching.

3323. **Crop Physiology (3:3:0)**. Presents fundamental concepts underlying the science of crop physiology, including crop phenology, canopy development and light interception, photosynthesis and respiration, and dry matter partitioning.
3324. **Seed Science (3:3:0)**. Analysis of seed for planting. Seed quality as related to production, processing, storing, and handling. Study of federal and state seed laws.
3421. **Fundamental Principles of Genetics (4:4:0)**. Prerequisite: PSS 1321 or BIOL 1401. Mendelian genetic principles and chromosomal basis of heredity and genetic analysis based on recombinant DNA. (Writing Intensive)
4000. **Internship (V1-3)**. Prerequisite: Approval of department chair. A supervised study course providing in-service training and practice in various areas of plant science. May be repeated for credit.
4001. **Problems (V1-3)**. Prerequisite: Approval of instructor. An assigned problem and individual instruction in a specific area,

Plant Science. May be repeated for credit with approval of department chair.

- 4100. **Seminar (1:1:0)**. Prerequisite: Senior standing or approval of instructor. Utilization of writing and oral presentation skills. Continued enhancement of education skills and adherence to professional ethics.
- 4131. **Soil Fertility Laboratory (1:0:3)**. Prerequisite: PSS 2432 and concurrent enrollment in PSS 4335. Laboratory analysis of soil and plant samples; interpretation of fertility management data.
- 4301. **Agricultural Compounds (3:3:0)**. Prerequisite: PSS 2401 and CHEM 3303, 3103. Nature, mode of action, and uses of insecticides, fungicides, herbicides, and other pesticides.
- 4305. **Integrated Pest Management (3:3:0)**. Prerequisite: PSS 2401. The principles and practices of integration of all available control strategies in the management of arthropod pest populations.
- 4313. **Arboriculture (3:3:0)**. Prerequisite: PSS 1411. The physiological principles and industry practices in the production, moving, care, and maintenance of ornamental trees, shrubs, and ground covers. Required field trips.
- 4314. **Garden Center Management (3:3:0)**. The principles of management, marketing, structures, and distribution for retail establishments. (Writing Intensive)
- 4316. **Turfgrass Science (3:3:0)**. Prerequisite: PSS 3309. Second course in turfgrass management including turf physiology, nutrition, weed control, insects, and diseases.
- 4321. **Fundamental Principles of Plant Breeding (3:3:0)**. Prerequisite: PSS 3421. Practical application of genetics and biotechnology in the breeding and improvement of plants.
- 4325. **Crop Water Management (3:3:0)**. Comprehensive evaluation of soil-plant atmosphere interactions affecting supply and demand of water for crop production.
- 4330. **Environmental Soil Chemistry (3:3:0)**. Chemistry of inorganic and organic soil components with emphasis on environmental significance of soil solution-solid phase equilibria, sorption phenomena, ion exchange processes, reaction kinetics, redox reactions, and acidity processes.
- 4332. **Soil Classification (3:2:3)**. Prerequisite: PSS 2432, or approval of instructor for nonagriculture majors. Soil profile morphology. Classification systems with emphasis on the taxonomic system of the United States.
- 4335. **Soil Fertility Management (3:3:0)**. Prerequisite: PSS 2432. Nutrient availability as influenced by the properties of soils, use of fertilizers and soil amendments; methods and time of application of fertilizer.
- 4336. **Soil Physical Properties (3:3:0)**. Prerequisite: PSS 2432 and 6 hours of mathematics. Physical properties of soils: structure and movement of water, air, and temperature.
- 4337. **Environmental Soil Science (3:3:0)**. Prerequisite: PSS 2432. Physical, chemical, and biological properties and processes of soil as they relate to environmental quality.
- 4411. **Principles of Floriculture (4:3:3)**. Prerequisite: PSS 1411. Greenhouse construction, heating and cooling, growing media, pest management, nutrition and fertility, growth regulation, irrigation, post harvest handling, and marketing of floricultural crops. Required field trips.
- 4415. **Plant Biotechnology (4:3:2)**. Prerequisite: PSS 3401. The study of plant biotechnology with emphasis on industry topics such as research, marketability, product development, and regulatory and intellectual property issues. (Writing Intensive)
- 4421. **Principles of Weed Science (4:3:2)**. Fundamentals of chemical weed control. Emphasis on herbicide families, names, usage, absorption, translocation, mechanism of action, and factors influencing selectivity and soil persistence. The laboratory will emphasize labels, calculations, equipment, calibrations and usage, and methods of application.
- 4425. **Agricultural Plant Pathology (4:3:2)**. Identification and management of diseases of agricultural and horticultural plants. Diagnostic methods used to identify basic plant pathogens.

Plant Biotechnology Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
BIOL 1403, Biology I	4	BIOL 1404, Biology II	4
PSS 1321, Agr. Plant Sci.	3-4	Visual & Performing Arts	3
or PSS 1411, Princ. of Hort.		PSS 2401, Intro. Entomology	4
TOTAL	13-14	TOTAL	17
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 1330, Intro. Math. Analysis or MATH 1320, College Algebra	3	MATH 1331, Intro. Math. Anal. or MATH 1330, Intro. Math. Anal.	3
CHEM 1307, Prin. Chem. I	3	CHEM 1308, Prin. Chem. II	3
CHEM 1107, Prin. Chem. I (lab.)	1	CHEM 1108, Prin. Chem. II (lab.)	1
ENGL 2311, Technical Writing	3	COMS 3358, Bus. Comm. or	3
POLS 1301, Amer. Gov. Org.	3	COMS 2300, Public Speaking	3
Humanities/Multicultural	3	POLS 2302, Amer. Public Politics	3
TOTAL	16	TOTAL	13
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
CHEM 2303 or 3305, Intro. Org.	3	PSS 2432, Prin. & Prac of Soils	4
CHEM 2103 or 3105, Org. Lab.	1	Group 1 Electives*	10
MBIO 3400, Microbiology	4	TOTAL	14
PSS 4421, Prin. Weed Science	4		
Group 1 Electives*	3		
TOTAL	15		
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
Group 1 Electives*	7-8	AAEC 2305, Fund. Ag. Eco. or	3
PSS 4305, Integrated Pest Mgt.	3	ECO 2301,	
PSS 4415, Agric. Biotechnology	4	PSS 3421, Genetics	4
PSS 4100, Seminar	1	PSS 4301, Agric. Compounds	3
TOTAL	15-16	Group 1 Electives*	7-8
		TOTAL	17-18

Minimum hours required for graduation—120

* Students will select one of the emphases listed below according to their area of interest. Directed, required, and free electives within an emphasis are subject to approval of the academic advisor.

Biotechnology: Group I Electives — BIOL 3320 and 3120, PSS 4425, BOT 3401 or PSS 3323, BOT 4304, CHEM 3311, 3312, 3313. Directed Electives — 2-4 hours from any 2000 or above PSS course. Specialization in one of the three disciplines within PSS is encouraged.

Integrated Pest Management Science: Group I Electives — AGSC 2300. Directed Electives — 23-24 hours from the following: PSS 2311, 2313, 3309, 3321, 3322, 3323, 3324, 3402, 4321, 4336, NRM 3302, BIOL 3303, 3307, 4305, 4306, ZOO 3406, 4312, ATMO 1300 and 1100, BOT 3302, 3401.

needs and interests, not included in other courses. May be repeated for credit with approval of department.

- 5100. **Seminar (1:1:0)**. Current research in all aspects of plant and soil science including presentations by internationally recognized scientists. May be repeated for credit.
- 5231. **Applied Geostatistics (2:2:0)**. Application of regionalized variable theory to surface and subsurface land forms using semivariograms and kriging.
- 5232. **International Agronomic Development (2:2:0)**. Overview of world food situation. Role of assistance programs and international and national research centers in the development of agronomic research and outreach for developing countries.
- 5304. **Economic Entomology (3:3:0)**. Prerequisite: PSS 2401 or consent of instructor. A synthesis of the theory and practice of insect control including prediction and implementations of control strategies in agricultural systems.
- 5306. **Advanced Insect Anatomy and Physiology (3:2:3)**. Prerequisite: PSS 2401. The structure and function of insect organ systems.
- 5307. **Pesticides (3:3:0)**. Advanced study of the registration, development, and legal use of pesticides.
- 5310. **Insect Ecology (3:3:0)**. The effects of environmental factors on insect abundance, composition, complexity, and dynamics of insect community systems.

Graduate Courses

- 5000. **Professional Internship (V1-6)**. Prerequisite: Consent of department chairperson. Supervised study providing advanced training for master's students. Emphasis is on scientific and technical training.
- 5001. **Problems in Plant and Soil Science (V1-3)**. Prerequisite: Consent of instructor. Selected problems based on the student's

Agronomy Curriculum

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
PSS 1321, Agr. Plant Sci.	3	AGSC 2300, Comp. in Ag.	3
MATH 1320, Coll. Algebra or MATH 1330, Intro. Math. Anal.	3	MATH 1321, Trigonometry or MATH 1331, Intro. Math. Anal.	3
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. Chem. II	3
CHEM 1107, Prin. of Chem. I (Lab.)	1	CHEM 1108, Prin. Chem. II (Lab.)	1
TOTAL	13	Group 1 Elective	3
		TOTAL	16
SECOND YEAR			
Fall		Spring	
CHEM 2303, Intro. Organ. Chem. or CHEM 3305, Organic Chem. I	3	HIST 2301, History of U.S. Since 1877	3
CHEM 2103, Intro. Chem. Lab. or CHEM 3105, Chem. Lab.	1	PSS 2401, Intro. Ento.	4
HIST 2300, History of U.S. to 1877	3	ENGL 2311, Rpts. & Corresp., or ENGL 3365, Prof. Rpt. Writ.	3
PSS 2432, Prin. & Prac. Soils	4	Required Elective	4
BIOL 1401, Biol. of Plants	4	TOTAL	14
TOTAL	15		
THIRD YEAR			
Fall		Spring	
Group 1 Electives	6	AAEC 3401, Ag. Stats.	4
POLS 1301, Am. Gov. Org.	3	POLS 2302, Am. Pub. Pol.	3
MBIO 3400, Microbiology	4	PSS 4301, Ag. Compounds	3
AAEC 2305, Fund. AAEC or ECO 2301, Prin. of Econ.	3	Group 1 Electives	2
TOTAL	16	PSS 3421, Genetics	4
		TOTAL	16
FOURTH YEAR			
Fall		Spring	
PSS 4100, Seminar	1	COMS 2300, Public Speaking	3
PSS 4415, Ag. Biotech.	4	Visual & Performing Arts*	3
Humanities or Multicultural*	3	and/or Multicultural	
Group 1 Electives**	6	Group 1 Electives**	8
TOTAL	14	Free Elective	2
		TOTAL	16

Minimum hours required for graduation—120 (Students must fulfill the university multicultural requirement.)

* Choose from Core Curriculum requirements.

** Students will select one of the options listed below according to their area of interest. Directed and required electives are subject to approval of the academic advisor.

Agronomy: Group I Electives — PSS 3421 plus 25 hours from the following: PSS 3321, 3322, 3323, 3324, 4321, 4325, 4332, 4335, 4336, 4337, or 4421. Required Electives — 4 hours from the following: atmospheric science, chemistry, geology, mathematics, or physics.

Environmental Soil Science: Group I Electives — PSS 4332, 4335, 4336, 4337, and 9 hours from any other PSS courses. Directed Electives — 9 hours from the following: BIOL 2313, ENVE 1301, 3203, GEOL 3323, or NRM 4314.

Horticulture Curriculum

FIRST YEAR			
Fall		Spring	
PSS 1411, Prin. of Hort.	4	AAEC 2305, Fund. of AAEC	3
CHEM 1307, Prin. Chem. I	3	or ECO 2301, Prin. Micro. Eco.	
CHEM 1107, Prin. Chem. I (lab.)	1	BIOL 1401, Biol. of Plants	4
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1308, Prin. Chem. II	3
POLS 1301, Amer. Govt., Org.	3	CHEM 1108, Prin. Chem. II (lab.)	1
TOTAL	14	ENGL 1302, Adv. Coll. Rhetoric	3
		TOTAL	14
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
ENGL 2311, Pat. & Rept. Cor.	3	PSS 2312, Propagation Meth.	3
PSS 2401, Intro. Ento.	4	MATH 1330 or AAEC 3401	3-4
PSS 2313, Herb. Plants	3	POLS 2302, Amer. Pub. Pol.	3
MATH 1320, Coll. Alg.	3	Visual and Performing Arts*	3
TOTAL	16	TOTAL	15-16
THIRD YEAR			
Fall		Spring	
PSS 3421, Genetics	4	PSS 3318, Woody Plants	3
Free Electives	2-3	COMS 2300, Public Speaking or	3
Humanities or Multicultural*	3	COMS 3358, Bus. & Prof. Comm.	
PSS 2432, Prin. & Pract. Soils	4	Directed Elective**	3
Group 1 PSS Elective**	3	Group 1 PSS Electives**	6
TOTAL	16-17	TOTAL	15
FOURTH YEAR			
Fall		Spring	
PSS 4425, Ag. Plant Path.	4	PSS 4301, Ag. Compounds	3
PSS 4100, Seminar	1	PSS 3323, Crop Growth	3-4
Group 1 PSS Electives**	6	or BOT 3401, Plant Physiology	
Free Electives	3	Directed Elective**	10-11
TOTAL	14	TOTAL	16-18

Minimum hours required for graduation—120 (Students must fulfill the university multicultural requirement).

* Choose from Core Curriculum requirements.

** Students will select one of the emphases listed below according to their area of interest. Directed and Group I electives are subject to approval.

Horticultural Science: Group I Electives — 15 hours from PSS 2210, 2311, 3309, 3310, 3317, 4000, 4001, 4313 with a minimum of 6 hours from PSS 4314, 4411, 4415. Directed Electives — 12 hours from the following areas of study: B A, AAEC, BIOL, CHEM, FS, LARC, MBIO, PSS PSY, NRM, SOC. Free Electives — 5-6 hours.

Turfgrass Management: Group I Electives — 13 hours from the following: PSS 3309, 4335, 4421, plus 3-4 hours from PSS 4313, 4314, 4411, 4415. Directed Electives — 11 hours from PSS 3317, 4000, 4001, 4305, 4325, or B A, CHEM, AAEC, BIOL, PSS, SOC, PSY, NRM, LARC. Free Electives — 4-6 hours.

5316. **Advanced Arboriculture (3:3:0).** Advanced principles associated with anatomical, physiological, and chemical changes in woody plants.
5317. **Advanced Nursery Management (3:3:0).** Principles of nursery production, cultural management, and marketing of both wholesale and retail commodities.
5318. **Advanced Turfgrass Science (3:3:0).** An advanced course in turfgrass science including turf physiology, nutrition, insects, diseases, and weed control.
5319. **Advanced Interiorscaping (3:2:2).** A tropical foliage plant course for graduate students with no previous training in interiorscaping. Emphasis is placed on plant identification, selection, design, lighting and maintenance.
5321. **Plant Breeding Theory (3:3:0).** Breeding and plant improvement presented at an advanced level.
5322. **Organic Plant Metabolism (3:3:0).** Considerations of cellular organization and its relation to cellular metabolism. Bioenergetics and biochemistry of the organic constituents of living systems including their synthesis and metabolism are considered.
5323. **Environmental Crop Physiology (3:3:0).** The plant-environment interaction in relation to growth and production of crop communities. Radiant energy, carbon dioxide, water, and temperature relationships in crop stands.
5324. **Mode and Mechanism of Herbicide Action (3:3:0).** Prerequisite: Consent of instructor. Herbicide classification, activity, crop selectivity, and resistant plants.
5325. **Transgenic and Plant Cell Genetics (3:3:0).** Genome organization in plants, interspecific hybridization, cytoplasmic male sterility, self-incompatibility, tissue culture, in-vitro screening, and transformation technologies.
5326. **Advanced Seed Science (3:3:0).** In-depth study of seed and seedling anatomy, the sequence of events and factors affecting germination and emergence, and the characteristics of dormancy and vigor.
5327. **Soil-Plant-Animal Interrelationships in Grazing Lands (3:3:0).** Ecological and nutritional principles of livestock grazing are established. Mineral cycling, antiquality factors, limitations to intake, and research methodology in forage-livestock systems are presented.
5328. **Forages and Livestock in Pasture Ecosystems (3:3:0).** Systems of grazing management are presented from the perspective of ecosystems in pasture lands and other grazing lands with intensified management.
5329. **Precision Agriculture (3:3:0).** Introduction to site-specific management of agricultural crops emphasizing collection and use of geospatial information in performing variable-rate farming practices.

5330. **Advanced Environmental Soil Chemistry (3:3:0)**. Chemistry of inorganic and organic soil components with emphasis on environmental significance of soil solution-solid phase equilibria, sorption phenomena, ion exchange processes reaction kinetics, redox reactions, and acidity processes.
5331. **Soil Fertility and Fertilizers (3:3:0)**. Not open to students having had PSS 4335. Evaluation and application of theory to soil fertility and fertilizers; a study of nutrient needs and nutrient reactions in soil; and predicting nutrient need and response.
5332. **Pedology (3:3:0)**. Processes of rock weathering with associated soil formation. Genesis of clay minerals. Soil forming factors and their interrelationships.
5333. **Soil and Plant Relationships (3:3:0)**. Selected topics in soil-plant relationships. Cause and effect, management, and control of factors influencing plant growth in the soil.
5334. **Soils and Crops in Arid Lands (3:3:0)**. Potentials for utilizing soils, rainfall patterns, and plant characteristics for crop production in arid lands.
5335. **Soil Physics (3:3:0)**. Physical characteristics of soils and porous media and principles underlying flow and distribution of water, air, and heat in soils.
5336. **Soil Mineralogy (3:3:0)**. The mineralogical makeup of sand, silt, and clay. The relation of physical and chemical soil properties to mineralogy.
5337. **Advanced Soil Classification (3:2:3)**. A study of the taxonomic System of Soil Classification as used in the United States.
5351. **Environmental Instrumentation and Measurements (3:1:4)**. Setting up and programming a data logger to collect environmental measurements related to soil, atmosphere, and plant conditions using a variety of sensors.
5370. **U.S. and Global Cotton Fiber-Textile Industries (3:3:0)**. Examination of factors affecting cotton production, processing, marketing, and utilization as an industrial raw material for textile manufacturing.
5371. **Dyeing and Finishing of Textiles (3:3:0)**. Dyeing and finishing of textile materials, with emphasis on cotton. Explains and evaluates determinants of quality and technique for engineering textile surfaces.
5372. **Textile Manufacturing Systems (3:3:0)**. Fundamental principles and processes for converting fibers into textile structures and evaluating and optimizing performance criteria in yarn and fabric production. Advanced process and quality control.
5376. **Advanced Studies in Cotton Fibers (3:3:0)**. Examination of the structure of cotton fibers, meaning and measurement of fiber properties, and issues related to increasing cotton's use-value as an industrial raw material.
5377. **Cotton Fiber: Genotype to Phenotype Characterization (3:3:0)**. An integrated approach that relates cotton fiber morphogenesis to fiber macro- and microstructures to fiber physical and mechanical properties.
5401. **Advanced Insect Taxonomy (4:3:3)**. Taxonomy, keys, descriptions, biology, and literature for all insect orders will be discussed. Sight identification of over 200 families is stressed in laboratories. A specific taxon will be assigned for detailed study, and a collection is required.
5415. **Advanced Floriculture (4:3:3)**. Prerequisite: Consent of the instructor. Principles of floricultural crop production and greenhouse construction presented at an advanced level.
5425. **Advanced Agricultural Plant Pathology (4:3:2)**. Prerequisite: Approval of instructor. Identification of causal agents of plant diseases (fungi, bacteria, nematodes, and viruses). Emphasis will be placed on diagnostic methods, isolation, and inoculation.
5429. **Advanced Principles of Weed Science (4:3:2)**. Prerequisite: Consent of the instructor. Weeds, weed control, plant identification, and equipment presented at an advanced level.
6000. **Master's Thesis (V1-6)**.
6001. **Selected Topics in Plant and Soil Science (V1-3)**. Prerequisite: Consent of instructor. Individual study of advanced topics in plant and soil science. May be repeated in different areas for credit.
6211. **Principles and Practices in Viticulture (2:2:0)**. Prerequisite: Consent of instructor. Introduction to the physiology and anatomy of grapevines and the application of best management practices for commercial production of wine grapes.
6301. **Quantitative Agricultural Remote Sensing (3:3:0)**. A general course in the theory and application of remote sensing to quantifying soil and vegetation characteristics relevant to agriculture and natural biosystems.
6302. **Plant Growth Modeling (3:3:0)**. Development, testing, and application of mathematical models of plant growth relevant to agriculture and natural biosystems.
6322. **Advanced Plant Breeding (3:3:0)**. Qualitative and quantitative inheritance, heterosis, selection theory and breeding methodology for crop plant improvement, genotype by environment interaction, and application of cellular and molecular techniques to plant breeding.
6323. **Plant-Water Relations (3:3:0)**. Comprehensive understanding of biophysical factors affecting water status of plant tissue and resultant physiological responses.
6331. **Advanced Environmental Soil Science (3:3:0)**. Prerequisite: PSS 2432 or equivalent. Applications of soil chemical, physical, and biological principles to environmental issues.
6424. **Structural Genetics and Plant Genomics (4:3:2)**. Gene structure and cloning, molecular markers, population structure, QTL and association mapping, physical mapping and position cloning, genome sequencing and structure, SNP identification and analysis. S, even years.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Natural Resources Management

Faculty

Ernest B. Fish, Ph.D., Chairperson

Bricker Chair: Ballard

Caesar Kleberg Professor: Smith

Professors: Britton, Fish, Patino, Sosebee, Wester, Wilde

Associate Professors: Boal, Dabbert, Taylor, Villalobos, Wallace

Assistant Professors: Perry, Rideout-Hanzak

Adjunct Faculty: Arsuffi, Cronin, DeMaso, Drawe, Gipson,

Haukos, Krausman, LeVering, Pence, Peterson, Rhodes, Vermeire

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Range Management
- Bachelor of Science in Wildlife and Fisheries Management
- Bachelor of Science in Environmental Conservation of Natural Resources
- Master of Science in Fisheries Science
- Master of Science in Range Science
- Master of Science in Wildlife Science
- Doctor of Philosophy in Fisheries Science
- Doctor of Philosophy in Range Science
- Doctor of Philosophy in Wildlife Science

Undergraduate Program

This department is primarily concerned with the application of basic ecological principles to the management and use of natural resources. The range management curriculum prepares students for graduate school and meets the Civil Service requirements for positions as range conservationists for agencies such as the Natural Resource Conservation Service, Forest Service, and Bureau of Land Management. The wildlife and fisheries management curriculum prepares students for graduate school and the wildlife management option of the wildlife management track meets the minimum requirements recommended by the Wildlife Society for wildlife biologist certification whereas the fisheries management track meets the minimum certification requirements recommended by the American Fisheries Society for a fisheries professional. The wildlife and fisheries management curriculum, wildlife management track, also includes an option for those interested in conservation science.

Students may simultaneously fulfill the requirements for a second B.S. degree in the department by completing a minimum of 24 hours of coursework. Students majoring in either range, wildlife and fisheries management, or environmental conservation of natural resources must make a C or better in departmental courses to be eligible for graduation.

Students are encouraged to become actively involved in the clubs sponsored by the Natural Resources Management Department—the Range, Wildlife, and Fisheries Club and the Soil Conservation Club. These clubs promote involvement in professional societies such as the Wildlife Society, the American Fisheries Society, the Society for Range Management, and the Soil and Water Conservation Society of America. Club activities also include regularly scheduled meetings with guest speakers and social events.

This department offers a minor in natural resource management for students majoring outside the department. For more information on requirements for completing a minor, refer to “Selecting a Minor” in the introductory information about this college or contact the departmental chair.

Natural Resources Management (NRM)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

2301. [AGRI 2330] **Introductory Wildlife (3:3:0)**. Introduction to the ecology and management of wildlife populations. Stresses principles, life histories, and management techniques. F, S, SSII.
2302. **The Ecology and Conservation of Natural Resources (3:3:0)**. An introduction to the ecology and conservation of renewable natural resources of native lands, including their multiple use for timber, water, range, recreation, and wildlife. F, S, SSI.
2305. **Introduction to Freshwater Ecology and Fisheries (3:3:0)**. Survey and management of freshwater habitats: types of organisms, adaptations, and ecological interactions; and effects of solar radiation, temperature, currents, dissolved gases, chemicals, and pollution. F, S.
2307. **Diversity of Life (3:3:0)**. Principles of biogeography, examination of current environmental threats to biodiversity, and conservation of natural systems. Plant and animal (including invertebrate) issues are examined. F.
2406. **Comparative Anatomy of Game Animals (4:3:3)**. Prerequisite: BIOL 1402 or 1404 or equivalent. A comparative study of game and other wild animals, with emphasis on embryology, functional anatomy, and evolution. Not for major or minor credit in the biological sciences. F.
3201. **Vegetation Inventory and Analysis (2:1:2)**. Techniques and methods for sampling and analyzing rangeland vegetation. F.
3302. **Range Plant Ecology (3:3:0)**. The basic principles of autecology and synecology and their relationship to management of the range ecosystem. F.
3303. **Range Management Principles and Practices (3:3:0)**. Prerequisite: Sophomore standing. A general course in the principles and practices of range management designed for nonrange majors who plan to enter the ranching industry. F, S. Field trips required. Not open to range or wildlife majors.
3304. **Principles of Range Management (3:2:3)**. Prerequisite: NRM 3501. Application of ecological principles in the management of rangelands for sustained livestock products consistent with conservation of the range resource. Field trips required. S.
3307. **Principles of Conservation Science (3:3:0)**. Prerequisite: NRM 2307. A survey of the theory and practices of conservation biology. Emphasis is placed on methods used to maintain plant and animal biodiversity. S.
3308. **Quantitative Methods in Natural Resources (3:3:0)**. Prerequisite: MATH 1331 or 1351. Survey of quantitative and statistical methods used in natural resource management, conservation biology, and in assessing biodiversity.
3323. **Prescribed Burning (3:2:3)**. Planning, implementing and evaluating prescribed fires. S.
3333. **Pond Fish Management (3:2:3)**. Management of ponds for recreational fishing. Includes principles of pond construction, fish stocking, water quality and habitat management, and assessment of common problems. Field trips required.
3501. **Range, Forest, Wetland Plants, and Plant Identification (5:3:4)**. Native and naturalized forage plants of the U.S.;

Graduate Program

Those interested in pursuing a master's or doctoral degree in the Department of Natural Resources Management should consult with the chairperson prior to enrolling for any course.

Master's Program

The M.S. degree requires a minimum of 24 hours of graduate coursework plus 6 hours of thesis. Before being recommended for candidacy to a master's degree program, the student may be requested to take a preliminary examination to determine proficiency and background for graduate work. The student may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the graduate advisory committee.

Doctoral Program

Doctoral candidates may specialize in grazing management, range improvement, range animal nutrition, fire ecology, plant ecology, plant physiology, wildlife habitat management, big game ecology, waterfowl ecology, upland game ecology, fisheries, aquaculture or wetland ecology and management.

An oral and/or written preliminary examination is required of all students seeking a Ph.D. degree. If the preliminary examination reveals weaknesses in the student's background, remedial courses may be designated by the graduate advisory committee. The student's graduate advisory committee will also recommend courses to be taken in supporting disciplines. A Qualifying Examination for admission to candidacy for the Ph.D. degree will also be conducted in accordance with the requirements of the Graduate School. This Qualifying Examination is prepared and administered by the candidate's graduate advisory committee and any other professors the committee may consider necessary.

The doctorate normally requires completion of 60 to 80, or more, semester credit hours of graduate coursework beyond the bachelor's degree, exclusive of credit for the dissertation. In addition to the courses required for the major, an applicant for the doctorate must have taken at least 15 semester hours of graduate coursework outside the department. These hours may be taken in supporting fields without concern for a minor specialization, depending on recommendation of the student's graduate advisory committee. However, if they are taken in a block of related courses, they may be declared as a minor.

There is no foreign language requirement for the Ph.D. degree, but such a requirement may be incorporated into individual programs at the discretion of the student's graduate advisory committee. All doctoral candidates must successfully complete or have completed one semester of experimental design (NRM 5403) and one semester of teaching practicum (NRM 7210). Additionally, range science doctoral candidates must successfully complete or have completed two semesters of calculus and either College Teaching in Agriculture (AGED 5310) or College Teaching (EDHE 5342).

identification, distribution, ecology, plant communities, and economic value are stressed. F, S. Field trips are required.

4000. **Internship (V1-12)**.

4001. **Undergraduate Research (V1-12)**. Selected research problems according to the needs of the student. May be repeated.

4100. **Seminar (1:1:0)**. An organized discussion of current problems and research in natural resources management. May be repeated.

4301. **Problems (3)**. Prerequisite: Approval of instructor. Individual investigation of an assigned problem in natural resources management. Emphasis placed on the theory, methods, and practice of natural resources field work.

Wildlife and Fisheries Management Curriculum

FISHERIES MANAGEMENT TRACK

FIRST YEAR	
Fall	Spring
ENGL 1301, Ess. Coll. Rhet. 3	ENGL 1302, Adv. Coll. Rhet. 3
MATH 1330, Intro. Math. Anal. I or MATH 1350, Anal. Geo. 3	MATH 1331, Intro. Math. Anal. II or MATH 1351, Calculus I 3
CHEM 1307, Prin. Chem. I 3	CHEM 1308, Prin. Chem. II 3
CHEM 1107, Prin. Chem. I (Lab.) 3	CHEM 1108, Prin. Chem. II (Lab.) 1
NRM 2301, Intro. Wildlife 3	NRM 2302, Eco. & Con. or NRM 2307, Diversity of Life 3
NRM 4100, Seminar 1	NRM 2307, Diversity of Life 3
TOTAL 14	HIST 2300, History of U.S. to 1877 3
	TOTAL 16

SECOND YEAR	
Fall	Spring
BIOL 1403, Biol. I 4	BIOL 1404, Biol. II 4
NRM 2406, Anat. Game Animals or PSS 2401, Intro. Entomology 4	BIOL 3416, Genetics or PSS 3421, Fund. Prin. Gen. 4
NRM 2305, Fresh. Eco. and Fish. 3	PSS 2432, Prin. Prac. Soils or NRM 4314, Watershed Pln. 3-4
POLS 1301, Amer. Govt. Org. 3	NRM 4314, Watershed Pln. 3
CHEM 2303, Intro. Org. Chem. 3	or PHYS 1403, Gen. Physics or GEOL 1303, Phy. Geology 3
CHEM 2103, Intr. Org. (Lab.) 1	or GEOL 1303, Phy. Geology 3
TOTAL 18	AAEC 2305, Fund. AAEC 3
	TOTAL 14-15

THIRD YEAR	
Fall	Spring
NRM 4330, Aquaculture 3	NRM 4335, Fisheries Science 3
BOT 3401, Plant Phys. or PSS 3307, Insect Ana. & Phys. or ANSC 2401, Ana. Phys. Dom. 3-4	NRM 3308, Quant. Meth. in NR or AAEC 3401, Ag. Stat. 3-4
HIST 2301, History of U.S. Since 1877 3	ZOOL 4310, Intro. Ichthyology 3
POLS 2302, Amer. Pub. Pol 3	NRM 4320, Nat. Res. Policy or PHIL 3325, Environmental Ethics 3
Elective*** 3	or AGSC 3301, Ag. Lead. Prin. Elective** 3
TOTAL 15-16	TOTAL 15-16

FOURTH YEAR	
Fall	Spring
NRM 4407, Wildlife Inv. Tech. or ZOOL 4308, Ornithology or BIOL 4301, Herpetology or BIOL 4407, Nat. Hist. Verts. 3-4	*Humanities-Multicultural* 3
NRM 4401, Fisheries Mgt. 4	NRM 4408, Wild. Pop. Dyn. or BIOL 3309, Pop. Com. Eco. or BIOL 4310, Comm. Ecology or NRM 3307, Prin. Con. Sci. 3-4
COMS 2300, Public Speaking 3	ENGL 2311, Technical Writing 3
Visual & Performing Arts* 3	AAEC 4302, Stat. Meth. Ag. 3
Elective** 3	NRM 4100, Seminar 1
TOTAL 16-17	TOTAL 13-14

Minimum hours required for graduation—122 (Students must fulfill the university multicultural requirement.)

* Choose from Core Curriculum requirements.
 ** Suggested electives for students interested in becoming a game warden are SOC 4325 and POLS 3350. Suggested electives to enhance fisheries track are C E 3371, 3171, ZOOL 3406, GEOL 3322.
 *** An introductory botany course is suggested (NRM 3501, BOT 3403, 3404, 4302).

- 4302. **Range Improvements (3:2:3).** Application of principles and practices necessary to enhance the productive potential of the range resource for all potential uses. Methods for brush management, revegetation, conservation, etc. are considered. Improvement for increased domestic livestock production and for enhancing wildlife habitat is emphasized. Field trips required. F
- 4303. **Rangeland Analysis and Management Planning (3:2:3).** Prerequisite: NRM 3304 or 4302. Analysis of rangeland resource inventories for the purpose of planning appropriate use of such resources. A familiarization with the basic components of a range resource plan and their application in decision making. S. (Writing Intensive)
- 4304. **Fire Ecology and Management (3:3:0).** Prerequisite: NRM 3302 and 3501. Ecological effects, adaptations, management implications of fire (and its exclusion) on flora and fauna of North America ecosystems. F. (Writing Intensive)
- 4305. **Big Game Ecology (3:2:3).** Prerequisite: BIOL 1404, NRM 2301. Survey of distributions and life histories of North American big game species. Productivity, food habits, economic significance, and management will be examined. Field trips required. S, even years.

Wildlife and Fisheries Management Curriculum

WILDLIFE MANAGEMENT TRACK

FIRST YEAR	
Fall	Spring
ENGL 1301, Ess. Coll. Rhet. 3	ENGL 1302, Adv. Coll. Rhet. 3
MATH 1330, Intro. Math. Anal. I or MATH 1350, Anal. Geo. 3	MATH 1331, Intro. Math. Anal. II or MATH 1351, Calculus I 3
CHEM 1307, Prin. Chem. I 3	CHEM 1308, Prin. Chem. II 3
CHEM 1107, Prin. Chem. I (Lab.) 3	CHEM 1108, Prin. Chem. II (Lab.) 1
NRM 2301, Intro. Wildlife 3	NRM 2302, Eco. Con. Nat. Res. or NRM 2307, Diversity of Life 3
NRM 4100, Seminar 1	or NRM 2307, Diversity of Life 3
TOTAL 14	HIST 2300, History of U.S. to 1877 3
	TOTAL 16

SECOND YEAR	
Fall	Spring
BIOL 1403, Biol. I 4	BIOL 1404, Biol. II 4
NRM 2406, Com. Ana. Game Ani. or ZOOL 3405, Vert. Struct. & Dev. 4	NRM 2305, Fresh Eco. and Fish. or BIOL 3416, Genetics or PSS 3421, Fund. Prin. Genetics 4
NRM 3501, Rng., For., Wet. 5	PSS 3421, Fund. Prin. Genetics 3
CHEM 2303, Intro. Org. Chem. 3	NRM 3308, Quant. Meth. NR 3
CHEM 2103, Chem. (Lab.) 1	TOTAL 14
TOTAL 17	

THIRD YEAR	
Fall	Spring
NRM 3302, ° Plant Ecol. 3	NRM 3304, Prin. Range Mgt. 3-4
AAEC 2305, Fund. AAEC 3	or NRM 4401, Fisheries Mgt. or NRM 3307 Prin. Cons. Sci. 3
Required Elective** 3	NRM 4407, Wildlife Inv. Tech. 4
POLS 1301, Amer. Govt. Org. 3	Required Elective** 3
PSS 2432, Prin. & Pract. Soils 4	POLS 2302, Amer. Pub. Pol. 3
TOTAL 16	TOTAL 13-14

FOURTH YEAR	
Fall	Spring
Required Electives** 6	NRM 4303, Range. Anal. Plan. 3
COMS 2300, Public Speaking 3	or NRM 4314, Watershed Plan. 3
Visual & Performing Arts* 3	or NRM 4320, Nat. Res. Policy 3
ENGL 2311, Technical Writing 3	NRM 4408, Wild. Pop. Dynamics 4
TOTAL 15	HIST 2301, History of U.S. Since 1877 3
	NRM 4100, Seminar 1
	Required Electives** 3
	Humanities - Multicultural* 3
	TOTAL 17

Minimum hours required for graduation—122 (Students must fulfill the university multicultural requirement.)

* Choose from Core Curriculum requirements.
 ** Students will select one of the options listed below according to their area of interest. Required electives are subject to approval of the academic advisor.

Wildlife Management — Choose at least two courses from ZOOL 4306, 4308, 4310, or BIOL 4301; choose at least two courses from NRM 4305, 4306, 4310, 4322, or 4309.

Conservation Science — NRM 3307; choose at least two courses from BIOL 3309, 4303, 4310 or NRM 4322; choose at least one course from NRM 4315, 4403, or GEOG 3300.

Suggested electives for students interested in becoming a game warden are SOC 4325 and POLS 3350. Suggested electives to enhance the wildlife management option are NRM 3201, 3304, 3307, 3323, 4304, 4335, 4401, 4403; LARC 4302, and 4303. Suggested electives to enhance the conservation science option are NRM 3201, 3304, 3323, 4304, 4335, 4401, LARC 4302, and 4303.

- 4306. **Upland Game Ecology (3:2:3).** Prerequisite: NRM 2301 and ZOOL 4308, or consent of instructor. Ecological approach to the management of upland game populations. Stresses population mechanisms and habitat management of selected species. Field trips required. S, odd years.
- 4309. **Range-Wildlife Habitat Management (3:3:0).** Prerequisite: NRM 2301, 3501, 3304, or consent 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 offered. F. (Writing Intensive)
- 4310. **Principles of Waterfowl Management (3:2:3).** Prerequisite: NRM 2301. Ecology and management of continental waterfowl resources. Life histories, population management, and habitat manipulation are stressed. Field trips required. F, even years.

Environmental Conservation of Natural Resources

FIRST YEAR	
Fall	Spring
ENGL 1301, Ess. Coll. Rhet.	3 ENGL 1302, Adv. Coll. Rhet.
MATH 1330, Intro. Math. Anal. I or MATH 1350, Anal. Geo.	3 POLS 1301, Amer. Govt. Org.
CHEM 1307, Prin. Chem. I	3 CHEM 1308, Prin. Chem. II
CHEM 1107, Prin. Chem. I (Lab.)	1 CHEM 1108, Prin. Chem. II (Lab.)
NRM 2301, Intro. Wildlife	3 NRM 2302, Eco. & Cons. Res.
NRM 4100, Seminar	3 HIST 2300, History of U.S. to 1877
TOTAL	16 TOTAL
	14

SECOND YEAR	
Fall	Spring
BIOL 1403, Biol. I	4 BIOL 1404, Biol. II
AAEC 2305, Fund. Ag. & Appl. Eco.	3 NRM 2307, Diversity of Life
NRM 3501, Rng., For., Wet.	5 COMS 2300, Public Speaking
POLS 2302, American Pub. Pol.	3 Specialized Elective††
TOTAL	15 Physical Science Elective*
	17 TOTAL

THIRD YEAR	
Fall	Spring
NRM 3302, Range Plant Ecol.	3 AAEC 3401, Ag. Stat.
BIOL 3309, Pop., Comm., & Eco.	3 HIST 3327, Sur. Amer. Env. Hist.
NRM 4314, Watershed Planning	3 NRM 3304, Prin. Range Mgt.
Specialized Elective††	6 BIOL 3416, Genetics
TOTAL	15 or PSS 3421, Fun. Prin. Gen.
	3 Specialized Elective††
	17 TOTAL

FOURTH YEAR	
Fall	Spring
NRM 3307, Prin. Con. Science	3 NRM 4407, Wildlife Inv. Tech.
Specialized Electives††	6 NRM 4315, Spatial Anal. NR or
NRM 3201, Veg. Inven. & Anal.	2 GEOG 3300, Geog. Info Sys.
Humanities-Multicultural	3 NRM 4408, Wildlife Pop. Dyn.
Visual & Performing Arts	3 or NRM 4304, Fire Eco. & Mgt.
TOTAL	17 or NRM 4309, Habitat Mgt. or NRM 4401, Fisheries Mgt. ENGL 2311, Technical Writing
	3
	13-14 TOTAL

Minimum hours required for graduation—124

* Students will select one of the following courses to satisfy the physical science elective: PSS 2432, GEOL 1303 and 1101, GEOG 1301 and 1101, 1302 and 1102, CHEM 2303 and 2103, ATMO 1300 and 1100.

†† Students will select one of the following specializations according to their area of interest. Of the 18 hours required, at least 15 hours must come from at least three categories within the path. The other 3 may be from either specialization path.

Technical Path — Category 1 (ENGL 3365 or 3366, ACOM 2302 or 4300); Category 2 (NRM 3323, 4403 or GEOG 3301, GEOG 4302, BIOL 4330); Category 3 (CHEM 3341 and 3141 or 3351 and 3251, second course from physical science elective group); Category 4 (AAEC 4302).

Conservation Path — Category 1 (NRM 3323, 4303, 4304, 4305, 4306, 4310, or 4408; BIOL 3307, 4310, or 4330); Category 2 (NRM 2305 or 4322); Category 3 (PSS 2401 or BOT 3404 or ZOOL 3406, 4306, 4308, 4310, 4321, 4407, or 4301 herpetology); Category 4 (NRM 4324 or Summer Field Studies); Category 5 (NRM 4320, BIOL 4305 or ZOOL 4312 or PSS 4337 or PHIL 3325).

4314. Watershed Planning (3:3:0). The watershed as a unit of resource-oriented planning and development. Principles and objectives of watershed management. Physical description of watershed. Relationship between land-use conditions and the water delivery character of watersheds. Watershed analysis, including techniques, collection of field data, and sources of information. F, S.

4315. Spatial Analysis in Natural Resource Management (3:2:3). Introduction to geographic information systems and global positioning systems. Applications for inventory, planning, and management of natural resources are emphasized. S.

4320. Natural Resource Policy (3:3:0). Prerequisite: NRM 2301. Emphasis on the human dimension of natural resource management. Historical, agency, and private organization roles in policy and conflict resolution. F.

4322. Nongame Ecology and Management (3:2:2). Prerequisite: NRM 2301. Ecological approach to nongame wildlife population management. Public policies, socioeconomic factors,

Range Management Curriculum

FIRST YEAR	
Fall	Spring
ENGL 1301, Ess. Coll. Rhet.	3 ENGL 1302, Adv. Coll. Rhet.
MATH 1330, Intro. Math. Anal. I or MATH 1350, Anal. Geo.	3 MATH 1331, Intro. Math. Anal. II or MATH 1351, Calculus I
CHEM 1307, Prin. Chem. I	3 CHEM 1308, Prin. Chem. II
CHEM 1107, Prin. Chem. I (Lab.)	1 CHEM 1108, Prin. Chem. II (Lab.)
NRM 2301, Intro. Wildlife	3 NRM 2302, Eco. & Cons.
NRM 4100, Seminar	1 TOTAL
TOTAL	14

SECOND YEAR	
Fall	Spring
BIOL 1403, Biol. I	4 BIOL 1404, Biol. II
AAEC 2305, Fund. AAEC	3 NRM 3501, Rng., For., Wet.
POLS 1301, Amer. Govt., Org.	3 PSS 2432, Prin. & Pract. Soils
CHEM 2303, Intro. Org. Chem.	3 BOT 3401, Plant Physiol.
CHEM 2103, Chem. (Lab.)	1 TOTAL
TOTAL	17

THIRD YEAR	
Fall	Spring
NRM 3302, Range Plant Ecol.	3 NRM 3304, Prin. Range Mgt.
NRM 3201, Veg. Invent. & Anal.	2 COMS 2300, Public Speaking
HIST 2300, History of U.S. to 1877	3 AAEC 3401, Ag. Stat.
PSS 4332, Soil Class.	3 HIST 2301, History of U.S. Since 1877
PSS 3321, For. & Past. Crops	3 Required Elective**
ANSC 3301, Prin. Nutri.	3 TOTAL
TOTAL	17

FOURTH YEAR	
Fall	Spring
NRM 4302, Range Impr.	3 NRM 4303, Range. Anal. & Plan.
NRM 4304, Fire Ecol. & Mgt.	3 POLS 2302, American Pub. Pol.
NRM 4309, Rge-Wild. Hab. Mgt.	3 NRM 4314, Watershed Plan.
Humanities - Multicultural*	3 ANSC 4403, Beef Prod. or
Required Elective**	3 ANSC 4406, Sheep & Goat Prod. or
TOTAL	15 ANSC 3302, Livestock Prod.
	3 Visual & Performing Arts
	15-16 TOTAL

Minimum hours required for graduation—121 (Students must fulfill the university multicultural requirement.)

* Choose from Core Curriculum requirements.

** Select at least two courses from NRM 4305, 4306, 4310, 4322. Required electives are subject to approval of the academic advisor.

population dynamics, and species-at-risk issues are examined. S, even years.

4324. Tropical Ecology and Conservation (3:3:0). An introductory survey of tropical ecology and conservation covering both theory and practice. Previous ecology course, consent of instructor, and field trips are required.

4330. Aquaculture (3:3:0). Prerequisite: BIOL 1404 and CHEM 1308 or consent of instructor. A global overview of aquaculture including fish, aquatic invertebrates, plants, and design and operation of production facilities. F, odd years.

4335. Fisheries Science (3:3:0). Prerequisite: NRM 2301, 2302, 2305, and ZOOL 4310. Scientific study of aquatic organisms. Includes resource sampling, ecology, analysis of populations, resource conflict, and management. S, even years.

4401. Fisheries Management (4:3:3). Prerequisite: AAEC 3401, MATH 2300, or NRM 3308. Theory and practice of fisheries management with emphasis on basic strategies used in effective management of aquatic renewable natural resources. Applied field problems, equipment use. F, even years. (Writing Intensive)

4403. Aerial Photo Interpretation in Natural Resource Management (4:2:4). Fundamentals of aerial photograph reading, interpretation, and evaluation. Introduction to remote sensing techniques and geographic information systems. F.

4407. Wildlife Investigational Techniques (4:3:3). Prerequisite: Junior standing and AAEC 3401, MATH 2300, or NRM 3308. The basic methodology of practical wildlife management. This involves the routine techniques in data collection related to population maintenance, as well as ways to monitor field research. S. (Writing Intensive)

4408. **Wildlife Population Dynamics and Analysis (4:3:3)**. Prerequisite: AAEC 3401 or MATH 2300 or NRM 3308 and NRM 2301 and MATH 1331 or consent of instructor. The mechanisms of wildlife population changes and their management. Detailed examination of techniques for measuring population characteristics. S. (Writing Intensive)

Graduate Courses

5100. **Seminar (1:1:0)**. An organized discussion of current problems in natural resources management. May be repeated.
5302. **Range Research Methods (3:2:3)**. Prerequisite: ISQS 5346. Study plan preparation; methods of studying vegetation; sampling techniques; increasing sampling efficiency; methods of reducing experimental error; grazing studies; utilization studies; wildlife techniques; and tests of goodness of fit for binomial, poison, negative binomials, and normal distributions. F, odd years.
5303. **Synecology (3:3:0)**. Prerequisite: NRM 3302. An advanced study of terrestrial plant community ecology; mechanisms and consequences of species coexistence; diversity relations; causes and patterns of community development; community dynamics. Statistical and numerical analyses applicable to community ecology are discussed. F, odd years.
5304. **Fire Behavior and Ecology (3:2:3)**. Prerequisite: NRM 3302 and 3501. Advanced discussion of fire's ecological role in North American ecosystems including soils, flora, fauna, adaptations, and fire exclusion. Field trips required. F.
5305. **Plant Ecophysiology (3:3:0)**. Prerequisite: NRM 3302. Advanced study of the influences of the environmental complex on the processes, structure, and physiological functioning of an individual plant or species. S, even years.
5306. **The Physiological Basis for Grazing Management (3:2:3)**. A study of the physiological processes, morphological development, nutritional qualities, and palatability of range plants as a basis for grazing management strategies for domestic and wild animals. Field trips required. F, even years.
5307. **Wetland Ecology (3:3:0)**. Prerequisite: NRM 3307. Advanced study in the structure and functioning of wetland ecosystems. Course will also examine wetland classification. F, odd years.
5309. **Population Estimation and Dynamics (3:3:0)**. Prerequisite: AAEC 3401. Principles of estimation theory. Detailed examination of modern analysis techniques; indices, line transect, capture-recapture, Jolly-Seber, survival, and life table limitations. Computer use. S.
5310. **Advanced Range Ecology (3:3:0)**. An examination of the basic ecological principles affecting plant growth and development, distribution of plants, community structure and dynamics, and nutrient cycling. Field trips required. F.
5311. **Wildlife Conservation and Management (3:3:0)**. An examination of conservation principles and management practices enhancing wildlife populations. Not open to biological science majors.
5312. **Ecology of Renewable Natural Resources (3:3:0)**. An introduction to the ecology of renewable natural resources such as vegetation, wildlife, soil, and water. Not open to biological science majors.
5313. **Advanced Big Game Ecology and Management (3:3:0)**. Prerequisite: NRM 4305 or equivalent or consent of instructor. An advanced study of the ecology and management of big game resources. Field trips required. S, even years.
5314. **Advanced Upland Game Ecology and Management (3:2:3)**. An advanced study of the ecology and management of upland game resources. Field trips are required. S, odd years.
5315. **Advanced Studies in Range-Wildlife Habitat (3:3:0)**. An ecological approach to wildlife management stressing the relationships between animals and their habitat. Focuses on rangeland habitats. Field trips required. F.
5316. **Waterfowl Ecology (3:2:3)**. Prerequisite: NRM 4310. An ecological examination of waterfowl behavior, breeding biology, and habitat requirements. Field trips required. F, even years.
5317. **Watershed Management (3:3:0)**. Management concepts of watersheds as a holistic unit. Inventory techniques, information sources, analysis procedures, and economic and financial effects applicable to watershed management planning. F, S.
5318. **Range Animal Nutrition (3:3:0)**. Prerequisite: ANSC 3301 or equivalent. Study of the nutritional relationship between the range resource and grazing herbivores, including domestic livestock and wild ungulates, and techniques for range animal nutrition research. F, odd years.
5320. **Natural Resource Biopolitics (3:3:0)**. Policy, planning, and conflict resolution from a natural resource management perspective. Historical, agency, and private organization roles in natural resource management are evaluated. F.
5322. **Advanced Nongame Ecology and Management (3:2:2)**. Prerequisite: NRM 2301 or consent of instructor. Ecological approach to nongame wildlife population management. Public policies, socioeconomic factors, population dynamics, and species-at-risk issues are examined. S, even years.
5323. **Prescribed Burning (3:2:3)**. Planning, implementing, evaluating prescribed fires, and expert systems. Field trips required. S.
5324. **Physiological Ecology of Aquatic Organisms (3:3:0)**. Regulatory mechanisms and adaptive significance of selected physiological processes in aquatic vertebrates. S, even years.
5330. **Advanced Aquaculture (3:3:0)**. A global overview of aquaculture including fish, aquatic invertebrates, plants, and design and operation of production facilities. F, odd years.
5335. **Advanced Fisheries Science (3:3:0)**. Scientific study of the use of aquatic organisms. Includes resources, sampling, ecology and analysis of populations, resource conflicts, and management. May not be taken for credit by students who have taken NRM 4335. S, even years.
5337. **Fish and Wildlife Population Modelling (3:3:0)**. The development and use of models to analyze and simulate ecological processes in fish and wildlife populations and communities. S, odd years.
5347. **Advanced Conservation Science (3:3:0)**. Prerequisite: Consent instructor. A survey of the theory and practice of conservation biology for advanced students.
5401. **Advanced Fisheries Management (4:3:3)**. Theory and methodology used in managing aquatic renewable resources; applied field problems, equipment use. May not be taken for credit by students who have taken NRM 4401. F, even years.
5402. **Fisheries Ecology (4:3:3)**. Prerequisite: Statistics and basic fisheries. An examination of population dynamics, community ecology, bioenergetics, fisheries models and other quantitative aspects of fisheries ecology. F, even years.
5403. **Experimental Design and Analysis (4:3:2)**. Prerequisite: ISQS 5346, ANSC 5403, or BIOL 6502. Principles and applications of experimental design and analysis (completely randomized designs, randomized blocks, covariance analysis, factorials, split plots, repeated measures, regression). F, even years, and S.
5404. **Aerial Terrain Analysis (4:2:4)**. Exploration of methods, the utilization of techniques, and evaluation of landscape using aerial photographs. An introduction to the theories, technical and practical aspects, and considerations of computer based geographic information systems in landscape planning, design, and management. F.
6000. **Master's Thesis (V1-6)**.
6001. **Selected Topics in Range Science (V1-6)**. Advanced topics selected by departmental recommendation. May be repeated for credit in different subject areas.
6002. **Selected Topics in Wildlife Science (V1-6)**. Advanced topics selected by departmental recommendation. May be repeated for credit in different subject areas.
6003. **Selected Topics in Fisheries Science (V1-6)**. Advanced topics selected by departmental recommendation. May be repeated for credit in different subject areas.
6301. **Research Methods (3:3:0)**. A review of the philosophy of science, scientific methods, research activities, and the planning and execution of research programs. F, even years.
6303. **Imagery Interpretation for Natural Resource Management (3:2:2)**. Prerequisite: NRM 4403 or 5404. An advanced course in the applications of imagery producing systems for use in the inventory, analysis, planning, and management of natural resources. Involves the use of satellite imagery, infrared and radar scanning systems, as well as advanced work in interpreting standard aerial photography. S.
6305. **Geospatial Technologies in Natural Resource Management (3:2:2)**. Principles of geographic information systems and global positioning systems. Applications for natural resource inventory, planning, and management are emphasized.
6324. **Advanced Tropical Ecology and Conservation (3:3:0)**. Prerequisite: Consent of instructor. A survey of tropical ecology for advanced students. Both theory and practice will be covered. Field trips required.
7000. **Research (V1-12)**.
7210. **Teaching Practicum (2:0:4)**. Prerequisite: Doctoral student in range, wildlife, or fisheries science program and AGED 5310. Supervised teaching experience at the university level.
8000. **Doctor's Dissertation (V1-12)**.

College of Architecture

Andrew Vernooy, M.D.S., Dean

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Faculty

Horn Professor: Watkins

Professors: Louden, Peters, Vernooy, J.E. White, J.P. White

Associate Professors: Aranha, Buelinckx, Davis, Driskill, Flueckiger, Haq, Hill, Markovich, Neiman, Perl, Pongratz, Shacklette, Smith, Torres-McDonald

Assistant Professors: Ellis, Jaddo, Park, Rex, Robertson, Tsubaki

Instructors: Anderson, Campbell, Chinn, Fairbetter, Faulk, Harris, Martin, Powell, Schellhase, Vogler

About the College

Architecture bridges the sciences with the arts. Students who succeed in architecture are balanced individuals who can manage the rigor of the rational and the ambiguity of the intuitive. In addition to the degree program in architecture, the College of Architecture offers dual programs with the College of Engineering and the College of Business Administration. Students can pursue career paths in design, construction, real estate development, and construction product development and sales. The general architecture curriculum also provides an excellent portal into the university with coursework that is not only specific to the field but also in line with the core curriculum of the university. Students who elect to study other disciplines after the first year of the architecture curriculum have a solid academic base.

Mission Statement. The College of Architecture educates students for future design practice and advances knowledge of the discipline for the benefit of society.

Admission. The undergraduate architecture program has two components: general architecture and preprofessional architecture. Admission to the general architecture program is open to all students admitted into the university. Admission into the preprofessional program in the second-year is competitive and based on a comprehensive review of the student's portfolio, essay, statement of intent, and grade point average.



Requirements for Licensure as an Architect. Becoming a licensed architect is a three-step process. Students must receive an accredited degree in architecture that has been approved by the National Architectural Accreditation Board (NAAB) (www.naab.org), successfully complete an internship with a licensed architect(s), and pass the Architect Registration Examination (ARE) (www.ncarb.org). The accredited program at Texas Tech University includes three components: general architecture, preprofessional, and professional. The general and preprofessional programs are undergraduate programs, while the accredited professional degree is the Master of Architecture.

Degree Programs

The College of Architecture offers programs leading to the following degrees:

- Bachelor of Science in Architecture
- Master of Architecture (professional degree)
- Master of Science in Architecture (postprofessional degree)
- Doctor of Philosophy in Land-Use Planning, Management, and Design

Dual-Degree/Joint Programs

- Bachelor of Science in Architecture/Bachelor of Business Administration (General Business)
- Bachelor of Science in Architecture/Bachelor of Science in Civil Engineering
- Master of Architecture/Master of Business Administration

Undergraduate Program

Program Descriptions. The Bachelor of Science in Architecture consists of 131 credit hours of undergraduate courses. This program has two components: general architecture and preprofessional. The B.S. in Architecture degree will give students knowledge of and career opportunities in architecture, the building industry, and related fields.

Transfer Courses. All transfer coursework to be taken at any other institution must receive evaluation and approval from the Placement, Programs, Advisement, and Recruiting Center (P²ARC) within the College of Architecture. The student must provide sufficient evidence of equivalency. No course with a grade less than a C will be accepted. All architecture courses must be completed with a grade of B or higher.

Core Curriculum Requirements. The university has established Core Curriculum requirements for all students. A listing of these requirements appears in the Undergraduate Academics section of this catalog.

Writing Intensive Courses. Students may fulfill this course requirement with any university course identified in the catalog as "writing intensive" or with another course specifically preapproved by the P²ARC as "writing intensive."

Diversity Course. Students may fulfill this requirement with courses as listed with the P²ARC. Other courses must be approved prior to enrollment for credit.

Electives. All electives taken to satisfy the architecture degree plan must be at the 2000 and above level. All undergraduate architecture courses numbered 2000 and above may only be taken by architecture students or with the permission of the Chair.

Computer Requirement. Students in the general and preprofessional program are required to have their own computer in the classroom or studio. Computer equipment and software must be compatible with college standards. Computer equipment and software requirements are posted on the college Web site.

Graduate Program

The College of Architecture awards three graduate degrees: The Master of Architecture (M.Arch.); Master of Science in Architecture (M.S.); and Doctor of Philosophy (Ph.D.) in Land-Use Planning, Management, and Design (LPMD). The Master of Architecture is a professional degree accredited by the NAAB. The college has an agreement with the College of Business Administration allowing students to seek a joint M.Arch. degree in architecture and a Master of Business Administration (M.B.A.). The Master of Science in Architecture is considered a post-professional research-based academic degree. The Ph.D. in LPMD is an interdisciplinary degree program that accepts students from diverse educational backgrounds.

Students applying to any of the three degree programs must have an appropriate bachelor's degree from any undergraduate program. All students must make application to and meet the requirements of the Texas Tech University Graduate School and the College of Architecture. The following criteria will be considered in the admission process: GRE scores, GPA, academic transcripts, portfolio of work, letters of recommendation, statement of interest, exceptional extracurricular activities, and professional work.

Students applying to the Master of Architecture program with an undergraduate degree other than the B.S. in Architecture from Texas Tech University must request an audit of their transcripts. All applicants must submit a portfolio of work to the college to determine the amount of leveling courses required to comply with the entry into the professional degree program. Students accepted into the Master of Architecture program may automatically be accepted into the Master of Business Administration program.

Transfer courses applicable to a student's degree plan at the graduate level are determined by the college administration and the Graduate School. Refer to "Transfer Courses" section on the previous page.

Off-Campus Programs. Off-campus programs are offered to enrich student experience. The college offers regional, continental, and European summer programs. The Architour Spring Break program provides opportunities for travel and study of American architecture and architects.

Attendance. Students in the college will attend all scheduled class meeting times and activities. Absences in excess of those stipulated in each individual course syllabus may result in an F in the course.

Computer Requirement. Students entering the graduate programs in architecture are required to have their own computer in the classroom and studio. Computer equipment and software must be compatible with college standards. The computer equipment and software requirement is posted on the college Web site or can be requested from the Placement, Programs, Advisement, and Recruiting Center (P²ARC).

Ownership of Student Work. The college reserves the right to retain, exhibit, and reproduce work submitted by students. Work submitted for a grade is the property of the college and remains such until it is returned to the student.

Research and Design Center. The RDC is the clearinghouse for scholarly work, research, and creative activity in the college. The RDC provides lab and studio space for faculty scholarship and often provides financial assistantship for students through research and graduate assistantship. Contact the college for information on these positions.

Internships. Each student is encouraged to participate in the professional internship program. The program provides opportunities for professional experience in some of the nation's leading architectural firms. With advance approval students participating in an internship may take courses offered via distance learning when those courses apply to their degree program.

Certificates. Certificates in the college are offered to graduate students who are pursuing the Master of Science or Master of Architecture degrees as well as environmental design professionals. There are three certificates: Community Development,

Historic Preservation, and Visualization. A certificate requires that the student take 15 hours of specified coursework in one of these four programs. Upon completion of the coursework, students will receive a "certificate of completion" and notification on their transcript of program completion. Students who wish to apply for acceptance into a certificate program should talk to an academic advisor within the college.

Master of Architecture (Accredited Professional Degree)

Mandatory Accreditation Statement. The NAAB provides the following statement: "In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure that are accredited by NAAB, which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards. Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not by itself recognized as an accredited degree."

The Master of Architecture accredited professional program consists of an undergraduate curriculum of 131 hours and a graduate curriculum of 42 hours. The dual Master of Architecture/Master of Business Administration includes an additional 30 credit hours in the graduate program. A comprehensive master's degree design project is required.

The highly motivated student may desire to concentrate in one of the three certificate programs. A certificate of concentration may be achieved by completing 15 hours of coursework in one of these certificate programs: Community Development, Historic Preservation, and Visualization. Upon completion of the coursework, students will receive a "certificate of completion" and notification on their transcript of program completion.

Master of Science in Architecture (Postprofessional Degree)

The Master of Science in Architecture degree is a research-based academic degree for students interested in a focused area of study. This degree does not prepare students to receive an architecture licensure. The degree is for students with an accredited professional B.Arch., M.Arch., or an approved bachelor's degree in another discipline (e.g., art, interior design, engineering, archaeology). Students who have non-architecture degrees and wish to enter the program may be required to complete leveling work that will not accrue graduate credit toward their degree. Students will be required to complete a minimum of 32 credit hours of graduate study, write and defend a thesis (6 hours), and take an oral comprehensive examination. All students will be required to complete a written thesis.

Students requesting admission into the Master of Science in Architecture must meet the entrance standards of the Graduate School and the College of Architecture. The admission application includes a portfolio of creative work (writing, design, drawing, photography, etc.) that reflects the student's level of design interest, intellectual inquiry, and communication skills. Students must also show a basic understanding and accomplishment of computing and computer-assisted design skills. Candidates with deficiencies in these skills are required to take graduate or undergraduate leveling courses to acquire basic competence, enabling them to perform well in their coursework. Any leveling course requirements will be in addition to the 38 hours required for the degree.

Continued on next page

Graduate Program / Architecture *continued*

All students entering the degree program will be required to own, purchase, or lease computing hardware and software that will meet the requirements of the college. The student is required to have this equipment available in the building for classwork or homework. The college will provide a studio workspace in which to keep the equipment in the architecture building. Some software is provided by the college. See the college Web site at www.arch.ttu.edu for more details. The college does not take responsibility for loss or damage to the equipment in the building.

Each candidate for the Master of Science in Architecture degree must obtain a certificate in one of three areas: Community Design and Development, Historic Preservation, or Visualization. Students applying for the Master of Science in Architecture degree must file for admission into one of these certificate programs. After the first semester, students will be matched with a faculty member who will serve as their academic advisor and the chair of their thesis committee. The advisor will be responsible for guiding the student concerning electives, developing a thesis proposal, and selecting thesis advisors. All students seeking a degree must complete the program in residency, including the thesis.

Financial assistance may be available for students applying by January 15 for admission into the program the next fall semester. There are scholarships, teaching assistantships, research assistantships, and graduate part-time instructor positions available for graduate students.

Certificates

Community Design and Development Certificate. Increasing globalization and the decline of traditional human environments has produced a critical need for sustainable community development. The Certificate in Community Design and Development emphasizes inclusive community-based design and research through civic engagement to assist regional communities, local governments, non-profit organizations, and development professionals in the design of quality communities. The curriculum integrates heritage management, conservation policies, development strategies, and applied participatory design to prepare students for professional challenges in architectural practice, planning and management, and community service.

The program is a regional leader in providing community assistance for courthouse renovations, historic town squares, housing, adaptive reuse, and new planning and building projects. The Community Design and Development Certificate underscores the role of the architect as an active participant in community life based on a triad formed between client, teacher/professional, and student.

Historic Preservation Certificate. The Historic Preservation Certificate prepares graduate students to play leadership roles in the historic preservation of architecture. This specialization provides students with the knowledge and practical skills needed to be thoughtful stewards of the world's architectural heritage and provides a comprehensive understanding of historic preservation that includes the built, cultural, and natural environments. To satisfy these objectives, this graduate certificate presents a balanced curriculum of history, theory, documentation, and preservation technology courses.

The program is an international leader in historic architectural documentation and provides opportunities for regional, national, and international research. Students and faculty participate in documentation and preservation research through collaborative efforts with public, private, and non-profit organizations.

Visualization Certificate. The Certificate in Visualization (VIZ) focuses on digital visualization of art, design, engineering, and science. This specialization places the student at the leading edge of inquiry into visualization. The student is encouraged to explore the use of visualization in environmental design, design communication, science, product production, fabrication, simulation, and modeling/simulation, and entertainment. The VIZ coursework prepares the student to apply concepts, principles,

and techniques of internet media, animation, and virtual reality into a visualization tool set to bring form to ideas.

The faculty's research and teaching experience produces a stimulating environment for students to develop into technical designers capable of the design and implementation of 3-D digital environments. This combination of the theoretical and practical provides the student a balanced combination of real world experience and academic inquiry.

Doctor of Philosophy in Land-Use Planning, Management, and Design (LPMD)

The interdisciplinary Ph.D. program in Land-Use Planning, Management, and Design (LPMD) accepts students from diverse educational backgrounds. The program is administered by the dean of the College of Architecture with faculty and courses drawn from participating units across the university. It is designed to provide education in several facets of physical design, with special emphasis on non-urban lands and those in arid and semi-arid environments. Included in the program are studies of the complex factors influencing human use of resources, training in the research and evaluative methods that can be applied to interdisciplinary studies, and education in the institutional structures that shape policy and action. The four tracks of study are environmental/natural resource management and planning, community planning and design, public policy administration, and historic preservation. Students with an interest in these fields as well as in architecture and many other aspects of land and land use may find the LPMD program suitable to their needs.

Students are required to complete a minimum of 66 hours beyond the bachelor's degree. This includes 24 hours of multi-disciplinary core courses, 36 credit hours of track courses, and 6 hours of tool courses. In addition, the program requires 12 hours of dissertation. Track courses, research projects, and ultimately the student's dissertation will focus on the track selected. A student also is required to present evidence of competency in an appropriate tool subject (e.g., computer science, statistics).

Requirements considered for admission to the program include GRE, grade-point average, statement of research interests and goals, writing samples/portfolio, and letters of recommendation on official letterheads.

Because students come from a variety of backgrounds with different interests and career goals, one standard course of study is not required. Initial advisement and program development is conducted by the program coordinator. A degree plan is formulated by an advisory committee drawn from three or more departments and two or more colleges. This committee will arrange a student's course of study in the track specialization. The student will therefore follow a "custom-designed" program of study. The advisory committee will be responsible for administering comprehensive exams and for directing both the dissertation and the student's program.

Core Courses

ARCH 5605	Advanced Architectural Design Studio (6:0:12)
LARC 5302	Advanced Environmental Planning for Sustainable Development (3:3:0)
PUAD 5333	Environmental Policy and Administration (3:3:0)
LAW 6025	Land-Use Planning (V2-3)
HMG1 5323	Principles of Heritage Management (3:3:0)
GEOG 5306	Seminar in Geography of Arid Lands (3:3:0) or ARCH 5324, History and Theory of Historic Preservation (3:3:0)

One 3-hour research method course approved by coordinator

Other Courses

LPMD 7000	Research (V1-12)
LPMD 8000	Doctor's Dissertation (V1-12)

Prerequisite: AutoCAD. AutoCAD experience is required to enroll in ARCH 1353. Students must provide proof of experience prior to enrollment in the course.

Distance Education Courses. All correspondence and distance education courses require approval from the P²ARC to apply to the degree program.

Grades of C. A grade of C or better is required for all courses included in the architecture degree plan. In the college, a C is equivalent to a grade of 70-79. Students may repeat architecture courses only one time for grade replacement.

Student Projects. The college reserves the right to retain, exhibit, and reproduce work submitted by students. Work submitted for a grade is the property of the college and remains so until it is returned to the student.

Academic Status. The academic information section of this catalog gives information regarding academic status. Students on academic probation or academic suspension should familiarize themselves with these regulations. At the graduate level only one semester of probation is allowed before academic suspension.

Counseling and Advising. Faculty members assist students in career counseling and guidance. Advisement for course registration is provided by the P²ARC staff.

Ineligible Registration. The College of Architecture reserves the right to prevent any student who is not eligible for registration from entering or dropping a course for reasons such as unapproved overloads, unapproved repeated courses, lower division-upper division rule infractions, and lack of prerequisites. Courses taken when the student was ineligible may not be used in the student's degree program.

Catalog Selection. Students will use the catalog issued for the year in which they were first officially admitted to the College of Architecture or may elect to use a more recent catalog. However, if they later transfer to another institution or another college at Texas Tech and wish to return to the College of Architecture at Texas Tech, they will follow the current catalog curricula in effect when they are readmitted. A catalog expires after seven years.

Course Load. Approval from the P²ARC is required for a course load of more than 18 semester hours (8 hours for a summer term). Correspondence courses are included in the student's course load, as are courses taken concurrently at other institutions. Students who are employed for more than 20 hours each week should limit their semester hour enrollment.

Class Attendance. Students in the college are expected to attend all scheduled class meeting times and activities. Absences in excess of those stipulated in each individual course syllabus will result in an F in the course. Refer to the university's policy, procedures, and dates on dropping a course. See your academic advisor for additional information.

Application for Degree. The Bachelor of Science degree candidate must file an "Application for Degree" with the P²ARC at least one year before the anticipated date of graduation. Subsequently, the student will receive a list of courses and be apprised of the number of grade points that are lacking. Students must have a 2.5 GPA to graduate.

Because students are expected to follow the graduation requirements set forth in the catalog of the year they entered the College of Architecture, students filing an "Application for Degree" must indicate the catalog year under which they will graduate. This must be the year in which they were accepted and registered in the College of Architecture. See also "Uniform Undergraduate Degree Requirements" in the Undergraduate Academics section of this catalog.

Travel Programs. International and domestic travel programs are offered annually to enrich the student's experience. These programs are open to related majors, with prior approval. Students are encouraged to participate in one of the travel programs prior to graduation.

Practicum Program. Each student is encouraged to participate in the professional practicum program. The program provides opportunities for professional experience in some of the nation's leading architectural firms.

Minor. The students should consult with an architecture advisor and have a Minor Approval Form signed. A list of recommended courses is available from the advisor. A minor consists of 18 hours, which must include 6 hours of junior and senior level courses. At least 9 of the 18 hours must be taken in residence. Grades of C or better are required in each course.

Bachelor of Science in Architecture

General Architecture Program. Admission to the university. Only courses with a minimum grade of C or better will be accepted for the preprofessional program.

FIRST YEAR

Fall: SEEING		Spring: FOUNDATION	
ARCH 1311, Design Environ. & Society	3	ARCH 1412, Arch. Design Studio I	4
ARCH 1341, Arch. Freehand Drawing	3	ARCH 1353, Digital Media I	3
Core Curriculum (see below)	3	Core Curriculum (see below)	3
Core Curriculum (see below)	3	Core Curriculum (see below)	3
Core Curriculum (see below)	3	Core Curriculum (see below)	3
TOTAL	15	TOTAL	16

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, statement of intent, and grade point average.

SUMMER

Core Curriculum—Nat'l or Phys. (below)	4	Core Curriculum—Nat'l or Phys. (below)	4
Core Curriculum (see below)	3	Core Curriculum (see below)	3
TOTAL	7	TOTAL	7

SECOND YEAR

Fall: BASIC—INTERNAL		Spring: BASIC—EXTERNAL	
ARCH 2501, Arch. Design Studio II	5	ARCH 2502, Arch. Design Studio III	5
ARCH 2311, History of World Arch.	3	ARCH 2315, Hist. 18/19/20 Cent. Arch.	3
ARCH 2351, Arch. Construction I	3	ARCH 2342, Arch. Design Drawing	3
Core Curriculum (see below)	3	ARCH 2355, Arch. Environ. Systems	3
Diversity Elective+	3	Elective	3
TOTAL	17	TOTAL	17

THIRD YEAR

Fall: BUILDING ENCLOSURE		Spring: BUILDING SYSTEMS	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 3341, Digital Media II	3	ARCH 3314, Contemporary Issues	3
ARCH 3350, Arch. Construction II	3	ARCH 3352, Building Information	3
ARCH 3373, Environ. Analysis/Site Plan.	3	ARCH 3355, Arch. Construction III	3
Elective (Writing Intensive)**	3	ARCH Elective	3
TOTAL	17	TOTAL	17

SUMMER I and II

URBANISM	
ARCH 4601, Arch. Design Studio VI++	6

FOURTH YEAR

Fall: COLLABORATION	
ARCH 4000, Research in Arch.	3
ARCH 4354, Integrative Systems	3
ARCH 4363, Arch. Theory	3
Elective	3
TOTAL	12

Minimum hours required for graduation—131

Core Curriculum

ENGL	1301	Essentials of College Rhetoric
ENGL	1302	Advanced College Rhetoric
MATH	1321	Trigonometry
MATH	1350	Analytical Geometry
PHYS	1403	General Physics I w/lab (4 hrs.)
Natural Lab Science † (4 hrs.)		
POLS	1301	American Government Organ.
POLS ††	2302	American Public Policy
HIST	2300	History U.S. to 1877
HIST	2301	History U.S. Since 1877
COMS*		Elective

† Choose from Core Curriculum requirements.

†† Or approved substitution

+ Diversity elective course offerings are available on the architecture Web site (www.arch.ttu.edu).

* Or approved oral communication course

** Select any course designated as "writing intensive" in TTU catalog.

++ Or approved Collaboration Studio in fall of fourth year. Optional courses are ARCH 4365/4366 for those who choose not to pursue the professional degree.

Dual-Degree Curriculum: Bachelor of Science in Architecture and Bachelor of Science in Civil Engineering

General Architecture Program. Admission to the university. Only courses with a minimum grade of C or better will be accepted for the preprofessional program.

FIRST YEAR

Fall: SEEING		Spring: FOUNDATION	
ARCH 1311, Design Environ. & Society	3	ARCH 1412, Arch. Design Studio I	4
ARCH 1341, Arch. Freehand Drawing	3	ARCH 1353, Digital Media I	3
C E 1130, Civil Engr. Seminar I	1	HIST 2301, History of U.S. Since 1877	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
HIST 2300, History of U.S. to 1877	3	C E 1305, Engr. Analysis I	3
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
TOTAL	16	TOTAL	19

SUMMER

MATH 2350, Calculus III	3	MATH 3350, Higher Math for Engr.	3
PHYS 1408, Prin. Physics I	4	PHYS 2401, Prin. Physics II w/lab	3-4
TOTAL	7	or E E 3301, General E E	6-7

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, statement of intent, and grade point average.

SECOND YEAR

Fall: BASIC-INTERNAL		Spring: BASIC-EXTERNAL	
ARCH 2501, Arch. Design Studio II	5	ARCH 2502, Arch. Design Studio III	5
ARCH 2311, History of World Arch.	3	ARCH 2315, Hist. 18/19/20 Cent. Arch.	3
ARCH 2351, Arch. Construction I	3	ARCH 2342, Arch. Design Drawing	3
C E 2301, Statics	3	C E 3303, Mechanics of Solids	3
C E 2101, Const. Materials Lab	1	C E 3103, Mechanics of Solids Lab.	1
POLS 1301, American Govt. Org.	3	I E 3341 or MATH 3342 Statistics	3
TOTAL	18	TOTAL	18

SUMMER

CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. I Lab	1	CHEM 1108, Prin. of Chem. II Lab	1
POLS 2302, Amer. Public Policy††	3	COMS Elective I E 2331 or PTR 3308*	3
TOTAL	7	TOTAL	7

THIRD YEAR

Fall: BUILDING ENCLOSURE		Spring: BUILDING SYSTEMS	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 2353, Arch. Environ. Systems	3	ARCH 3352, Building Information	3
C E 3321, Intro. Geotech. Engr.	3	C E 3302, Dynamics	3
C E 3121, Geotech. Engr. Lab	1	C E 3305, Mechanics of Fluids	3
C TEC 2301, Surveying	3	Diversity Elective	3
TOTAL	15	TOTAL	17

FOURTH YEAR

Fall		Spring	
C E 3440, Struct. Analysis I	4	C E 3341, Prin. Struct. Design	3
C E 3309, Environ. Engr.	3	C E 4340, Structural Analysis II †	3
C E 3171, Environ. Eng. Lab. I	1	I E 3301 or M E 2322	3
C E 3354, Engr. Hydrology	3	C E 3372, Water Systems Design	3
Writing-Intensive Elective+	3	C E 4343, Des. Concrete Struct.	3
TOTAL	14	TOTAL	15

SUMMER I and II

<i>URBANISM</i>	
ARCH 4601, Arch. Design Studio VI**	6

FIFTH YEAR

Fall: COLLABORATION	
ARCH 4363, Arch. Theory	3
C E 4330, Design Engr. Systems	3
C E 4342, Design Steel Struct.	3
C E 4361, Transport. Engr.	3
TOTAL	12

Total Hours—177 (178)

++Course offerings available on the architecture Web site (www.arch.ttu.edu)

* COMS elective choices for **civil engineering students** only are I E 2331 or PETR 3308.

† C E 4340 is offered every third semester only.

†† Or approved substitution

+ Select any TTU course designated as "writing intensive" in current catalog.

** Or approved Collaboration Studio in fall of fifth year. Optional courses are ARCH 4365/4366 for those who choose not to pursue the professional degree.

Dual-Degree Curriculum: Bachelor of Science in Architecture and Bachelor of Business Administration (General Business)

General Architecture Program. Admission to the university. Only courses with a minimum grade of C or better will be accepted for the preprofessional program. **All business administration students must complete lower-division business core requirements and maintain a 2.75 cumulative GPA to take upper-level business courses.**

FIRST YEAR

Fall: SEEING		Spring: FOUNDATION	
ARCH 1311, Design Environ. & Society	3	ARCH 1412, Arch. Design Studio I	4
ARCH 1341, Arch. Freehand Drawing	3	ARCH 1353, Digital Media I	3
POLS 1301, American Govt. Organ.	3	POLS 2302, American Public Policy	3
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
MATH 1321, Trigonometry	3	MATH 1350, Analytical Geometry	3
TOTAL	15	TOTAL	16

SUMMER

HIST 2300, History of U.S. to 1877	3	ACCT 2301, Managerial Acct.	3
ACCT 2300, Financial Accounting	3	TOTAL	3
TOTAL	6		

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, statement of intent, and grade point average.

SECOND YEAR

Fall: BASIC-INTERNAL		Spring: BASIC-EXTERNAL	
ARCH 2501, Arch. Design Studio II	5	ARCH 2502, Arch. Design Studio III	5
ARCH 2311, History of World Arch.	3	ARCH 2315, Hist. 18/19/20 Cent. Arch.	3
ARCH 2351, Arch. Construction I	3	ARCH 2342, Arch. Design Drawing	3
MATH 2345, Intro. Stats. Bus.	3	ARCH 2355, Arch. Environ. Systems	3
ECO 2301, Prin. Economics I	3	ECO 2302, Princ. Economics II	3
TOTAL	17	TOTAL	17

SUMMER

PHYS 1403, Gen. Physics I w/lab	4	Natural Lab Science †	4
MGT 3370, Org. and Mgt.	3	MKT 3350, Intro. to Marketing	3
TOTAL	7	TOTAL	7

THIRD YEAR

Fall: BUILDING ENCLOSURE		Spring: BUILDING SYSTEMS	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 3341, Digital Media II	3	ARCH 3314, Contemporary Issues	3
ARCH 3350, Arch. Construction II	3	ARCH 3352, Building Information	3
ARCH 3373, Environ. Analysis/Site Plan	3	ARCH 3355, Arch. Construction III	3
FIN 3320, Financial Management	3	FIN 3332, Real Estate Fund.	3
TOTAL	17	TOTAL	17

SUMMER

ISQS 3344, Intro. Prod/Oper. Mgt	3	Advanced BA course *	3
BLAW 3391, Business Law I	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	6	TOTAL	6

FOURTH YEAR

Fall: COLLABORATION		Spring	
ARCH 4365, Project Mgt.**	3	Advanced BA course *	3
MGT 3373, Managerial Communication	3	ARCH 4363, Arch. Theory	3
FIN 4336, Urban Land Develop.	3	ARCH 4366, Design/Build Methodology**	3
Economics Course***	3	MGT 4380, Strategic Mgt.	3
Advanced BA Course *	3	TOTAL	12
TOTAL	15		

Total Hours—161

See the Rawls College of Business section of the catalog for information on lower-division requirements.

† Choose from Core Curriculum requirements.

* These courses must be selected from the areas of accounting, economics, ISQS, management, and marketing. There must be at least one course chosen from at least two of the five areas.

** Students continuing to the M.Arch. program may require additional leveling, including ARCH 4601/4602 and a diversity elective.

***Must be a junior or senior level economics course except for ECO 3323 or 4332.

Master of Architecture

General Architecture Program. Admission to the university. Only courses with a minimum grade of C or better will be accepted for the preprofessional program.

FIRST YEAR

Fall: SEEING		Spring: FOUNDATION	
ARCH 1311, Design Environ. & Society	3	ARCH 1412, Arch. Design Studio I	4
ARCH 1341, Arch. Freehand Drawing	3	ARCH 1353, Digital Media I	3
Core Curriculum †	3	Core Curriculum †	3
Core Curriculum †	3	Core Curriculum †	3
Core Curriculum †	3	Core Curriculum †	3
TOTAL	15	TOTAL	16

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, statement of intent, and grade point average.

SUMMER

Core Curriculum–Nat'l or Phys. †	4	Core Curriculum–Nat'l or Phys. †	4
Core Curriculum †	3	Core Curriculum †	3
TOTAL	7	TOTAL	7

SECOND YEAR

Fall: BASIC–INTERNAL		Spring: BASIC–EXTERNAL	
ARCH 2501, Arch. Design Studio II	5	ARCH 2502, Arch. Design Studio III	5
ARCH 2311, History of World Arch.	3	ARCH 2315, Hist. 18/19/20 Cent. Arch.	3
ARCH 2351, Arch. Construction I	3	ARCH 2342, Arch. Design Drawing	3
Core Curriculum †	3	ARCH 2355, Arch. Environ. Systems	3
Diversity Elective+	3	Elective	3
TOTAL	17	TOTAL	17

THIRD YEAR

Fall: BUILDING ENCLOSURE		Spring: BUILDING SYSTEMS	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 3341, Digital Media II	3	ARCH 3314, Contemporary Issues	3
ARCH 3350, Arch. Construction II	3	ARCH 3352, Building Information	3
ARCH 3373, Environ. Analysis/Site Plan.	3	ARCH 3355, Arch. Construction III	3
Elective (Writing Intensive)**	3	ARCH Elective	3
TOTAL	17	TOTAL	17

SUMMER I and II

URBANISM	
ARCH 4601, Arch. Design Studio VI++	6

FOURTH YEAR

Fall: COLLABORATION		Spring: ADV. SPECIALIZATION (Professional Level**)	
ARCH 4000, Research in Arch.	3	ARCH 5604, Urban Design Studio	6
ARCH 4363, Arch. Theory	3	ARCH 5365, Arch. Res. Methods	3
ARCH 4354, Integrative Systems	3	ARCH 5000–Level Course TBA ^Δ	3
Elective	3	ARCH Elective	3
TOTAL	12	TOTAL	15

Professional Program.** Requirements for admission to the professional program include: completion of all academic coursework in the first three years and a threshold score on the Admission Criteria Rating System. The threshold score is based on a sliding scale of GRE, GPA, and portfolio scores. A copy of the form is available from the Academic Programs Office. In all graduate courses, no grade below a C will be accepted, a student must have a 3.0 GPA each semester, and a 3.0 GPA is required to graduate.

SUMMER

ARCH 5605, Adv. Arch. Design Studio	6
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FIFTH YEAR

Fall: MASTER DESIGN STUDY (Professional Level**)		Spring: MASTER DESIGN STUDY (Professional Level**)	
ARCH 5395, Master Design Studio I	3	ARCH 5692, Master Design Studio II	6
ARCH 5392, Professional Practice	3	Elective	3
ARCH Elective	3	ARCH Elective	3
TOTAL	9	TOTAL	12

Minimum hours required for graduation—173

† Choose from Core Curriculum list on page 121 (B.S. Table).

+ Diversity elective course offerings available on the architecture Web site.

++ Or approved Collaboration Studio in fall of fourth year.

** Select any course designated as "writing intensive" in TTU catalog.

Δ Course to be announced prior to fall 2007.

Dual-Degree Curriculum: Master of Architecture and Master of Business Administration

General Architecture Program. Only courses with a minimum grade of C or better will be accepted for the preprofessional program.

FIRST YEAR

Fall: SEEING		Spring: FOUNDATION	
ARCH 1311, Design Environ. & Society	3	ARCH 1412, Arch. Design Studio I	4
ARCH 1341, Arch. Freehand Drawing	3	ARCH 1353, Digital Media I	3
Core Curriculum †	3	Core Curriculum †	3
Core Curriculum †	3	Core Curriculum †	3
Core Curriculum †	3	Core Curriculum †	3
TOTAL	15	TOTAL	16

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, statement of intent, and grade point average.

SUMMER

Core Curriculum–Nat'l or Phys. †	4	Core Curriculum–Nat'l or Phys. †	4
Core Curriculum †	3	Core Curriculum †	3
TOTAL	7	TOTAL	7

SECOND YEAR

Fall: BASIC–INTERNAL		Spring: BASIC–EXTERNAL	
ARCH 2501, Arch. Design Studio II	5	ARCH 2502, Arch. Design Studio III	5
ARCH 2311, History of World Arch.	3	ARCH 2315, Hist. 18/19/20 Cent. Arch.	3
ARCH 2351, Arch. Construction I	3	ARCH 2342, Arch. Design Drawing	3
Core Curriculum †	3	ARCH 2355, Arch. Environ. Systems	3
Diversity Elective+	3	Elective	3
TOTAL	17	TOTAL	17

THIRD YEAR

Fall: BUILDING ENCLOSURE		Spring: BUILDING SYSTEMS	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 3341, Digital Media II	3	ARCH 3314, Contemporary Issues	3
ARCH 3350, Arch. Construction II	3	ARCH 3352, Building Information	3
ARCH 3373, Environ. Analysis/Site Plan.	3	ARCH 3355, Arch. Construction III	3
Elective (Writing Intensive)**	3	ARCH Elective	3
TOTAL	17	TOTAL	17

SUMMER I and II

URBANISM	
ARCH 4601, Arch. Design Studio VI	6

FOURTH YEAR

Fall: COLLABORATION		Spring: ADV. SPECIALIZATION (Professional Level**)	
ARCH 5604, Urban Design Studio	6	ARCH 5605, Adv. Arch. Design Studio	6
ARCH 4000, Research in Arch.	3	ARCH 5365, Arch. Res. Methods	3
ARCH 4354, Integrative Systems	3	ARCH 5000–Level Course TBA ^Δ	3
ARCH 4363, Arch. Theory	3	ARCH 5301, Spec. Problems (Elective)	3
Elective	3	TOTAL	15
TOTAL	18		

Professional Level Program.** Requirements for admission to the professional level program include completion of all academic coursework in the first three years and a threshold score on the Admission Criteria Rating System. The threshold score is based on a sliding scale of GRE, GPA, and portfolio scores. In all graduate courses, no grade below a C will be accepted, a student must have a 3.0 GPA each semester, and a 3.0 GPA is required to graduate. In all BA graduate courses, one A above a 3.0 GPA is required to receive the M.B.A. degree. All BA courses must be completed with a minimum grade of B.

SUMMER

MGT 5476, Executive Skills	4	ACCT 5401, Fin. and Mgt. Acct.	4
ISQS 5345, Statistical Concepts	3	ISQS 5230, Managerial Dec. Theory	2
TOTAL	7	ISQS 5231, Info. Tech. for Managers	2
		TOTAL	8

FIFTH YEAR

Fall (Professional Level**)		Spring (Professional Level**)	
ARCH 5395, Master Design Studio I	3	ARCH 5692, Master Design Studio II	6
MGT 5371, Manag. Org. Beh. & Des.	3	ARCH 5392, Professional Practice	3
ECO 5310, Price & Income Theory	3	MKT 5360, Mkt. Concepts & Strategies	3
ARCH History Elective	3	TOTAL	12
TOTAL	12		

SUMMER

FIN 5421, Financial Mgmt. Concepts	4	ISQS 5343, Oper. Mgmt. & Mgmt. Sci	3
BLAW 5290, Business Law	2	MGT 5391, Strategy & Global Mgmt.	3
TOTAL	6	TOTAL	6

Total Hours—203

† Choose from Core Curriculum list on page 121 (B.S. Table).

** Select any course designated as "writing intensive" in TTU catalog.

+ Diversity elective offerings available on the architecture Web site.

Δ Course to be announced prior to fall 2007.

Master of Science in Architecture Certification in Historic Preservation

FIRST YEAR			
Fall		Spring	
ARCH 5315, Systems of Inquiry	3	ARCH 5321, Hist. Bldg. Tech. Doc.	3
ARCH 5319, Arch. Hist. Before 1865	3	ARCH 5320, Arch. Hist. After 1865	3
ARCH 5324, History and Theory	3	ARCH 5325, Conservation Policies	3
ARCH 5102, Grad. Colloquium	1	ARCH 5102, Graduate Colloquium	1
TOTAL	10	TOTAL	10

SUMMER	
Internship or off-campus program	Summer Intern Pro. Preservation Highly Recommended

SECOND YEAR			
Fall		Spring	
ARCH 5622, Preservation Studio	6	Elective*	6
ARCH 6000, Master's Thesis	3	ARCH 6000, Master's Thesis	3
TOTAL	9	TOTAL	9

Total Program Hours—38

Most degree plans will require at least 6 hours of research.
Minor in historic preservation may be conferred upon completion of the first 18 hours of the curriculum.

* Must complete 6 hours of elective courses. See College of Architecture for an approved list.

Master of Science in Architecture Certification in Community Design, Development

FIRST YEAR			
Fall		Spring	
ARCH 5315, Systems of Inquiry	3	ARCH 5325, Conservation Policies	3
GEOG 5300, Geographic Info. Systems	3	HMG 5327, Heritage Planning	3
ARCH 5384, Comm. Design and Dev.	3	ARCH 5102, Graduate Colloquium	1
ARCH 5102, Graduate Colloquium	1	Elective	3
TOTAL	10	TOTAL	10

SECOND YEAR			
Fall		Spring	
ARCH 5605, Advanced Design Studio	6	ARCH 6000, Master's Thesis	6
ARCH 7000, Research	3	Elective	3
TOTAL	9	TOTAL	9

Total Program Hours—38

Master of Science in Architecture Certification in Visualization

FIRST YEAR			
Fall		Spring	
ARCH 5315, Systems of Inquiry	3	ARCH 5344, Virtual Reality Tech.	3
ARCH 5341, Internet Media, Vis. Des.	3	ARCH 5345, Design Vis. Studio	3
ARCH 5347, 3-D Digital Visualization	3	ARCH 5343, 3-D Anim./Imaging	3
ARCH 5102, Graduate Colloquium	1	ARCH 5102, Graduate Colloquium	1
TOTAL	10	TOTAL	10

SECOND YEAR			
Fall		Spring	
ARCH 6000, Master's Thesis	3	ARCH 5345, Design Vis. Studio	3
ARCH 7000, Research	3	ARCH 6000, Master's Thesis	3
Elective	3	Elective	3
TOTAL	9	TOTAL	9

Total Program Hours—38

El Paso Program: Bachelor of Science in Architecture

The College of Architecture has established a partnership with El Paso Community College (EPCC) to expand the pathway for El Paso students to attend Texas Tech and obtain a degree in architecture. The program will begin in fall 2007 and offer the first degrees in 2008. Students who enter the program will complete 131 credit hours, including 66 hours at EPCC and 65 at Texas Tech in El Paso. After admission to the university as a transfer student, students in will be expected to complete the curriculum outlined below.

THIRD YEAR			
Fall		Spring	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 2355, Arch. Environ. Systems	3	ARCH 4355, Construction Documents	3
ARCH 3350, Arch. Construction II	3	ARCH 3355, Arch. Construction III	3
ARCH 4311, Arch. in Nonwestern Soc.	3	ARCH 3341, Digital Media II	3
ARCH 2353, 3-D Computer Design Drwg.	3	POLS 2302, Amer. Public Policy or approved substitution	3
TOTAL	17	TOTAL	17

SUMMER I and II	
ARCH 4601, Arch. Design Studio VI	6

FOURTH YEAR			
Fall		Spring	
ARCH 4602, Collaboration Studio	6	ARCH 4354, Integrative Systems	3
ARCH 4000, Research	1	ARCH 3356, Spec. Studies Con. Tech.	3
ARCH 3373, Environ. Analysis/Site Plan.	3	ARCH 4363, Theory in Arch.	3
Elective (Writing Intensive)	3	COMS Elective or approved substitution	3
TOTAL	13	TOTAL	12

Total Program Hours—66 (EPCC) + 65 (TTU) = 131

Architecture (ARCH)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1311. [ARCH 1311] Design, Environment, and Society (3:3:0).** Introduction to architecture as an integral component of a complex world. Examination of societal and environmental contexts and appropriate design responses. F
- 1341. Architectural Freehand Drawing (3:0:6).** Basic skills and techniques in representational drawing. Subjects include the human figure, architectural interiors and exteriors, landscapes and cityscapes. Black and white media.
- 1353. Digital Media I (3:2:2).** Prerequisite: AutoCAD. An introduction to the use of the computer as a design drawing tool with an emphasis on conceptual knowledge and computing skills for design communication.
- 1412. [ARCH 1303, 1304] Architectural Design Studio I (4:2:4).** Introduction to the principles and methods used at various stages of design analysis and synthesis processes. Skill developments in the abstraction, transformation, composition, of two- and three-dimensional design. S.
- 1441. Architectural Delineation I (4:0:8).** Basic skills and techniques in representational drawing. Subjects include the human figure, architectural interiors and exteriors, landscapes and cityscapes. Black and white media. Outside assignments required. F
- 1442. Architectural Delineation II (4:0:8).** Prerequisite: ARCH 1441. Development of graphic communication skills. Color theory and its application to architectural graphic expression. Presentation techniques. Outside assignments required. S.
- 2311. [ARCH 1301] History of World Architecture c. 3000 BC to c. 1600 AD (3:3:0).** Survey of the development of world architecture from the ancient era to the advent of enlightenment in Europe.
- 2315. [ARCH 1302] History of 18th, 19th, and 20th Century Architecture (3:3:0).** Prerequisite: ARCH 2311. Survey of the development of World Architecture from the Enlightenment in Europe to the present.
- 2342. Architectural Design Drawing (3:0:6).** Prerequisite: ARCH 1341. Development of graphic communication skills. Graphic exploration through analytical drawing techniques. Application of color theory. S.

2351. [ARCH 2312] **Architectural Construction I (3:3:0)**. Corequisite or credit in: ARCH 2501. Introduction to construction systems, methods, and materials with emphasis on the wall section. Introduction to issues of sustainability and envelope performance.
2353. **3-D Computer Design Drawing (3:2:2)**. An introduction to the use of the computer as a design drawing tool with an emphasis on conceptual knowledge and computing skills for design communication.
2354. **Computer-Assisted Design Development (3:2:2)**. Prerequisite: ARCH 2353. The use of 3-D computer graphics for design development with an emphasis on multimedia design presentations.
2355. **Architectural Environmental Systems (3:3:0)**. Introduction to thermal design; daylighting; analysis of mechanical, electrical, and plumbing systems; and acoustical design. F
2394. **Architectural Programming (3:3:0)**. Introduction to architectural programming methodologies, including problem seeking, issue-goal identification, contextual and case studies, site analysis, space and spatial relationships, determination of budget, and project feasibility.
- 2501.* [ARCH 1403] **Architectural Design Studio II (5:2:8)**. Prerequisite: Admission to the professional program. Basic-Internal. Introducing design skills that are core and internal to architecture. Practical-drawing as inquiries/form/transformation/composition/spatial modulation. F
- 2502.* [ARCH 1404] **Architectural Design Studio III (5:2:8)**. Prerequisite: ARCH 2501. Basic-External. Introduces design skills that are external to architectural practice-drawing as inquiries and analysis, integration of building elements, site and program.
3312. **Architectural Theory Seminar (3:3:0)**. Prerequisite: ARCH 2315. Topical theory seminar involving analysis of a body of scholarly literature, frequent writing and focused research. (Writing intensive)
3313. **Architectural History Seminar (3:3:0)**. Prerequisite: ARCH 2315. Focused studies in western/non-western architectural history involving written and oral analysis of scholarly sources. Topic varies and may include preservation, race, class and/or gender issues. (Writing Intensive)
3314. **Contemporary Issues in Architecture (3:3:0)**. Prerequisite: ARCH 2311 and 2315. Contemporary issues in architectural theory and history utilizing precedents from early 20th century.
3324. **Architectural Conservation (3:3:0)**. Prerequisite: Junior standing or consent of instructor. An in-depth examination of history, theory, and practice of historic preservation, restoration, and federal legislation supporting preservation.
3341. **Digital Media II (3:2:2)**. Prerequisite: ARCH 1353. The use of 3-D computer graphics and modeling or design development with an emphasis on multimedia design presentations.
3350. **Architectural Construction II (3:2:2)**. Prerequisite: ARCH 2351. Study of statics, member analysis, material science, and advanced construction systems with emphasis on the systems module and introduction to system integration code and cost.
- 3352.* **Building Information Technology (3:2:4)**. Prerequisite: ARCH 1353, 2355, and 3350. Analysis of communication of technical information and the process of preparing documents for building construction utilizing Building Information Modeling (BIM).
3355. **Architectural Construction III (3:2:2)**. Prerequisite: ARCH 3350; corequisite: ARCH 3501. Study of structural capacity, connection design, and envelope performance and cost with emphasis on cladding. Introduction to system integration. Outside assignments required.
3356. **Special Studies in Construction Technology (3:3:0)**. Prerequisite: ARCH 3355. Approved technology elective dealing with the advanced study of technical building concerns.
3361. **Design Workshop (3:3:3)**. Special projects and project development in architectural design. May be repeated for credit.
3362. **Product Design Workshop (3:0:6)**. Introduction to the design and executed construction of a prototypical piece of furniture or other design product using an architectural design process. May be repeated for credit. S.
3373. **Environmental Analysis – Site Planning (3:3:0)**. A basic course to develop a working knowledge of the techniques and principles involved in site planning to provide optimum living and working environments.
- 3501.* **Architectural Design Studio IV (5:2:8)**. Prerequisite: ARCH 2502. Building frame and skin. Teaches design skills centered on the technology of enclosure in building design. Introduces life safety and building codes. F
- 3502.* **Architectural Design Studio V (5:2:8)**. Prerequisite: ARCH 3501. Building systems. Teaches design skills centered on the building as a technological system and ecological device. Considers site and building details.
4000. **Research in Architecture and Urban Studies (VI-6)**. Prerequisite: Advanced standing and approval of the Dean. Individual studies of special interest in advanced architecture, history of architecture, and city planning. May be repeated for credit.
- 4091.* **Architectural Internship (3)**. Prerequisite: ARCH 3502. Individual study based on an approved internship position consisting of a minimum of 300 hours per semester or summer.
4311. **Architecture in Nonwestern Societies (3:3:0)**. A study of multicultural architectural contributions, interrelationships of culture and architecture, diversity of traditions, meanings, modernity, and change in the nonwestern world.
4353. **Advanced Computer Applications (3:2:2)**. Prerequisite: ARCH 2353. Continuation of the principles of ARCH 2353. Advanced computer graphics applications, programming, and contract document systems.
4354. **Integrative Systems (3:2:2)**. Prerequisite: ARCH 2355, ARCH 3355. Integration of structural, mechanics, electrical, plumbing, and code with life safety systems into building design, through a comprehensive building model.
- 4355.* **Construction Documents (3:2:4)**. Prerequisite: ARCH 2353, 3350, and 3502. Analysis and communication of technical information and the process of preparing documents for building construction.
4361. **Architectural Studies Seminar (3:3:0)**. The study, presentation, and discussion of issues regarding architecture as an aspect of culture. May be repeated for credit.
4363. **Architectural Theory (3:3:0)**. Prerequisite: ARCH 2311 and 2315. Examination of the theoretical issues in architecture through critical reading of texts selected from Vitruvius to the most contemporary thinkers in relation to the emerging design challenges.
4364. **Issues of Differences in the Built Environment (3:3:0)**. Issues of race, ethnicity, culture, gender, and political-economic contexts influencing process of design of architecture, the built environment and international and cross-cultural architectural practices.
4365. **Architectural Project Management (3:3:0)**. Project organization and management documentation of project information, budget analysis, and coordination of consultants and building systems.
4366. **Design and Building Methodology (3:3:0)**. Design and construction under one contract as a delivery system, including scheduling, bidding, job site safety, and management.
4381. **Urban Theory (3:3:0)**. Prerequisite: Junior standing in architecture curriculum. An extensive writing course offering a comprehensive exploration of the relationship between culture, the city, planning, and urban design. (Writing Intensive)
- 4601.* **Architectural Design Studio VI (6:3:8)**. Prerequisite: ARCH 3502. Urbanism: design of urban aggregates of buildings, infrastructure, and land use. Explores the interface between culture and architecture at the scale of the city. Must be taken off campus in study abroad programs or practicums.
- 4602.* **Collaboration Studio (6:3:8)**. An interdisciplinary studio for the design professions which addresses the process and skills necessary for collaboration as well as team-developed products. (Field Trip Required)

Graduate Courses

5102. **Graduate Colloquium (1:1:0)**. An academic seminar on a broad field of study, each meeting is usually led by a different lecturer and will be followed by a question and answer session.
5301. **Special Problems in Architecture (3)**. Prerequisite: College approval. Individual study projects in architecture of special interest to students. May be repeated for credit. Particularly useful for Interdisciplinary Studies master's program.

* Open only to architecture majors or to students with the dean's permission.

5302. **Product Design Workshop (3:0:6)**. Introduction to the design and executed construction of a prototypical piece of furniture or other design product using an architectural design process. F
5311. **Special Problems in Architectural History (3)**. Individual advanced studies in architectural history of special interest to the student. May be repeated for credit.
5313. **Special Studies in the History of Architecture (3:3:0)**. Prerequisite: ARCH 2311 and 2315. Studies in architectural history involving written and oral analysis of scholarly sources. Topics vary and may include preservation, class, race, and/or gender issues.
5315. **Systems of Architectural Inquiry (3:3:0)**. An investigation into the schools of thought and methods of inquiry, including the craft of research with a focus on writing, reading, and critical thinking.
5319. **History of American Architecture: Pre-Contact to 1865 (3:3:0)**. Prerequisite: ARCH 2311 or approval of instructor. History of American Cultural expression, using buildings as a vehicle for exploring diverse issues including race, class and gender. Time period covers Pre-Contact to 1865. (Writing Intensive)
5320. **History of American Architecture: 1865 to the Present (3:3:0)**. Prerequisite: ARCH 2311 or approval of instructor. History of American Cultural expression, using buildings as a vehicle for exploring diverse issues including race, class and gender. Time period 1865 to present. (Writing Intensive)
5321. **Historic Building Technology and Documentation (3:3:0)**. Survey of techniques of restoration and stabilization of historic buildings; standards of workmanship; traditional methods and new technologies. Survey of documentation techniques and preservation design.
5324. **History and Theory of Historic Preservation (3:3:0)**. Survey of theory and practice of historic preservation and restoration; overview of the history of the preservation movement in the U.S.
5325. **Conservation Policies (3:3:0)**. Survey of federal and state enabling legislation; federal, state, and local policies on historic preservation and urban design, discussion of redevelopment strategies.
5326. **History of American Architecture: Pre-Colombian-1900 (3:3:0)**. A survey of American architecture from the Pre-Columbian period to the year 1900. Architecture will be studied in a broad context that will include American art, literature, city planning, politics, and professional practice.
5331. **Graduate Seminar (3:3:0)**. Prerequisite: College approval. Critical readings, discussions, and writing assignments on a range of interdisciplinary issues and theoretical positions. May be repeated for credit. (Writing Intensive)
5333. **Special Studies in the History of Architecture (3:3:0)**. Prerequisite: ARCH 2311 and 2315. Studies in western / nonwestern Architectural history involving written and oral analysis of scholarly sources. Topic varies and may include preservation, class, race and/or gender issues. (Writing Intensive)
5340. **Design Visualization Seminar (3:3:0)**. Prerequisite: Approval of the instructor. Critical readings, discussions and writing assignments on issues pertaining to design visualization. Topics may vary per semester. May be repeated for credit.
5341. **Internet Media for Visualization Design (3:3:0)**. Prerequisite: Fundamental understanding of Windows and graphic computer applications or approval of instructor. This course focuses on the design implications and application of interactive Internet visualization media for the communication of virtual environments.
5342. **Architecture Drawing (3:0:9)**. Skills and techniques of drawing. Translation of perceptions of three-dimensional objects and spaces into graphic expression. Outside assignments required. May be repeated once for credit.
5343. **3-D Computer Animation and Imaging (3:3:0)**. Prerequisite: ARCH 2354, equivalent, or instructor approval. This course covers the theory, design, and application three-dimensional computer animation and imaging.
5344. **Virtual Reality Software and Technology (3:3:0)**. Prerequisite: 3D model / animation experience, permission of instructor. Focus on the theory, design, implementation and application of creating 3D stereoscopic real-time virtual environments.
5345. **Design Visualization Studio (3:0:6)**. Prerequisite: ARCH 5343 and 5344 or permission of instructor. Students shall pursue the design and visualization of digital environments for design exploration, communication, research simulation, entertainment or gaming. May be repeated for credit.
5347. **3-D Digital Visualization (3:2:2)**. A study of the concepts, principles, and techniques of three-dimensional digital modeling, texturing, lighting, and rendering.
5352. **Computer Applications to Architecture (3:3:0)**. Survey of digital computer applications to the issues and processes of architecture and planning. May be repeated for credit.
5353. **Architectural Technology (3:3:0)**. Examination of traditional and innovative uses of building materials, the application of industrial and scientific technology, and the integration of the building systems derived from these considerations. May be repeated for credit.
5361. **Architectural Theory Seminar (3:3:0)**. Architecture as art, science, and a contemporary philosophical concept. Exploration of context and goals. Illustrated lectures. May be repeated for credit. (Writing Intensive)
5362. **Theory in Architecture (3:3:0)**. Examination of theoretical issues in architecture through critical reading of texts selected from Vitruvius to the most contemporary thinkers in relation to emerging design challenges. (Writing Intensive)
5363. **Architectural Design Programming (3:3:0)**. Contextual and case studies; analyses of site, activities, space and spatial relationships. Systems and costs criteria. Determination of significant issues, goals, and emerging concepts.
5365. **Architecture Research Methods (3:3:0)**. Comprehensive survey of qualitative and quantitative research methods and their method-specific hypothesis formulation, data acquisition, verification, and analysis. (Writing Intensive)
5382. **Urban Theory (3:3:0)**. An extensive writing course proffering a comprehensive exploration of the relationship between culture, the city, planning, and urban design.
5383. **Urban Land Development (3:3:0)**. The land conversion process including feasibility analysis market and merchandising targets, site selection design, construction and financial analysis. Land-use controls, planning, and environmental constraints.
5384. **Community Design and Development Resources (3:3:0)**. Investigation of the development resources available to community and designers emphasizing partnerships and collaboration.
5391. **Architectural Internship (3)**. Individual study based on approved internship position consisting of a minimum of 300 hours per semester or summer. Internship will not be approved if the student has received credit for ARCH 4091.
5392. **Professional Practice (3:3:1)**. The principles and practices of architectural business including the discussion of professionalism, administration, management, legalities, and liabilities. Exploration of current, advanced, and complex processes for the delivery of architecture.
- 5395.* **Master Design Studio I (3:0:6)**. Prerequisite: ARCH 5365; corequisite or prerequisite ARCH 5362. Guided individual research and documentation in a studio, leading to a seminal architectural project in ARCH 5692. (Writing Intensive)
- 5601.* **Architectural Graduate Design I (6:0:12)**. Knowledge and application of fundamental principles of architectural theory, organization, including the introduction to conceptual design through context, meaning and design processes as well as the introduction to graphic skills.
- 5602.* **Architectural Graduate Design II (6:0:12)**. Prerequisite: ARCH 5601. Integration of fundamental building systems, functional requirements, spatial composition and interior-exterior relationships. Course broadens the design process and communication skills.
- 5604.* **Urban Design Studio (6:0:12)**. Explores the interface of culture and architecture in relation to its social and physical environment.
- 5605.* **Advanced Architectural Design Studio (6:0:12)**. Comprehensive architectural design of complex building types.
5622. **Preservation Studio (6:0:12)**. Research on current preservation issues. Individual projects required.
- 5692.* **Master Design Studio II (6:0:12)**. Prerequisite: ARCH 5395, 5604, and 5605. Design and documentation of a seminal architectural project articulated in ARCH 5395.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

* Open only to architecture majors or to students with the dean's permission.

College of Arts and Sciences

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About the College

The College of Arts and Sciences offers a broad spectrum of programs and courses in the liberal arts; humanities; mathematics; and social, behavioral, and natural sciences. The primary function of the college is to impart to students the knowledge, skills of thinking and communicating, and values and attitudes that constitute a liberal education. The faculty of the college seek to instill in their students a humanistic spirit, an appreciation of creativity, a commitment to excellence and truth, an ability to think critically and communicate effectively, and a desire for lifelong learning.

The courses and programs in the college also provide a base of knowledge and skills from which students may enter such professional fields of study as law and medicine.

General Undergraduate Degree Requirements

Core Curriculum Requirements. The Core Curriculum requirements ensure breadth in each academic program. These requirements have been incorporated into the college's various degree programs. Students have no need to refer to the Core Curriculum requirements unless so directed by their specific degree program.

Course Load. A normal full-time course load is 15 hours or more per semester. In calculating the course load, the dean will consider all active correspondence courses as a part of the course load. Course loads in excess of 19 semester hours require approval by the associate dean in the Student Division of the College of Arts and Sciences. The maximum course load for a student on probation is 16 hours. To receive full-time financial aid, students must be enrolled for a minimum of 12 hours. Some financial aid programs allow enrollment in less than full-time hours.

The normal course load for a single summer term is 6-8 hours. To meet graduation requirements, a graduating senior may petition to take 9 hours in one term.

Correspondence Courses. Approval for courses to be taken by correspondence must be obtained at 102 Holden Hall. All prerequisites must be met to be granted enrollment. Junior status is required to enroll in upper-division courses.

Catalog Selection. Students will use the catalog issued for the year in which they were first officially admitted to the College of Arts and Sciences, or a more recent catalog if approved. However, if they later transfer to another institution or another college at Texas Tech and then desire readmission to the College of Arts and Sciences, they will use the catalog in effect when they are readmitted. Students who do not enroll for one calendar year will be placed into the current catalog upon readmission to the university. For graduation purposes, a catalog expires after seven years at which time the current catalog becomes the catalog in effect.

Credit by Examination. A matriculated student may attempt credit by examination (described in Admissions section of catalog). Approval from the dean is required to take an examination a second time before six months has elapsed, if more advanced material in the same subject has already been completed, or if an examination is in the semester of graduation (generally not allowed).

Grading Practices. The College of Arts and Sciences conforms to university grading practices as set forth in the major section entitled Undergraduate Academics in this catalog. Credits for a course in which a grade of D is earned may not be applied toward fulfill-

ment of the major, adjunct, minor, concentration area, or teaching field requirements for any degree program.

Except for those courses designated “may be repeated for credit” in this catalog, no course may be used more than once on a degree plan unless it has been approved by the associate dean in the Student Division of the College of Arts and Sciences.

Freshman Year. Entering freshmen develop their programs in conference with an academic advisor. The students report to their advisors for such individual conferences or group meetings as are needed for the purpose of orienting themselves to academic regulations and procedures, curricula, and degree requirements in their various areas of interest.

Students are urged to take required freshman courses during the freshman year. During the sophomore year the student should complete the second year of English and all other freshman requirements. Normally, Core Curriculum requirements should be completed by the end of the sophomore year. Freshmen should not enroll in junior-senior level courses.

Admission of Transfer Students. Students transferring from another academic institution must meet the university-wide admission requirements stated in an earlier section. Students requesting permission to transfer from another college at Texas Tech must have an adjusted cumulative GPA of at least 2.0. The College of Arts and Sciences will determine the applicability of any transferred credit to academic programs in the college. The last 30 hours prior to graduation must be completed while enrolled in the college.

Arts and Sciences Undeclared. Freshmen or sophomores may be admitted with a general major known as “Arts and Sciences Undeclared” (ASUD) until they select the major degree program in which they intend to graduate. The college offers a broad area of education that includes the social sciences, liberal arts, and humanities, as well as the natural sciences and mathematics. Arts and Sciences Undeclared is only a temporary administrative designation in which students cannot earn a degree. Students in the College of Arts and Sciences are urged to focus on fulfilling general degree requirements during their first two years. This alleviates the pressure to make an immediate decision on a major and career. Students can use their first two years to build a strong academic foundation. At the same time, students can investigate career alternatives and take elective courses in those professional fields or subject areas that are possible majors. Students listed as ASUD are advised by academic counselors in the Advising Center for Texas Tech (79 Holden Hall) to help with selecting general degree requirements, electives, and a major. After taking courses that are required for most majors (e.g., English, American history, political science, mathematics), the student has the flexibility to begin working toward any of the major fields offered within the College of Arts and Sciences. **ONLY STUDENTS WITH FEWER THAN 60 HOURS MAY BE LISTED AS ARTS AND SCIENCES UNDECLARED.** Students who have completed 60 or more hours will have a hold placed on their records until they declare a major.

Final 30 Credit Hours. The final 30 credit hours of a degree program must be completed with Texas Tech enrollments. Credit for courses (other than TTU) taken without prior approval from the associate dean in the Student Division may not be applied to degree program requirements.

Degree Plan and Intention to Graduate. Students are encouraged to file degree plans with the student division office as soon as their academic goals are clearly defined. Students must file degree plans upon completing 60 hours of coursework. In addition, the Intention to Graduate form must be submitted upon completion of 80 hours of coursework. Students who have completed 80 or more hours will have a hold placed on their records until they file the Intention to Graduate form.

Teacher Education. The curricula of most of the Bachelor of Arts degree programs and some of the Bachelor of Science programs are 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. Prospective teachers should refer to the College of Education section of this catalog as well as consult the College of Education and the chairperson or undergraduate advisor of the department in which they wish to major.

Second Bachelor's Degree. Permission to enroll in courses to pursue a second bachelor's degree must be obtained at the Student Division office (102 Holden Hall). No second bachelor's degree is conferred until the candidate has completed at least 30 semester hours in the major in residence. These hours are in addition to the courses counted toward the first bachelor's degree. Credit by examination and correspondence courses will not satisfy the 30-hour residence requirement. A second bachelor's degree sought by a student who did not graduate from a public Texas university must include the required Core Curriculum.

Undergraduate Degree Programs

General Degree Requirements

Requirements for the degree of Bachelor of Arts apply to all baccalaureate degrees offered through the College of Arts and Sciences unless specifically shown to the contrary. Not more than 24 hours in agriculture, architecture, business administration, education, engineering, human sciences, mass communications, and/or visual and performing arts may be counted (and not more than 6 additional hours if the minor is taken outside Arts and Sciences). In addition, students will be allowed 3 to 6 hours in visual and performing arts to fulfill the general degree requirement.

Major, Minor, and Electives

Students must take major, minor, and elective courses sufficient to total 120 semester hours, although some majors may require more total hours.

The minor may be any departmental minor, an established interdisciplinary minor, or a student-initiated interdisciplinary minor (with approval of the associate dean in the Student Division of the College of Arts and Sciences).

Many departments and programs have residency requirements for the major and minor. See departmental or program listings for specific information. Courses used to fulfill the writing intensive requirement are to be taken in residence.

Students should have selected their major and minor fields by the time they reach their junior year. For the major subject they will be required to complete a minimum of 30 to 36 semester hours, including 6 hours of intensive writing courses. As indicated in the degree programs on the following pages, some majors require more than the 30-hour minimum. At least 18 to 24 hours of the major subject must be in courses at the junior-senior level. For the minor, a minimum of 18 semester hours must be completed (except in certain foreign languages as explained in the curriculum for languages), at least 6 of which must be of junior or senior level. All courses in the major and minor must be approved by the appropriate academic unit. Students are expected to develop a degree plan no later than the first semester of the junior year. Forms and information are available in department offices.

A minimum of 40 semester hours of junior and senior work must be presented; not more than 8 hours may be counted in applied music and/or music ensemble; not more than 8 hours of personal fitness and wellness as well as exercise and sport sciences activity courses may be counted except for students offering exercise and sport sciences as a major, minor, or specialization.

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; arts; mathematics; and social, behavioral, and natural sciences. It also provides the factual basis and the insights requisite for specialized study and professional work in these fields.

General Requirements. See “Undergraduate Credit by Examination” in the Admissions section of this catalog for information on credit provided by test scores to meet these requirements. Students must take the specified number of hours in the areas listed below. With a few exceptions, courses from the major and minor may be used to satisfy these requirements. Except for the multicultural requirement, a course may not be counted in two different areas of the general requirements nor may a course be counted in requirements for both the major and minor.

	Semester Hours
English	12
The 12 hours of English must consist of ENGL 1301 and 1302 and two literature courses (which excludes ENGL 2311, 2371, 3360, 3365, 3366, 3367, 3368, 3369, 3371, 3372, 3373, 4300, 4360, 4365, 4366, 4367, 4368, 4369, 4373, 4378, and 4380 as they are not literature courses). However, ENGL 2311 or CLAS 1310 may be used as equivalents to fulfill 3 hours of this requirement.	
Oral Communication	3
COMS 1300, 2300 or 3358, CH E 2306, MGT 3373 (MGT 3373 may not be taken by correspondence), PETR 3308.	
Foreign Language	11-16
A student must complete 6 hours at the sophomore level or above in a single language. If 4 or more semesters of high school foreign language are accepted for admission, the student should consult the information preceding the course listing for the foreign language department. A student enrolling in the first-year sequence will have a requirement of 11-16 hours. A student who enrolls in the second-year sequence will have a 6-hour requirement. International students whose native language is not English and who graduated from a secondary school in their native country may satisfy this requirement by bringing their certificate of graduation to the Student Division of the Arts and Sciences Dean's Office. Credit by examination through the language laboratory is available for the following languages: French, German, Latin, and Spanish. Students who petition to complete the foreign language requirement via study abroad through a non-Texas Tech affiliated program will agree to have foreign language credit applied to their degrees based on scores on a language placement test administered by the language laboratory upon their return from the study abroad. Approval to do this must be granted in advance by the Associate Dean. For more information, consult the Department of Classical and Modern Languages and Literatures.	
Mathematics and Logical Reasoning	6
All mathematics courses 1300 and above (except 3430) may be used. Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply. PHIL 2310 or 4310 may be used to satisfy 3 hours of this requirement. The following courses from the Core Curriculum may not be used: AAEC 3401, I E 3341, MUTH 3303, PSY 3400, and SOC 3391.	
Natural Science	8-11
If 4 or more high school semesters of natural laboratory science (not including general, physical, or applied science) are accepted for admission, the requirement is 8 hours; if not, the requirement is 11 hours. The first 8 hours of a student's requirement must come from the natural science laboratory courses listed in the Core Curriculum. Additional required credit hours may come from those courses or from ANTH 3310, 3311, 4341, GEOG 3335, 4301, 4321, or HONS 3302.	
Technology and Applied Science	3
Courses must be selected from the list of Core Curriculum options.	
Individual or Group Behavior	6
Three hours must come from courses in individual or group behavior approved for Core Curriculum requirements. The other 3 hours may come from the same list or from anthropology, economics, geography, political science, psychology, sociology,	

and social work but excluding courses cited as options for any other requirement.

American History	6
Students will normally enroll in HIST 2300 and 2301 although any American history courses will satisfy this requirement.	
Political Science	6
Students will enroll in POLS 1301 and normally in 2302. For more information, see the Department of Political Science section of this catalog. One course must be taken from a Texas college or university.	
Humanities	6
ADM 3312; ANTH 3323, 3325, 3346, 3351; ARCH 2311, 2315; CLAS 3302, 3303, 3320, 3330, 3350; Classical and Modern Languages (except those used to fulfill the foreign language requirement); C LT 4305; COMS 3311, 3318; English (except ENGL 2311, 3365, 3366, 3367, 3368, 3369, 4365, 4366, 4367, 4378, 4380); History (except those used to fulfill U.S. history requirement); HONS 2301, 2302; JOUR 3350; LAIS 2300, 3300, 4300; LARC 3302; NHH 1301; PHIL (except 1310, 2310, 3321, 3330, 3331, 4310); POLS 3330, 3331, 3332, 3333; SLAV 3301; VPA 3301; W S 2300, 3341, 4327, 4374.	
Visual and Performing Arts	6
Art (except ART 3311, 3362, 4315), ARCH 1412, 1441, 1442, DAN 3313, 4301, HONS 1304, 3304, LARC 1401, MUAP 1001, 1002, 1123, 1124, 2001, 2002, 2123, 2124, 2133, 2134, 3001, 3002, 3205, 4001, 4002, MUCP 1201, 1202, any MUEN course except 1103, MUHL 1301, 1302, 1308, 2301, 2302, 2308, 2309, 3304, 3308, MUSI 2301, MUTH 1300, 1301 and 1101, 1303 and 1103, 1304 and 1104, TH A 2301, 2303, 2304, 3308, 3309, 4303, SPAN 4392.	
Multicultural Requirement	3
3 hours of coursework chosen from the Core Curriculum requirements approved list. This course may also be used to satisfy another general degree requirement listed above.	
Personal Fitness and Wellness	2
To satisfy the College of Arts and Sciences requirement of 2 hours of personal fitness and wellness, students are to complete successfully any two PF&W courses. For a specific physical activity, the completion of the course sequence is allowed if the sequence is taken in the appropriate order (i.e., beginning then advanced). Only exercise and sport science majors may satisfy this requirement with ESS activities courses. Also accepted for fulfilling the requirement are AERS 1105, 1106, DAN 1105, 1206, 2202, MILS 1101, 1102, 3301, 3302, 4301, 4302, and MUEN 1103. Students over age 25 are exempt. Any student who has served honorably in the U.S. Armed Forces for a minimum of 90 days may receive credit for 2 semester hours in personal fitness and wellness. Application for this credit must be made in the first semester of attendance at the university. Students participating in varsity athletics may enroll in the PF&W course that corresponds to their varsity sport. A maximum of one credit hour per academic year per sport may be earned in this manner.	

Bachelor of General Studies

The B.G.S. is a unique program for students who wish to study multiple fields in equivalent depth. As an interdisciplinary liberal arts degree, it requires the same general requirements as the Bachelor of Arts degree. Instead of a major and minor, the student selects three concentration areas, each of which meets the minimum requirements of an existing departmental or interdisciplinary minor. Together, the three concentration areas (minor fields) formulate a coherent specialization of interest to the student that is unavailable elsewhere in the university as an organized program of study. The student chooses the three concentrations in consultation with the B.G.S. advisor. Each concentration area consists of a minimum of 18 hours in the chosen discipline, for a total of 54 hours across the three areas. Through these self-selected concentration areas, forming an integrated specialization, and with a liberal arts foundation, the B.G.S. degree can prepare a student to pursue an intellectual interest, a career goal, or graduate or professional study. For example, a student might focus on a specialization in “science journalism” with concentrations made of minors in biology, chemistry, and journalism. Or one might specialize in “His-

panic studies” using concentrations made of minors in Spanish, history, and Latin American and Iberian studies. Likewise, a student might fulfill coursework in preparation for medical school by forming concentration areas after minors in biology, biochemistry, and psychology; or for law school by basing the concentrations on minors in political science, history, and English. Students who wish to earn teacher certification at the secondary level could make two concentration areas out of the subject matter fields and the third concentration area out of the requisite education courses.

Admission Requirements. A GPA of 2.0 is required. Students declare the general studies major just as they do any major. A visit with the general studies advisor (806.742.3831) is the best place to start. Students who permanently reside at a distance from Texas Tech and who are unable to travel to campus to attend classes may pursue the degree externally using print-based and Internet courses through the Division of Outreach and Distance Education. For information about Distance Education, call 806.742.7200 or visit www.ode.ttu.edu.

Graduation Requirements. Requirements for the B.A. degree apply to the B.G.S. degree. The student’s official catalog will be the catalog current when the student officially enters the B.G.S. program. All coursework in the general degree requirements, the three concentration areas, and electives must total a minimum of 120 semester hours. Each concentration area shall include 9 hours of Texas Tech coursework, 6 hours at the junior-senior level. Students should be aware that the later one enters the program the greater likelihood of needing more than the minimum total hours to complete the program, due to possible incompatibility of earlier completed courses with the selected concentration areas and general degree requirements. Similarly, prerequisites for courses selected in the concentration areas must be completed and, depending on the concentration, may not count toward the 18-hour minimum. At least 6 hours of upper-division coursework is required in each concentration area, with a total of 40 upper-division hours required for the degree. Students wishing to develop a concentration area based on a minor in the College of Mass Communications, the Rawls College of Business, or the College of Human Sciences must meet the GPA standard and complete necessary prerequisites to take those courses. Alternatively, students having an interest to develop a business or finance oriented concentration may do so, with guidance and approval of appropriate advisors, using courses from such disciplines as economics, personal financial planning, agricultural economics, consumer science, and retailing. Departmental requirements for entering these courses must be met.

Research Option. Highly motivated and focused students may wish to culminate the integration of concentration areas in a written research project supervised by a student-selected faculty member from one of the concentration areas. This can be done by selecting individual research or individual studies courses for the final 6 hours of coursework in one or more of the concentrations. Under the direction of a faculty member, such courses engage the student in readings, research, or an applied project related to the concentration areas. The faculty member may recommend, or the student may elect, that the project be evaluated by at least one other faculty member from each of the other concentration areas.

Bachelor of General Studies with Global Affairs Specialization. This specially structured interdisciplinary program is for students interested in pursuing global careers with the U.S. government, international organizations, nongovernmental organizations, private voluntary organizations, or further academic studies in related fields. The specialization consists of three inter-related minors, or concentration areas, of at least 18 hours each. All students will take the international studies minor as one concentration area. Working closely with the global affairs specialization advisor, students may choose the other two concentration areas from minors that offer substantial international content, in accord with their interests and career goals. For example, a student might choose one concentration area from the existing interdisciplinary studies minor programs, such as Asian studies, European studies,

Russian language and area studies, or Latin American and Iberian studies. The other concentration area could be from a social science discipline, history, additional foreign language study, or another field that fits the student’s individual needs and interests. Students will consult with the program advisor to ensure that the areas of concentration they choose, in addition to the international studies minor, fit with the specialization’s requirements. (Note: In lieu of the B.G.S. program, students seeking a concentration in international economics should consider the Bachelor of Science in International Economics degree offered by the Department of Economics and Geography.) To complete the B.G.S. degree requirements for this specialization successfully, students must demonstrate proficiency in a foreign language by taking a minimum of two courses at a junior or senior level. Students can select language study as one of their three areas of concentration. The research option of the general studies degree is available to students in the global affairs specialization. To enhance their language and inter-cultural skills, students taking the specialization are strongly encouraged to undertake one semester of study abroad at one of Texas Tech’s international centers or through an affiliated program. The program advisor will work with students to assure that their degree plans comprehensively address their areas of interest. **Contact information:** Dr. John Barkdull, Department of Political Science, 227 Holden Hall, 806.742.4043, john.barkdull@ttu.edu

Bachelor of Science

The B.S. degree permits a greater degree of specialization than the B.A. and is offered by the Departments of Biological Sciences; Chemistry and Biochemistry; Economics and Geography; Geosciences; Health, Exercise, and Sport Sciences; Mathematics and Statistics; and Physics. Requirements for the B.A. degree apply unless specifically shown to the contrary. The following courses are required for the B.S. degree:

Semester Hours

English	12
Oral Communication	3
Foreign Language	11-16
Mathematics and Logical Reasoning	6
Political Science and History	12
Natural Science	8
Technology and Applied Science	3
Individual or Group Behavior	3
Humanities	3
Three hours of literature taken in the English requirement will also satisfy this requirement.	
Visual and Performing Arts	3
Personal Fitness and Wellness	2
Multicultural Requirement	3
Three hours of coursework chosen from the Core Curriculum requirements approved list. This course may be used to satisfy another general degree requirement.	
Major	(min.) 36
(Including a minimum of 24 junior-senior hours)	
Minor	(min.) 18
Including a minimum of 6 junior-senior hours. The minor may be any departmental minor, an established interdisciplinary minor approved by the major department, or a student-initiated minor approved by the associate dean.	
Adjunct Requirements	As required
Requirements determined by the major department as essential to supplement the major.	
Total for Degree	(min.) 121

Specific curricula are provided for all programs leading to the Bachelor of Science degree. Students are expected to follow the suggestions and recommendations contained in the department sections of this catalog.

Bachelor of Science in International Economics

The B.S.I.E. provides understanding of international economic and commercial relationships through concentrations of coursework in international economics, international politics, and international business. This understanding is important for a variety of careers with either direct or indirect international aspects. Requirements for the B.S. degree apply unless specifically shown to the contrary. The following courses are required for the B.S.I.E. degree:

	<i>Semester Hours</i>
English	12
(Inc. ENGL 2311 and any ENGL literature course)	
Foreign Language	11-16
Mathematics	6
(MATH 1330 and 1331 or more advanced courses)	
Political Science and History	12
Personal Fitness and Wellness	2
Oral Communication	3
Natural (Laboratory) Science	8
Technology and Applied Science	3
Humanities	3
Three hours of literature taken in the English requirement will also satisfy this requirement.	
Visual and Performing Arts	3
Individual or Group Behavior	3
(May be satisfied with courses taken in major)	
Multicultural Requirement	3
Three hours of coursework chosen from the Core Curriculum requirements approved list. This course may be used to satisfy another general degree requirement.	
Economics and International Economics	30
ECO 2301, 2302, 3311, 3312, 3330, 3333, 4331, 4332, and two advanced elective courses in ECO.	
International Business, Managerial Economics and Quantitative Tools	18-19
Basic Statistics AAEC 3401 or MATH 2345 or 2300, five of the following:* ACCT 2300 and 2301 (counted as one), MKT 4358, MGT 4375, ECO 3320, ECO 4305 or AAEC 4312, AAEC 4302, 4306, 4317, FIN 3320, 4328, ISQS 3343, 3344, FREN 4304, SPAN 3306, 3344, 4308, 4344, GERM 3301, 4309, RUSN 3304	
International Political Science	9
Three of the following: POLS 3360, 3361, 3363, 3364, 3366, 3371, 3372, 3373, 3374, 3375, 3376, 3378.	
Elective Courses	0-9
Total for Degree	(min.) 121

* GPA requirement must be satisfied to enroll in courses administered by the Rawls College of Business (ACCT, MKT, MGT, FIN, ISQS).

For more information and academic advisement, contact the Department of Economics and Geography.

'3+3' Early Admission Joint Program With Texas Tech School of Law

Honors students in good standing who are working toward the B.A., B.S., B.F.A., B.M., or B.G.S. degree in the College of Arts and Sciences, the College of Visual and Performing Arts, or the Honors College may gain early admission to the Texas Tech University School of Law by completing coursework totaling a minimum of 100 semester hours in their undergraduate college and then completing the first year of coursework at the Texas Tech School of Law. To be eligible to participate in this program, students must meet all of the following criteria:

- Have an undergraduate GPA of at least 3.5.
- Have an LSAT score that places them in the top half nationwide.
- Have an SAT of at least 1300 or an ACT of at least 29.
- Be enrolled in the Honors College and making satisfactory progress toward an Arts and Sciences B.A. or B.S. degree consistent with the regulations established by the College of Arts and Sciences and the Honors College.
- Submit an Honors certification form to the Honors College at the time of application to the Law School.

Of the 100 semester hours of undergraduate work, at least the last 30 must be completed from Texas Tech. 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. (Note that the Honors College residency requirement generally requires a minimum of three long semesters of work from Texas Tech for Honors graduation.)

The 100 hours of work must satisfy all graduation requirements for the B.A. or B.S. degree in the College of Arts and Sciences at Texas Tech, with the exception of requirements in the minor. Honors students must complete the minimum requirements for an Honors College designation as outlined in the *Honors Student Handbook*.

To earn the baccalaureate degree, the applicant for a degree under this plan must submit an official transcript from the Texas Tech School of Law following completion of the first year of coursework in the School of Law. Evidence of the successful completion of the first year of law school coursework (totaling 29 hours) will substitute for the 18 hours required for the minor and any electives needed (totaling up to 11 hours) for the baccalaureate degree.

The total number of credit hours from outside the College of Arts and Sciences (including those transferred as non-Arts and Sciences credit) and the credit hours from the School of Law applied to the baccalaureate degree cannot exceed 30 hours.

Any student selecting the "3+3" Early Admission Program option should plan carefully in consultation with the associate deans of the Honors College and the College of Arts and Sciences at least one year prior to beginning professional school. Due to the unique nature of the law school application process, students are strongly encouraged to meet with the Assistant Dean for Admissions at the School of Law at least two years prior to the desired start date for law school. Students must apply for the "3+3" program during the fall semester of their third year and must take the LSAT by December of that year. The Admissions Committee applies the same standards and procedures to both "3+3" applicants and traditional admission applicants. Students wishing to pursue the "3+3" program also must file a degree plan with an Arts and Sciences major and a Law minor at least one semester prior to beginning their coursework in the School of Law.

Further information may be found at www.prelaw.ttu.edu, www.honr.ttu.edu, and www.law.ttu.edu/lawWeb/prospective/specialprograms/3plus3Program.shtm.

Interdisciplinary Programs

Asian Studies

The minor in Asian studies allows students throughout the university to develop expertise in a vital part of the world. Besides taking core courses and electives drawn from a wide range of disciplines, including architecture, geography, history, philosophy, and political science, students may also study Asian languages such as Chinese, Japanese, or Vietnamese. The minor in Asian Studies requires 18 hours of coursework in addition to the courses taken to fulfill a student's major. **Contact information:** Dr. Patricia Pelley, Department of History, 806.742.1004 ext. 242, patricia.pelley@ttu.edu.

Community and Urban Studies

The College of Arts and Sciences offers an interdisciplinary minor in community and urban studies. The program consists of an integrated course of study that provides the student with a conceptual and theoretical foundation for recognizing and approaching urban problems. An opportunity is also provided for observation and analysis of community and urban affairs. The program includes core courses in architecture, economics, geography, history, political science, and sociology as well as elective courses in architecture, business administration, economics, geography, history, landscape architecture, political science, sociology, and social work. **Contact information:** Dr. Yung-mei Tsai, 162 Holden Hall, 806.742.2401 ext. 233, FAX 806.742.1088, yung.mei.tsai@ttu.edu.

Arts and Sciences

Comparative Literature

Undergraduate Program

Comparative literature is designed for students who are interested in critical studies of literatures and cultures across national boundaries. The program provides a minor for the Bachelor of Arts degree. The minor consists of 18 hours of courses, 3 hours of which must be at the 4000 level. Students may apply 6 hours of sophomore-level coursework from either the Department of Classical and Modern Languages and Literatures or the Department of English if such coursework is not in the student's major field. Students not majoring in a foreign language must complete at least 3 hours at the junior or senior level in a foreign language. Comparative literature minors must take at least 6 hours from the following courses: CLAS 3350, C LT 4300, 4305, 4317, ENGL 3337, 3384, 3389, GERM 4312, HUM 2301, 2302, SLAV 3301, and W S 4310. Individual minor programs are arranged by the student and the director of the comparative literature program. This minor may not include coursework in the student's major field unless such coursework is over and above the minimum catalog requirements for the major. **Contact information:** Dr. Yuan Shu, Department of English, 806.742.2500 ext. 240, yuan.shu@ttu.edu

Undergraduate Courses in Comparative Literature (C LT)

4300. **Individual Studies in Comparative Literature (3).** Independent study in comparative literature under the guidance of a faculty member. May be repeated for credit with the consent of instructor.
4305. **Contemporary Theories of Cultural Meaning (3:3:0).** Introduction to the most important contemporary theories on the nature and origin of meaning in culture.
4317. **Readings in Comparative Literature and Culture (3:3:0).** Readings from a particular period or study of a literary theme or genre. May be repeated for credit with consent of instructor.

Dramatic Writing

The Departments of English and Theatre and Dance as well as the College of Mass Communications offer an interdisciplinary minor in dramatic writing. The program is designed to prepare students to write scripts for cinema, television, and stage productions. The minor consists of 21 hours—12 in writing and 9 in analysis. The 12 hours in writing are to be chosen from the following courses and must include at least one course from each department: ENGL 3351, 4351, EM&C 4370, 4375, and TH A 4303 (may be repeated for credit). The 9 hours in analysis will include EM&C 3345, TH A 3335, and one course of either ENGL 3388, 4312, or 4315. Courses in which the student earns less than a C may not be counted toward the minor. This 21-hour requirement may not include courses taken to fulfill requirements in the student's major field. **Contact information:** Dr. Norman Bert, University Theatre, norman.bert@ttu.edu, 806.742.3601 ext. 223

Environmental Studies

The college offers an interdisciplinary minor in environmental studies. This minor is nontechnical in nature and is specifically designed for students seeking the Bachelor of Arts degree. Its focus is on the interaction of humans and the natural environment and the consequences of that interaction. The environmental studies minor does not seek to train professional environmentalists, but in combination with existing major programs, it will give the student a broad foundation for more advanced environmental studies programs, professional work in law, regional planning or resource management, various environmental positions in government, business, or teaching. The plan will also provide students with a better understanding of basic ecology and the nature of environmental problems so that they can make more knowledgeable value judgments on environmental issues, a vital concern in the contemporary world. The minor consists of 18 hours of elective courses.

Graduate Program / Comparative Literature

Administered by the Comparative Literature Committee, this interdisciplinary specialization gives students the opportunity to study literature from a global perspective, to study two or more national literatures, and to concentrate attention upon the following special fields: periods, genres, theories, or relationships between literatures and other arts and disciplines.

Majors in classical humanities, English, French, German, and Spanish with specializations in comparative literature are available at the master's level. At the doctoral level, majors are offered in English and Spanish with specializations in comparative literature. Students specializing in comparative literature at both the M.A. and Ph.D. levels must be admitted to the program in which they plan to major (e.g., English, Spanish). The graduate advisor of the program in comparative literature oversees the preparation of the comparative literature specialization.

Comparative literature candidates who are not international students should have completed sufficient language study to begin or continue graduate work in the literature of at least two languages. Inquiries concerning sound preparation for specializations in comparative literature at the master's and doctor's level should be addressed to the graduate advisor of the program in comparative literature.

Students are required to take at least five courses for the specialization at the master's level, including at least two graduate literature courses in languages other than their major and at least two graduate comparative literature (C LT) courses. The fifth course may be an interdisciplinary elective approved by

the graduate advisor of the comparative literature program. Degree plans must be approved by both the student's major advisor and the graduate advisor in comparative literature.

At the Ph.D. level, the specialization involves a minimum of six courses, including at least two in comparative literature (C LT) and at least three graduate courses taught in one or more foreign languages. The sixth course may be an interdisciplinary elective approved by the graduate advisor of the comparative literature program. A student's program is supervised by a doctoral committee drawn up in consultation with the student's major advisor and the graduate advisor in comparative literature.

Graduate Courses in Comparative Literature (C LT)

5301. **Theories of Literature (3:3:0).** Intensive exploration of selected theories or methodologies of literary study. May be repeated.
5310. **Literature and Cultural Studies (3:3:0).** Places a variety of national literatures in relation to other cultural institutions and structures. May be repeated for credit. Readings in English.
5314. **Literature and Gender (3:3:0).** Examines the representation of gender in various national literatures. May be repeated for credit.
5355. **Studies in Comparative Literature (3:3:0).** Practice of the study of comparative literature with emphasis on themes and motifs. (ENGL 5355)
7000. **Research (V1-12).**

No more than 6 hours from any department or program may count toward the minor. At least 6 hours must be from upper-division courses. Electives in the program include: AAEC 4313, ANTH 3314, 3317, ATMO 1300, 2301, BIOL 1305, 1401, 1402, 3303, 3307, 3309, 4310, 4330, 4350, 4392, ECO 3336, ENTX 4000, 4301, GEOG 1401, 3300, 3301, 3310, 3335, 3353, 3360, 4301, 4321, 4357, GEOL 1303, 3322, 3323, HLTH 2302, HIST 3327, 4323, LARC 3302, 4302, 4303, PHIL 3325, PSS 4330, RWFM 2301, 2302, 2305, 2307, 3302, 3307. **Contact information:** Dr. Mark Stoll, Department of History, 806.742.3744, mark.stoll@ttu.edu

European Studies

The interdisciplinary minor in European studies is designed to allow students to pursue interests in European society, culture, history, and politics. It offers them the opportunity to deepen their knowledge of the European continent from the British Isles to Russia and interactions between Europe and the wider world from ancient times to the postcolonial present. The program builds upon strengths of the Texas Tech faculty, invites students to take advantage of academic activities outside the classroom, and encourages study in Europe. The minor targets students with interests in the humanities and social sciences, fine and performing arts, and law and business. A European studies minor touching on contemporary European affairs, including European integration, would suit students planning graduate study in arts and sciences and anticipating careers in education, law, business, government, and nongovernmental agencies.

The minor consists of 18 hours of coursework divided into two tracks: Historical and Social Sciences (HSS) and Arts and Humanities (AH). Students will take at least 6 hours in each track, but the total hours will number 18. Students will choose from a curriculum that currently includes courses in architecture, art, classical and modern languages and literatures, English, history, music, philosophy, political science and theatre and dance. Students are encouraged to take appropriate courses in a European country. They also should take at least one course in a European language other than English (or a course on an appropriate literature in translation) beyond the basic foreign language requirement in the College of Arts and Sciences. Those basic courses and sophomore-level English courses will not count towards the minor. **Contact information:** Dr. Aliza Wong, Department of History, 806.742.3744 ext. 227, aliza.wong@ttu.edu

Family Life Studies

The Colleges of Arts and Sciences and Human Sciences jointly offer an interdisciplinary minor in family life studies. The program involves an integrated course of study and provides the student with a variety of perspectives on the family. The minor consists of 18 hours chosen from several disciplines. No more than 6 hours may be taken from any one department. Courses counted toward the major will not count toward the minor. At least 6 hours must be at the junior-senior level.

Courses may be selected from the following: COMS 3333, 3334, HLTH 1300, 1305, 1307, 3313, 3314, 4312, HDFS 2303, 2322, 3301, 3320, 3321, 3322, 3324, 3326, 3331, 3332, 3350, HIST 3323, 3341, 4325, 4326, 4374, 4380, PFP 2325, 3301, PSY 3341, 4300, 4301, SOC 2331, 3325, 3331, S W 3311, 3312.

Contact information: Dr. Charlotte Dunham, Department of Sociology, Anthropology, and Social Work, 806.742.2401 ext. 226, charlotte.dunham@ttu.edu

Ethnic Studies

Undergraduate Program

The college offers an interdisciplinary minor in ethnic studies. The goals of the program are to increase students' understanding of the nature and development of race relations and to stimulate a greater sense of dignity for minority students. Students may, if they wish, specialize in African-American, Mexican-American, or Native-American studies. All students minoring in ethnic studies must complete at least 18 hours in ethnic content courses. No more than three courses may be taken in one department. Electives in the program include, but are not limited to, the following courses: ANTH 1301, 2301, 2302, 3325, 3331, 3345, 3347, 3371, 4372, ART 3311, 4315, COMS 3332, ENGL 3322, HIST 3311, 3312, 3318, 3324, 3325, 3326, 3395, 4326, 4383, MUHL 3304, PSY 3305, SOC 3324, 4362, SPAN 4320, 4360. **Contact information:** Dr. Julian Perez, Department of Classical and Modern Languages and Literatures, 806.742.1562, julian.perez@ttu.edu

Graduate Program / Ethnic Studies

Ethnic studies is offered as an interdisciplinary minor for students who may find a greater knowledge of ethnic groups and majority-minority relations a useful complement to their major area of study. With the continued prominence of public issues related to race and ethnicity, students from diverse fields may benefit from either a broader or a more specialized knowledge of ethnicity. Students may focus on African-American, Mexican-American, or Native-American studies. The Ethnic Studies Committee, which is comprised of faculty from the departments offering courses acceptable as part of the minor, supervises the minor degree plans.

A doctoral minor consists of at least 15 hours of ethnic studies courses to be taken in at least two departments outside the student's major field. A minor at the master's level consists of 6 hours of ethnic studies courses in two departments outside the major. General rules of the Graduate School governing minors at both degree levels apply.

Courses in the ethnic studies program include, but are not limited to the following:

Graduate Program Courses

ANTH 5322	Social Anthropology (3:3:0)
ANTH 5323*	Topics in Cultural Anthropology (3:3:0)
ANTH 7000*	Research (V1-12)
ART 5315	Arts of the Indian Americas (3:3:0)
COMS 5302	Intercultural Communication (3:3:0)
ECO 7000*	Research (V1-12)
EDBL 5332*	Foundations of Bilingual Education (3:3:0)
EDBL 5333*	Teaching the Multicultural-Multilingual Student (3:3:0)
EDEC 5314	Early Education for Culturally Diverse Children (3:3:0)
EDCI 7000*	Research (V1-12)
EDEL 7000*	Research (V1-12)
HIST 5319	Studies in Native-American History (3:3:0)
HIST 5333	Studies in African-American History (3:3:0)
HIST 6304*	Seminar in American History (3:3:0)
HIST 7000*	Research (V1-12)
POLS 5327*	Selected Topics in American Government and Politics (3:3:0)
POLS 7000*	Research (V1-12)
PSY 5332	Stereotypes and Prejudice (3:3:0)
SOC 5312	Seminar in Urban Problems (3:3:0)
SOC 5313	Seminar in Minority Relations (3:3:0)
SOC 7000*	Research (V1-12)
SPAN 5381	Hispanic Literature of the Southwest (3:3:0)
SPAN 7000*	Research (V1-12)

* Courses marked with an asterisk will be considered acceptable as part of the minor when the topic studied deals with ethnic groups.

Forensic Sciences

The goal of the interdisciplinary minor is to offer students the opportunity to take courses pertinent to scientific and methodological issues associated with crime investigation and criminal behavior. All students minoring in forensic sciences must complete at least 18 hours in designated forensic-related courses. No more than 12 hours may be taken in one department or program. At least 12 hours must be taken in upper-division courses. Courses with a grade of D cannot be counted toward fulfillment of the minor. At least 6 hours of upper-division courses must be taken at Texas Tech. All students who are enrolled in the forensic sciences minor are required to enroll in the introductory forensic science course PHYS 2351 or ANTH 3300.

Course options in the physical and biological sciences include CHEM 3141, 3341, 4010, 4114, 4314, PHYS 2351, BIOL 3416, MBIO 3401, ZOOL 4321, ENTX 4325, 4326, ANTH 2305, 4343, and AHMT 4305.

Course options in the social and behavioral sciences include ANTH 2305, 3300, 4343, PSY 4000, 4384, SOC 3327, 3329, 3335, 4325, 4327, and NURS 3365.

Designated courses may require prerequisites before the student can enroll in them. Consult the catalog or contact the specific instructors for details. Prerequisite courses (except PHYS 2351 and ANTH 2305) do not count toward the minor. Cross-listed courses that are required by the major cannot be counted toward the minor.

Contact information: Dr. Robert Paine; Department of Sociology, Anthropology, and Social Work; 806.742.2401 ext. 241; robert.paine@ttu.edu

General Studies

For a description of the General Studies degree program, see "Bachelor of General Studies" in the "Undergraduate Degree Programs" section of the College of Arts and Sciences.

Courses in General Studies (G ST)

- 2001. **General Studies Abroad (VI-12).** Individual studies in interdisciplinary, international, and multicultural experiences.
- 2300. **Introduction to General Studies (3).** An optional individual studies course to assist the student in developing an interdisciplinary plan of study for the Bachelor of General Studies degree.
- 4000. **Internship in General Studies (VI-6).** Supervised internship with government, profit, and nonprofit offices and agencies including congressional offices in Washington, D.C. Open to all undergraduate students at Texas Tech.
- 4300. **Senior Thesis or Project (3).** Preparation of an optional senior thesis or project for the Bachelor of General Studies degree. Students should take the course the first long semester of the senior year. May be repeated for credit with approval.

Geographic Information Science

The College of Arts and Sciences offers an interdisciplinary minor in geographic information science (GIS). The minor is designed to give students a technical background in GIS and related technologies. These skills supplement a wide variety of majors in which spatial information is analyzed. The minor consists of 18 hours, with three required courses and three electives. The required courses include (1) GEOG 3300 or GEOL 3428; (2) GEOG 4302, RWF 4315, or GEOL 4332; and (3) GEOG 3335, RWF 4403, or GEOL 4331. Three electives can be chosen from ISQS 2340 or AGSC 2300, GEOG 3335, 4310, 4400, ISQS 2341, 3348, MATH 2300, ENGL 2311, 3365. Course substitutions are allowed, if approved by the director. Because this is interdisciplinary, no more than two

courses from the student's major department may be used toward the GIS minor. **Contact information:** Dr. Jeff Lee, Department of Economics and Geography, 806.742.2466 ext. 247, jeff.lee@ttu.edu.

International Studies

An interdisciplinary minor in international studies is offered for students who wish to gain an understanding of how the nations of the world are economically, politically, socially, and culturally interdependent. The minor is made up of a 9-hour core of required courses and 9 hours of electives. The core courses are ECO 3333, International Economics; GEOG 2351, Regional Geography of the World; and POLS 3361, International Politics. The advisor may allow substitutions in the core when it can be shown that they fit in with the student's major program and academic objectives. Elective courses are selected from among courses that deal with international topics in departments within the College of Arts and Sciences. Courses from other colleges may be accepted if they have been previously approved by the program advisors. The international studies minor is a required concentration area in the global affairs specialization for the Bachelor of General Studies degree. **Contact information:** Dr. John Barkdull, Department of Political Science, john.barkdull@ttu.edu, 806.742.3121

Latin American and Iberian Studies (LAIS)

Undergraduate Program

A major in Latin American and Iberian Studies for a Bachelor of Arts degree consists of coursework in several departments. It requires 30 semester hours, which must be completed as follows:

Area I (9 hours): Upper-division Latin American and Iberian content courses in Spanish and/or Portuguese.

Area II (9 hours): Latin American anthropology, art, history, geography, economics, and U.S. Latino literature courses.

Area III (6 hours): Latin American history and political science courses.

Interdisciplinary Courses (6 hours): LAIS 2300 and 3300 or 4300.

With prior approval, students may plan programs at variance with the above requirements to meet their special interests. A minimum of 9 hours of courses in the major and 6 hours in the minor must be taken in residence at Texas Tech University.

A minor in Latin American and Iberian Studies consists of 18 hours of content courses taken from those approved for the major in this program. These 18 hours may not include work in the student's major field and must be taken in at least two of the three areas represented in the program. LAIS 2300 and 3300 or 4300 are required. In addition, the standard requirements for a B.A. degree must be met. **Contact information:** Dr. Alberto Julian Perez, Box 42071, 256 Foreign Languages, 806.742.1562, julian.perez@ttu.edu

Undergraduate Courses in Latin American and Iberian Studies (LAIS)

- 2300. **Latin America and Iberia: An Interdisciplinary Introduction (3:3:0).** A basic survey of Latin American and Iberian culture and civilization.
- 3300. **Topics in Latin American and Iberian Studies (3:3:0).** Selected multidisciplinary readings dealing with different topics of Latin American and Iberian culture, literature, history and politics.
- 4300. **Seminar in Latin American and Iberian Studies (3:3:0).** Interdisciplinary studies in selected Latin American and Iberian topics. Readings and lectures in English. May be repeated once for credit with permission of the director.

Graduate Program / Latin American and Iberian Studies

The Latin American and Iberian Studies Committee administers a doctoral minor in Latin American and Iberian Studies. The minor consists of 18 hours of graduate-level courses taken in the participating departments and approved by the student's doctoral committee. No courses from the student's major field may be included in the minor. At least two different areas must be represented in the minor, and the maximum number of hours permitted in any one field is 9. Doctoral minors in the program must demonstrate competency, as determined by the student's committee, in Spanish and Portuguese except in special circumstances.

A minor at the master's level shall consist of a minimum of 9 hours in at least two areas outside the major.

Certain courses not listed below may be considered acceptable as part of the minor when the topic studied deals with Latin America or Iberia. Students should contact the course instructor in the department in which the course is offered and the director of Latin American and Iberian Studies to determine if such courses are acceptable.

Contact information: Dr. Alberto Julián Pérez, Department of Classical and Modern Languages and Literatures, 806.742.3145

Graduate Program Courses

ART 5315	Arts of the Indian Americas (3:3:0) (when course deals with Latin America)
GEOG 5307	NAFTA, Western Hemisphere Trade, and Regional Integration in the Americas (3:3:0)

LAIS 5300
HIST 5355
HIST 5356
POLS 5371

PORT 7000
SPAN 5345
SPAN 5347
SPAN 5348
SPAN 5354
SPAN 5355
SPAN 5361
SPAN 5362
SPAN 5364
SPAN 5366
SPAN 5368
SPAN 5370
SPAN 5374
SPAN 5375
SPAN 5376
SPAN 5378

SPAN 5381

Directed Studies (3:3:0)

Studies in Colonial Latin American History (3:3:0)
Studies in National Latin American History (3:3:0)
Area Studies in Comparative Politics (3:3:0) (when course deals with Latin America or Iberia)
Research (V1-12)
History of the Spanish Language (3:3:0)
Language Development (3:3:0) (offered in Mexico)
Culture and Literature (3:3:0) (offered in Mexico)
Hispanic Literary Concepts (3:3:0)
Seminar in Hispanic Literature (3:3:0)
Medieval Literature (3:3:0)
Golden Age Literature (3:3:0)
Nineteenth-Century Spanish Literature (3:3:0)
Twentieth-Century Spanish Prose (3:3:0)
Twentieth-Century Spanish Theatre and Poetry (3:3:0)
Colonial Spanish American Literature (3:3:0)
Nineteenth-Century Spanish American Literature (3:3:0)
Modernism (3:3:0)
Twentieth-Century Spanish American Prose (3:3:0)
Twentieth-Century Spanish American Theatre and Poetry (3:3:0)
Hispanic Literature of the Southwest (3:3:0)

Graduate Course in LAIS

5300. Directed Studies (3:3:0). Prerequisite: Consent of instructor and Director of Latin American and Iberian Studies. Content will vary to meet the needs of students. May be repeated for credit.

Linguistics

Undergraduate Program

The Interdepartmental Committee on Linguistics offers a minor in linguistics for the B.A. degree. The minor consists of 18 hours of required and elective courses drawn from the Departments of Classical and Modern Languages and Literatures; Communication Studies; English; Mass Communications; Philosophy; Psychology; Sociology, Anthropology, and Social Work; and the Division of Curriculum and Instruction within the College of Education.

Contact information: Dr. Colleen Fitzgerald, Department of English, 806.742.2500, colleen.fitzgerald@ttu.edu or Dr. Jim Holland, Department of Classical and Modern Languages and Literatures, 806.742.1565, jim.holland@ttu.edu.

Linguistics is concerned with (1) the scientific description and analysis of languages; (2) the study of language in its social and cultural context; (3) the evolution and historical development of language; (4) the formal study of communication systems involving the acquisition and use of language; (5) the relation of language to literature, philosophy, and other fields in the humanities; and (6) human biology and neurology as they affect the use of language. Linguistics shares interests with speech, science, psychology, anthropology, sociology, literature, philosophy, and other fields of study. It is, therefore, an interesting and useful minor area for students majoring in these fields and one that can, in many cases, help students in developing an area of academic or professional specialization.

The linguistics minor for the B.A. consists of 18 hours of courses. Of these, it is required that 3 hours be drawn from Group A (general and introductory linguistics courses), 3 hours from Group B (courses dealing intensively with a single language or a restricted group of languages), at least 3 hours from Group C (courses dealing with applied uses of linguistics and historical linguistics), and 3 hours from group D (courses relating linguistics to other fields). The remaining 6 hours may be taken from any group. Students should take only one of ANTH 3305, ENGL 3371, or LING 4335, as

all three are general introductions to linguistics. Students are encouraged to work with a linguistics professor to construct an appropriate individualized program of courses.

Group A — ANTH 3305, ENGL 3371, LING 4335

Group B — ASL 3312, ENGL 3373, FREN 4302, 4306, GERM 4301, LAT 4302, SPAN 4302, 4303

Group C — EDBL 3337, ENGL 3372, 4373, LING 4311

Group D — ANTH 3351, COMS 3332, EDBL 3334, EDLL 3352, ENGL 2371, 4300, MCOM 3300, PHIL 4310, 4331, PSY 4324, 4343

Undergraduate Courses in Linguistics (LING)

4311. Methods of Teaching Second and Foreign Languages (3:3:0). Overview of historical and current methods of teaching second and foreign languages.

4335. Introduction to Linguistics for Second and Foreign Language Education (3:3:0). Basic concepts in linguistics and linguistic analysis as they relate to bilingual education, ESL, and second or foreign language education.



Graduate Program / Linguistics

Graduate study in linguistics may be pursued through either the Department of English or the Department of Classical and Modern Languages and Literatures or students may pursue an interdisciplinary program combining courses not only from these departments but also others.

A Master of Arts degree is offered through the Department of English. Students may select a 36-hour nonthesis or a 30-hour plus thesis option with a concentration in linguistics. The department also offers a doctorate with a concentration in linguistics requiring students to take 18 hours of linguistics and write a dissertation on linguistics under the guidance of English faculty. English also offers a Certificate in Linguistics that can be earned by completing a minimum of 12 hours of linguistics courses in the Department of English. Students may earn a certificate without being admitted to a graduate degree program in the Department of English.

The Department of English offers graduate study focusing on the core areas of linguistics (e.g., syntax, phonology, morphology, semantics) as well as the structure of English, including its historical development and contemporary American dialects. The department includes specialists in East Asian and Native American languages and in Old and Middle English. Limited support is available for teaching assistantships in composition and lower-level courses.

A Master of Arts degree in Applied Linguistics is offered through the Department of Classical and Modern Languages and Literatures. Students may select a 36-hour nonthesis or a 30-hour plus thesis option in either general applied linguistics or in teaching English as a second or foreign language.

The option in general applied linguistics prepares students who plan to design programs for and/or teach second or foreign languages; it also provides a foundation in applied linguistics for students who plan doctoral studies in first and second language acquisition, second and foreign language teaching and learning, language testing and assessment, studies in second language composition, translation, language planning, or corpus linguistics. Both options include work using CML's digital language laboratory and SCOLA (Satellite Communications for Learning) facilities for teaching and research. Faculty from several areas (anthropology, bilingual education, English, language literacy education, mass communications, psychology, and Spanish) offer supporting courses that may count toward the degree.

Candidates must demonstrate knowledge of a language other than English. Oral and comprehensive examinations are required. Limited support is available for teaching assistantships in TESOL and may be available for teaching assistantships in Arabic, American Sign Language, Chinese, and Japanese.

Graduate Courses in Linguistics (LING)

5310. **Second and Foreign Language Testing (3:3:0)**. This course is designed to give language teachers a working knowledge of testing principles applied to second and foreign language classrooms and programs.
5315. **Pedagogical Grammar of Second/Foreign Languages and ESL (3:3:0)**. A study of the role of grammar in interlanguage development, aspects of grammar most frequently taught in second/foreign language and ESL and teaching strategies.
5320. **Second and Foreign Language Composition (3:3:0)**. A study of second and foreign language theories and research in composition learning and teaching and their implications for methods of teaching second and foreign language composition.
5322. **Methods of Teaching Modern Second and Foreign Languages (3:3:0)**. Theory and practice of teaching modern second and foreign languages.
5325. **Technology for Teaching Second and Foreign Languages (3:3:0)**. A study of theory, research, and practice in the use of technology for teaching second and foreign languages including audio, video, CALL, and Internet technologies.
5330. **Second and Foreign Language Acquisition (3:3:0)**. A study of the theories and processes of second and foreign language acquisition, with emphasis on adult learners.
5335. **Introduction to Linguistics for Second and Foreign Language Educators (3:3:0)**. Concepts in linguistics and linguistics analysis as they relate to bilingual education, ESL, and second or foreign languages.
5345. **Seminar in Applied Linguistics (3:3:0)**. Study of current topics of interest in applied linguistics. Course content will vary. May be repeated for credit.
5350. **Second and Foreign Language Curriculum Design (3:3:0)**. Analysis of second and foreign language teaching curriculum design models and application to current language teaching contexts.
5355. **Teaching English in International Contexts (3:3:0)**. This course is designed to prepare students methodologically and professionally for teaching English in international contexts.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Religion Studies

A minor in religion studies is offered to students who wish to enhance their understanding of religion by studying it from a variety of academic perspectives. The program is intended to enable students to place their understanding of religion in the broader frameworks of several academic disciplines.

A minor in religion studies for a baccalaureate degree is composed of courses drawn from several departments in the college. Eighteen hours of coursework are necessary to complete the minor, including courses from at least three disciplines. Four of the courses in the minor must be from the core courses and such courses must be taken from at least two disciplines. Courses taken must reflect the study of at least two religious traditions. The 18 hours may not include courses taken to fulfill requirements in the student's major.

Students may use one independent topics course for the minor when the topic is religion. Prior to registration, the student should consult the director of the program concerning availability of courses and the student's progress in the minor. **Contact information:** Dr. D. Paul Johnson; Department of Sociology, Anthropology, and Social Work; 278A Holden Hall; d.paul.johnson@ttu.edu; 806.742.2400.

Core Courses: ANTH 3323, CLAS 3302, 3350, ENGL 3383, 3384, HIST 3328, 3342, 3344, 4347, 4349, PHIL 2350, 3302, 3324, POLS 3339, PSY 3310, SOC 4331

Other Courses: ANTH 3325, 3346, ART 3317, HIST 3348, 3394, 3395, 3398, 4374, PHIL 2320, POLS 3330, 3332

Russian Language and Area Studies

A major or minor in Russian language and area studies for a Bachelor of Arts degree consists of integrated coursework in several departments. The degree is offered to students who wish to study the Russian language and aspects of culture; literature; history; politics; economic relations; and society in Tsarist Russia, the Soviet Union, and post-Soviet Russia. The program is intended to give students qualifications for various types of professional work that require knowledge of Russia and the Commonwealth of Independent States and to prepare motivated students for further study.

The major requires 33 semester hours of coursework. RUSN 1501 and 1502 are prerequisites of, but do not count towards, the major or minor. RUSN 2301, 2302 (or their equivalents), and 3304 are required for all students seeking a major. In addition, majors need to take 24 hours of approved courses offered by the Departments of Classical and Modern Languages and Literatures, Economics and Geography, History, and Political Science. Prior to enrolling in the program and to registering for courses, students should consult one of the program directors.

For the minor, 18 hours of coursework is necessary from courses approved for the major. RUSN 2301, 2302 (or their equivalents), and 3304 are required for all students seeking a minor. Courses taken for this major or minor may not be used to satisfy requirements for another major or minor. Standard requirements for a B.A. degree must be met. **Contact information:** Dr. Anthony Qualin and Dr. Erin Collopy, Department of Classical and Modern Languages and Literatures, 806.742.3145 ext. 244, anthony.qualin@ttu.edu

Department of Biological Sciences

Faculty

John C. Zak, Ph.D., Chairperson

Horn Professor: R. Baker

Professors: Allen, Bradley, Carr, Chesser, Densmore, Heintz, Holaday, Patino, Phillips, San Francisco, Smith, Strauss, Tissue, Zak

Associate Professors: Bilimoria, Collie, Deslippe, Diamond-Tissue, Dini, Gollahon, Held, Jeter, McGinley, McIntyre, Reilly, Rice, Rock, Rosenheimer, H. Zhang

Assistant Professors: Cannon, Salazar-Bravo, Schmidt, Xie, K. Zhang

Instructors: Atanassov, Dani, McAliley, Zimmermann

Adjunct Faculty: Acosta-Martinez, Arsuffi, Owen, Parajulee, Payton, Rodgers

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Biology
- Bachelor of Science in Cell and Molecular Biology
- Bachelor of Science in Microbiology
- Bachelor of Science in Zoology
- Master of Science in Biology
- Master of Science in Biological Informatics
- Master of Science in Microbiology
- Master of Science in Zoology
- Doctor of Philosophy in Biology
- Doctor of Philosophy in Zoology

Undergraduate Program

Students majoring in biology for the B.S. degree must complete a minimum of 39 semester hours, including the following:

- BIOL 1403, 1404, 3309, 3320, 3120, 3416, and 4305.
- Additional hours at the junior or senior level to bring the total course hours from biological sciences to a minimum of 39, and may include either PHIL 3322 or 3325.

Students majoring in biology for the B.S. degree may gain a specialization in ecology and environmental biology by completing a minimum of 39 semester hours from this department, including the following:

- BIOL 1403, 1404, 3416, 3309, and 4305.
- Group I—At least one course from BOT 3401, MBIO 3401, ZOOL 4409, or BIOL 3320 and 3120.
- Group II—At least one course from BOT 3404, ZOOL 3406, 4407.
- Three courses from Group III (BIOL 3307, 4301, 4310, MBIO 4401, ZOOL 4321) and Group IV (BIOL 4330, BOT 3404, ZOOL 3303, 3406, 4310, 4406, 4408, 4312, 4407), including at least one course from each of the offerings in Group III and Group IV.
- One additional course from any of Groups I-IV, or may substitute either PHIL 3322 or 3325.

Students majoring in cell and molecular biology for the B.S. degree must complete a minimum of 39 hours from this department, including the following:

- BIOL 1403, 1404, 2120, 3302, 3320, 3120 (or 3310), 3416, 4320, MBIO 3401
- Three of the following courses, at least one of which must include a laboratory: BIOL 4300 (counts as a laboratory course), BOT 3401, 3409, MBIO 4303, 4310, 4402, 4404, 4406, ZOOL 3401, 4304, 4409.
- Additional junior or senior level courses in the department to bring the total course hours from biological sciences to a

minimum of 39 (may include the courses above), or may use either PHIL 3322 or 3325.

- Strongly recommends BIOL 3310 or 4300.
- Requires a chemistry minor, including CHEM 3311, 3312.

Students majoring in microbiology for the B.S. degree must complete a minimum of 39 hours of core courses as well as additional biological sciences courses. Requirements include the following:

- BIOL 1403, 1404, 4305, BIOL 3416 or MBIO 4406, BIOL 4101 and MBIO 3401.
- At least five of the following courses: BIOL 3320, MBIO 4303, 4310, 4401, 4402, 4404, and 4406.
- Additional 3000-4000 level courses in biology and microbiology to bring the total course hours from biological sciences to a minimum of 39.
- CHEM 1307, 1308, 1107, 1108, 3305, 3306, 3105, 3106, 3311, 3312.
- Recommended electives: BIOL 3416, 4300, 4301, ZOOL 3303, MBIO 4400, and FDSC 3301. May also use either PHIL 3322 or 3325. May also use either PHIL 3322 or 3325.

Students majoring in zoology for the B.S. degree must complete a minimum of 39 hours of the following biological science courses:

- BIOL 1403, 1404, 3120, 3309, 3320, 3416, 4305.
- Any four junior or senior level ZOOL courses (BIOL 3302 may count for one of the four).
- Additional biological science courses at the junior or senior level to bring the total course hours to a minimum of 39. May also use either PHIL 3322 or 3325.

The department encourages undergraduate students to work with professors in research laboratories and projects to obtain first-hand information about research in the life sciences. Opportunities are available in many fields, including systematics and evolutionary biology, ecology and environmental biology, cell and molecular biology, and several areas of biotechnology. These research programs have been well received in the past and have proved beneficial to both students and faculty. Students who have been involved in the research projects have received competitive grants; presented papers at scientific meetings; authored papers published in scientific journals; and progressed to become successful medical doctors, college professors, etc. Students should contact faculty members with whom they will conduct research prior to advisement. Information describing research interests of the faculty are available from advisors or on the departmental Web site at www.biol.ttu.edu. No more than 6 hours of undergraduate research credit may be counted toward any major in the department.

Students majoring in biology or zoology may minor in any other field (major and minor may not be in the same field). Other recommended minors, subject to approval by the department, are in such areas as chemistry, geosciences, physics, mathematics, entomology, animal science, plant and soil science, and range and wildlife management. A chemistry minor is required of cell and molecular biology and microbiology majors.

Two semesters of organic chemistry are required of all majors within this department except for teacher education biology majors who must have at least one semester of organic chemistry. It is urged that organic chemistry be taken during the second year of study. Students whose area of interest requires a strong background in chemistry should complete a chemistry minor.

Biology, zoology, and ecology and environmental biology majors must take either MATH 1351 (calculus) or MATH 2300 (statistics). Cell and molecular biology majors must take one semester of cal-

culus (MATH 1351). Microbiology majors must take either MATH 1351, 2300, or AAEC 3401.

Students majoring in biology, cell and molecular biology, microbiology, or zoology must complete PHYS 1403 and 1404 or PHYS 1408 and 2401. Students majoring in biology with a specialization in ecology and environmental biology may substitute another environmental science for the second physics class with advisor's permission.

All majors must include 3 hours of multicultural coursework to fulfill their Core Curriculum requirement. Six hours of coursework taken in this department for use toward the major must be writing intensive (BIOL 1403, 1404, 3307, 3416, 4101, 4303, 4305, 4320, BOT 3401, 3404, 3409, 3416, MBIO 4303, 4307, 4402, 4404, ZOO 4409, 4410, 4321).

Courses with a grade of D cannot be counted toward fulfillment of requirements for a major or minor (including adjunct requirements and minors from other departments) in any program in this department.

Departmental Residency Requirement. At least 10 hours of upper-division biological sciences courses for all majors in this department and at least 6 hours of upper-division biological sciences courses for biology minors must be taken at Texas Tech.

Minors. Students from other departments may minor in biology, cell and molecular biology, microbiology, or zoology. Students wishing to minor in one of these fields must complete 18 hours in biological sciences (includes courses with BIOL, BOT, MBIO, and ZOO prefixes). BIOL 1403 and 1404 must account for 8 of these hours; another 6 hours must come from junior and senior level courses. Coursework for the zoology minor must include one upper-division ZOO class; for cell and molecular biology minor, BIOL 3320; for microbiology minor, MBIO 3401. Only 1 hour of research credit (BIOL 4100) may be used to fulfill the minor

requirement. The minor advisor in biological sciences should be consulted no later than the beginning of the junior year.

Teacher Education. Students who complete a major in biology and satisfy other requirements for the B.S. degree, including 18 hours of professional educational courses, will be qualified to teach high school biology in the public schools of Texas. The following courses meet both the major and the certification requirements in life science:

- BIOL 1403 and 1404, 3320, 3120, 3416; MBIO 3401; BOT 3403, 3404 or 3401; ZOO 2403 or 3405; ZOO 3406 or 4407.
- At least one of BIOL 3309, 3307, 4305, or ZOO 4312.
- PHYS 1403 and 1404 or 1408 and 2401; CHEM 1307, 1107, 1308, 1108, and one semester of organic chemistry, which may be satisfied with CHEM 3305 and 3105.

Students may also satisfy the requirements for the teaching of high school biology under the multidisciplinary science major, with an emphasis in biology. This major is administered by the College of Education. All students must take the following:

- CHEM 1107, 1108, 1307, and 1308; PHYS 1403 and 1404 or 1408 and 2401; GEOL 1101, 1102, 1303, and 1304; BIOL 1403 and 1404; ATMO 1300 and 1100; ASTR 1300 and 1100; ZOO 2403; BIOL 3416; MBIO 3400.
- One of BOT 3403, 3404, or 3401.
- 6 to 8 hours from BOT 3403, 3404, or 3401; ZOO 3406 or 4407; BIOL 3320, 4305 or ZOO 3303.

Either BIOL 1401 and 1402 or BIOL 1403 and 1404 will satisfy the laboratory science requirements for the College of Arts and Sciences. BIOL 1403 and 1404 (or courses with Texas Common Course Numbers BIOL 1406 and 1407) are required for all majors and minors in the department. Students can test out of BIOL 1403 and 1404 by taking the AP biology test in high school and achieving a score of five (5). Alternatively, students can test out of BIOL 1403 and/or 1404 by passing departmentally administered tests (see course coordinator). Students can test out of BIOL 1401 and 1402 by taking the AP biology test in high school and achieving a score of at least three (3). Alternatively, students can test out of BIOL 1401 and 1402 by taking the CLEP-S test administered by Academic Testing Services, but advanced placement scores for BIOL 1401 and 1402 will not be accepted as credit toward major requirements in the department.

Biological Informatics (BINF)

(To interpret course descriptions, see page 8.)

Graduate Course

5301. **Biological Informatics (3:3:0).** Introduction to assessment of data in computer data bases, management of multiple layers of biological information, and exploring hidden patterns in the data.

Biology (BIOL)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1113. [BIOL 2106, 2406, ENVR 1101, 1401] **Environmental Problems Laboratory (1:0:3).** Prerequisite: BIOL 1305 (or concurrent enrollment) or permission of instructor. Laboratory and field studies of environmental problems. Not for major credit.
1305. [BIOL 2306, 2406, ENVR 1301, 1401] **Ecology and Environmental Problems (3:3:0).** An introduction to ecological principles and the analysis of environmental problems. Not for major credit. BIOL 1401, 1402, 1305, and 1306 may be taken in any sequence or simultaneously. Fulfills the lecture component of the natural sciences requirement.
1306. **Biology of Sex (3:3:0).** An introduction to the diversity of reproductive modes in organisms and issues such as human reproduction, the evolution of sex, and mating systems. BIOL 1401, 1402, 1305, and 1306 may be taken in any sequence or simultaneously.

Graduate Program

The master's and doctoral programs include specializations in the areas of animal physiology and biomedical sciences, biological informatics, ecology, evolution and systematic biology, microbiology, plant physiology, plant biotechnology, and quantitative biology.

Once admitted to a master's or doctoral degree program, the student may be required by his or her advisory committee to take a preliminary, diagnostic examination that includes subject matter usually required of undergraduates. If the preliminary examination reveals serious weaknesses in the student's subject-matter background, the student may be required to take remedial courses designated by the advisory committee.

Doctoral students must have five members on their advisory committee. Otherwise, the basic degree requirements of the Graduate School determine the policy of the department.

The Department of Biological Sciences has no general requirement of a foreign language. However, it may be necessary for a student to demonstrate proficiency in a foreign language in certain programs, if such is necessary for research purposes. The student's advisory committee will make recommendations concerning language options, statistics, and basic work in other sciences.

The 36-hour nonthesis option may be elected by students working toward the M.S. degrees in biology, microbiology, biological informatics, and zoology. However, those students who expect to work beyond the M.S. degree, and toward the Ph.D. degree are strongly encouraged to choose the 30-hour thesis option.

All graduate students majoring in this department are required to take BIOL 6202 during their first fall semester after acceptance in the graduate degree program. During their first year, teaching assistants are required to take a special topics course (BIOL 6301) that emphasizes development of teaching skills.

1401. [BIOL 1411] **Biology of Plants (4:3:3)**. An introductory coverage of plant-environment interactions and plant structure and function as they relate to our understanding of the plant world. Expressly designed for students not majoring in a biological science. Will fulfill laboratory science requirements. BIOL 1401 and 1402 may be taken in any sequence or simultaneously.
1402. [BIOL 1413] **Biology of Animals (4:3:3)**. An introductory coverage of animal-environment interactions and animal structure, function, and behavior as they relate to our understanding of the animal world. Expressly designed for students not majoring in a biological science. BIOL 1401 and 1402 may be taken in any sequence or simultaneously.
1403. [BIOL 1406] **Biology I (4:3:3)**. Prerequisite: One year of high school biology. Enrollment as a freshman requires a minimum composite SAT1 score of 1100, or a minimum composite ACT score of 24, or a minimum AP Biology score of 5. Students accepted provisionally cannot take BIOL 1403. Fundamentals of molecular biology, cell biology, genetics, and evolutionary theory. First semester of an integrated course recommended for students majoring in biological sciences or related disciplines. (Writing Intensive)
1404. [BIOL 1407] **Biology II (4:3:3)**. Prerequisite: BIOL 1403. Fundamentals of organismal biology, population biology, and biological diversity. Second semester of an integrated course recommended for majors in biological and related sciences. (Writing Intensive)
2120. **Introductory Cell and Molecular Biology (1:1:0)**. An introduction to current areas of research and to recent technological advances in the field of cellular and molecular biology.
3109. **Principles of Ecology Laboratory (1:0:3)**. Prerequisite or corequisite: BIOL 3309. Explores ecology through laboratory and field exercises that enhance understanding of ecological processes spanning multiple levels from individuals to ecosystems.
3120. **Cell Biology Laboratory (1:0:3)**. Prerequisite or corequisite: BIOL 3320. A survey of the experimental techniques used to study cells and cellular processes.
3201. **Coral Reef Monitoring (2:2:2)**. Prerequisite: One year of introductory biology; open-water scuba certification. Course is taught from a sailboat and introduces students to coral reef ecology and techniques used to monitor reef ecology.
3202. **Reef Fish Monitoring (2:2:2)**. Prerequisite: One year of introductory biology; open-water scuba certification. Course is taught from a sailboat and introduces students to ichthyology, reef fish ecology, and techniques to monitor fish populations.
3301. **Field Ecology (3:3:3)**. Prerequisite: One year of introductory biology. Course teaches students how to design, conduct, analyze, and report on the results of field studies in aquatic and terrestrial environments.
3302. **Developmental Biology (3:3:0)**. Prerequisite: Introductory biology and genetics; cell biology recommended. A synthesis of animal and plant development, stressing the basic principles of molecular, cellular, and organismic development.
3303. **Tropical Marine Biology (3:3:3)**. Prerequisite: One year of introductory biology or Honors integrated science. This course introduces students to the ecology and diversity of tropical marine communities.
3304. **Human Genetics (3:3:0)**. Prerequisite: One semester of general genetics (BIOL 3416) or equivalent. A study of the frequency and transmission of human genetics and chromosomal mutations and the application of this information to individual cases.
3307. **Population Biology (3:3:0)**. Prerequisite: BIOL 3309. Introduction to population biology theory with emphasis on interaction between genetics and ecology. (Writing Intensive)
3309. **Principles of Ecology (3:3:0)**. Prerequisite: BIOL 1305, 1401, 1402, 1404, or consent of instructor. An examination of ecological systems emphasizing populations, communities, and ecosystems.
3310. **Experimental Cell Biology (3:1:6)**. Prerequisite: Declared major in cell and molecular biology, or consent of the instructor, and prior or concurrent enrollment in BIOL 3320. An introduction to the modern research techniques used to study cellular and molecular processes in eukaryotic cells.
3320. **Cell Biology (3:3:0)**. Prerequisite: BIOL 1403, 1404, 3416, and junior standing. An integrated study of the basic principles of cell structure and function.
3416. **Genetics (4:3:3)**. Prerequisite: BIOL 1401, 1402, or 1403. Genetic principles with emphasis on mechanisms and problem solving. (Writing Intensive)
4100. **Undergraduate Research in Biology (1)**. Prerequisite: 15 hours of biology, junior or senior standing, and consent of instructor. Selected research problems according to the needs of the students. May be repeated or taken parallel for credit in another field or with new materials in the same field.
4101. **Biology Seminar (1:1:0)**. Prerequisite: Senior standing in biology, botany, or zoology. Critical reviews of classical and recent literature and reports of original investigations. May be repeated once for credit. (Writing Intensive)
4110. **Topics in Biology (1)**. Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for credit up to 3 hours.
4300. **Undergraduate Research in Biology (3)**. Prerequisite: 15 hours of biology, junior or senior standing in biology, and consent of instructor. Selected research problems according to the needs of the students. May be repeated or taken parallel for credit in another field or with new materials in the same field. No more than 6 hours can be applied to degree requirements.
4301. **Topics in Biology (3)**. Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for credit toward degree requirements if content is different.
4303. **Population Genetics (3:3:0)**. Prerequisite: BIOL 3416 or equivalent course in genetics; MATH 1320 or equivalent course in algebra recommended. The origin, maintenance, and significance of genetic variation in natural and artificial populations. (Writing Intensive)
4305. **Organic Evolution (3:3:0)**. Prerequisite: BIOL 3416 or MBIO 4406. The principles and processes of evolution and how they relate to the ecology, physiology, behavior, morphology, and systematic classification of organisms. (Writing Intensive)
4307. **Cancer Biology (3:3:0)**. Prerequisite: BIOL 3320, ZOOL 4304 is recommended. This course presents a comprehensive overview covering the history of cancer biology to the most recent developments in the field. Molecular and cellular biology as well as clinical topics will be covered.
4310. **Community Ecology (3:3:0)**. Prerequisite: A course in ecology or consent of instructor. An investigation of theoretical and experimental approaches to understanding the composition, diversity, and structure of plant, animal, and microbial communities. F, even years.
4320. **Molecular Biology (3:3:0)**. Prerequisite: BIOL 3320. Includes the study of molecular processes involved in cellular functioning of eukaryotic and prokaryotic cells and viruses together with recent technological advances in molecular biology research. (Writing Intensive)
4330. **Landscape Ecology (3:3:0)**. Prerequisite: BIOL 1404 or 3309 or consent of instructor. An examination of how we quantify patterns and effects of spatial heterogeneity on organisms and ecological processes. F, odd years.
4350. **Physiological Plant Ecology (3:3:0)**. Prerequisite: BOT 3401. Investigation of the physiological processes of plants that contribute to understanding the ecological distribution and evolutionary success of plants in their physical environment.
4392. **Marine Biology (3:3:0)**. Prerequisite: 1403 and 1404 or consent of instructor. Introduction to the study of marine organisms and their environments.

Graduate Courses

5301. **Advanced Genetics (3:3:0)**. Prerequisite: 8 hours of biology, 8 hours of chemistry, one semester of organic chemistry, or consent of instructor. Genetic and molecular analyses of inheritance. Course is offered to graduate students with limited knowledge in genetics.
5302. **Advanced Cell Biology (3:3:0)**. Prerequisite: 8 hours of biology, 8 hours of chemistry, plus at least one semester of organic chemistry; or consent of instructor. Structure and function of cells with introduction to modern techniques for cell study. Course is offered to graduate students with no formal training in cell biology.
5303. **Advanced Experimental Cell Biology (3:1:6)**. Prerequisite: Consent of instructor and prior or concurrent enrollment in BIOL 5302. A project-oriented introduction to modern research techniques used to study cellular and molecular processes in eukaryotic cells.
5305. **Organic Evolution for Advanced Students (3:3:0)**. Prerequisite: BIOL 3416 or equivalent course in genetics. The concept of evolution, its mode and tempo of operation, and its relationship to organic diversity in its broadest sense are emphasized. S.

5306. **Advanced Cancer Biology (3:3:0)**. Prerequisite: BIOL 5320; ZOOL 5304 is recommended. This course presents a comprehensive overview covering the history of cancer biology to the most recent findings in the field. Molecular and cellular biology as well as clinical topics will be covered.
5309. **Advanced Ecology (3:3:0)**. Prerequisite: Background in organismal biology or undergraduate ecology. A detailed examination of the structural and functional relationships underlying the organization of populations, communities, and ecosystems.
5310. **Advanced Community Ecology (3:3:0)**. Prerequisite: A course in ecology or consent of instructor. An investigation of both theoretical and experimental approaches to understanding the composition, diversity, and structure of plant, animal, and microbial communities. F, even years.
5311. **Ecology for Teachers (3:3:0)**. Prerequisite: Admission to the Multidisciplinary Science Master's Program or consent of instructor. An investigation into ecology for individuals, populations, communities, and ecosystems for practicing teachers.
5312. **Cell and Molecular Biology for Teachers (3:3:0)**. Prerequisite: Admission to the Multidisciplinary Science Master's Program or consent of instructor. An investigation into cellular and molecular biology intended for practicing teachers.
5320. **Advanced Molecular Biology (3:3:0)**. Coverage includes a rigorous examination of molecular processes in cellular functioning. Experimental approaches used to investigate molecular events in eukaryotes, prokaryotes, and viruses will be emphasized. S.
5330. **Advanced Landscape Ecology (3:3:0)**. Prerequisite: Consent of instructor. In-depth examination of how we quantify patterns and effects of spatial heterogeneity on organisms and ecological processes. Discussion section is required. F, odd years.
5405. **Systems Ecology (4:3:3)**. Prerequisite: MATH 1352 or 1552, BIOL 3303 and 3307, or consent of instructor. Theory and techniques of system analysis and mathematical modeling applied to ecological problems. S, even years.
5407. **Advanced Population Biology (4:3:3)**. Prerequisite: BIOL 3301, 3303, or equivalent. Introduction to the genetics or ecology of populations including a survey of topical, historic, and current literature with emphasis on experimental evaluation of testable hypotheses. S.
6000. **Master's Thesis (V1-6)**.
6100. **Advanced Topics in Biology (1)**. Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for additional credit.
6101. **Seminar (1:1:0)**. Various topics in modern biology. May be repeated for credit.
6202. **Preparation for Graduate Learning and Teaching in Biology (2:2:0)**. Prerequisite: Acceptance in a graduate degree program in the Department of Biological Sciences or consent of instructor. Preparation of graduate students for the roles of scholar, researcher, and teaching assistant. Emphasizes literature research, preparation of visual aids, innovative teaching strategies, and problem-solving methods. F.
6301. **Advanced Topics in Biology (3)**. Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for additional credit.
6304. **Principles and Practice of Phylogenetic Systematics (3:3:0)**. Prerequisite: BIOL 4305 or 5305; ZOOL 6302 recommended. Character, analysis, phylogeny reconstruction, consensus procedures, and phylogenetic classification, using morphologic and molecular data.
6309. **Advanced Topics in Quantitative Biology (3:3:0)**. Prerequisite: Consent of instructor. Studies of current applications of mathematics, statistics, and computing to the biological sciences. Content normally different each time offered. May be repeated for additional credit.
6315. **Regulation of Gene Expression (3:3:0)**. Prerequisite: BIOL 5320 or 4320. An advanced, in-depth analysis of current research on mechanisms that regulate eukaryotic gene expression at transcriptional and post-transcriptional levels. S.
6350. **Advanced Physiological Plant Ecology (3:3:0)**. Investigation of the physiological processes of plants that contribute to understanding the ecological distribution and evolutionary success of plants in their physical environment.
6392. **Marine Biology (3:3:0)**. Prerequisite: Undergraduate degree in biology or consent of instructor. The study of marine organisms and their environments.

6408. **Research Techniques in Electron Microscopy (4:1:6)**. Prerequisite: BA or BS in a scientific field. Introduction to operation of electron microscopes emphasizing independent work with organic or inorganic sample preparation and analysis for transmission or scanning electron microscopes.
6502. **Biometry (5:4:3)**. Prerequisite: College algebra. The application of statistical methods to data from various fields of biological research. Special emphasis on conceptual bases of univariate and multivariate tests from both parametric and nonparametric perspectives. F.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Botany (BOT)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

3401. **Plant Physiology (4:3:3)**. Prerequisite: Introductory botany or BIOL 1403 and 1404. One semester of organic chemistry. The physiology of plants with an emphasis on relationships of structure to function in vascular plants. (Writing Intensive)
3403. **Comparative Morphology of Plants (4:3:3)**. Prerequisite: One year of introductory biology. An evolutionary survey of the diversity of plants (broadly defined) emphasizing adaptations in form and sexual life cycles.
3404. **Evolution and Classification of Plants (4:3:3)**. Prerequisite: BIOL 1401 or 1404. A survey of plant diversity from an evolutionary perspective, including genetic analysis, classification schemes, identification / documentation techniques, and field trips to study local flora. (Writing Intensive)
3409. **Plant Development (4:3:2)**. Prerequisite: BIOL 1403/1404. Integration of positional, environmental, hormonal, and genetic regulation of embryo-, morpho-, and organo-genesis; emphasis on model species and comparisons to animals. Alternate years. (Writing Intensive)
4302. **Field Botany (3:0:6)**. Prerequisite: BOT 3404 or consent of instructor. Thorough knowledge of and familiarity with the flora of West Texas and adjacent areas is developed through field trips, collection, and herbarium work.
4304. **Plant Molecular Biology (3:3:0)**. Prerequisite: BIOL 1403, 1404, 3416, and 3320. Molecular analysis of plant metabolism and signaling. S, alternate years.

Graduate Courses

5401. **Advanced Plant Physiology (4:3:3)**. Prerequisite: Organic chemistry or biochemistry and general botany or biology. A general plant physiology course for graduate students with no previous training in plant physiology. Emphasis is placed on recent experimental advances in the field.
6302. **Advanced Field Botany (3:1:6)**. Prerequisite: BOT 3404, 5404, or consent of instructor. A field-trip and herbarium-based course that will provide students with sophistication in the identification and classification of plants in natural areas of West Texas and adjacent regions.
6304. **Advanced Plant Molecular Biology (3:3:0)**. Prerequisite: Introductory biology, genetics, cell biology, or consent of instructor. Molecular mechanisms regulating plant metabolism. Intensive reading of current literature is required. Alternate years.

Microbiology (MBO)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

3400. **Microbiology (4:3:4)**. Prerequisite: 3 hours of introductory biology. Morphology, physiology, and activities of bacteria, fungi, and viruses. Primarily for students of agriculture, food and nutrition, animal science, secondary education, nursing, and others seeking an advanced science elective. May not be applied to degree requirements for biological sciences majors.
3401. **Principles of Microbiology (4:3:4)**. Prerequisite: BIOL 1401 and 1402 or BIOL 1403 and 1404; CHEM 3305 as pre- or corequisite. Morphology, physiology, and classification of microorganisms.

4101. **Microbiology Seminar (1:1:0)**. Prerequisite: Senior standing in microbiology. Critical reviews of classical and recent literature and reports of original investigations. May be repeated for credit.
4303. **Physiology of Bacteria (3:3:0)**. Prerequisite: MBIO 3401. Anatomy and physiology of the bacterial cell: molecular approach. (Writing Intensive)
4307. **Industrial Microbiology (3:3:0)**. Prerequisite: MBIO 3401. An introduction to fermentation techniques, food microbiology, production of various microbial products, microbial transformations, sewage disposal, and microbiological control. (Writing Intensive)
4310. **Introduction to Virology (3:3:0)**. Prerequisite: MBIO 3401 or BIOL 3320 or consent of instructor. An introduction to basic concepts in the structure, replication, and ecology of viruses from animals, plants, and prokaryotes.
4400. **Practicum in Applied Microbiology (4:0:12)**. Prerequisite: Consent of instructor at least one month prior to registration. Practical experience in affiliated governmental, industrial, and medical microbiology laboratories. May not be repeated for credit.
4401. **Microbial Ecology (4:3:3)**. Prerequisite: MBIO 3401 or BIOL 3309. An examination of the population and community ecology of bacteria and fungi, and the roles of these organisms in ecosystem processes.
4402. **Immunology and Serology (4:3:4)**. Prerequisite: MBIO 3401 or BIOL 3320 or consent of instructor; or 10 hours of chemistry. Theories of infection and resistance, the production and demonstration of antibodies, the action of antigens, and diagnostic tests. (Writing Intensive)
4404. **Pathogenic Microbiology (4:3:4)**. Prerequisite: MBIO 3401 and 4402 or consent of instructor. A detailed study of pathogenic microorganisms. Laboratory discussion of medical case studies. (Writing Intensive)
4406. **The Genetics of Microorganisms (4:3:3)**. Prerequisite: MBIO 3401 or consent of instructor. The principles of genetic systems existing among microorganisms, with emphasis upon bacteria and bacteriophages.

Graduate Courses

5301. **Advanced General Microbiology (3:2:3)**. Prerequisite or parallel: Organic chemistry. Content is similar to that of MBIO 3401 except that readings or original research in one area of microbiology is required. May not be taken for credit by students who have taken MBIO 3401. F, S.
5303. **Microbe-Plant Interactions (3:3:0)**. Prerequisite: MBIO 3400 or 3401 or BIOL 3420 or BOT 3401. Biochemical, molecular, genetic, and ecological basis of pathogenic and symbiotic microbe-plant interactions. F, even years.
5401. **Current Perspectives in Microbial Ecology (4:3:3)**. Prerequisite: A course in microbiology, mycology, ecology, or related area, or consent of instructor; may not be taken for credit by students who have taken MBIO 4401. Course will examine specific theories and concepts concerning ecology of the soil microflora and microfauna, and the roles of these organisms in ecosystem functioning. S, odd years.
5403. **Immunobiology (4:3:4)**. Prerequisite: Consent of instructor. Content is similar to that of MBIO 4402 except that readings or research in one area of immunology is required. May not be taken for credit by students who have taken MBIO 4402. S.
5404. **Pathogenic Microbiology (4:3:4)**. Prerequisite: MBIO 3401 or 5301; may not be taken for credit by students who have received credit for MBIO 4404. A detailed study of pathogenic microorganisms. S, odd years.
5408. **Microbial Genetics (4:3:3)**. Prerequisite: MBIO 5301 or consent of instructor. Topics include current techniques of genetic analysis, molecular biology, molecular genetics, nucleic acid metabolism, and gene regulation in microorganisms, with emphasis on bacteria and bacteriophages. May not be taken for credit by students who have taken MBIO 4406. F.
6000. **Master's Thesis (VI-6)**.
6302. **Advanced Bacterial Physiology (3:3:0)**. Prerequisite: MBIO 3401 or 5301; 12 semester hours of chemistry, including biochemistry or concurrent registration; consent of instructor. Advanced study of bacterial physiology. S.
6306. **General Virology (3:2:3)**. Prerequisite: Consent of instructor. An introduction to the biology of animal, bacterial, and plant viruses. S.

Zoology (ZOOL)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

2402. **Human Anatomy and Physiology (4:3:3)**. Three hours of chemistry recommended. A one-semester terminal service course for students requiring an overview of human anatomy and physiology. Not for major credit.
2403. **[BIOL 2401]. Human Anatomy (4:3:3)**. Three hours of chemistry recommended. In-depth study of human gross anatomy for allied health majors requiring two semesters of human anatomy and physiology. Not for major credit.
2404. **[BIOL 2402]. Human Physiology (4:3:3)**. CHEM 1301 or equivalent recommended. In-depth study of human physiology for allied health majors requiring two semesters of human anatomy and physiology. Not for major credit.
2406. **Comparative Anatomy of Game Animals (4:3:3)**. Prerequisite: BIOL 1402 or 1404 or equivalent. A comparative study of game and other wild animals, with emphasis on embryology, functional anatomy, and evolution. Not for major or minor credit in the biological sciences.
3401. **Animal Histology (4:2:6)**. Prerequisite: ZOOL 3405. The study of normal tissues of the human and other mammals. An introductory course recommended for students of pathology, medical sciences, and biomedical sciences.
3403. **Parasitology (4:3:3)**. Prerequisite: Introductory zoology. Morphology, life cycles, and physiology of protozoan and helminth parasites, with emphasis on broad aspects of parasitism and examples with medical and economic interest.
3405. **Vertebrate Structure and Development (4:3:3)**. Prerequisite: Introductory zoology or biology. The comparative study of vertebrate structure and embryological development.
3406. **Comparative Invertebrate Zoology (4:3:3)**. Prerequisite: BIOL 1401 and 1402 or 1403 and 1404 or consent of instructor. Structure, life history, and evolution of the invertebrates.
4304. **General Endocrinology (3:3:0)**. Prerequisite: BIOL 3320 or ZOOL 4409, organic chemistry. Hormones as chemical coordinators of bodily functions.
4312. **Animal Behavior (3:3:0)**. Comparative study of animal behavior; its genetic basis, expression through neurophysiological mechanisms, function in the environment, and adaptive role during evolutionary history.
4321. **Insect Diversity (3:3:0)**. Prerequisite: BIOL 1403 and 1404 required, BIOL 3309 recommended. An advanced exploration of the behavior, ecology, and evolution of insects. (Writing Intensive)
4406. **Introduction to Mammalogy (4:3:3)**. Prerequisite: Introductory zoology or junior standing in wildlife management; ZOOL 4407 recommended. Study of the classification, natural history, and ecology of mammals.
4407. **Natural History of the Vertebrates (4:3:3)**. Prerequisite: One year of introductory biology. Evolutionary relationships, identification, and ecology of vertebrates. Local fauna emphasized.
4408. **General Ornithology (4:3:3)**. Prerequisite: Junior standing. Emphasis on laboratory and field work in systematics, ecology, and anatomy of birds. Local field trips.
4409. **Comparative Animal Physiology (4:3:3)**. Prerequisite: CHEM 1308 and BIOL 1404. A comparison of physiological functions of animals in the major phyla. (Writing Intensive)
4410. **Introduction to Ichthyology (4:3:3)**. Prerequisite: BIOL 1404, 3309, or consent of instructor. Diversity, evolutionary relationships, ecology, and anatomy of fishes. (Writing Intensive)

Graduate Courses

5304. **Comparative Endocrinology (3:3:0)**. Prerequisite: ZOOL 2405, 3301, BIOL 1404. Hormones as chemical coordinators of bodily functions. S.
5306. **Advanced Mammalogy (3:2:3)**. Studies of recent advances in mammalogy. For students who have not taken ZOOL 4306. F.
5308. **Advanced Ornithology (3:2:3)**. Prerequisite: Consent of instructor. Selected topics including avian systematics, migration, physiology, ecology, and comparative behavior. S.
5312. **Advanced Animal Behavior (3:3:0)**. Comparative animal behavior with emphasis on genetics and neurophysiology and how they relate to survival. F.
5401. **Animal Histology for Advanced Students (4:2:6)**. Prerequisite: ZOOL 2405 or a course in chordate anatomy or consent

of instructor. Microscopic anatomy of the normal cells, tissues, and organ systems of the human and other mammals are studied. Open to graduate students who have not taken ZOOL 3401 or equivalent.

5406. **Advanced Invertebrate Zoology (4:3:3)**. Prerequisite: Consent of instructor. This course develops a comprehension of the structure, function, ecology, and evolution of invertebrate animals, with an emphasis on the relationships among taxa and the diversity within taxa. Written reports on special projects required. F
5407. **Vertebrate Zoology for Advanced Students (4:3:3)**. Diversity, evolutionary relationships, and adaptations of vertebrates. Field trips required. Open to students who have not taken ZOOL 4307.
5409. **Comparative Physiology for Advanced Students (4:3:3)**. Prerequisite: ZOOL 2405 or 3406; BIOL 3420; CHEM 3305, 3306 recommended. A comparison of physiological functions including homeostatic mechanisms, muscle, nerve, in the major phyla. Laboratory reports written in a journal format are required.
5421. **Ecological Entomology (4:3:3)**. Prerequisite: Consent of instructor. An advanced exploration of the behavior, ecology, and evolution of insects.
6000. **Master's Thesis (V1-6)**.
6302. **Principles of Systematic Zoology for Advanced Students (3:3:0)**. Prerequisite: BIOL 3301 or equivalent; BIOL 4305 or 5305 recommended. Theory and practice of naming, describing, and classifying organisms. Speciation, phylogeny reconstruction, and other current topics in evolutionary biology emphasized. F, even years.
6303. **Seminar in Mammalogy for Advanced Students (3:3:0)**. Prerequisite: Consent of instructor. A historical perspective of mammalogy as a science including advances in ideology, character systems, and data analysis. Current topics and controversies will be addressed. S, odd years.
6320. **Comparative Neuroanatomy (3:2:3)**. Prerequisite: Consent of instructor. A comparative study of the vertebrate central nervous system, with emphasis on the structure, development, and function of the mammalian brain.
6321. **Advanced Herpetology (3:2:3)**. Prerequisite: Consent of 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.



Department of Chemistry and Biochemistry

Faculty

Dominick J. Casadonte Jr., Ph.D., Chairperson

Horn Professors: Bartsch, Knaff, Nes

Piper Professor: Casadonte

Welch Professor: Hase

Professors: Birney, Gellene, Korzeniewski, G. Li, Liu, Quitevis

Associate Professors: Morales, Niwayama, Paré, Poirier, Shaw, Shelly, Whittlesey

Assistant Professors: Blake, Fuertes, Hope-Weeks, Mayer, Pappas, Shi, Weber

Instructors: M. Jones, Z. Li, Mason, Truitt,

Adjunct Faculty: Dasgupta, Reid

Joint Faculty: Smith

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Chemistry
- Bachelor of Science in Chemistry
- Bachelor of Arts in Biochemistry
- Bachelor of Science in Biochemistry
- Master of Science in Chemistry
- Doctor of Philosophy in Chemistry

Those students seeking graduate degrees may specialize in analytical, inorganic, organic, physical, or theoretical chemistry; chemical education; chemical physics; or biochemistry.

Undergraduate Program

The Department of Chemistry and Biochemistry offers four undergraduate degree programs in chemistry and biochemistry. The Bachelor of Science degree programs are most appropriate for students who plan to pursue a professional, research-based career in chemistry or biochemistry. The Bachelor of Arts options provide a strong undergraduate background in the central sciences of chemistry and biochemistry as preparation for other objectives, such as health-related professional schools, teaching, or sales. The undergraduate advisor provides career counseling and assists students in selecting courses and fulfilling degree requirements. The department offers honors-level courses to qualified students (admitted to the Honors College) in both general and organic chemistry. Highly motivated undergraduate chemistry or biochemistry majors are strongly encouraged to complete an individual research project under the supervision of a faculty member. Undergraduate research students gain a working knowledge of research methods in a specialized area and familiarity with a wide range of instrumentation and techniques. The department has a very active chapter of the Student Affiliates of the American Chemical Society.

Chemistry Curriculum. The undergraduate student may take courses leading to a Bachelor of Arts or a Bachelor of Science degree in chemistry. Either program offers a wide choice of minor subjects in Arts and Sciences or other colleges. Consult the undergraduate advisor prior to registration for a particular minor program. Students who have not completed the prerequisites for a course in which they have enrolled will not be allowed to continue and will be dropped from the course by the department.

Chemistry, B.S. Degree. The Bachelor of Science degree prepares a student for graduate school or a career as a professional chemist. This degree program is technically oriented, requiring greater depth of mathematics, physics, and chemistry than does the Bachelor of Arts degree. With a heavier chemistry requirement in the B.S.

degree program, the student has fewer elective courses for other interests. Completion of the B.S. curriculum leads to automatic American Chemical Society certification of a student as the recipient of a professional degree.

Chemistry, B.A. Degree. The Bachelor of Arts in chemistry has a curriculum primarily designed for the student who is interested in using an undergraduate major in chemistry as the background for a career in which extensive training in chemistry is either valuable or essential (e.g., medicine, dentistry, forensics, environmental protection, clinical and pharmacological chemistry, technical sales, and chemical patent law). Though a B.S. is generally preferred by employers, a B.A. may also provide a sufficient background in chemistry for employment as a chemist in a small laboratory or to enter a graduate program leading to the M.S. or Ph.D. degree in chemistry. The minimum number of hours required for baccalaureate degrees is 120.

Semester Hours

CHEM	34 hours
1307, 1308 (or 1301, 1307, 1308), 1107, 1108, 3301, 3305, 3306, 3105, 3106, 3307, 3107, 3341, 3141, 4303, and 4 hours to be chosen from 3000, 3308, 3108, 4300, 4302, 4309, 4105, 4310, 4314, 4114	
MATH	6 hours
1350 (if needed), 1351, 1352	
PHYS	8 hours
1403 and 1404 or 1408 and 2401	
English	12 hours
American History	6 hours
POLS 1301, 2302	6 hours
Social and Behavioral Sciences	6 hours
Humanities	6 hours
Oral Communication	3 hours
Visual and Performing Arts	6 hours
Foreign Language	6-16 hours
Personal Fitness and Wellness	2 hours

Biochemistry Curriculum. Both the Bachelor of Science and Bachelor of Arts degree programs in biochemistry have a common objective of providing general education and training in the chemical aspects of biological systems through a combination of coursework in biochemistry, chemistry, and biology. Students who have not completed the prerequisites for a course in which they have enrolled will not be allowed to continue and will be dropped from the course by the department.

Biochemistry, B.S. Degree. The B.S. in biochemistry program will prepare an undergraduate student for graduate study in biochemistry and related disciplines, for entry into medical or dental school, or for employment in industrial or governmental laboratories in which graduate training is not required. A biology minor may be earned by completing one biology course in addition to those specifically required for the B.S. biochemistry degree (see the biological sciences undergraduate advisor for specific requirements). This additional biology course may be selected from the advanced electives needed to fulfill the B.S. biochemistry degree.

Biochemistry, B.A. Degree. The Bachelor of Arts program in biochemistry is primarily designed to prepare an undergraduate student for entry into medical school (admission requirements for Texas medical schools are satisfied) or other medically related professional schools. Graduates with a B.A. in biochemistry are also qualified for industrial employment in areas in which a strong biochemistry background is an asset, such as technical sales or management. The B.A. degree provides sufficient background in biochemistry and chemistry for admission to a graduate program in biochemistry or biotechnology.

Semester Hours

CHEM	40 hours
1307, 1308 (or 1301, 1307, 1308), 1107, 1108, 2100, 3305, 3306, 3105, 3106, 3311, 3312, 3313, 3314, 3341, 3141, 4311, and 4 hours to be chosen from 3000, 4300, 4314, and 4114	
BIOL 1403, 1404, 3320, 3416	15 hours
MATH	6 hours
1350 (if needed), 1351, 1352	
PHYS	8 hours
1403 and 1404 or 1408 and 2401	
English	12 hours
American History	6 hours
POLS 1301, 2302	6 hours
Social and Behavioral Sciences	6 hours
Humanities	6 hours
Oral Communication	3 hours
Visual and Performing Arts	6 hours
Foreign Language	6-16 hours
Personal Fitness and Wellness	2 hours

Chemistry Minor. The Chemistry minor consists of CHEM 1307, 1308, 1107, 1108 and 11 credit hours of courses at the 2000 level or higher (excluding the following courses: CHEM 2000, 2100, 2103, 2303, 3000, 4010, 4100, and 4300). At least 6 credit hours must be taken from 3000- or 4000-level chemistry courses. Two hours of laboratory coursework must be included in the 11-hour total. Students who have taken organic chemistry at other institutions below the 3000 level will be required to pass a departmental organic chemistry exit exam to satisfy upper-division credit hour requirements for the minor (equivalency for CHEM 3305 and/or CHEM 3306).

Residency Requirements. The department generally accepts transfer credits from other colleges and universities. However, to receive an undergraduate degree in either chemistry or biochemistry, at least 25 percent of the hours in the major must be taken at

Graduate Program

Students majoring in this department for advanced degrees must pass three diagnostic examinations by the end of their second long semester. These examinations are based on the undergraduate curriculum.

Each student is required to take the diagnostic examinations in his or her area of specialization and any two others or a series of three Biological Chemistry Examinations designed for students whose academic background emphasizes biochemistry. These examinations are offered three times a year.

A master's degree program includes a minimum of 19 credit hours of graduate-level coursework, 5 credit hours of research (CHEM 7000), and 6 hours of thesis (CHEM 6000). At least one graduate course must be from outside the area of specialization. A doctoral degree program includes a minimum of 26 credit hours of graduate-level coursework, 34 credit hours of research (CHEM 7000), and 12 credit hours of dissertation (CHEM 8000). At least two graduate courses must be from outside the area of specialization.

A cumulative examination system is used as the written part of the qualifying examination for the doctoral degree, with cumulatives offered eight times each year. Passing three cumulative examinations by the end of the second year and an additional three cumulative examinations by the end of the third year is required to satisfy the written part of the qualifying examination. Students in the inorganic chemistry division are required to pass a written preliminary exam instead of the cumulative examinations before the end of their third long semester. The successful oral defense of an independent research proposal is required after satisfying the written part of the qualifying examination requirement. A successful oral defense of the Ph.D. research plan must be completed before the end of the second year.

Each student fulfilling the doctoral residence requirement in chemistry and biochemistry will normally enroll for 24 hours within a 12-month period. Ordinarily, this would be accomplished by taking 9 hours in two long semesters and 6 hours in the summer.

Texas Tech. For a chemistry minor, at least one of the junior-senior level courses must be taken at Texas Tech.

Advanced Standing. The department will permit a student to receive credit for any courses in the curriculum if proficiency is demonstrated in that subject by examination. Examinations for CHEM 1305, 1306, 1307, and 1308 are given at Academic Testing Services prior to each semester. Previous registration for these examinations is not required for students entering Texas Tech for the first time. Students who are currently enrolled must apply to the Arts and Sciences Dean's Office for approval to take the examination. For all other courses, it is the student's responsibility to obtain approval from the dean's office and to petition the department chair for such examination(s) well before normal enrollment in the course. There is a fee for the CLEP test.

Teacher Education. Students seeking a teaching certificate in physical science are expected to earn a bachelor's degree (B.A. or B.S.) with a major in either chemistry or biochemistry. College of Education requirements for certification in chemistry and science are described in the Teacher Education section of this catalog.

Chemistry Placement Examination. Students wishing to enroll in either CHEM 1301 or 1307 must first take the Chemistry Placement Examination. Please consult the department Web site at www.depts.ttu.edu/chemistry for additional information. A sample placement exam with key may be found at this site. Previous registration for this examination is not required and there is no fee.

Students are strongly encouraged to review high school level chemistry concepts and skills prior to attempting the examination.

Chemistry (CHEM)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1105. [CHEM 1105, 1405] **Experimental General Chemistry I (Laboratory) (1:0:3).** Corequisite: CHEM 1305. This course is designed to introduce the student to a variety of laboratory techniques and to complement the lecture course CHEM 1305.
1106. [CHEM 1107, 1407] **Experimental General Chemistry II (Laboratory) (1:0:3).**
1107. [CHEM 1111, 1411] **Principles of Chemistry I (Laboratory) (1:0:3).** Corequisite: CHEM 1307. Introduction to a wide variety of experimental techniques.
1108. [CHEM 1112, 1412] **Principles of Chemistry II (Laboratory) (1:0:3).** A continuation of CHEM 1107, which serves as a prerequisite for all advanced laboratory courses in chemistry.
1110. **Teaching Methods in Chemistry (1:1:0).** Corequisite: CHEM 1307. This course prepares undergraduate students to be student assistants for first-year chemistry courses. Topics include chemistry content, pedagogy, classroom dynamics, and pedagogical content knowledge.
1301. **Introductory Chemistry (3:3:0).** Prerequisite: Completion of the Chemistry Placement Exam. Basic vocabulary, concepts, and problem-solving skills required for CHEM 1307 and 1308.

Chemistry Curriculum, B.A. Degree

FIRST YEAR			
Fall		Spring	
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. Lab. I	1	CHEM 1108, Prin. Chem. Lab. II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
American History†	3	American History†	3
MATH 1351, Calculus I*	3	MATH 1352, Calculus II*	3
Personal Fitness and Wellness†	1	Personal Fitness and Wellness†	1
Visual or Performing Arts Elective†	3	Oral Communication†	3
TOTAL	17	TOTAL	17

SECOND YEAR			
Fall		Spring	
CHEM 3305, Org. Chem. I	3	CHEM 3306, Org. Chem. II	3
CHEM 3105, Org. Chem. Lab. I	1	CHEM 3106, Org. Chem. Lab. II	1
POLS 1301, Amer. Govt., Org.	3	Political Science†	3
Humanities Elective†	3	Social/Behavioral Science Elective†	3
PHYS 1408, Prin. of Physics I**	4	PHYS 2401, Prin. of Physics II**	4
English†	3	Minor	3-4
TOTAL	17	TOTAL	17-18

THIRD YEAR			
Fall		Spring	
CHEM 3301, Desc. Inorg. Chem.	3	CHEM 3341, Analytical Chem.	3
CHEM 3307, Phys. Chem. I	3	CHEM 3141, Analytical Chem. Lab.	1
CHEM 3107, Phys. Chem. Lab. I	1	Foreign Language†	5
Foreign Language†	5	Visual or Performing Arts Elective†	3
Humanities Elective†	3	Minor	3
Minor	3-4	TOTAL	15
TOTAL	18-19		

FOURTH YEAR			
Fall		Spring	
CHEM 3310, Mol. Biochem.	3	Advanced Elective^	4
Minor	3	Humanities Elective†	3
English†	3	Foreign Language	3
Social/Behavioral Science Elective†	3	Minor	3-6
Foreign Language	3	TOTAL	13-16
TOTAL	15		

* Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. A score of 7 on the Math Placement Exam is necessary to take calculus the first year. Scores below 7 will require additional classes which will make the degree difficult to complete in four years without taking courses during summer sessions.

** PHYS 1403 and 1404 may be substituted for PHYS 1408 and 2401.

† Select from Arts and Sciences General Degree Requirements.

^ Four advanced elective hours with at least 3 hours from CHEM 4300 or 4314 and the remaining hours from CHEM 3000 (3) or 4114.

Chemistry Curriculum, B.S. Degree

FIRST YEAR			
Fall		Spring	
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. Lab. I	1	CHEM 1108, Prin. Chem. Lab. II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
American History†	3	American History†	3
MATH 1351, Calculus I*	3	MATH 1352, Calculus II*	3
Personal Fitness and Wellness†	1	Personal Fitness and Wellness†	1
Visual or Performing Arts Elective†	3	Oral Communication†	3
TOTAL	17	TOTAL	17

SECOND YEAR			
Fall=		Spring	
CHEM 3305, Org. Chem. I	3	CHEM 3306, Org. Chem. II	3
CHEM 3105, Org. Chem. Lab. I	1	CHEM 3106, Org. Chem. Lab. II	1
CHEM 3301, Desc. Inorg. Chem.	3	CHEM 3351, Analytical Chemistry	3
MATH 2350, Calculus III	3	CHEM 3251, Analytical Chem. Lab.	2
PHYS 1408, Prin. of Physics I	4	PHYS 2401, Prin. of Physics II	4
English†	3	Minor	3-4
TOTAL	17	TOTAL	16-17

THIRD YEAR			
Fall		Spring	
CHEM 3201, Adv. Org. Chem. Lab.	2	CHEM 3308, Phys. Chem. II	3
CHEM 3307, Phys. Chem. I	3	CHEM 3108, Phys. Chem. Lab. II	1
CHEM 3107, Phys. Chem. Lab. I	1	Advanced Electives+	4
Foreign Language†	5	Foreign Language†	5
POLS 1301, Amer. Govt., Org.	3	Political Science†	3
Minor	3-4	TOTAL	16
TOTAL	17-18		

FOURTH YEAR			
Fall		Spring	
CHEM 3310, Mol. Biochem.	3	CHEM 4309, Inorg. Chem. II	3
Minor	3	CHEM 4105, Inorg. Chem. Lab	1
English†	3	Humanities Elective†	3
Advanced Electives^	3-6	Social or Behav. Sci. Elective†	3
Foreign Language	3	Advanced Electives^	3
TOTAL	15-18	Foreign Language	3
		Minor	3
		TOTAL	19

* Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. A score of 7 on the Math Placement Exam is necessary to take calculus the first year. Scores below 7 will require additional classes which will make the degree difficult to complete in four years without taking courses during summer sessions.

† Select from Arts and Sciences General Degree Requirements.

^ Ten advanced elective hours from CHEM 3000 (3), 4300, 4302, 4310, 4314, 4114.

This course has no laboratory and will not satisfy a laboratory science requirement.

- 1305. [CHEM 1305, 1405] Chemistry and Society I (3:3:0).** A non-mathematical survey of basic chemical concepts, properties, and applications within society. Along with CHEM 1105, 1106, and 1306, it satisfies the laboratory science requirement for non-majors and those who do not require CHEM 1307 and 1308.
- 1306. [CHEM 1307, 1407] Chemistry and Society II (3:3:0).** Prerequisite: CHEM 1305. This course consists of chemical applications within society and the modern chemical world.
- 1307. [CHEM 1311, 1411] Principles of Chemistry I (3:3:0).** Prerequisite: CHEM 1301 or a passing grade on the Chemistry Placement Exam. A study of fundamental concepts of chemistry including nomenclature, states of matter, the periodic table and periodic trends, chemical reactions, atomic structure, chemical bonding, molecular structure, and the properties of gases, liquids, solutions and solids. This course is recommended for students who plan careers in the physical and biological sciences as well as medicine and engineering.
- 1308. [CHEM 1312, 1412] Principles of Chemistry II (3:3:0).** A continuation of CHEM 1307, which covers solution chemistry, chemical kinetics, acid/base and ionic equilibria, thermodynamics, electrochemistry, nuclear chemistry, and coordination chemistry. This course serves as a prerequisite to all advanced chemistry courses.
- 2000. Introduction to Chemical Research (1:0:3).** Prerequisite: One semester of college chemistry or consent of instructor. Selected research problems according to the needs of students, especially group or team projects. Includes an introduction to chemical research and mentorship by the staff. May not be repeated for credit.

- 2100. Introduction to Biochemistry Research (1:1:0).** Prerequisite: CHEM 1307 or consent of instructor. A structured seminar series on contemporary biochemical research topics. May not be repeated for credit.
- 2103. [CHEM 1419] Introductory Organic Chemistry Laboratory (1:0:3).** Corequisite: CHEM 2303. Introductory organic laboratory techniques for students in agriculture and human sciences.
- 2303. Introductory Organic Chemistry (3:3:0).** Prerequisite: CHEM 1306 or 1308. A brief study of the chemistry of carbon compounds for students in agriculture and human sciences. Not for majors or minors.
- 3000. Undergraduate Research (V1-6).** Prerequisite: Consent of instructor. Individual research project under the guidance of a staff member. May be repeated for credit.
- 3105. Organic Chemistry Laboratory I (1:0:3).** Prerequisite: CHEM 1108; corequisite: CHEM 3305. First semester of fundamental techniques of organic chemistry.
- 3106. Organic Chemistry Laboratory II (1:0:3).** Prerequisite: CHEM 3105; corequisite: 3306. Second semester of fundamental techniques of organic chemistry.
- 3107. Physical Chemistry Laboratory I (1:0:3).** Corequisite: CHEM 3307. An introduction to physical chemical experimental methods including calorimetry, phase equilibria, surface phenomena, and viscosity. (Writing Intensive)
- 3108. Physical Chemistry Laboratory II (1:0:3).** Corequisite: CHEM 3308. An introduction to physical chemical methods, including spectroscopy, high-vacuum techniques, electric and magnetic phenomena. (Writing Intensive)

Biochemistry Curriculum, B.A. Degree

FIRST YEAR			
Fall		Spring	
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. Lab. I	1	CHEM 1108, Prin. of Chem. Lab. II	1
BIOL 1403, Biology I**	4	BIOL 1404, Biology II**	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
American History†	3	American History†	3
MATH 1351, Calculus I*	3	MATH 1352, Calculus II*	3
Physical Fitness and Wellness†	1	Physical Fitness and Wellness†	1
TOTAL	18	TOTAL	18
SECOND YEAR			
Fall		Spring	
CHEM 3305, Org. Chem. I	3	CHEM 3306, Org. Chem. II	3
CHEM 3105, Org. Chem. Lab. I	1	CHEM 3106, Org. Chem. Lab. II	1
CHEM 2100, Intro. Biochem. Res.	1	Social/Behavioral Science Elective†	3
Foreign Language†	5	PHYS 2401, Prin. of Phys. II***	4
PHYS 1408, Prin. of Physics I***	4	Foreign Language†	5
Visual/Performing Arts Elective†	3	TOTAL	16
TOTAL	17	TOTAL	16
THIRD YEAR			
Fall		Spring	
CHEM 3311, Biol. Chem. I	3	CHEM 3312, Biol. Chem. II	3
BIOL 3416, Genetics	4	CHEM 3313, Biol. Chem. Lab	3
English†	3	CHEM 3314, Biol. Chem. III	3
Foreign Language†	3	Foreign Language†	3
POLS 1301, Amer. Govt., Org.	3	CHEM 3341, Analytical Chem.	3
TOTAL	16	CHEM 3141, Analytical Chem. Lab	1
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
CHEM 4311, Phys. Chem. Biol. Sci.	3	English†	3
BIOL 3320, Cell Biology	3	Humanities Elective†	3
Advanced Elective^	4	Visual or Performing Arts Elective†	3
Social/Behavioral Science Elective†	3	Political Science†	3
Oral Communications†	3	Advanced Biology Elective	3
TOTAL	16	TOTAL	15

* Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. A score of 7 on the Math Placement Exam is necessary to take calculus the first year. Scores below 7 will require additional classes which will make the degree difficult to complete in four years without taking courses during summer sessions.

** Failure to complete BIOL 1403 and 1404 in the first year will make the degree difficult to complete in four years without taking courses during summer sessions.

*** PHYS 1403 and 1404 may be substituted for PHYS 1408 and 2401.

† Select from Arts and Sciences General Degree Requirements.

^ Four advanced elective hours with at least 3 hours from CHEM 4300, 4309, 4314 and the remaining hour from CHEM 3000 (3), 3308, 4105, 4114, 4302 or 4310.

Biochemistry Curriculum, B.S. Degree

FIRST YEAR			
Fall		Spring	
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. Lab. I	1	CHEM 1108, Prin. of Chem. Lab. II	1
BIOL 1403, Biology I**	4	BIOL 1404, Biology II**	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
American History†	3	American History†	3
MATH 1351, Calculus I*	3	MATH 1352, Calculus II*	3
Physical Fitness and Wellness†	1	Physical Fitness and Wellness†	1
TOTAL	18	TOTAL	18
SECOND YEAR			
Fall		Spring	
CHEM 3305, Org. Chem. I	3	CHEM 3306, Org. Chem. II	3
CHEM 3105, Org. Chem. Lab. I	1	CHEM 3106, Org. Chem. Lab. II	1
CHEM 2100, Intro. Biochem. Res.	1	CHEM 3351, Analytical Chemistry	3
BIOL 3416, Genetics	4	CHEM 3251, Analytical Chem. Lab.	2
PHYS 1408, Prin. of Physics I	4	PHYS 2401, Prin. of Phys. II	4
Foreign Language†	5	Foreign Language†	5
TOTAL	18	TOTAL	18
THIRD YEAR			
Fall		Spring	
CHEM 3311, Biol. Chem. I	3	CHEM 3312, Biol. Chem. II	3
MBIO 3401, Prin. of Microbiology	4	CHEM 3313, Biol. Chem. Lab	3
English†	3	CHEM 3314, Biol. Chem. III	3
Foreign Language†	3	Foreign Language†	3
POLS 1301, Amer. Govt., Org.	3	Political Science†	3
TOTAL	16	TOTAL	15
FOURTH YEAR			
Fall		Spring	
CHEM 4311, Phys. Chem. Biol. Sci.	3	CHEM 4312, Phys. Biochemistry	3
Social/Behavioral Science Elective†	3	English†	3
Visual or Performing Arts Elective†	3	Humanities Elective†	3
Oral Communications†	3	Advanced Elective^	7-8
Advanced Elective^	3-4	TOTAL	16-17
TOTAL	15-16	TOTAL	16-17

* Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. A score of 7 on the Math Placement Exam is necessary to take calculus the first year. Scores below 7 will require additional classes which will make the degree difficult to complete in four years without taking courses during summer sessions.

** Failure to complete BIOL 1403 and 1404 in the first year will make the degree difficult to complete in four years without taking courses during summer sessions.

† Select from Arts and Sciences General Degree Requirements.

^ Ten advanced elective hours with at least 3 hours from CHEM 4300 or 4314, and the remaining hours from BIOL 3320, 4320, CHEM 3000 (3), 4114, MBIO 4402, ZOO 3405.

3141. **Analytical Chemical Methods Laboratory (1:0:3)**. Corequisite: CHEM 3341. Discovery and practice of analytical laboratory techniques important to the biological and medical sciences.
3201. **Advanced Organic Chemistry Laboratory (2:0:6)**. Prerequisite: CHEM 3306. Advanced synthesis, purification, and analysis of organic compounds. Required for B.S. majors in chemistry.
3251. **Analytical Chemistry Laboratory (2:0:6)**. Corequisite: CHEM 3351. Discovery and practice of the major analytical laboratory techniques.
3301. **Descriptive Inorganic Chemistry (3:3:0)**. Prerequisite: CHEM 1308. A descriptive survey of modern topics in inorganic chemistry, including coordination compounds, acid-base chemistry, periodicity, transition elements, and inorganic rings, cages, and chains. (Writing Intensive)
3305. **Organic Chemistry I (3:3:0)**. Prerequisite: CHEM 1308. First semester of a thorough foundation course in organic chemistry.
3306. **Organic Chemistry II (3:3:0)**. Prerequisite: CHEM 3305. Second semester of a thorough foundation course in organic chemistry.
3307. **Physical Chemistry I (3:3:0)**. Prerequisite: CHEM 1308, PHYS 1404, 2401, MATH 1352. The study of gases, thermodynamics, chemical and phase equilibria, and solutions.
3308. **Physical Chemistry II (3:3:0)**. Prerequisite: CHEM 3307 or CH E 3322. The study of kinetic theory, chemical kinetics, electrochemistry, transport properties, surface chemistry, quantum chemistry, and statistical mechanics.
3310. **Molecular Biochemistry (3:3:0)**. Prerequisite: CHEM 3306. Molecular descriptions of biological materials and systems. A one-semester course covering molecular approaches to biochemistry and metabolism.
3311. **Biological Chemistry I (3:3:0)**. Prerequisite: CHEM 3306 and BIOL 1401 and 1402 or BIOL 1404. First semester of a three-semester course in general biochemistry.
3312. **Biological Chemistry II (3:3:0)**. Prerequisite: CHEM 3311. Second of a three-part course in general biochemistry.
3313. **Biological Chemistry Laboratory (3:1:6)**. Prerequisite: CHEM 3106, 3311. Techniques for the isolation, purification, and characterization of biomolecular species. (Writing Intensive)
3314. **Biological Chemistry III (3:3:0)**. Prerequisite: CHEM 3311. Third of a three-part course in general biochemistry. Emphasis on nucleotide metabolism and cellular processes involving nucleic acids.
3341. **Analytical Chemical Methods (3:3:0)**. Prerequisite: CHEM 1308. A lecture course in analytical chemical methods emphasizing practical applications, including techniques important to the biological and medical sciences.
3351. **Analytical Chemistry (3:3:0)**. Prerequisite: CHEM 1308, MATH 1352. A lecture course in the basic and advanced theories and techniques of analytical chemical methods. Required of all B.S. chemistry and biochemistry majors.
4010. **Individual Studies in Chemistry (VI-6)**. Prerequisite: Consent of instructor. A structured independent studies course under the guidance of a faculty member. May be repeated for credit.
4100. **Case Studies of Chemical Enterprises (1:0:3)**. Prerequisite: Senior standing and consent of instructor. A student seminar opportunity to study the structure and operation of chemical processes and/or enterprises. (Writing Intensive)
4105. **Inorganic Chemistry Laboratory (1:0:3)**. Prerequisite: CHEM 3105. Techniques used in the synthesis and characterization of inorganic compounds: complex ions, vacuum-line techniques, chromatography, inert atmosphere methods, reactivity profiles, spectroscopy of inorganic compounds.
4114. **Instrumental Analytical Methods Laboratory (1:0:3)**. Corequisite: CHEM 4314. Experience and practice with several important chemical instruments. (Writing Intensive)
4300. **Senior Research (3:0:8)**. Prerequisite: Senior standing with minimum 2.5 chemistry GPA and consent of instructor. Individual research project under the guidance of a staff member. The project will be at a more advanced level than is involved in CHEM 3000. The student is required to use the chemical literature in planning of the research and to submit a formal written report. May not be repeated for credit. (Writing Intensive)
4302. **Structure and Mechanisms in Organic Chemistry (3:3:0)**. Prerequisite: CHEM 3306 and 3307. Organic chemistry at an advanced level. Emphasis on developments in theoretical organic chemistry.
4309. **Advanced Inorganic Chemistry (3:3:0)**. Prerequisite: CHEM 3305 and MATH 1352. A theoretical treatment of inorganic chemistry, including symmetry, group theory, bonding principles, spectroscopy, inorganic reaction mechanisms, transition metals, and organometallic chemistry. (Writing Intensive)
4310. **Polymer Chemistry (3:3:0)**. Prerequisite: CHEM 3306 and 4311 or 3307 or CH E 3322. An introduction to the chemistry of macromolecules, including the synthesis, structures, properties, and applications of polymers.
4311. **Physical Chemistry for the Biological Sciences (3:3:0)**. Prerequisite: CHEM 1308, 3311; PHYS 1404 or 2401; MATH 1352. A physical chemistry course for majors in biochemistry and the biological sciences. Topics include quantum chemistry, thermodynamics, electrochemistry, and kinetics.
4312. **Physical Biochemistry (3:3:0)**. Prerequisite: CHEM 3312, 3313, 3314, 3351 and 4311 or 3307. Applications of physical chemical techniques to proteins, nucleic acids, and membranes.
4314. **Instrumental Analytical Methods (3:3:0)**. Prerequisite: CHEM 3341, 3351, and 3307 or 4311. Lecture course covering theories and application of instrumental chemical analysis methods. (Writing Intensive)

Graduate Courses

5010. **Individual Studies in Chemistry (VI-6)**. Prerequisite: Consent of instructor. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
- 5101, 5102. **Seminar (1:1:0 each)**. Prerequisite: Graduate standing in chemistry. Required of all graduate students majoring in chemistry.
5301. **Advanced Inorganic Chemistry I (3:3:0)**. Prerequisite: CHEM 4309 or equivalent. 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.
5304. **Topics in Chemistry (3:3:0)**. Prerequisite: Consent of instructor. Special area of chemistry not commonly included in other courses. Topics may be taken from the traditional chemical disciplines or any interdisciplinary combination. May be repeated under a different topic for credit.
5310. **Polymer Chemistry (3:3:0)**. Prerequisite: CHEM 4311 or 3307 and 3306, or equivalents. An introduction to the chemistry of macromolecules, including the synthesis, structures, properties and applications of polymers.
5314. **Advanced Analytical Chemistry (3:3:0)**. Prerequisite: CHEM 3307, 3308, 3351, or equivalents. General principles and special methods of analytical chemistry.
5315. **Atmospheric Chemistry (3:3:0)**. Prerequisite: Consent of instructor. An advanced course covering the production, monitoring, and fate of gases, vapors, and particulates in planetary atmospheres.
5316. **Aquatic Chemistry (3:3:0)**. Prerequisite: Consent of instructor. An advanced course in the analytical, physical, and inorganic chemistry of naturally occurring aqueous solutions and suspensions.
5318. **Analytical Separation Science and Technology (3:3:0)**. Prerequisite: Consent of instructor. The science and technology of analytical separation techniques, including chromatography, electrophoresis, field flow fractionation, and capillary separation.
5319. **Electrochemical Analysis (3:3:0)**. Prerequisite: Consent of instructor. Principles and applications of electrochemistry with emphasis on topics in electroanalytical chemistry.
5320. **Analytical Spectroscopy (3:3:0)**. Prerequisite: Consent of instructor. A detailed fundamental assessment and survey of the important techniques in analytical spectroscopy.
5321. **Advanced Organic Chemistry I (3:3:0)**. Prerequisite: CHEM 3305 and 3306 or equivalents. 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. Principles and methods of synthesis of organic compounds.
5323. **Modern Principles of Organic Chemistry I (3:3:0)**. A survey of modern organic chemistry with emphasis on reactions and contemporary theory. Not appropriate for graduate students in the department.
5324. **Modern Principles of Organic Chemistry II (3:3:0)**. Prerequisite: CHEM 5323. A continuation of CHEM 5323. Primarily intended for graduate minors in chemistry. Will serve as the prerequisite for other graduate courses in organic chemistry. Not appropriate for graduate students in the department.
5326. **Organic Spectroscopic Analysis (3:3:0)**. Prerequisite: CHEM 3306 or equivalent. Theory and interpretation of spectra of organic compounds: MS, IR, UV-Vis, carbon and proton NMR.
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.
5330. **Biochemistry I (3:3:0)**. Prerequisite: CHEM 2303, 2103 or 3105, 3106, 3305, 3306 or equivalents. Properties of biological compounds. Chemical processes in living systems. For advanced study by graduate students with majors outside the department. Not appropriate for graduate students in the department.

5331. **Biochemistry II (3:3:0)**. Prerequisite: CHEM 5330. Properties of biological compounds. Chemical processes in living systems. For advanced study by graduate students with majors outside the department. Not appropriate for graduate students in the department.
5332. **Biochemistry III (3:3:0)**. Prerequisite: CHEM 5330. Third semester of a three semester general biochemistry series for nonmajors. Topics include nucleotide metabolism and cellular processes involving nucleic acids. Not appropriate for graduate students in the department.
5333. **Proteins (3:3:0)**. Prerequisite: CHEM 3311, 3312 or CHEM 4303 or BCH 5921 or equivalents. Chemical and physical properties of proteins. Primary and conformational structure determination.
5334. **Principles of Biochemistry (3:3:0)**. Prerequisite: CHEM 3305, 3306, 2303, or equivalents. A one-semester course geared towards graduate students in animal sciences, food technology, plant and soil sciences, biotechnology and biology. Not appropriate for graduate students in the department.
5335. **Physical Biochemistry (3:3:0)**. Prerequisite: CHEM 3307 or 4311 and CHEM 3311, 3312 or equivalents. Biophysical methods and approaches to the study of structure-function relationships in biopolymers.
5336. **Lipids (3:3:0)**. Prerequisite: CHEM 3305, 3306, 3311, and 3312. Structure and function of lipids. Emphasis is placed on the methods of characterization, evolution, biosynthetic pathways, and biological roles of lipids.
5337. **Enzymes (3:3:0)**. Prerequisite: CHEM 3311, 3312 or CHEM 4303 or equivalents. Structure, mode of action, and kinetics of enzymes.
5339. **Nucleic Acids (3:3:0)**. Prerequisite: CHEM 3312 or 4303 and BIOL 4320 or 5320. Eukaryotic and prokaryotic DNA cloning strategies, DNA sequence analysis and manipulation, and recombinant DNA expression.
5340. **Physical Chemistry Principles I (3:3:0)**. Prerequisite: CHEM 1307, 1308, PHYS 1308, 1105, 2301, 1106, MATH 1351, 1352 or equivalents. A foundation course, for the graduate student minoring in chemistry, covering a wide range of principles. Prerequisite for other courses in physical and inorganic chemistry. Not appropriate for graduate students in the department.
5341. **Physical Chemistry Principles II (3:3:0)**. Prerequisite: CHEM 5340. A foundation course, for the graduate student minoring in chemistry, covering a wide range of principles. Prerequisite for other graduate courses in physical and inorganic chemistry. Not appropriate for graduate students in the department.
5342. **Introduction to Quantum Chemistry (3:3:0)**. Prerequisite: CHEM 3307, 3308, or equivalents. Introduction to quantum mechanics, spectroscopy, and the electronic structures of atoms and molecules.
5343. **Quantum Chemistry (3:3:0)**. Prerequisite: CHEM 5342. The application of non-relativistic wave mechanics to problems of chemical structure and reactivity.
5344. **Kinetics of Chemical Reactions (3:3:0)**. Prerequisite: CHEM 3307, 3308, or equivalents. A survey of chemical kinetics including transition state theory, the theory of mass spectra, spectroscopic methods, and models of reactions in solution.
5345. **Molecular Spectroscopy (3:3:0)**. Prerequisite: CHEM 5342. Principles of electronic, vibrational, and rotational spectroscopy and applications for determining molecular structure and other properties.
5346. **Statistical Mechanics and Thermodynamics (3:3:0)**. Prerequisite: CHEM 5342. Equilibrium and non-equilibrium systems including ensembles, density matrices, and time-correlation functions.
5349. **Physical Chemistry Principles for Biological Sciences (3:3:0)**. Prerequisite: CHEM 1307, 1308, 1107, 1108; PHYS 1308, 2301, 1105, 1106 or 1306, 1307, 1103, 1104; MATH 1351, 1352 or equivalents. A physical chemistry course for graduate students in biological sciences. Topics: Thermodynamics, electrochemistry, chemical kinetics, and quantum mechanics. Not appropriate for graduate students in the department.
5360. **Conceptual Chemistry for Teachers I (3:3:0)**. An integrated course for teachers. Topics include water, acids-bases, the periodic table, compounds, reactivity, structure, and energy.
5361. **Conceptual Chemistry for Teachers II (3:3:0)**. Prerequisite: CHEM 5360. A continuation of CHEM 5360, covering organic chemistry, biochemistry, equilibrium, kinetics, polymers, and nuclear chemistry.
6000. **Master's Thesis**. (V1-6).
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Classical and Modern Languages and Literatures

Faculty

Frederick Suppe, Ph.D., Chairperson

Horn and Qualia Chair: J. Pérez

Horn and Qualia Professor: Gafaïti

Professors: Christiansen, Larmour, A.J. Pérez, G. Pérez, Smith, Suppe, Wood

Associate Professors: Beard, Beusterien, Farley, Fry, Gorsuch, Graf, Grair, Holland, McClain, Qualin, Reed, Stein, Stratton, Zamora

Assistant Professors: Bonzo (Visiing), Borst, Cole, Collopy, Corbett, Elola, Ladeira, Lavigne, Pereira-Muro, Pratt, Robin, Sunseri, Surliuga,

Instructors: Hays, Meier, Thrasher

Adjunct Faculty: Le, Sneed

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Classics
- Bachelor of Arts in French
- Bachelor of Arts in German
- Bachelor of Arts in Spanish
- Master of Arts in Applied Linguistics
- Master of Arts in Classics
- Master of Arts in German
- Master of Arts in Romance Languages
- Doctor of Philosophy in Spanish

The department participates in the Russian Language and Area Studies program at the undergraduate level and the Latin American and Iberian Studies program at the undergraduate level as well as in the minor at the master's and doctoral levels. Graduate students majoring in romance languages may specialize in French or Spanish. The department also participates in the ethnic studies, honors, linguistics, comparative literature, and teacher education programs. See the "Interdisciplinary Programs" section of the College of Arts and Sciences.

Undergraduate Program

Majors and Minors for the B.A. Degree. A major may be obtained in classics, French, German, Russian Language and Area Studies, and Spanish. An undergraduate major in Spanish consists of 30 hours at the 2000 level and above, including a minimum of four 4000 level courses. An undergraduate major in French consists of 30 hours at the 2000 level or above, including five 4000 level courses one of which must be a writing intensive literature course. The German major consists of 30 hours at the 2000 level and above including a minimum of four (12 hours) 4000 level courses, one of which must be a capstone course (4305). The Classics major consists of 30 hours from Classics, Latin at the 1502 level and above, Greek, ART 3310, C LT 2301, HIST 3340, and PHIL 3301.

Classics students pursuing teacher certification must replace classics with advanced Latin to complete 24 hours specifically in Latin.

For information on the B.A. degree or a minor in Russian area and language studies or applied linguistics, see program descriptions in the College of Arts and Sciences "Interdisciplinary Programs" section of this catalog.

A minor can be obtained in Arabic, American Sign Language, Chinese, Classics, Comparative Literature, French, German, Greek, Italian, Japanese, Latin, Latin American and Iberian Studies, Linguistics, Portuguese, Russian, Russian Language and Area Studies, Spanish, and Turkish. The minor consists of a minimum of 18-22 hours in a particular lan-

Graduate Program

Before beginning a graduate program in this department, students should consult the graduate advisor of the particular program concerning departmental admission procedures and degree requirements. Admission to the Graduate School requires departmental recommendation as well as approval by the graduate dean.

The master's program offers advanced study in literature and linguistics. It is intended to be a distinctly different educational experience from undergraduate study. It requires study in greater depth and the development of critical thinking. Applicants for the M.A. degree in Romance Languages, with a concentration in French or Spanish, may complete 24 hours of graduate courses and a thesis or 36 hours of coursework. The degree may include a six-hour minor. Applicants for the M.A. degree in Applied Linguistics, Classics, or German may complete 30 hours of graduate courses and a thesis or 36 hours of coursework. Areas of emphasis for Spanish, French, or German include literature, comparative literature, linguistics, civilization and/or culture. Areas of emphasis for classics include literature, language, gender, and art history. Classics candidates are directed to the *Guide to the M.A. Degree Program in Classics*, which is obtainable from the graduate advisor or the departmental office. Candidates for the M.A. degree in this department must demonstrate a reading knowledge of a second foreign language. Areas of emphasis for applied linguistics include teaching English as a second language, teaching second/foreign languages, or general applied linguistics. Candidates for the M.A. degree in Applied Linguistics must demonstrate knowledge of a language other than English (see also the "Applied Linguistics" section of this catalog). Oral and written comprehensive examinations are required. This department also participates in the joint M.B.A.–

M.A. program. See a full description under the Rawls College of Business section of this catalog.

The department offers a 150-hour dual B.A.–M.A. option for outstanding students.

Graduate minors for the M.A. degree are available in applied linguistics, classics, German, Greek, Latin, Portuguese, Russian, and romance languages.

The doctoral program in Spanish requires both greater breadth of study than the M.A. program and greater concentration in the area selected for specialization. To fulfill these requirements the student must demonstrate a reasonable comprehensive knowledge of literature and the ability to engage in original research. To qualify for admission to candidacy for the Ph.D. degree in Spanish, applicants must complete a graduate minor in another language or demonstrate a reading knowledge of two approved languages other than English or Spanish. Any substitution must be submitted in writing to the Spanish graduate advisor and approved by the candidate's doctoral committee.

Students in the Ph.D. program normally minor within the department in one of the above mentioned minor areas, but may select a combination of courses within and outside the department if approved by the appropriate graduate advisor. Students should consult with a graduate advisor for approved options. A Ph.D. minor consists of 15 to 18 hours of coursework in approved areas.

Coursework for the Ph.D. generally amounts to a minimum 60 hours beyond the B.A. degree, including at least 45 hours of coursework in Spanish and 15 additional hours in a minor program outside the major field. In addition, the student must satisfy the preliminary examination requirement, pass qualifying examinations, and prepare and defend a dissertation.

guage or area. All minors must complete at least 6 hours at the upper level; however, French, German, Latin, Portuguese, Russian, and Spanish minors require 9 hours of upper-level courses (at least 3 of the 9 hours must be at the 4000 level in French, German, Latin and Spanish). Classics, Latin American and Iberian Studies, Linguistics, and Russian Language and Area Studies minors will complete at least 18 hours from the approved course lists of these areas (listed elsewhere in the catalog). An Arabic minor can include, with approval of the student's minor advisor, one upper-level course in either history or political science (dealing with the Middle East). For more information on minors, consult the Advising, Recruitment and Retention Center in the Foreign Language Building or the appropriate faculty advisor.

Students wishing to obtain information on a major or minor in one of these languages should consult the department's Advising, Retention and Recruitment Center. The advisors can provide information on all aspects of the major and minor programs, including career opportunities. A grade of at least C in all major and minor courses is required. College Level Examination (CLEP) credits are accepted by the department.

Resident Courses. Students who are minors are required to take at least one upper-level 3-hour class in residence in the target language at Texas Tech University. Students who are majors are required to take at least three upper-level classes (9 hours) in residence in the target language at Texas Tech. Students who study abroad with the university programs (which involve faculty from this department) may include those courses among the required courses. Foreign study courses taken through approved exchange programs or other programs affiliated with Texas Tech are not considered as resident courses.

Study Abroad Courses. The department encourages students to study abroad and is very proud of its study abroad programs. Students enrolled at Texas Tech have many opportunities and options to accomplish this. Many students take this opportunity to

enhance their language skills. Resident semester abroad programs are available in Seville, Spain and Quedlinburg, Germany, and summer programs in Seville, Spain and San Luis Potosi, Mexico. Students enrolled in French, Italian, Portuguese, and Russian have the opportunity to study abroad in the respective countries. During the long semester, students may earn up to 16 hours of credit and during the summer they may earn up to 6 hours of credit per summer semester. Course offerings may include from first year through graduate study. Students should check with the respective language advisors and program directors for specific information on the programs, including prerequisites and other important information.

Foreign Language Requirements and Options. To fulfill the general Bachelor of Arts requirements, students must complete 6 semester hours in the same language at the sophomore level or above. A student who enrolls in the first-year sequence will have a 11-16 hour requirement. Courses taught in English such as SPAN 3390, 3391, 3392, FREN 3390, GERM 3312, 3313, RUSN 3301, 3302, 3304, 4301, and 4302 may not be used to fulfill the foreign language requirement for any bachelor's degree.

Foreign language courses 1301 and 1302 or 1501 and 1502 or 1507 are prerequisites for courses 2301 or 2607; a minimum grade of B in SPAN 1507 is required to enroll in SPAN 2607. All first- and second-year courses are sequential and should be taken in their proper order beginning with 1301, 1501, or 1507 and progressing up through 2302 or 2607. If credit is earned for 1507, no credit will be awarded for 1501 and/or 1502. Students with two years of high school French, German, Latin, or Spanish are required to enroll in 1507. Those students enrolled in French, German, or Latin 1507 but judged not qualified for 1507 are required to take 1501 pass-fail with approval of faculty.

Successful completion of lower-numbered courses or equivalent competency is a prerequisite for the higher-numbered courses.

These higher-numbered courses allow students to pursue their particular interests in language, civilization, and literature.

Teacher Education. For purposes of certification, teaching fields are offered in French, German, Latin, and Spanish. The standard program requires 24-27 hours at the 2000-level and above, which must include 9 hours of 4000-level courses in the specific language (12 hours in German). Students seeking secondary certification in French and Spanish must complete LING 4311, preferably before their student teaching, as part of the teaching field. Students seeking bilingual education endorsement, ESL endorsement, or secondary certification in French, German, Latin, or Spanish should consult with advisors in the College of Education and in the Department of Classical and Modern Languages and Literatures.

Placement and Credit by Examination. The department offers placement exams in French, German, Latin, and Spanish. The department recommends that students with three or more years of study in one of these languages or students with advanced fluency take the placement exam. These exams permit students to earn up to 16 hours credit for a variety of first and second year courses. The placement exams also provide a recommended placement or the next logical course the student should take.

Each placement exam is intended to evaluate an individual's general level of knowledge of the language; a grade is not issued, nor is any specific text or study material recommended for the tests. Any credit earned through these exams is posted to the student's transcript as credit by examination. The hours will count towards languages or other humanities requirements, depending on the student's college, but will not affect the GPA.

Students who earn credit through a language placement test may not later take that course and receive credit. Likewise, an individual cannot receive credit through the placement tests for a course that has already been completed. Each of the language placement tests (i.e., French, German, Latin, Spanish) may be taken only once per student.

The placement tests are administered by the Language Learning Laboratory and Resource Center. The tests are offered the last Wednesday and Thursday of each month (except December), during preregistration periods and at the beginning of each long semester. Further information may be obtained by calling the Language Laboratory at 806.742.3151.

American Sign Language (ASL)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1301, 1302. [SGNL 1401, 1402] **Beginning Course in American Sign Language I and II (3:3:1 each).** Introduction and development of receptive and expressive language skills in American Sign Language.
- 2301, 2302. [SGNL 2301, 2302] **Second Course in American Sign Language III and IV (3:3:0 each).** Prerequisite: ASL 1301 and 1302. Development of intermediate receptive and expressive skills in American Sign Language.
- 3301, 3302. **Third Course in American Sign Language V and VI (3:3:0 each).** Prerequisite: ASL 2302 for 3301 and 3301 for 3302. Development of advanced expressive and receptive ASL skills. English-ASL translation.
3312. **Introduction to Deaf Culture and Linguistics (3:3:0).** Prerequisite: ASL 2302. Overview of deaf culture and history including deaf community values and issues. ASL linguistic structure.
4300. **Individual Studies in ASL (3).** Prerequisite: ASL 2302. Independent study in American Sign Language under the guidance of a faculty member. May be repeated for credit with consent of instructor.

Arabic (ARAB)

Undergraduate Courses

- 1501, 1502. **Beginning Course in Arabic I and II (5:5:1 each).** Introduction and development of the four language skills in Arabic. Listening comprehension, speaking, reading, and writing.

- 2301, 2302. **Second Course in Arabic I and II (3:3:0 each).** Prerequisite: ARAB 1501 and 1502. Reading, cultural background, grammar review, conversation and composition.
4300. **Individual Studies in Arabic (3).** Prerequisite: ARAB 2302 or equivalent. Independent work under the guidance of a faculty member. Contents vary to meet the needs of the student. May be repeated once.

Chinese (CHIN)

Undergraduate Courses

- 1501, 1502. [CHIN 1511, 1512] **A Beginning Course in Chinese I, II (5:5:1 each).** Introduction and development of the four language skills in Chinese. Listening comprehension, speaking, reading, and writing.
- 2301, 2302. [CHIN 2311, 2312] **A Second Course in Chinese I, II (3:3:0 each).** Prerequisite: CHIN 1402 for CHIN 2301 and CHIN 2301 for CHIN 2302. Reading, cultural background, grammar review, conversation, and composition.
4300. **Individual Problems in Chinese (3).** Prerequisite: CHIN 2302 or equivalent as well as consent of instructor and department chairperson. Contents will vary to meet the needs of the student. May be repeated for credit with consent of instructor. Independent work under the guidance of a faculty member.

Classics (CLAS)

Undergraduate Courses

1310. **Latin and Greek Terminology (3:3:0).** Analysis of English words through the study of Latin and Greek roots, prefixes, and suffixes.
3302. **Classical Mythology (3:3:0).** Classical myths: stories of gods, demigods, and heroes; their significance in the ancient and modern worlds. Selected readings in translation with lectures and discussions in English.
3303. **Sports and Public Spectacles in the Ancient World (3:3:0).** Survey of Greek and Roman athletics, the Roman Triumph, gladiatorial combat, and other spectacles in the Ancient World.
3304. **Ancient Technology (3:3:0).** Examination of the science and engineering of the ancient Egyptians, Greeks, and Romans through archeological remains and literary sources.
3315. **World of Egypt and the Near East (3:3:0).** Examination of the literature and /or art and archaeology of ancient Egypt, and the Near East in its cultural context.
3320. **The World of Greece (3:3:0).** Examination of the literature and/or art and archeology of ancient Greece in its cultural context.
3330. **The World of Rome (3:3:0).** Examination of the literature and/or art and archeology of ancient Rome in its cultural context.
3340. **Gender and Sexuality in the Classical World (3:3:0).** Examination of the social and cultural dimensions of gender and sexuality in the ancient Greco-Roman world. Readings in English.
3350. **Comparative Mythology (3:3:0).** Ancient myths in various cultures and their influence on modern literature and film.
4300. **Research in Classics (3).** Undergraduate research in classics under direction of instructor. May be repeated for credit. (Writing Intensive)
4310. **Seminar in Classics (3:3:0).** Prerequisite: Six hours of classics or consent of instructor. Intensive study of a topic in ancient culture. May be repeated for credit. (Writing Intensive)

Graduate Courses

5101. **Classical Language Pedagogy (1:1:0).** Systemic formal training in language pedagogy for Latin and ancient Greek.
5102. **Classical Culture Pedagogy (1:1:0).** Systematic formal training in pedagogy for diverse classical culture courses.
5301. **Studies in Greco-Roman Literature (3:3:0).** Selected studies in major authors, genres, or themes. May be repeated for credit.
5305. **Aims and Methods of Classical Scholarship (3:3:0).** A general overview of aims and methods of ancient studies covering primary and secondary sources.
5311. **Classical Art and Archaeology (3:3:0).** Examines architecture, sculpture, and painting of the Greco-Roman World. May be repeated for credit.
5350. **The Classical Tradition (3:3:0).** Designed to acquaint students with the influence of ancient Rome and Greece on Western culture. Readings in English.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**

Classical and Modern Languages and Literatures (CMLL)

Undergraduate Courses

- 1301, 1302. [CZEC 1311, 1312; VIET 1311, 1312] **Individual Studies in Modern Languages I, II (3 each)**. Introduction and development of skills in a modern language, including listening comprehension, speaking, reading, and writing.
- 1501, 1502. [CZEC 1511, 1512; VIET 1511, 1512] **Individual Studies in Modern Languages I, II (5 each)**. Introduction and development of the four languages skills: listening comprehension, speaking, reading, and writing. May be repeated twice for credit when language is different.
- 2301, 2302. [CZEC 2311, 2312; VIET 2311, 2312] **Individual Studies in Modern Languages III, IV (3 each)**. Prerequisite: CMLL 1301 and 1302, or equivalent. Continuation of study of a modern language. Introduction and development of skills in a modern language, including listening comprehension, speaking, reading, and writing.
4300. **Individual Studies in Modern Language (3)**. Prerequisite: CMLL 2302 or equivalent. Independent study in modern language under the guidance of a faculty member. May be repeated for credit with consent of instructor.

Graduate Courses

5301. **Research Methods and Bibliography (3:3:0)**. Systematic study of research methods, bibliographical materials and problems in the fields of languages and literatures.
5302. **Literary Criticism and Theory (3:3:0)**. Theories and practices of literary analysis and criticism with emphasis on critical / analytic thinking, reading and writing.

English as a Second Language (ESL)

Undergraduate Courses

1301. **Oral Skills for International Students (3:3:0)**. Prerequisite: Consent of instructor. Development of oral language skills and interaction strategies, English pronunciation and intonation, and idiomatic English expression.
1302. **English Grammar and Composition for International Students (3:3:0)**. Prerequisite: Consent of instructor. Development of academic writing skills with emphasis on the grammar of written English.

Graduate Courses

5301. **Advanced Writing for International Students (3:3:0)**. Focusing on advanced writing projects, the preparation of theses and dissertations, and the preparation of research for publication.
5305. **Academic Listening (3:3:0)**. Teaches listening, note-taking, interrogative and verbal skills to students who are non-native speakers of English.
5310. **English for Classroom Management (3:3:0)**. Classroom management and teaching communication skills for non-native speakers of English. May be repeated once.
5315. **Academic Writing (3:3:0)**. Prepares non-native speakers of English for graduate-level academic writing. May be repeated once.

French (FREN)

Undergraduate Courses

- 1501, 1502. [FREN 1511, 1512] **A Beginning Course in French I, II (5:5:1 each)**.
1507. **Comprehensive French Review First Year (5:5:1)**. Prerequisite: Two years of high school French. A comprehensive one-semester review.
- 2301, 2302. [FREN 2311, 2312] **A Second Course in French I, II (3:3:0 each)**. Prerequisite: FREN 1501 and 1502 or 1507. Readings, cultural background, conversation, and composition.
3302. **Major French Writers (3:3:0)**. Prerequisite: FREN 2301 and 2302, or equivalent. A survey of major French writers. (Writing Intensive)
3303. **French Conversation (3:3:0)**. Prerequisite: FREN 2301 and 2302, or equivalent. Designed to increase vocabulary and attain oral fluency. May be taken concurrently with FREN 3301 or 3302.

3304. **Grammar: A Comprehensive Review (3:3:0)**. Prerequisite: FREN 2301 and 2302 or equivalent. A comprehensive overview of French grammar.
3390. **French Culture (3:3:0)**. A multimedia approach to topics related to French culture. Taught in English. Credit does not apply to major or minor. May not be repeated.
4100. **Advanced Individual Problems in French (1)**. Prerequisite: FREN 2301 or equivalent. Contents will vary to meet the needs of student. May be repeated for credit with the consent of the instructor.
4300. **Individual Problems in French (3)**. Prerequisite: FREN 2301 and/or 2302, together with consent of instructor and department chairperson. Contents will vary to meet the needs of students. May be repeated for credit with the consent of the instructor. Independent work under the guidance of a staff member.
4302. **Advanced Grammar and Composition (3:3:0)**. Review of important grammatical constructions and idioms, with written practice. May be repeated once for credit for purposes of study abroad. (Writing Intensive)
4303. **Advanced French Conversation (3:3:0)**. Prerequisite: FREN 3303. Designed to increase fluency in the spoken language. May be repeated once for credit for purposes of study abroad.
4304. **Commercial French (3:3:0)**. Oral and written French, with special attention to idiomatic expressions currently in use in business and technical fields.
4315. **The French Short Story (3:3:0)**. This course will trace the development of the French short story from Voltaire's *Candide* to Boris Vian's *Les Lorettes Furreés*. May be repeated once for credit for purposes of study abroad. (Writing Intensive)
4317. **Readings in French Literature and Culture (3:3:0)**. Prerequisite: FREN 3301, 3302, 3303, or equivalent. May be repeated for credit with consent of instructor. Conducted in French. (Writing Intensive)
4322. **Civilisation Francaise: French Civilization (3:3:0)**. A survey of French civilization from the Middle Ages to the present: literature, art, music, philosophy, science, and architecture. Readings, slides, films, and tapes. Conducted in French. May be repeated once for credit for purposes of study abroad. (Writing Intensive)

Graduate Courses

5100. **Advanced Problems in French Language and Literature (1)**. An individualized research project course. Contents will vary to meet the needs of students.
5101. **Teaching French in College (1:1:0)**. Classroom organization and explanation as well as demonstrations of instructional techniques. Does not count toward the minimum requirement of a graduate degree. Must be taken pass-fail by all teaching assistants each semester.
5312. **Medieval Literature (3:3:0)**. Reading and philological interpretation of selected Old French texts.
5315. **Studies in French Language and Literature (3:3:0)**. This course concentrates on topics in French civilization, linguistics, and literature with content varying to meet the needs of students. May be repeated for credit.
5316. **Sixteenth Century Literature (3:3:0)**. Readings, analysis, and interpretation of selected works of the sixteenth century.
5317. **Seventeenth-Century Literature (3:3:0)**. Reading, analysis, and interpretation of selected works of the seventeenth century.
5318. **Eighteenth Century Literature (3:3:0)**. Reading, analysis, and interpretation of selected works of the eighteenth century.
5319. **Nineteenth Century Literature (3:3:0)**. Readings, analysis, and interpretation of selected works of the nineteenth century. Course content may vary. May be repeated for credit.
5320. **Twentieth Century Literature (3:3:0)**. Readings, analysis, and interpretation of selected works of the twentieth century. Course content may vary. May be repeated for credit.
5321. **French Cinema (3:3:0)**. Presentation of the major trends of French cinema from the beginnings to the present. Course content may vary. May be repeated for credit.
5327. **French Civilization (3:3:0)**. Historical, geographical, social, and artistic aspects of the development of the culture of France. Course content will vary. May be repeated for credit.
5328. **Francophone Literature and Culture (3:3:0)**. Readings and topical studies relating to French-speaking cultures (in Africa, Europe, U. S., Quebec, and Caribbean) and French and Francophone culture that may require special treatment. May be repeated for credit.
5329. **Studies in Literary Criticism and Theory (3:3:0)**. Current and traditional ways of analyzing literary texts in their cultural contexts with emphasis on theory. Course content will vary. May be repeated for credit.

5341, 5342. **Intensive French for Graduate Research I and II (3:3:0 each)**. French readings with related grammar to acquaint graduates with French as a research skill; equivalent of two years of normal coursework. Not intended to meet major or minor degree requirements.

6000. **Master's Thesis (V1-6)**.

7000. **Research (V1-12)**.

German (GERM)

Undergraduate Courses

1501, 1502. [GERM 1511, 1512] **A Beginning Course in German I, II (5:5:1 each)**. Oral practice, elementary reading, and grammar.

1507. **Comprehensive German Review – First Year (5:5:1)**. Prerequisite: Two years of high school German. A comprehensive one-semester review.

2301, 2302. [GERM 2311, 2312] **A Second Course in German I, II (3:3:0 each)**. Prerequisite: GERM 1501 and 1502 or 1507. Reading, cultural background, grammar review, and conversation.

3301. **German Culture and Society (3:3:0)**. Prerequisite: GERM 2301 and 2302 or equivalent. Study of video, Internet, and textual resources on culture and current issues. Conducted in German. (Writing Intensive)

3303. **Conversation and Composition (3:3:0)**. Prerequisite: GERM 2302 or equivalent. Emphasis on fluency in spoken and written German. May be taken concurrently with GERM 3301. Conducted in German. (Writing Intensive)

3304. **Introduction to Literature (3:3:0)**. Prerequisite: GERM 2302 or equivalent. An introduction to periodization of German literature, literary genres, and literary theory. Conducted in German. (Writing Intensive)

3305. **German Language Studies (3:3:0)**. Prerequisite: GERM 2302 or consent of director. Development of listening, speaking, reading, and writing skills in Austria or Germany. Offered each summer. May be repeated once for credit.

3306. **Contemporary Germany (3:3:0)**. Prerequisite: GERM 2302 or consent of director. Readings in cultural history and literature, lectures, and tours on location. Taught in German. May not be repeated for credit toward major or minor. (Writing Intensive)

3312. **Literature of the Holocaust (3:3:0)**. Examination of the Holocaust as represented in literature, film, and art. Conducted in English. (Writing Intensive)

3313. **Northern Myths and Legends (3:3:0)**. Introduction to Germanic myths, epics, sagas, legends, and fairy tales. Selected readings in translation with lectures and discussions in English.

4000. **Individual and Group Studies in German (V1-6)**. Prerequisite: Consent of chairperson. Study in German under the guidance of a faculty member. May be repeated for credit.

4301. **Grammar (3:3:0)**. Prerequisite: GERM 3301 and 3303 or equivalent. Review of grammatical structure. Practice in pronunciation and in written and spoken German.

4303. **German Classics (3:3:0)**. Prerequisite: 6 hours from GERM 3301, 3303, 3304, or equivalent. Readings in German literature through selected works by Hoffman, Büchner, Keller, Kleist, Storm, and Hauptmann. Conducted in German. (Writing Intensive)

4305. **Readings in German Language and Literature (3:3:0)**. Prerequisite: 6 hours from GERM 3301, 3303, 3304, or equivalent. Readings from a particular period or study of a literary theme. May be repeated for credit with consent of instructor. Conducted in German. (Writing Intensive)

4309. **Business German (3:3:0)**. Prerequisite: 6 hours from GERM 3301, 3303, 3304, or equivalent. Oral and written German with special attention to the idiomatic expressions and cultural practices of business in Germany.

4335. **Internship to German (3)**. Prerequisite: Completion or concurrent enrollment in German 3000 or 4000 level course and consent of instructor. Teaching experience and service learning in community schools, while improving German language and communication skills. May be repeated once for credit.

Graduate Courses

5303, 5304. **Intensive German for Graduate Research I, II (3:3:0 each)**. Accelerated grammar course acquainting graduates with German as a research skill to be used in translating research articles in the graduate's field. Equivalent to two years of normal coursework. Not intended to meet major or minor degree requirements.

5314. **History of the German Language (3:3:0)**. Prerequisite: Graduate standing, possessing reading ability of advanced

German texts. Development of German from its origins to the present with emphasis on its phonological, morphological, and syntactic change.

5317. **The German Novelle (3:3:0)**. A detailed study of the German Novelle from its origins to the early 1900s, with special emphasis on its development in the nineteenth century.

5318. **German Romanticism (3:3:0)**. Study of German literature from 1790 to 1830.

5319. **The German "Klassik" (3:3:0)**. Introduction to the classical works of Goethe and Schiller and other authors of the period.

5320. **German Women Writers (3:3:0)**. Study of literary works produced by German women writers with emphasis on the 20th century.

5321. **Seminar in Modern German Literature (3:3:0)**. Study of various genres of twentieth-century German literature, with special emphasis on philosophical and psychological aspects. May be repeated for credit.

5323. **German Lyric (3:3:0)**. An introduction to the evolution of German lyric forms with close analysis of selected poems representative of the 18th, 19th, and 20th centuries.

5324. **German Literature of the Enlightenment (3:3:0)**. A study of German literature from 1700 to 1785, including "Aufklärung," "Sturm und Drang," and "Empfindsamkeit."

5325. **German Drama (3:3:0)**. Readings, analysis, and interpretation of German dramas and dramatic theories from the Romantic Age to the Contemporary Period.

5326. **German Modernism (3:3:0)**. Readings, analysis, and interpretation of selected works from 1890-1940.

6000. **Master's Thesis (V1-6)**.

7000. **Research (V1-12)**.

Greek (GRK)

Undergraduate Courses

1301, 1302. [GREE 1311, 1312] **A Beginning Course in Greek I, II (3:3:0 each)**.

2301, 2302. [GREE 2311, 2312] **A Second Course in Greek I, II (3:3:0 each)**. Prerequisite: GRK 1301 and 1302, or equivalent. Review; selected readings from standard authors.

4300. **Individual Problems in Greek (3)**. Prerequisite: GRK 2301 and 2302 or equivalent. Contents will vary to meet the needs of students. May be repeated for credit with consent of instructor. Independent readings under guidance of a staff member.

4302. **Greek Composition (3:3:0)**. Practice in Greek prose composition. May be repeated for credit once with consent of instructor.

Graduate Courses

5330. **Greek Prose (3:3:0)**. Selected readings from Greek texts in history, philosophy, oratory, rhetoric, biography, and the novel. Topics may vary. May be repeated for credit.

5340. **Greek Poetry (3:3:0)**. Selected readings in Greek poetic texts from various genres. Topics may vary. May be repeated for credit.

7000. **Research (V1-12)**.

Italian (ITAL)

Undergraduate Courses

1301, 1302. [ITAL 1411, 1412] **A Beginning Course in Italian I, II (3:3:0 each)**.

2301, 2302. [ITAL 2311, 2312] **A Second Course in Italian I, II (3:3:0 each)**. Prerequisite: ITAL 1301 and 1302, or equivalent. Reading, cultural background, conversation, and composition.

4300. **Individual Problems in Italian (3)**. Prerequisite: ITAL 2301 and 2302, or equivalent. Contents will vary to meet the needs of students. May be repeated for credit with consent of instructor. Independent work under guidance of a staff member.

4301. **Topics in Italian Literature (3:3:0)**. A study of selected classical masterpieces or contemporary Italian literary works. May be repeated once when content is different.

Graduate Courses

5301. **Topics in Italian Literature (3:3:0)**. Study of selected Italian literary works. Class taught partially in Italian with Italian readings. May be repeated twice if content is different.

7000. **Research (V1-12)**.

Japanese (JAPN)**Undergraduate Courses**

- 1501, 1502. [JAPN 1511, 1512] **A Beginning Course in Japanese I, II (5:5:1 each)**. Introduction and development of the four language skills: listening comprehension, speaking, writing, and reading.
- 2301, 2302. [JAPN 2311, 2312] **A Second Course in Japanese I, II (3:3:0 each)**. Prerequisite: JAPN 1501 and 1502. Reading, cultural background, grammar review, conversation, and composition skills.
4300. **Individual Studies in Japanese (3)**. Prerequisite: JAPN 2302 or equivalent. Independent study in the Japanese language under the guidance of a faculty member. May be repeated for credit with consent of instructor.

Latin (LAT)**Undergraduate Courses**

- 1501, 1502. [LATI 1511, 1512] **A Beginning Course in Latin I, II (5:5:0 each)**.
1507. **Comprehensive Latin Review First Year (5:5:0)**. Prerequisite: Equivalent of two years high school Latin, placement exam, or departmental consent. A comprehensive one-semester review of first year Latin for qualified students.
- 2301, 2302. [LATI 2311, 2312] **A Second Course in Latin I, II (3:3:0 each)**. Prerequisite: LAT 1501 and 1502 or 1507. Review; selected readings from standard authors.
4300. **Individual Problems in Latin (3)**. Contents will vary to meet the needs of the students. May be repeated for credit with consent of instructor. Independent reading under guidance of a staff member.
4302. **Latin Composition (3:3:0)**. Practice in Latin prose composition. May be repeated for credit once with consent of instructor. (Writing Intensive)
4305. **Individualized Readings in Latin Literature (3)**. Contents will vary to meet the needs of students. May be repeated for credit with consent of instructor. Major works of selected Latin writers.

Graduate Courses

5304. **Latin Poetry: Epic, Lyric, Elegiac, and Pastoral (3:3:0)**. Study of one or more poetic genres. May be repeated for credit.
5310. **Seminar in Latin Literature (3:3:0)**. Content will vary to meet the needs of the students. May be repeated for credit.
5341. **Intensive Latin for Graduate Research I (3:3:0)**. Grammar and readings for reading knowledge. Equivalent to one year of normal coursework. Not for classics majors or Latin minor graduate degree requirements.
5342. **Intensive Latin for Graduate Research II (3:3:0)**. Prerequisite: LAT 5341 or 1502. Continuation of LAT 5341. Equivalent to completion of LAT 2302. Not for classics majors or Latin minor graduate degree requirements.
5360. **Latin Prose (3:3:0)**. Selected readings from Latin texts in history, philosophy, oratory, rhetoric, epistolography, satire, biography, and the novel. Topics may vary. May be repeated for credit.
7000. **Research (V1-12)**.

Linguistics (LING)**Undergraduate Courses**

4311. **Methods of Teaching Second and Foreign Languages (3:3:0)**. Overview of historical and current methods of teaching second and foreign languages.
4335. **Introduction to Linguistics for Second and Foreign Language Education (3:3:0)**. Basic concepts in linguistics and linguistic analysis as they relate to bilingual education, ESL, and second or foreign language education.

Graduate Courses

5310. **Second and Foreign Language Testing (3:3:0)**. This course is designed to give language teachers a working knowledge of testing principles applied to second and foreign language classrooms and programs.
5315. **Pedagogical Grammar of Second/Foreign Languages and ESL (3:3:0)**. A study of the role of grammar in interlanguage development, aspects of grammar most frequently taught in second/foreign language and ESL and teaching strategies.

5320. **Second and Foreign Language Composition (3:3:0)**. A study of second and foreign language theories and research in composition learning and teaching and their implications for methods of teaching second and foreign language composition.
5322. **Methods of Teaching Modern Second and Foreign Languages (3:3:0)**. Theory and practice of teaching modern second and foreign languages.
5325. **Technology for Teaching Second and Foreign Languages (3:3:0)**. A study of theory, research, and practice in the use of technology for teaching second and foreign languages including audio, video, CALL, and Internet technologies.
5330. **Second and Foreign Language Acquisition (3:3:0)**. A study of the theories and processes of second and foreign language acquisition, with emphasis on adult learners.
5335. **Introduction to Linguistics for Second and Foreign Language Educators (3:3:0)**. Concepts in linguistics and linguistics analysis as they relate to bilingual education, ESL, and second or foreign languages.
5345. **Seminar in Applied Linguistics (3:3:0)**. Study of current topics of interest in applied linguistics. Course content will vary. May be repeated for credit.
5350. **Second and Foreign Language Curriculum Design (3:3:0)**. Analysis of second and foreign language teaching curriculum design models and application to current language teaching contexts.
5355. **Teaching English in International Contexts (3:3:0)**. This course is designed to prepare students methodologically and professionally for teaching English in international contexts.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Portuguese (PORT)**Undergraduate Courses**

- 1501, 1502. [PORT 1511, 1512] **Elementary Portuguese I and II (5:5:1 each)**. Introduction and development of the four language skills in Portuguese: Listening comprehension, speaking, reading, and writing.
1507. **Intensive Portuguese for Spanish Speakers (5:5:0)**. An intensive course of elementary Portuguese for Spanish speakers. Comparative aspects of Spanish and Portuguese. Topics in Lusophone culture. Covers the material of Portuguese 1501 and 1502. Admits to Portuguese 2301.
- 2301, 2302. [PORT 2311, 2312] **Intermediate Portuguese I and II (3:3:0 each)**. Reading, cultural background, grammar review, conversation, and composition.
3303. **Studies in Portuguese (3:3:0)**. Independent studies in selected topics in Portuguese language and literature. May be repeated once when content differs.
3307. **Luso-Brazilian Civilization and Literature (3:3:0)**. Examines the civilization and cultures of the Luso-Brazilian world through the study of representative literary, cultural and journalistic texts. Topics range from 16th through the 20th centuries. Films will be screened to illustrate the material. Taught in English. Course may be repeated with different content.
4300. **Individual Studies in Portuguese (3)**. Prerequisite: PORT 2302 or equivalent. Contents will vary to meet the needs of the student. May be repeated once for credit. Individual study under the guidance of a faculty member.

Graduate Courses

5307. **Luso-Brazilian Civilization and Literature (3:3:0)**. Examines the civilization and cultures of the Luso-Brazilian world through the study of representative literary, cultural, and journalistic texts. Topics range from 16th through the 20th centuries. Films will be screened to illustrate material. Taught in English. May be repeated for credit with different content.
- 5341, 5342. **Intensive Portuguese for Graduate Students I and II (3:3:0)**. Intensive introduction to the Portuguese language for graduate students proficient in Spanish. Supports the Portuguese minor for the Spanish MA and Ph.D. programs.
5355. **Readings in Luso-Brazilian Literature (3:3:0)**. Advanced topics in Luso-Brazilian literature. May be repeated for credit.
7000. **Research (V1-12)**.

Russian (RUSN)**Undergraduate Courses**

- 1501, 1502. [RUSN 1511, 1512] **A Beginning Course in Russian I, II (5:5:1 each)**. Introduction and development of the four language skills: listening comprehension, speaking, reading, and writing.
- 2301, 2302. [RUSS 2311, 2312] **A Second Course in Russian I, II (3:3:0 each)**. Prerequisite: RUSN 1501, 1502, or equivalent. Training in oral and written expression and in aural and reading comprehension, including optional work in the language laboratory.
3301. **Russian Civilization Through Literature in the 19th Century (3:3:0)**. A survey course of 19th century Russian literature. Includes the works of the century's most important writers from Alexander Pushkin to Anton Chekhov. Taught in English.
3302. **20th Century Russian Civilization Through Literature in Translation (3:3:0)**. This course will deal with the literature and other arts of the turn of the 20th century in Russia and with the survival of this pre-1917 cultural tradition among the émigrés and in the Soviet Union. Taught in English.
3303. **Russian Conversation and Composition (3:3:0)**. Prerequisite: RUSN 2302 or consent of instructor. The course is designed to increase fluency in the spoken language and proficiency in composition. Taught in Russian. May be repeated for credit.
3304. **Russian Culture (3:3:0)**. An examination of the important historical, political, and cultural events and trends that have been instrumental in forming Russian cultural identity.
3305. **Studies in Advanced Russian (3)**. Prerequisite: RUSN 2302 or consent of instructor. Advanced Russian language skill development at third and fourth year levels. May be repeated three times when content differs.
4301. **The Great Russian Realists: Tolstoy and Dostoevsky (3:3:0)**. Examines the significance of masterpieces by Tolstoy and Dostoevsky. The works will be read in translation. Conducted in English. (Writing Intensive)
4302. **Contemporary Russian Literature in Translation (3:3:0)**. This course will examine the works of major Russian authors such as Aleksandr Solzhenitsyn and Tatyana Tolstaya from 1953 to the present. (Writing Intensive)
4310. **Russian Language Study in Russia (3:3:0)**. Intensive study of the Russian language and culture. May be repeated for credit with consent of instructor.

Graduate Courses

5301. **Russian Language for Graduate Students (3:3:0)**. This course is conducted entirely in Russian. Students work towards achieving an American Council for Teaching Foreign Languages advanced or superior proficiency rating. May be repeated up to 3 times.
5303. **Topics in Russian Culture (3:3:0)**. This course will study selected aspects of classical or contemporary Russian culture organized around a particular period or theme. Readings, most writings, and a significant portion of the class will be in Russian. May be repeated up to three times when content is different.
5304. **Topics in Russian Literature (3:3:0)**. This course will study selected classical or contemporary Russian literary texts organized around a particular period or theme. Readings, most writings, and a significant portion of the class will be in Russian. May be repeated up to three times when content is different.
7000. **Research (V1-12)**.

Slavic (SLAV)**Undergraduate Courses**

3301. **Vampire Literature and Culture (3:3:0)**. An investigation of the myth of the vampire from its inception in early East European culture to its popularization in the West.
4300. **Individual Studies in Slavistics (3)**. Independent study in Slavic and East European subjects under guidance of a faculty member, with content varying according to needs. May be repeated for credit with consent of instructor. (Writing Intensive)

Spanish (SPAN)**Undergraduate Courses**

- 1501, 1502. [SPAN 1511, 1512] **A Beginning Course in Spanish I, II (5:5:1 each)**.

1507. [SPAN 1305] **Comprehensive Spanish Review—First Year (5:5:1)**. Prerequisite: Two years high school Spanish. A comprehensive one-semester review.
1607. **Intensive Spanish First Year (6:6:1)**. Intensive immersion development of the four language skills in Spanish: Oral comprehension, speaking, reading, and writing. Must be taken in a Spanish-speaking country.
- 2301, 2302. [SPAN 2311, 2312] **A Second Course in Spanish I, II (3:3:1 each)**. Prerequisite: SPAN 1501 and 1502 or 1507. Reading, cultural background, conversation, and composition. (Honors section offered.)
- 2303, 2304. **Intermediate Spanish for Hispanic Students I, II (3:3:0 each)**. Prerequisite: placement exam. A second-year course designed for Hispanic students who have been educated in the United States and have had exposure to Spanish at home but have had limited formal training in Spanish.
2607. **Intensive Spanish—Second Year (6:6:1)**. Prerequisite: A minimum grade of B in SPAN 1507. Reading, culture, conversation, and composition. Equivalent to 2301 and 2302.
3303. **Intermediate Spanish Conversation (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent. Designed to increase proficiency in oral Spanish for students who have had little or no extra academic experience in that language. Minors may take either 3303 or 4303. May not be taken following 4000-level work.
3305. **Intermediate Spanish Grammar (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent. An overview of important Spanish grammar concepts.
3306. **Introduction to Hispanic Life and Culture (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent. Origins, development, and characteristics of Hispanic life and culture. Conducted in Spanish.
3307. **Introduction to Hispanic Literatures (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent. Introduction Spanish and Spanish American literatures through selected works and authors. This course is highly recommended as a prerequisite to all 4000 level literature courses. (Writing Intensive)
3343. **Spanish Language Development (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent and consent of instructor. Development of listening, speaking, reading, and writing skills on location in Mexico. Offered in Mexico each summer.
3344. **Mexican Life and Culture (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent and consent of instructor. A basic survey of Mexico, with emphasis on its history and cultural patterns. Offered in Mexico each summer.
3389. **Individual Studies in Spanish (3)**. Prerequisite: SPAN 2302 or equivalent and consent of instructor. Independent work under the guidance of a full-time faculty member. Course is generally for study abroad when organized courses are not available. May be repeated for credit with different course content.
3390. **Hispanic Culture and Civilization (3:3:0)**. An overview of the Hispanic world, from Roman Spain to modern Latin America. Taught in English. Not for Spanish majors or minors but recommended as supplementary. Carries humanities credits.
3391. **Hispanic Film in Translation (3:3:0)**. A study of Hispanic film and its relationship to literature and culture. Taught in English. Not for Spanish majors or minors, but recommended as supplementary.
3392. **Hispanic Literature in Translation (3:3:0)**. A study of major literary themes and writers of the Hispanic world. Taught in English. Not for Spanish majors or minors, but recommended as supplementary.
4000. **Individual Studies in Spanish (V1-6)**. Prerequisite: Departmental consent. Study in Spanish under the guidance of a faculty member. May be repeated for credit up to 6 hours.
4100. **Advanced Individual Problems in Spanish (1)**. Prerequisite: SPAN 2302 or equivalent, together with consent of instructor and department chairperson. Contents will vary to meet the needs of students. May be repeated for credit with consent of instructor. Specifically designed for individual projects calling for fewer than 3 semester credit hours.
4303. **Advanced Conversation (3:3:0)**. Development of conversational skills for students who have completed required work in grammar or composition. No student who has graduated from a secondary school (junior high or high school level) in a Spanish-speaking country may receive credit for this course.
4305. **Advanced Grammar (3:3:0)**. Spanish language, syntax, and grammar.
4307. **Advanced Composition (3:3:0)**. Principles of correct writing and stylistics. (Writing Intensive)
4308. **Business Spanish (3:3:0)**. Oral and written Spanish with special attention to idiomatic expressions and cultural practices of business in the Hispanic world.

4309. **Spanish Language Studies-Special Topics (3:3:0)**. Study of diverse topics such as medical or legal Spanish, Spanish on the Internet, etc. May be repeated for credit with different content.
4320. **Masterpieces of Hispanic Literature (3:3:0)**. A study of selected works from Spanish and/or Spanish American literature. May be repeated for credit if different instructor and different content. (Writing Intensive)
4321. **Hispanic Prose (3:3:0)**. Readings of selected prose of Spanish and/or Spanish-American Literature. May be repeated for credit if different instructor and different content. (Writing Intensive)
4324. **Hispanic Drama and Poetry (3:3:0)**. Study of selected dramas and/or poetry from Spanish and/or Spanish American literature. May be repeated for credit with different instructor and different content. (Writing Intensive)
4325. **Hispanic Short Story (3:3:0)**. Study of short stories from Spain and/or Spanish America. May be repeated for credit. (Writing Intensive)
4327. **Hispanic Literature-Special Topics (3:3:0)**. Subject matter will vary to include such topics as women writers, Mexican Revolution, social protest, etc. May be repeated for credit with different content. (Writing Intensive)
4332. **Civilización Hispánica: Hispanic Civilization (3:3:0)**. A thematic study of Spanish and Spanish American patterns of civilization, especially in the contemporary period, and the United States' Spanish heritage. May be repeated for credit.
4335. **Internship in Spanish (3)**. Prerequisite: Consent of instructor. Work experience in a community agency that deals with native Spanish speakers. Emphasis on cultural understanding and communicative skills. (Writing Intensive)
4337. **Cultural Topics-Hispanic World (3:3:0)**. Subject matter will vary to include such topics as folklore, Latin American women, etc. May be repeated for credit with different content.
4343. **Advanced Language Skills (3:3:0)**. A study abroad course to help develop communicative language skills through class work and organized field projects. Offered only in Mexico and/or Spain each summer. May be repeated for credit.
4344. **Contemporary Mexico (3:3:0)**. A study of the various facets of contemporary Mexico: history, arts, politics, and economics. Offered only in Mexico each summer. May be repeated for credit.
4346. **Spanish Life and Culture (3:3:0)**. Prerequisite: SPAN 3303 or equivalent. A survey of Spain with emphasis on its literature, history, and culture. Offered in Spain each summer. May be repeated for credit.
4360. **Mexican American Literature (3:3:0)**. The development of Mexican-American literature from 1849 to the present with an emphasis on literature of the Chicano movement. (Writing Intensive)
4361. **Spanish for the Southwest (3:3:0)**. Study of similarities and differences between "standard" and "regional" Spanish.
4373. **Capstone Conversational Spanish (3)**. Prerequisite: Completion of 4303 with an A or B and departmental consent. For majors and teacher certification candidates. Additional development of aural/oral skills.
4389. **Individual Problems in Spanish (3)**. Prerequisite: Two Spanish 3300 level courses and consent of instructor. Independent work under the guidance of a full-time faculty member. Content will vary to meet the needs of the student. May be repeated for credit with different instructor and course content.
4392. **The Play in Spanish (3:3:0)**. Prerequisite: Consent of instructor. Intensive analysis of a play and preparation for two public performances. May be repeated for credit with change of content for up to 6 hours.
5345. **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.
5347. **Language Development (3:3:0)**. Mastery of language skills through readings, compositions, and directed oral projects. Offered only in programs abroad each summer.
5348. **Culture and Literature (3:3:0)**. Analysis and interpretation of cultural and literary expressions of the host country. Offered only in programs abroad each summer.
5352. **Methods of Literary Criticism (3:3:0)**. Theories and practices of literary analysis and criticism.
5353. **Bibliography and Methods of Research (3:3:0)**. Systematic study of bibliographical materials, methods, and problems in the field of Hispanic research.
5354. **Hispanic Literary Concepts (3:3:0)**. A study of movements, genres, influences, forms, themes, and other concepts in Hispanic literatures from the Middle Ages to the present.
5355. **Seminar in Hispanic Literature (3:3:0)**. Advanced topics in Hispanic literature and literary theory. May be repeated for credit.
5361. **Medieval Literature (3:3:0)**. Spanish literature from its earliest monuments to the end of the Middle Ages.
5362. **Golden Age Literature (3:3:0)**. Selected authors, works, and genres.
5364. **Nineteenth-Century Spanish Literature (3:3:0)**. A history of Spanish literature in the nineteenth century.
5366. **Twentieth-Century Spanish Prose (3:3:0)**. A comprehensive study of the principal literary currents, authors, and works with emphasis on the contemporary period.
5368. **Twentieth-Century Spanish Theatre and Poetry (3:3:0)**. A comprehensive study of the principal literary currents, authors, and works with emphasis on the contemporary period.
5370. **Colonial Spanish American Literature (3:3:0)**. A study of this literature from the Pre-Colombian era to the end of the Spanish American baroque.
5374. **Nineteenth-Century Spanish American Literature (3:3:0)**. A comprehensive study of the principal literary currents, authors, and works of the nineteenth century.
5375. **Modernism (3:3:0)**. A detailed study of Spanish American Modernism.
5376. **Twentieth-Century Spanish American Prose (3:3:0)**. The development of prose fiction in Spanish America during the twentieth century.
5378. **Twentieth-Century Spanish American Theatre and Poetry (3:3:0)**. The development of the theatre and poetry in Spanish America during the twentieth century.
5381. **Hispanic Literature of the Southwest (3:3:0)**. The origin and development of Hispanic literature in the southwest, including Spanish literature (1539-1820), Mexican literature (1821-1848), and Mexican-American literature (1849-present).
5392. **The Play in Spanish (3:3:0)**. Prerequisite: Consent of instructor. Intensive analysis of a play and preparation for two public performances.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Turkish (TURK)

Undergraduate Courses

- 1501, 1502. **Beginning Turkish I and II (5:5:1 each)**. Introduction and development of the four language skills in Turkish: Listening comprehension, speaking, reading and writing.
- 2301, 2302. **Second Course in Turkish I and II (3:3:0 each)**. Prerequisite: TURK 1501 and 1502: Reading, cultural background, grammar review, conversation and composition.
3307. **Turkish Culture (3:3:0)**. Turkish history, culture, and civilization. Course utilizes resources from Archives of Turkish Oral Narrative. Course may be repeated once with different content. Taught in English.
4300. **Individual Studies in Turkish (3)**. Prerequisite: TURK 2302 or equivalent. Independent studies in the language under the guidance of a faculty member. May be repeated for credit with consent of instructor.

Vietnamese (VIET)

Undergraduate Course

4300. **Individual Problems in Vietnamese (3)**. Content varies to meet the needs of students. May be repeated for credit.

Department of Communication Studies

Faculty

K. David Roach, Ed.D., Chairperson

Professors: Olaniran, Roach, Stewart, Williams

Associate Professor: Hughes

Assistant Professors: Carter, Gring, Heuman, Langford, Scholl

Lecturers: Gantt, Neal

Adjunct Professor: Trank

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Communication Studies
- Master of Arts in Communication Studies

Undergraduate Program

The Department of Communication Studies at Texas Tech prepares students for careers in business, industry, social service, and education. Plans are offered that allow for the study of communication skills and theories and their applications to problems in work and social settings. In addition to classroom instruction, the department sponsors cocurricular and extracurricular activity in forensics (speech and debate) and maintains a local chapter of Delta Sigma Rho–Tau Kappa Alpha (national forensic honorary). The department also sponsors a chapter of Lambda Pi Eta (the National Communication Honor Society of the National Communication Association). For advanced students, an undergraduate internship in communication studies is an option. The internship, normally completed in the student's last spring semester, provides an opportunity for practice in applied settings.

Requirements for the Major. Students must have a cumulative GPA of 2.0 or better to be admitted to the major in communication studies. Continued enrollment requires a 2.0 GPA or better in the first 15 hours taken at Texas Tech.

Students seeking an undergraduate degree in communication studies will complete a course of study that consists of 36 hours of communication studies courses with at least 18 hours of advanced courses. The department recognizes that each student has unique educational objectives and professional goals. Therefore, a flexible and individualized plan of undergraduate study is developed to be compatible with the student's aims. A total of 12 hours toward the major must be completed in residence at Texas Tech.

All students who major in communication studies must complete COMS 1301, 2300, 2301, 2302, and 3311. Students have the option to declare a concentration in one of three areas: communication and public affairs (CPA), interpersonal communication (IPC), or corporate-organizational communication (COC). A student who declares a concentration will take 12 hours in the specialization and 9 hours of electives in communication studies. A student who chooses not to declare a concentration will take a minimum of 6 hours from each of the three concentrations plus 3 hours of a COMS elective at the junior/senior level toward the required total of 36 hours in the major. Courses in the communication and public affairs concentration include COMS 3313, 3314, 3315, 3318, 4304, and 4310. Courses in the interpersonal communication concentration include COMS 3331, 3332, 3333, 3334,

4304, and 4330. Courses in the corporate-organizational communication concentration include 3351, 3353, 3355, 3358, 3359, 4304, and 4350.

Requirements for the Minor. A minor consists of 18 hours of communication studies with at least 9 hours in advanced courses. At least 6 hours of the minor must be completed in residence at Texas Tech. Students who minor in communication studies must complete COMS 1300, 2300, and 2301. These three courses should be taken before enrolling in upperdivision courses. Remaining courses may be selected from other departmental offerings.

Teacher Certification. Students desiring secondary certification in communication studies must complete the following: COMS 1300, 2300, 3314, 3351, 4314, TH A 2305, MCOM 1300, and 9 hours of electives in communication studies, all of which must be at the upper-division level.

Communication Studies (COMS)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1300. [SPCH 1311] **Introduction to Communication Studies (3:3:0).** A broad-based introduction to the field of communication studies, covering the major content areas in the discipline. Required for all majors and minors. May be applied toward the oral communication Core Curriculum requirement.
1301. [SPCH 1318] **Interpersonal Communication (3:3:0).** A study of the human communication process in one-to-one encounters. Required for all majors. May be applied toward the individual or group behavior Core Curriculum requirement.
2300. [SPCH 1315] **Public Speaking (3:3:0).** A course in the theory, preparation, delivery, and evaluation of public speeches. May be applied toward the oral communication Core Curriculum requirement. Required for all majors and minors.
2301. **Communication Theory (3:3:0).** An introduction to communication theories and models in both social-scientific and humanistic research traditions. Required for all majors and minors. (Writing Intensive)
2302. **Communication Research (3:3:0).** An introduction to the theory and practice of research in communication studies, including the critical evaluation of communication research. Required for all majors. (Writing Intensive)
2350. **Introduction to Communication Disorders (3:3:0).** Explores the range and types of communication disorders and examines the impact of these disorders on an individual's psychological, social, emotional, cultural, and educational status. May be applied toward the individual or group behavior Core Curriculum requirement.
3102. **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. May be repeated up to 4 semester hours; 2 semester hours may be applied toward Communication Studies major.
3105. **Listening (1:1:0).** A study of the basic factors in effective aural comprehension in various situations, such as lectures and interpersonal relationships.
3150. **Parliamentary Procedures (1:1:0).** Principles and procedures governing deliberative groups with practice in their usage.
3311. **Rhetoric in Western Thought (3:3:0).** Explores theories of rhetoric ranging from ancient Greece to modern times. Students examine different conceptions of how rhetoric negotiates public character, social truths, and power. May be applied toward the Core Curriculum humanities and multicultural requirement. Required for all majors.
3313. **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, mass media, and public affairs. May be applied toward the individual or group behavior Core Curriculum requirement.
3314. **Argumentation and Debate (3:3:0).** Evolution of argumentation with emphasis on modern viewpoints, application of theory to selected controversies.
3315. **Political Campaign Communication (3:3:0).** A study of the strategies of communication and persuasion in American political campaigns, focusing on the campaign currently in progress.

Graduate Program

The graduate program for the master's degree in communication studies requires a minimum of 30 semester hours of coursework plus 6 hours of thesis. Required courses are COMS 5300, 5301, 5305, 5306, and 5307.

- 3318. Persuasion and Social Movements (3:3:0).** Study of the role of persuasion in social movements, both historical and contemporary. Analysis of the various persuasive strategies employed as social movements evolve. May be applied toward the Core Curriculum humanities requirement.
- 3331. Nonverbal Communication (3:3:0).** The study of the origin, function, and control of nonverbal, symbolic elements inherent in Communication Studies. May be applied toward the Core Curriculum individual or group behavior requirement.
- 3332. Intercultural Communication (3:3:0).** Studies the role of cultural differences in human communication; theoretical and experiential approaches toward gaining competence in communicating across cultural barriers. May be applied toward the Core Curriculum individual or group behavior requirement and the multicultural requirement.
- 3333. Communication in Relationships (3:3:0).** Prerequisite: COMS 1301 or consent of instructor. A survey of research concerning the role of communication in the development, maintenance, and decay of interpersonal relationships.
- 3334. Gender and Communication (3:3:0).** Studies the similarities and differences of communication issues for males and females, with practical communication applications. Satisfies the individual or group behavior Core Curriculum requirement. (W S 3312)
- 3351. Communication in Instruction and Training (3:3:0).** Instructional communication theory applied to the processes of instruction, training, and performance in varied learning contexts. Attention to delivery skills.
- 3353. Small Group Communication (3:3:0).** An introduction to group process and interaction, the concepts of leadership, and effective participation. May be applied toward the Core Curriculum individual or group behavior requirement.
- 3355. Communication in Organizations (3:3:0).** A survey of research on communication in organizations with emphasis on relevant verbal and nonverbal factors; applications to basic communication skills and rudimentary research. May be applied toward the Core Curriculum individual or group behavior requirement.
- 3356. Leadership and Communication (3:3:0).** A broad-based theoretical approach to the study of leadership and communication. Application to a variety of settings will also be discussed. May be applied toward the Core Curriculum individual or group behavior requirement.
- 3358. Business and Professional Communication (3:3:0).** Basic principles of speech applied to the communication needs of the professional person. Practice in the construction and delivery of the various types of speeches and participation in interviews and group discussions. May be applied toward the Core Curriculum oral communication requirement.
- 3359. Interviewing: Process and Procedures (3:3:0).** Principles drawn from contemporary interpersonal communication theory are specifically applied to informational, employment, and persuasive interview situations. Practical application of theoretical concepts is encouraged through in-class role-playing interviews and through analysis of actual interviewing techniques.
- 3365. Communication in Healthcare (3:3:0).** Introductory survey of the influence of communication in health and healthcare delivery.
- 4000. Independent Research in Communication Studies (VI-3).** Prerequisite: 18 hours of COMS courses. Individual research in COMS area of student's choice under faculty member guidance. May be repeated once for credit up to 6 hours.
- 4304. Internship in Communication Studies (3:1:4).** Prerequisite: 24 hours of COMS courses or consent of instructor. Student internship, under supervision of faculty coordinator, in a selected area of applied communication.
- 4310. Special Topics in Rhetoric (3:3:0).** Prerequisite: Junior standing. Consideration of selected topics in rhetoric. May be repeated for credit.
- 4314. Directing Speech and Debate Activities (3:3:0).** Methods and principles involved in directing extracurricular speech activities such as debate, oral, interpretation, and public speaking.
- 4330. Special Topics in Interpersonal Communication (3:3:0).** Prerequisite: Junior standing. Consideration of selected topics in interpersonal communication. May be repeated for credit.
- 4350. Special Topics in Corporate-Organizational Communication (3:3:0).** Prerequisite: Junior standing. Consideration of selected topics in corporate-organizational communication. May be repeated for credit.
- assistants. Provides individual development in philosophies and practices unique to teaching basic oral communication courses.
- 5112. Communication Instruction in Higher Education II (1:1:0).** Second of two courses required of all communication studies teaching assistants. Provides individual development in philosophies and practices unique to teaching basic oral communication courses.
- 5300. Communication Theory (3:3:0).** A comprehensive overview of contemporary communication theories and research. Students will read original work beginning with general semantics theory and culminating with the most recently published reviews of theoretical work in communication studies.
- 5301. Qualitative Research Methods (3:3:0).** The course will introduce research methods of discourse analysis, conversation analysis, ethnography, applied qualitative communication research, and development of grounded theory. Students must engage in field work, interview participants, and write essays based on gathered data to complete this course successfully.
- 5302. Intercultural Communication (3:3:0).** An examination of the relationship between culture and communication and approaches to studying intercultural communication.
- 5303. Communication in Small Groups (3:3:0).** A study of factors affecting interpersonal communication in small group settings. Course content includes consideration of both theoretical and applied orientations to the study of small group communication.
- 5304. Communication in Organizations (3:3:0).** This course examines theoretical perspectives, contemporary research, and practical models of human communication in complex organizations.
- 5305. Quantitative Research Methods (3:3:0).** The study of quantitative research methods in communication research, emphasizing research designs, quantitative treatments, and analysis. Course requirements will include data entry, statistical analysis, and a research prospectus.
- 5306. Theories of Rhetoric (3:3:0).** An in-depth study of rhetorical theories which have had significant impact on the research, teaching, and practice of communication behavior. Students must write a lengthy research paper in order to successfully complete this course.
- 5307. Historical Critical Research Methods (3:3:0).** Survey of contemporary methods of rhetorical criticism and their application in analyzing a wide variety of message types. Students must write multiple essays exemplifying rhetorical criticism in order to successfully complete this course.
- 5309. Conflict Management and Problem Solving (3:3:0).** In-depth study of, and research into conflict resolution through mediation and negotiation.
- 5313. Theories of Persuasion (3:3:0).** Analysis of representative theories and models of persuasive processes and their implications for communication behavior. Theories of public, interpersonal, and mass communication are included.
- 5314. Communication Issues in Health and Healthcare (3:3:0).** An exploration of the nature and roles of discourse processes in healthcare interactions, including interpersonal, organizational, public, and intercultural communication contexts.
- 5315. Nonverbal Communication (3:3:0).** Examines communicative functions of nonverbal message behavior. Considers a variety of behavioral domains and interaction contexts from both theoretical and practical perspectives.
- 5318. Interpersonal Communication (3:3:0).** Communication theory and research on historical and contemporary topics in interpersonal communication contexts.
- 6000. Master's Thesis (VI-6).**
- 6302. Seminar in Interpersonal Communication (3:3:0).** A research course focusing on specific topics in interpersonal communication. Topics vary with students' needs. May be repeated for credit.
- 6303. Seminar in Organizational Communication (3:3:0).** A research course focusing on specific topics in organizational communication. Topics vary with students' needs. May be repeated for credit.
- 6304. Seminar in Rhetorical Theory (3:3:0).** A research course focusing on specific topics in rhetorical theory. Topics vary with students' needs. May be repeated for credit.
- 6307. Seminar in Instructional Communication (3:3:0).** A research course focusing on specific topics in instructional communication. Topics vary with students' needs. May be repeated for credit.
- 6308. Seminar in Cultural and Intercultural Communication (3:3:0).** A research course focusing on specific topics in cultural and intercultural communication. Topics vary with student's needs. May be repeated for credit.
- 7000. Research (VI-12).**

Graduate Courses

- 5111. Communication Instruction in Higher Education I (1:1:0).** First of two courses required of all communication studies teaching

Department of Economics and Geography

Faculty

Joseph E. King, Ph.D., Chairperson

Professors: Elbow, King, Steinmeier, Templer

Associate Professors: Al-Hmoud, Becker, Carter, Gilbert, Lee, McComb, Mulligan, Rahnama, von Ende

Assistant Professors: Delahunty, De Silva, Edwards, Kishor, Sorrensen, Summers, Vargas

Instructors: Barbato, Jones

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Economics
- Bachelor of Science in Economics
- Bachelor of Science in International Economics
- Bachelor of Arts in Geography
- Master of Arts in Economics
- Doctor of Philosophy in Economics

The economics faculty supervises the professional requirements of the economics major for the Bachelor of Business Administration degree offered through the Rawls College of Business. The geography faculty participates in the Latin American and Iberian Studies program leading to the Bachelor of Arts degree and in the Asian Studies, Environmental Studies, International Studies, and Community and Urban Studies programs.

Undergraduate Program

Economics Programs. The undergraduate program leading to the Bachelor of Arts degree is offered to students who want to pursue a broad liberal education while, at the same time, studying the complex interrelationships between consumers, producers, and governments in an economic system. A minimum of 30 semester hours in economics courses (including ECO 2301, 2302, 3311, 3312, 4314, and a course in statistics: MATH 2345 or 2300) and 18 semester hours in a minor field are required for the B.A. degree. Candidates for the B.A. degree in economics are encouraged to consult with their advisors. Other requirements are listed in the General Degree requirements section of the College of Arts and Sciences.

The undergraduate program leading to the Bachelor of Science degree combines a broad liberal education with rigorous and extensive training in theoretical and mathematical economics. The program is highly structured and technically oriented. Students in this major must include ECO 2301, 2302, 3311, 3312, ECO 4305, and 21 hours of advanced economics electives. The mathematics minor consists of 18 hours of mathematics subject to the approval of the Mathematics Department. The basic requirements are listed in the General Degree requirements of the College of Arts and Sciences. The adjunct requirements include a two-semester course sequence in statistics (MATH 4342 and 4343).

The B.S. in international economics degree program provides correlated emphasis on international economics, international politics, and international business. Course requirements for this degree are listed in the "General Degree Requirements" section of the College of Arts and Sciences.

Requirements for the minor in economics are: ECO 2301, 2302, 3311, 3312, and two elective courses in advanced economics.

Students majoring in economics must complete a minimum of 12 semester hours of their economics courses in residence at Texas Tech University. Students minoring in economics must complete a minimum of 6 semester hours of their economics courses in residence at Texas Tech.

At least a C in all economics courses in all programs is required of majors and minors. Moreover, a minimum grade of C is required in all core courses in the B.S. degree in international economics. Courses specifically required in the core by course number for the B.S. degree in international economics may not be taken pass-fail. Courses required for the major or minor in the B.A. or B.S. degree in economics may not be taken pass-fail. Courses taken pass-fail by a student before declaring a major or minor will be evaluated by the curriculum committee of the department and a decision rendered as to whether they will satisfy the degree requirements.

Geography Program. The undergraduate geography program at Texas Tech University offers a B.A. in geography and a minor in geography. Geography appeals to students who have broad interests in the relationships of humans and the environment, who are curious about the world, and who like to be challenged. Geographers study how people interact with the environment and how various phenomena are distributed and move over the surface of the earth. The B.A. degree is intended to provide students with a background in the nature of human interactions with the environment and a solid grounding in data collection and analysis techniques such as field data collection, statistical analysis, and geographic information systems. Due to its broad nature, geography is a minor that complements most majors, allowing the student to delve into the geographical aspects of his or her major field of study. Undergraduate majors find interesting careers in the public and private sectors. Geographers work with local, state, and national government agencies and the military. In the private sector, there are increasing demands by business and industry for employees trained in field research methods, geographic information systems, statistical analysis, remote sensing, and other skills acquired by geography students. Geography majors also become teachers at the elementary, secondary, and post-secondary levels. In addition, the undergraduate program provides a foundation for students who wish to pursue graduate study, whether in geography or some related professional field such as urban or regional planning, environmental and resource management, law, and public affairs.

Graduate Program

Students seeking a degree in economics should consult with the graduate advisor or the chairperson of the department.

The Master of Arts program requires a thesis and 24 semester hours beyond the bachelor's degree. A student may instead select a nonthesis 36-semester hour plan. In addition to the traditional program, the student may take courses with an applied emphasis in economics and related minor fields after consultation with the graduate advisor.

The candidate for the doctor's degree must choose three specializations from within the areas of international economics, economic development, monetary economics, public finance, labor economics, agricultural economics, natural resource economics, industrial organization, and special fields of economics.

The doctoral student in economics must demonstrate a mathematical proficiency in calculus and analytical geometry.

Although no graduate major is offered in geography, minors for both the master's and doctor's degrees are available.

The geography faculty also participates in the university's interdisciplinary Doctor of Philosophy degree program in Land-Use Planning, Management, and Design and in the arid land studies, environmental evaluation, and international development plans of the Interdisciplinary Studies master's program. Selected geography graduate-level courses may be used to fulfill requirements for these degrees.

The geography major consists of 31 hours of coursework in geography plus MATH 2300 (or equivalent). Required courses are GEOG 1401, 2300, 2351, 3300, 3340, 3350, and GEOG 4300. An additional 6 hours of courses must be selected from each of the following two blocks: physical geography and geographic information systems block (GEOG 3301, 3310, 3335, 3353, 4301, 4302, 4321, and 4400) and human and regional geography (GEOG 3337, 3350, 3351, 3352, 3354, 3356, 3360, 3363, 3364, 4305, and 4357). GEOG 4310, Internship in Geography, is open to seniors with a 3.0 GPA or better and may be substituted for 3 hours of courses in either of the blocks. Requirements for the minor are GEOG 1401, 2300 or 2351, 3300, and 9 hours of upper-division geography.

Students majoring in geography must complete a minimum of 12 semester hours of geography courses from Texas Tech. The geography minor requires at least 6 hours from Texas Tech.

Teacher Education. Geography coursework is included in the social science composite field certification program in secondary education. Specific course requirements for this program may be obtained in the department.

Economics (ECO)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

2301. [ECON 2302] **Principles of Economics I (3:3:0)**. 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.
2302. [ECON 2301] **Principles of Economics II (3:3:0)**. An introduction to modern economic society and theories of production and exchange. Emphasis upon monetary and fiscal policy and macroeconomics.
2305. **Principles of Economics (3:3:0)**. An abridged course for students not majoring in economics or business. Covers the most significant portions of ECO 2301 and 2302, with emphasis upon monetary and fiscal policy. Credit will not be given for both ECO 2305 and 2302.
3305. **Game Theory (3:3:0)**. Analysis of strategic interaction. Strategies of rational choice will be derived and analyzed in economics and other environments.
3311. **Intermediate Macroeconomics (3:3:0)**. Prerequisite: ECO 2302. Analysis of the determinants of aggregate demand and supply with special emphasis on macroeconomic problems such as unemployment and inflation and on techniques used to forecast macroeconomic variables.
3312. **Intermediate Economic Theory (3:3:0)**. Prerequisite: ECO 2301. Intermediate price theory and introduction to welfare theory. Includes theory of demand, theory of the firm, and welfare theory.
3320. **Managerial Economics (3:3:0)**. Prerequisite: ECO 2301. The application of economic theory to problems of business enterprise.
3323. **Principles of Money, Banking, and Credit (3:3:0)**. Prerequisite: ECO 2301 and 2302. A basic course which deals with the commercial banking system, the Federal Reserve System, and other matters associated with money, prices, and credit control.
3324. **Taxation and Public Expenditure (3:3:0)**. The objective of this course is to explore the justification for and effects of the entrance of government into the U.S. marketplace.
3326. **Industrial Organization, Antitrust, and Regulation (3:3:0)**. Prerequisite: ECO 2301. This course combines the latest theories with empirical evidence about the organization of firms and industries. Particular attention is paid to antitrust and regulation issues.
3330. **Economic Systems (3:3:0)**. Prerequisite: ECO 2301 and 2302 or consent of instructor. Study of different economic systems, with attention given to selected ones or types (e.g., market economies, Yugoslavia's co-participation, corporate statism, Scandinavian socialism, Soviet central planning).
3333. **International Economics (3:3:0)**. Prerequisite: ECO 2301 and 2302 or consent of instructor. Principles of international trade, balance of payments, trade policies, and agreements.
3336. **Environmental and Natural Resource Economics (3:3:0)**. Prerequisite: ECO 2301 or consent of instructor. Economic analysis of environmental and natural resource problems. Topics

include externalities, market failures, property rights, public goods, environmental regulation, and optimal resource use.

4300. **Economic Research (3)**. Prerequisite: ECO 3311 and 3312. Economics major, or consent of instructor or chairperson. Directed undergraduate student research in selected areas under the supervision of selected departmental faculty.
4305. **Introduction to Econometrics (3:3:0)**. Prerequisite: ECO 2301, 2302, 3311, and MATH 2345 or equivalent, or consent of instructor. Application of linear regression analysis including simple statistics, probability, distributions, hypothesis testing, and linear regression.
4314. **Development of Economic Doctrines (3:3:0)**. Prerequisite: ECO 2301 and 2302. The basis, nature, and effects of economic doctrines from ancient times through the 19th century.
4322. **The Economics of Labor Markets**. Prerequisite: ECO 3312 or ECO 3320. Labor as a factor of production, labor market participation and hours worked, compensating wage differentials, human capital investment, income inequality, migration, and discrimination.
4323. **Monetary Theory (3:3:0)**. Prerequisite: ECO 3311. Analysis of money supply, money demand, interest rates, income and price level determination, and transmission mechanisms. Emphases include monetary policies in an open economy context.
4331. **Economics of Multinational Enterprise (3:3:0)**. Prerequisite: ECO 2301 or consent of instructor. Examination of the economics of international enterprise and associations with the major dimensions of the international economy and international political economy.
4332. **International Finance (3:3:0)**. Prerequisite: ECO 3323 or 3333 or consent of instructor. Analysis of international monetary system theory, policy, and institutions. Includes attention to foreign exchange markets and roles of international banking and international managerial finance.

Graduate Courses

5310. **Price and Income Theory (3:3:0)**. Designed for graduate students who need intensive study of intermediate economic price and income theory.
5311. **Macroeconomic Theory and Policy (3:3:0)**. Prerequisite: ECO 3311 or 5310. Market clearing and non-market clearing business cycle models and their policy implications. Emphases include inflation, real growth, unemployment, and balance of payments and their interactions.
5312. **Microeconomic Analysis (3:3:0)**. Prerequisite: ECO 5310 or consent of instructor. Theory of household and firm choice, duality, commodity, and factor market structures, general equilibrium and welfare economics. Emphasis on theory and policy applications.
5313. **Mathematical Economics I (3:3:0)**. Prerequisite: Consent of instructor. The application of mathematical techniques to economic model-building.
5314. **Econometrics I (3:3:0)**. Prerequisite: AAEC 5311 or ISQS 5349 or consent of instructor. Topics chosen from the following: problems in single and multiple regressions, qualitative choice models, specification tests, estimation of rational expectations models, and fixed-effects models.
5315. **Mathematical Economics II (3:3:0)**. Prerequisite: ECO 5313 or consent of instructor. Advanced topics in the application of mathematics to economic model-building including dynamic models and programming techniques.
5316. **Time Series Econometrics (3:3:0)**. Prerequisite: ECO 5314. Contemporary issues in time series econometrics. Topics include dynamic models, ARMA models, stationarity, causality and exogeneity, unit root tests, integration and error correction.
5317. **Natural Resource and Environmental Economics (3:3:0)**. Prerequisite: ECO 5312 or consent of instructor. Covers theory and policy in natural resource and environmental economics. Optimal rules for renewable and nonrenewable patterns of use, public policy. Intensive study of one sector (energy, water, forestry).
5318. **History of Economics (3:3:0)**. This course examines various historical episodes and their influence on the development of economic theories.
5320. **Managerial Economics (3:3:0)**. Prerequisite: Consent of instructor. The application of economic analysis to the problems of private firms and public institutions. Emphasis on quantitative tools of analysis.
5323. **Monetary Theory I (3:3:0)**. Prerequisite: ECO 3323 or 5310. Introduction to monetary theories and their policy implications. Partial and general equilibrium models of price levels,

inflation rates, income flows, and interest rates are developed in an open economy context.

5324. **Seminar in Public Finance (3:3:0)**. Prerequisite: Consent of instructor. Analysis of economic effects of taxation, governmental expenditures, debt management, and budgetary planning and administration.
5325. **Seminar in Economic Policy (3:3:0)**. Prerequisite: Consent of instructor. Analysis of major economic issues, theories, or policies. May be repeated for credit.
5328. **Monetary Theory II (3:3:0)**. Prerequisite: ECO 5323 or consent of instructor. Recent developments and controversies in monetary theory and policy. Emphasis on leading edge issues and literature and on development of research skills in monetary economics.
5329. **Current Problems in Public Finance (3:3:0)**. Prerequisite: Consent of instructor. Research in and analysis of public goods, public choice, public budgeting, cost-benefit analysis, and intergovernmental fiscal relations.
5332. **Advanced International Finance (3:3:0)**. Prerequisite: Advanced graduate standing and consent of instructor. Advanced study of theory, problems, and policies associated with the international monetary system. (FIN 5332).
5333. **Advanced International Economics (3:3:0)**. Prerequisite: ECO 3333 or consent of instructor. Advanced study of theory, problems, and policies in international economics.
5337. **Healthcare Economics (3:3:0)**. Prerequisite: ECO 5300 or equivalent. The application of economic principles to the analysis of problems and the formulation of policies in the healthcare sector of the economy.
5346. **Game Theory (3:3:0)**. Introduction to game theory with an emphasis on economic applications.
5347. **Topics in Industrial Organization (3:3:0)**. Prerequisite: ECO 5312 or consent of instructor. Study of recent research in applied microeconomics and business behavior. Topics include oligopoly, vertical integration, collusion, and the empirical links between monopoly power and profitability.
5381. **Empirical Studies in Macroeconomics (3:3:0)**. Prerequisite: ECO 5311 or consent of instructor. Contemporary theoretical and empirical macroeconomic issues. Use of empirical studies to evaluate competing hypotheses. Student conducted empirical studies.
5382. **Advanced Microeconomics (3:3:0)**. Prerequisite: ECO 5312 or consent of instructor. Topics include investment and capital theory, uncertainty, general equilibrium, and welfare.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Geography (GEOG)

(To interpret course descriptions, see page 8.)

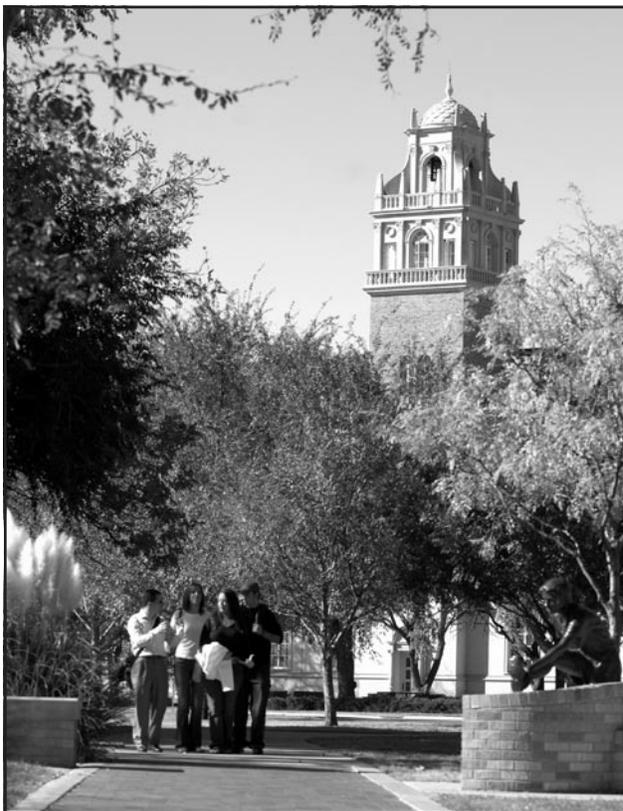
Undergraduate Courses

- 1101, 1102. **Physical Geography Laboratory (1:0:2 each)**. Optional laboratories for GEOG 1301, 1302. GEOG 1101 accompanies GEOG 1301 and GEOG 1102 accompanies GEOG 1302.
1300. **Geography for Educators (3:3:0)**. Introduction to the world and its regions; provides a background in geography and geography education for teachers in training.
- 1401.* **[GEOG 1301] Physical Geography (4:3:2)**. Study of the atmospheric and terrestrial systems that shape our natural environment, especially the global patterns of climate, landforms, and vegetation. Fulfills laboratory science requirements.
2300. **[GEOG 1302] Introduction to Human Geography (3:3:0)**. Survey of human geography, including factors affecting location of different aspects of culture, economy, and politics.
2351. **[GEOG 1303] Regional Geography of the World (3:3:0)**. An introduction to the geography of world regions for students who have had no previous geography courses.
3300. **Geographic Information Systems (3:2:3)**. Fundamentals of cartography and the use of geographic information systems for thematic mapping and spatial analysis. Laboratory emphasizes experience with GIS software.
3301. **Remote Sensing of the Environment (3:2:3)**. Prerequisite: GEOG 3300 or equivalent. Introduction to remote sensing techniques, including air photo interpretation and digital satellite image processing. Emphasis on the use of remote sensing imagery in geographic information systems.
3310. **Environmental Change (3:2:2)**. Prerequisite: GEOG 1401 or equivalent natural science courses. Investigates changes in climate, hydrology, soils, biota and landforms since the start of the Ice Age, and the effects of these environmental changes on humans.
- 3335.* **Field Seminar in Physical Geography (3:3:0)**. Seminar conducted in field setting to provide students with first-hand opportunity for observing actual physical and human aspects of study area. Specific region and topic may vary. May be repeated for credit with change of subject matter.
3337. **Economic Geography (3:3:0)**. Consideration of the characteristics and distribution of production and consumption of goods and services and of variation and interaction of economic activities.
3340. **Introduction to Research in Human Geography (3:3:0)**. An introduction to research and research methods in geography. (Writing Intensive)
3350. **Social and Cultural Geography (3:3:0)**. An examination of the spatial dimensions of human social, cultural, economic, and historical interactions.
3351. **Geography of Urban Places (3:3:0)**. An analysis of the location, distribution, function, and spread of urban places, including a study of current urban problems sprawl, city decline, and metropolitan transportation.
3352. **Geography of US and Canada (3:3:0)**. Study of the physical and cultural geography of the United States and Canada, including geographical aspects of the development of Texas.
3353. **Man, Resources, and Environment (3:3:0)**. Prerequisite: Introductory physical geography or consent of instructor. Study of the interrelated problems of population growth, efficient use of natural resources, and human disruption of the earth's environment.
3354. **Historical Geography of the United States (3:3:0)**. Survey of the settlement geography of the United States in the 18th and 19th centuries with special emphasis on Texas.
3356. **Contemporary Texas and the American Southwest (3:3:0)**. Study of the physical and contemporary cultural geography of Texas and the American Southwest.
3360. **Technology and the Human Landscape (3:3:0)**. Study of the relationship of technological development and energy use with human use of the earth from pre-humans to the present.
3363. **Geography of South America (3:3:0)**. Study of the physical and human geography of South America, with special emphasis on contemporary issues.
3364. **Geography of Middle America (3:3:0)**. Study of the physical and human geography of Mexico, Central America, and the West Indies, with emphasis on contemporary issues.
4300. **Seminar in Geography (3:3:0)**. A capstone course required of all majors, intended to assess knowledge in the discipline. Topics vary. May be repeated for credit. (Writing Intensive)
- 4301.* **Geomorphology in Environmental Management (3:2:2)**. Prerequisite: GEOG 1401, GEOL 1303, or consent of instructor. Evaluation and analysis of earth-forming processes and terrain features in relation to human activities. Course emphasizes analytical techniques.
4302. **Advanced Geographic Information Systems (3:2:3)**. Prerequisite: GEOG 3300 or equivalent. An advanced course in geographic information systems. Major topics include data acquisition, database management, and spatial analysis techniques. Laboratory emphasizes experience with professional GIS software.
4305. **Geography of Trade and Regional Integration in the Western Hemisphere (3:3:0)**. The geographic bases of regional integration in the Western Hemisphere and the relationship of the free trade movement to the internal development of Western Hemisphere countries, with emphasis on Latin America and the Caribbean.
4310. **Internship in Geography (3)**. Prerequisite: Minimum of 12 hours in geography, minimum 3.0 GPA in geography, and consent of instructor. Supervised activity in a nonacademic setting. Students gain experience in the working world while having the opportunity to utilize accumulated geographic concepts and tools.
- 4321.* **Biogeography (3:3:0)**. Prerequisite: GEOG 1401 or consent of instructor. Study of plants and animals in their spatial context, functional interaction, and as related to human impacts.
4357. **Geography of Arid Lands (3:3:0)**. Systemic and regional inquiry into the physical nature and the problems of human utilization of the arid and semiarid lands of the earth.
4369. **Independent Research in Geography (3)**. Conference course. May be repeated for credit. (Writing Intensive)
4400. **Topics in Geographic Information Systems (4:2:4)**. Prerequisite: Consent of instructor. A focused exploration of specialized applications of geographic information systems. Laboratory emphasizes the use of GIS software in problem solving context. May be repeated for credit when topics vary.

* Courses marked with an asterisk provide laboratory and nonlaboratory science credit.

Graduate Courses

5300. **Geographic Information Systems (3:2:3)**. Review of basic cartographic principles and the use of geographic information systems for thematic mapping and spatial analysis. Laboratory emphasizes experience with GIS software.
5301. **Remote Sensing of the Environment (3:2:3)**. Review of remote sensing techniques, including air photo interpretation and digital satellite image processing. Emphasis on the use of remote sensing imagery in geographic information systems.
5302. **Advanced Geographic Information Systems (3:2:3)**. Prerequisite: GEOG 5300 or equivalent. An advanced course in geographic information systems. Major topics include data acquisition, database management, and spatial analysis techniques. Laboratory emphasizes experience with professional GIS software.
5303. **Advanced Human Geography (3:3:0)**. Consideration of current research in human geography with special reference to the spatial aspects of natural resource-environmental analysis. May be repeated as topic varies.
5304. **Advanced Physical Geography (3:3:0)**. Consideration of current research in physical geography with special reference to the spatial aspects of natural resource-environmental analysis. May be repeated as topic varies.
5306. **Seminar in Geography of Arid Lands (3:3:0)**. Systematic and regional review and analysis of the physical nature and problems of human utilization of the arid and semi-arid lands of the earth.
5307. **NAFTA, Western Hemisphere Trade, and Regional Integration in the Americas (3:3:0)**. Consideration of spatial and cultural aspects of trade and economic development in the Western Hemisphere with emphasis on NAFTA, Mercosur, CACM, and regional integration organizations.
5309. **Seminar in Regional Analysis (3:3:0)**. Consideration of the objectives and methods of regional analysis and the application of research techniques to the spatial analysis of selected regions. May be repeated as topic varies.
5310. **Readings in Geography (3)**. Conference course. May be repeated for credit.
5400. **Topics in Geographic Information Systems (4:2:4)**. Prerequisite: Consent of instructor. A focused exploration of specialized applications of Geographic Information Systems. Laboratory emphasizes the use of GIS software in problem solving context. May be repeated for credit when topics vary.
7000. **Research (V1-12)**.



Department of English

Faculty

Sam A. Dragga, Jr, Ph.D., Chairperson

Professors: Aycock, Barker, Clarke, Covington, Dragga, Hurst, Kuriyama, Miner, Purinton, Wenthe, Whitlark

Associate Professors: Baake, Baehr, Carter, Conrad, Crowell, Daghistan, Desens, Fitzgerald, Grass, Hawkins, Jones, Kemp, Kimball, Kolosov-Wenthe, Lang, McFadden, Patterson, Poch, Rickly, Samson, Schoenecke, Shelton, Shu, St.Amant

Assistant Professors: Baugh, Borshuk, Couch, Eaton, Frangos, Kim, Koerber, Rice, Snead, Spurgeon, Still, Ybarra, Zdenek

Lecturers: Duke, Heise, Hester, Hiemstra, McLaughlin, Myers, Rylander

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in English
- Master of Arts in English
- Master of Arts in Technical Communication
- Doctor of Philosophy in English
- Doctor of Philosophy in Technical Communication and Rhetoric

The department also offers a graduate certificate in linguistics and cooperates in interdepartmental programs in linguistics and comparative literature at both the undergraduate and the graduate levels.

Undergraduate Program

Undergraduate English majors must specialize in either literature and language, in technical communication, in creative writing, or in the certification program for teaching in the secondary schools.

The department sponsors both the local chapter of Sigma Tau Delta (of the national English honorary society) and a chapter of the Society for Technical Communication. The department publishes four international journals: *Conradiana*, *The Eighteenth Century: Theory and Interpretation*, *The Iron Horse Literary Review*, and *William Carlos Williams Review*.

An English minor consists of 18 hours: ENGL 1302, two 2000-level English courses, and 9 hours of advanced English courses (3000 or 4000 level). Students wishing to minor in a particular area of study (British or American literature, creative writing, linguistics, technical communication, comparative literature, etc.) may do so by taking their three advanced courses in the appropriate area. To receive credit toward graduation, a student who is an English major or minor must receive at least a C in courses in English. A maximum of 9 advanced hours of transfer credit in English will be accepted for the major, and a maximum of 3 advanced hours of transfer credit will be accepted for the minor.

Written Communication Requirements

ENGL 1301 and 1302 are required of all undergraduate students. Some colleges require additional hours in English; students should consult their advisors concerning required English courses.

Students who score 360 or below (verbal) on the SAT examination or 15 or below (English) on the ACT examination are required to pass ENGL 0301 or any approved assessment instrument approved by the Coordinating Board (ASSET, COMPASS, ACCU-PLACER, or THEA) before they can take ENGL 1301. Although ENGL 0301 appears on the transcript, the hours do not count as part of the minimum number of hours required for graduation in any degree program of the university. A grade is awarded for the semester but is not recorded on the transcript; therefore, it will not be computed in the student's grade point average. This course counts for meeting the Texas Success Initiative (TSI) requirements for writing skills

development. Students who must fulfill this requirement should visit the TSI Office located in 72 Holden Hall.

ENGL 1301 and 1302 are prerequisites for all 2000-level English courses. Two 2000-level English courses are prerequisites for all 3000- and 4000-level English courses (except ENGL 3365).

Literature and Language Concentration

Students majoring in English with a concentration in literature and language study literary works from a wide variety of periods and genres, and they learn to think critically and analytically about literature and about language itself. This concentration prepares students for many careers—including teaching, government service, and business—and for graduate and professional study in fields requiring extensive reading and writing, such as law, medicine, and business. ENGL 1301, 1302, 2391 and 3 hours from ENGL 2305, 2306, 2307, 2308, 2371, and 2388 are required for an English major with a concentration in literature and language. Majors must complete 15 hours at the 3000-level and 12 hours at the 4000-level in the following courses:

I. 3000-Level

A. Period Courses

Take three of the following: ENGL 3302, 3304, 3305, 3307, 3308, 3309, 3323, 3324, 3325, 3335, 3336, 3337.

- One course must be Early: ENGL 3302, 3304, 3305, 3323, 3335
- One must be American: ENGL 3323, 3324, 3325
- One must be British: ENGL 3302, 3304, 3305, 3307, 3308, 3309

Note that some courses fulfill more than one category (e.g., ENGL 3302 is both Early and British; ENGL 3323 is both Early and American). However, three courses are required from this group.

B. Two additional 3000-level courses.

II. 4000-Level

A. ENGL 4301

B. One genre course: ENGL 4311, 4312, 4313, 4314, or 4315

C. ENGL 4374

D. One additional 4000-level course from the following: ENGL 4300, 4311, 4312, 4313, 4314, 4315, 4321, 4351, or 4373

Technical Communication Concentration

The major in English with a concentration in technical communication prepares students to become technical and professional writers and editors. This plan also prepares students for graduate professional schools in which written communication plays an important part, such as law and business.

Students selecting the technical communication plan are advised to minor in and choose electives from disciplines within which they expect to write or edit. Minors and electives in fields such as computer science, engineering, chemistry, biology, physics, business, and agriculture provide knowledge that is helpful in technical and professional writing and editing.

ENGL 1301, 1302, 2311, and a 2000-level literature course are required for a concentration in technical communication. Majors must complete 15 hours at the 3000-level and 12 hours at the 4000 level in the following courses:

I. 3000-Level

- A. One style or linguistics course: ENGL 3366, 3371, or 3373
- B. Four courses from 3365, 3366 (may not also be used for I.A.), 3367, 3368, or 3369

II. 4000-Level

- A. Three courses from 4365, 4366, 4367, 4368, 4369, or 4378
- B. ENGL 4380

Creative Writing Concentration

The major in English with a concentration in creative writing is designed for students wishing to write fiction, nonfiction, and/or poetry with the guidance of teachers who write. This plan allows maximum concentration in literature courses so that, as they write, students may further understand and appreciate the aspects and techniques of fiction, nonfiction, and poetry. In addition to the opportunities for writing and literary study, this concentration is especially appropriate for students interested in teaching creative writing and literature, studying creative writing and literature in graduate school, and preparing for professional graduate schools, such as law and business. Permission to take 4351 requires submission of a writing sample and permission of the instructor.

The creative writing specialization requires ENGL 1301 and 1302 and 6 hours of 2000-level courses: 3 hours from ENGL 2305, 2306, 2307, 2308, 2371, or 2388; and 3 hours from ENGL 2351 or 2391.

Advanced courses include 15 hours at the 3000 level and 12 hours at the 4000 level.

I. 3000-Level

- A. One early literature period course: ENGL 3302, 3304, 3305, or 3335
- B. One British literature period course: ENGL 3302, 3304, 3305, 3307, 3308, or 3309
- C. One American literature period course: ENGL 3323, 3324, or 3325
- D. Six hours of ENGL 3351 under two separate genres (fiction, poetry, or creative nonfiction)

II. 4000-Level

- A. ENGL 4301
- B. One genre course: ENGL 4311, 4312, 4313, 4314, or 4315
- C. ENGL 4351
- D. One additional 4000-level course from the following: ENGL 4300, 4311, 4312, 4313, 4314, 4315, 4321, 4342, 4351, 4373, or 4374

Certification for Teaching

Students seeking a provisional certificate with English Language Arts as a teaching field may satisfy the requirement in English through the Bachelor of Arts degree. Certification requirements are determined by the State Board for Education Certification and are subject to change. A grade of C or better in all English courses is required. In addition, the certification program requires a 2.5 GPA in the teaching field. Before beginning to take advanced courses, students should successfully complete ENGL 1301 and 1302 and two courses in 2000-level English (2305, 2306, 2307, 2308, 2311, 2351, 2371, 2388, or 2391). Students wishing to follow any of the degree programs leading to certification should consult with the department's undergraduate advisor.

English (ENGL)

(To interpret course descriptions, see page 8.)

Developmental Course

0301. **Developmental Writing (3:3:0).** Emphasizes the development of fluency and coherence in writing and increased capability in usage and grammar. Students are assigned to this course on the basis of testing and evaluation, and successfully complete this course before registration in ENGL 1301. Not applicable toward general degree requirements in any degree program. Hours for ENGL 0301 are in addition to the minimum number needed for graduation.

Undergraduate Courses

1301. **[ENGL 1301] Essentials of College Rhetoric (3:3:0).** Prerequisite: Successful completion of ENGL 0301 or a satisfactory score on SAT, ACT, or English department writing sample. A

Graduate Program / English

Before beginning a graduate program in English, students must consult the Director of Graduate Studies concerning departmental admission procedures and degree requirements. Admission to the Graduate School requires departmental recommendation as well as approval by the Graduate Dean. Information on the requirements is available at www.english.ttu.edu.

The Graduate Certificate in Linguistics comprises a minimum of 12 hours in linguistics courses. The program usually includes study in phonology, syntax, and semantics, but flexibility is essential in meeting the diverse backgrounds, motivations, and goals of the students. The Director of Linguistics, in consultation with faculty and the Director of Graduate Studies, will develop and specify a program of study appropriate for each student in the program. If students decide to pursue studies beyond the certificate level, course credit earned towards the certificate can be considered toward a graduate degree in English.

The master's degree program in English offers advanced study in literature, creative writing, rhetoric, and linguistics. It is intended to be not merely a continuation of undergraduate work but a distinctly different educational experience requiring study in greater depth and the development of critical thinking.

Applicants for the M.A. degree in English may complete 30 hours of graduate courses and a thesis or 36 hours of coursework. Areas of concentration are English and American literature, comparative literature, linguistics, and creative writing. Supporting work is available in bibliography, film, literary criticism, teaching college composition, and technical and professional writing. Reading knowledge of one foreign language is required. In their final semester in the M.A. program, thesis students must successfully complete an oral defense and nonthesis students must submit a portfolio of their work for faculty review.

The doctoral program in English requires both greater breadth of study than the M.A. program and greater concentration in an area selected for specialization. To fulfill these requirements the student must demonstrate a reasonably comprehensive knowledge of literature and the ability to engage in original research.

Doctoral students in English may specialize in an area of English literature; American literature; two closely related areas of English and American literature; comparative literature; creative writing; linguistics; or literature, technology, and discourse. They may minor outside the department or create a secondary concentration within the department in one of the above areas or in technical communication.

Coursework for the Ph.D. generally amounts to 60 hours beyond the B.A. degree, including at least 45 hours of coursework in English. All students are reviewed annually for satisfac-

tory progress. In addition, the student must pass a qualifying examination and prepare and defend a dissertation. Reading knowledge of two foreign languages or high competence in one language is required.

The master's degree program in technical communication combines study of the history, theory, research, and genres of technical communication with practice in applying this knowledge. The thesis option requires students to complete 24 hours of graduate courses in technical communication and electives or a minor, 6 hours of research methods, and a thesis. The nonthesis option requires students to complete 36 hours of graduate courses in technical communication, electives, and a minor. Students who elect the nonthesis option must pass a comprehensive portfolio examination in the semester of graduation.

The master's degree in technical communication is also available online. Application and admission processes and degree requirements are similar to those for the nonthesis option for the degree. All distance students complete 36 hours of graduate coursework in technical communication, language- and communication-related electives, or a minor. One of the courses requires a substantial independent research project that could result in an article for publication. Prospective students are advised to consult www.english.ttu.edu/TC/DL for details of degree requirements and the course schedule.

The doctoral program in technical communication and rhetoric aims to engage the students in acquiring broad knowledge of the history, theory, research, genres, and practice of technical communication and rhetoric; specialized knowledge of some aspect of communication or rhetoric; and ability to conduct independent research. The Ph.D. requires at least 60 hours of graduate courses beyond the bachelor's degree, proficiency in research methodology, and a dissertation. The 60 hours include 45 hours in the specialization. The remaining 15 hours may be used for a minor in a field other than technical communication and rhetoric or for more courses in the specialization, including communication-related courses in other departments. A minor may be taken in one department or may consist of a cluster of courses on related topics from different departments.

The doctoral degree in technical communication and rhetoric is also available online. Application and admissions processes and degree requirements are similar to those for the on-campus degree. In addition to fulfilling all the degree requirements of the on-campus program, all distance students attend a two-week seminar every May. Prospective students are advised to consult www.english.ttu.edu/tc for details of degree requirements and the course schedule.

- student may be required to transfer to ENGL 0301 on the basis of the English department writing sample. Focuses on the writing process and requires students to write extensively in a variety of modes and styles. (Writing Intensive)
- 1302. [ENGL 1302] Advanced College Rhetoric (3:3:0).** Prerequisite: Successful completion of ENGL 1301. Focuses on writing from sources, research methods, and documentation. (Writing Intensive)
- 2305. Introduction to Poetry (3:3:0).** Prerequisite: ENGL 1301, 1302. Critical study of and writing about a variety of poems. (Writing Intensive)
- 2306. Introduction to Drama (3:3:0).** Prerequisite: ENGL 1301, 1302. Critical study of and writing about a variety of plays. (Writing Intensive)
- 2307. Introduction to Fiction (3:3:0).** Prerequisite: ENGL 1301, 1302. Critical study of and writing about a variety of short stories and novels. (Writing Intensive)
- 2308. Introduction to Nonfiction (3:3:0).** Prerequisite: 1301, 1302. Critical study of and writing about a variety of historical, biographical, and scientific writings. (Writing Intensive)
- 2311. [ENGL 2311] Introduction to Technical Writing (3:3:0).** Prerequisite: ENGL 1301 and 1302. Introduction to patterns of writing used in reports and letters for business, industry, and technology. (Writing Intensive)
- 2351. [ENGL 2307, 2308] Introduction to Creative Writing (3:3:0).** Prerequisite: ENGL 1301 and 1302. Fundamentals of creative writing with much practice in writing poetry and short fiction. (Writing Intensive)
- 2371. Language in a Multicultural America (3:3:0).** Prerequisite: ENGL 1301 and 1302. This course examines language in the U.S. as it relates to race, gender, class, religion, and ethnicity. (Writing Intensive)
- 2388. Introduction to Film Studies (3:3:0).** Prerequisite: ENGL 1301 and 1302. Introduction to the history, aesthetics, and

- criticism of avant-garde, documentary, and narrative film. (Writing Intensive)
2391. **Introduction to Critical Writing (3:3:0)**. Prerequisite: ENGL 1301, 1302. Extensive practice in writing critical essays about literature. (Writing Intensive)
3302. **Old and Middle English Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English. Poetry, prose, and drama from 700 to 1500. This course may be repeated once for credit when topics vary. (Writing Intensive)
3304. **Medieval and Renaissance Drama (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. English drama to 1642. This course may be repeated for credit once when topics vary. (Writing Intensive)
3305. **British Renaissance Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. British poetry, prose, and drama from 1485 to 1660. This course may be repeated for credit once when topics vary. (Writing Intensive)
3307. **Restoration and Eighteenth Century British Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. British poetry, prose, and drama from 1660 to 1800. This course may be repeated for credit once when topics vary. (Writing Intensive)
3308. **Nineteenth Century British Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. British poetry, prose, and drama from 1780 to 1900. This course may be repeated for credit once when topics vary. (Writing Intensive)
3309. **Modern and Contemporary British Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. British poetry, prose, and drama since 1900. This course may be repeated for credit once when topics vary. (Writing Intensive)
3323. **Early American Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. American poetry and prose to 1800. This course may be repeated for credit once when topics vary. (Writing Intensive)
3324. **Nineteenth Century American Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. American poetry, prose, and drama from 1800 to 1900. This course may be repeated for credit once when topics vary. (Writing Intensive)
3325. **Modern and Contemporary American Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. American poetry, prose, and drama since 1900. This course may be repeated for credit once when topics vary. (Writing Intensive)
3335. **Ancient and Medieval World Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Representative works in translation, primarily Greek and Roman. This course may be repeated for credit once when topics vary. (Writing Intensive)
3336. **Early Modern World Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Representative works in translation from 1400 to 1900. This course may be repeated for credit once when topics vary. (Writing Intensive)
3337. **Modern and Contemporary World Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Representative works in translation since 1900. This course may be repeated for credit once when topics vary. (Writing Intensive)
3351. **Creative Writing (3:3:0)**. Prerequisite: 6 hours of 2000-level English or, if a student's major does not require those courses, completion of English courses required by the student's major. Discussion of basic techniques in the genres of fiction, poetry, or creative nonfiction, with emphasis on student's creative writing. May be repeated once under a separate genre. (Writing Intensive)
3360. **Issues in Composition (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Exploration of principles and practices in rhetoric and writing. (Writing Intensive)
3365. **Professional Report Writing (3:3:0)**. Prerequisite: Junior standing. Preparation of professional and academic reports and publications through the use of communication analysis. (Writing Intensive)
3366. **Style in Technical Writing (3:3:0)**. Prerequisite: Junior standing. Investigation of the varieties, characteristics, and function of prose style in technical and professional writing. (Writing Intensive)
3367. **Usability Testing (3:3:0)**. Prerequisite or corequisite: ENGL 3365. Principles and techniques of designing usable documents with emphasis on rhetorical effectiveness and the integration of verbal and visual language. (Writing Intensive)
3368. **World Wide Web Publishing of Technical Information (3:3:0)**. Prerequisite: ENGL 2311 or 3365. Principles and techniques of designing usable Web sites, with emphasis on needs assessment, information architecture, and navigation. (Writing Intensive)
3369. **Information Design (3:3:0)**. Prerequisite: ENGL 2311 or 3365. Principles of design, visual rhetoric, and visual communication and application of those principles in document design. (Writing Intensive)
3371. **Linguistic Science (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Modern theory and practice in the description and analysis of natural languages. (Writing Intensive)
3372. **History of the English Language (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. An historical and descriptive survey of the English language in the context of the cultural development of the English-speaking peoples. (Writing Intensive)
3373. **Modern English Syntax (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. The syntactic and morphological analysis of modern English. (Writing Intensive)
3381. **Literature of the Fantastic (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. The analysis and criticism of the literary methods and style by which fantasy and science fiction explore cultural, psychological, and scientific issues. (Writing Intensive)
3382. **Women Writers (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Significant works by women. (W S 3382) (Writing Intensive)
3383. **Bible as Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. The styles and forms of biblical lyrics and narration as well as various theories of biblical interpretation. (Writing Intensive)
3384. **Religion and Literature (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. The function of religious images and ideas in British and American literature as well as in works in translation. (Writing Intensive)
3385. **Shakespeare (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Nine to twelve plays. (Writing Intensive)
3386. **Literature and Science (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. An exploration of the relations between science and technology and literature and discourse. (Writing Intensive)
3387. **Multicultural Literatures of America (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Representative works by Americans of different cultures. May be repeated once for credit when topic varies. (Writing Intensive)
3388. **Film Studies (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Concepts of visual and aural communication and a survey of various film genres. May be repeated once for credit when topic varies. (Writing Intensive)
3389. **Short Story (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Short stories around the world. (Writing Intensive)
3390. **Literatures of the Southwest (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Examines the diverse literatures and cultures of the Southwest. (Writing Intensive)
3391. **Literature and War (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. This course explores the representation of war and conflict in literature and emphasizes diverse perspectives involved. May be repeated once for credit when topic varies. (Writing Intensive)
4300. **Individual Studies in English (3:3:0)**. Prerequisite: Junior or senior standing and approval of the instructor and department chairperson. Independent study under the guidance of a member of the faculty. May be repeated once. (Writing Intensive)
4301. **Studies in Selected Authors (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive examination of one or more authors. May be repeated once for credit when topics vary. (Writing Intensive)
4311. **Studies in Poetry (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary. (Writing Intensive)
4312. **Studies in Drama (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary. (Writing Intensive)
4313. **Studies in Fiction (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary. (Writing Intensive)
4314. **Studies in Nonfiction (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary. (Writing Intensive)
4315. **Studies in Film (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary. (Writing Intensive)
4321. **Studies in Literary Topics (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive examination of one or more issues, themes, or motifs in British, American, or world

- literature. May be repeated once for credit when topics vary. (Writing Intensive)
4342. **Studies in Literary Theory (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in theories and traditions of literary criticism. May be repeated once for credit when topics vary. (Writing Intensive)
4351. **Advanced Creative Writing (3:3:0)**. Prerequisite: 6 hours of creative writing (ENGL 3351) and consent of instructor. Form and techniques of creative nonfiction, fiction, or poetry, with emphasis on writing and discussion of the student's own creative writing. May be repeated. (Writing Intensive)
4360. **Advanced Exposition (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive examination of one or more issues in the study of writing. May be repeated once for credit when topics vary. (Writing Intensive)
4365. **Special Topics in Technical Communication (3:3:0)**. Prerequisite: ENGL 3365 or consent of instructor. Development of complex documents, such as manuals, proposals, and newsletters. May be repeated once for credit when topics vary. (Writing Intensive)
4366. **Technical and Professional Editing (3:3:0)**. Prerequisite: ENGL 3365. Methods of editing and publishing in business, science, technology, and the professions. Practical experience with editing reports and publications produced in the university. (Writing Intensive)
4367. **Developing Instructional Materials (3:3:0)**. Prerequisite: ENGL 3365. Preparation of instructions for complex procedures with focus on task and user analysis, organization, format, and usability testing. (Writing Intensive)
4368. **Advanced Web Design (3:3:0)**. Prerequisite: ENGL 3367, 3368, or 3369. Advanced study of content design for database Web sites, interactive design using single sourcing, and scripting technologies. (Writing Intensive)
4369. **Interaction Design (3:3:0)**. Prerequisite: ENGL 3367, 3368, or 3369. The study of information gathering for design of efficient user interaction with software and hardware through adaptive interfaces, dynamic text structures, and single-sourcing methodologies. (Writing Intensive)
4371. **Language and Community (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Combines community service (tutoring language and literacy) with theory (readings and discussions on linguistics, language, race/ethnicity). May be repeated once for credit when topics vary. (Writing Intensive)
4373. **Studies in Linguistics (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive examination of one or more issues in the study of language. May be repeated once for credit when topics vary. (Writing Intensive)
4374. **Senior Seminar in English (3:3:0)**. Prerequisite: 15 hours junior or senior English. Required of English majors with specializations in literature and language. Seminar covering contemporary professional concerns and key issues in literature, language, and writing. Topics vary. (Writing Intensive)
4378. **Internship in Technical Communication (3)**. Prerequisite: Junior or senior standing, ENGL 3365, declared specialization in technical communication, and approval of the director of technical communication. Supervised work in technical communication. Requires portfolio and research paper. (Writing Intensive)
4380. **Professional issues in Technical Communication (3:3:0)**. Prerequisite: Senior standing, declared specialization in technical communication, 3 hours of 4000-level English courses, or approval of the technical communication director. Advanced study of trends in technical communication, application of theory in community service-learning project, and preparation of a professional portfolio. (Writing Intensive)
- through assigned readings, supervised participation in teaching activities, and seminar discussion.
5300. **Individual Studies (3:3:0)**. Prerequisite: Approval of the faculty mentor and Director of Graduate Studies. Independent study under the guidance of a graduate faculty member. May be repeated.
5301. **Old English (3:3:0)**. Survey of the grammar and vocabulary of Old English together with readings.
5303. **Studies in Medieval British Literature (3:3:0)**. Concentrated studies in British literature to 1500, treating in various semesters poetry, prose, drama, and major authors.
5304. **Studies in Renaissance British Literature (3:3:0)**. Concentrated studies in British literature, 1500-1600, treating in various semesters poetry, prose, drama, and major authors.
5305. **Studies in Shakespeare (3:3:0)**. Emphasis on the comedies, tragedies, histories, poetry, or a combination of these.
5306. **Studies in Seventeenth-Century British Literature (3:3:0)**. Concentrated studies in British literature, 1600-1660, treating in various semesters poetry, prose, drama, and major authors.
5307. **Studies in Restoration and Eighteenth-Century British Literature (3:3:0)**. Concentrated studies in British literature, 1660-1800, treating in various semesters poetry, prose, drama, and major authors.
5309. **Studies in Nineteenth-Century British Literature (3:3:0)**. Concentrated studies in British literature, 1800-1900, treating in various semesters poetry, prose, drama, and major authors.
5313. **Studies in Twentieth-Century British Literature (3:3:0)**. Concentrated studies in British literature, 1900-present, treating in various semesters poetry, prose, drama, and major authors.
5315. **Studies in British Fiction (3:3:0)**. Concentrated studies in British fiction, treating in various semesters major figures and movements.
5320. **Studies in Seventeenth- and Eighteenth-Century American Literature (3:3:0)**. Concentrated studies in American literature, 1600-1800, treating in various semesters poetry, prose, drama, and major authors.
5323. **Studies in Nineteenth-Century American Literature (3:3:0)**. Concentrated studies in American literature, 1800-1900, treating in various semesters poetry, prose, drama, and major authors.
5324. **Studies in Twentieth-Century American Literature (3:3:0)**. Concentrated studies in American literature, 1900-present, treating in various semesters poetry, prose, drama, and major authors.
5325. **Studies in American Fiction (3:3:0)**. Concentrated studies in American fiction, treating in various semesters major figures and movements.
5334. **History of the English Language (3:3:0)**. An exploration of the external and internal history of the English language and the people who speak it. Considers linguistic, historical, and literary materials.
5335. **Principles of Language (3:3:0)**. A broad introduction to the major subfields of descriptive and applied linguistics. Covers theoretical and practical issues in modern analyses of language.
5337. **Studies in Linguistics (3:3:0)**. Special topics. May be repeated when the topic varies.
5338. **Syntax (3:3:0)**. This course surveys syntactic analysis and generative syntactic theory.
5339. **Phonology (3:3:0)**. This course surveys the study of sound patterns, phonological description and analysis, and generative phonological theory.
5340. **Research Methods in Literature and Languages (3:3:0)**. Survey of research methods in literature and languages, providing experience with enumerative and analytical bibliography, bibliographic theory, and textual criticism.
5342. **Critical Methods (3:3:0)**. Survey of contemporary critical methods with special attention to their application to literature.
5343. **Studies in Literary Criticism (3:3:0)**. Concentrated study of specific problems in literary theory and its application to literature.
5350. **Studies in Drama (3:3:0)**. Concentrated studies in American, British, or world drama.
5351. **Studies in Film and Literature (3:3:0)**. Readings, analysis, and research in the interrelationships between film and literature.
5352. **Studies in Fiction (3:3:0)**. Concentrated studies in world fiction.
5353. **Studies in Poetry (3:3:0)**. Concentrated studies in American, British, or world poetry.
5355. **Studies in Comparative Literature (3:3:0)**. Theory and practice of the study of comparative literature, with emphasis on themes and motifs.
5361. **Theories of Invention in Writing (3:3:0)**. Classical and modern theories of rhetorical invention.

Graduate Courses

5000. **English as a Profession (V1-3)**. Introduction to professional issues in English. Topics include teaching dossiers, grant writing, project management and strategies for professional conduct and advancement. May be repeated.
5060. **History and Theories of College Composition (V1-3)**. Seminar in history and contemporary theories of composition and rhetoric studies. Required for all new teaching assistants and graduate part-time instructors.
5067. **Methods of Teaching College Composition (V1-3)**. Prerequisite: ENGL 5060. Introduces methods of teaching writing

5362. **Rhetorical Analysis of Text (3:3:0)**. Classical and modern theories of rhetorical analysis.
5363. **Research Methods in Technical Communication and Rhetoric (3:3:0)**. Survey of research methods in technical communication, rhetoric, and composition studies with emphasis on current research trends.
5364. **History of Rhetoric (3:3:0)**. Survey of history and theories of rhetoric with an emphasis on applications to written communication.
5365. **Studies in Composition (3:3:0)**. Consideration of classical and modern theories and research in written composition.
5366. **Teaching Technical and Professional Writing (3:3:0)**. The theory and teaching of technical and professional writing with special attention to developing course objectives, syllabi, and teaching techniques.
5368. **Studies in Written Argumentation (3:3:0)**. History and theories of written argumentation.
5369. **Discourse and Technology (3:3:0)**. Study of the effects of computer networks and digitally mediated knowledge management on theoretical, practical, and pedagogical notions of discourse and discourse communities.
5370. **Studies in Creative Writing (3:3:0)**. Prerequisite: Consent of instructor. Theory and practice of creative writing. This class may be taught as a single genre poetry, fiction, creative nonfiction, or other writing or as multiple genres. May be repeated for credit towards creative writing specialization.
5371. **Foundations of Technical Communication (3:3:0)**. Theory and practice of technical communication.
5372. **Technical Reports (3:3:0)**. Theory and practice of reports and proposals.
5373. **Technical Manuals (3:3:0)**. Theory and practice of manual development and design.
5374. **Technical Editing (3:3:0)**. Substantive editing and design of technical documents.
5375. **Document Design (3:3:0)**. Theory and practice of creating comprehensible, usable, and persuasive texts.
5376. **Online Publishing (3:3:0)**. Design and testing of online materials to support instruction and information retrieval.
5377. **Theoretical Approaches to Technical Communication (3:3:0)**. Intensive analysis and application of one or more theories of technical communication.
5378. **Graduate Internship (3:0:0)**. Prerequisite: Consent of the Director of Graduate Studies. Substantial writing, editing, and/or teaching experience under the direction of a faculty member or professional mentor.
5380. **Advanced Problems in Literary Studies (3:3:0)**. Concentrated studies in works, authors, or approaches.
5384. **Rhetoric of Scientific Literature (3:3:0)**. Study of the role of rhetoric in the texts of scientific inquiry.
5385. **Ethics in Technical Communication and Rhetoric (3:3:0)**. Definitions, philosophies, and applicability of ethics to technical communication problems and solutions.
5386. **Written Discourse and Social Issues (3:3:0)**. Study of uses of written discourse in problem solving on social issues involving science or technology.
5387. **Publications Management (3:3:0)**. Strategies of managing processes and knowledge that support publication.
5388. **Usability Testing and Research (3:3:0)**. Methods of planning, conducting, and analyzing usability tests.
5389. **Field Methods of Research (3:3:0)**. Survey of methods such as ethnography, observation, and participatory design with application to research in rhetoric and technical communication.
5390. **Writing for Publication (3:3:0)**. This course is designed to teach students in graduate programs how to write clear and effective articles for professional journals in their field.
5392. **Teaching College Literature (3:3:0)**. Survey of pedagogical issues associated with the teaching of university-level literature courses.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Environmental Toxicology

Faculty

Ronald J. Kendall, Ph.D., Chairperson

Professors: Cobb, Dixon, Kendall, Wang

Associate Professors: Anderson, Hooper, McMurry, Presley, E. Smith

Assistant Professors: Canas, Cox, Gao, Goddard-Codding, Maul, Ramkumar, P.N. Smith

Research Assistant Professors: Brown, Rainwater, Tang

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Environmental Toxicology
- Doctor of Philosophy in Environmental Toxicology

Joint Programs

- Master of Science in Environmental Toxicology/Doctor of Jurisprudence
- Master of Science in Environmental Toxicology/Master of Business Administration

Undergraduate Program

Environmental toxicology offers a graduate program within the College of Arts and Sciences as well as fixed and variable credit courses for undergraduates. The courses are designed to provide undergraduate students the opportunity to conduct scientific research in environmental toxicology at The Institute of Environmental and Human Health. Generally, a background in the natural, physical, or health sciences will provide the necessary preparation for completion of these courses. Interested students should contact faculty within the department.

Environmental Toxicology (ENTX)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

4000. **Undergraduate Research in Environmental Toxicology (V1-3)**. Prerequisite: 15 hours of biology or chemistry, junior or senior standing, and consent of instructor. Selected research problems according to the needs of the student. May be repeated for credit.
4325. **Principles of Toxicology I (3:3:0)**. Prerequisite: Senior standing or consent of instructor. First half of two-semester course. Examines foundations of toxicological sciences, covering principles, disposition and half of toxicity mechanisms. (Writing Intensive)
4326. **Principles of Toxicology II (3:3:0)**. Prerequisite: ENTX 4325. Second half of two-semester course. Covers remaining toxicity mechanisms, toxic agents and applied toxicology. (Writing Intensive)
4301. **Special Topics in Environmental Toxicology (3:3:0)**. Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other undergraduate courses (e.g., wildlife toxicology, pesticides in the environment).

Graduate Course

6000. **Master's Thesis (V1-6)**.
6100. **Graduate Seminar (1:1:0)**. Prerequisite: Graduate standing or consent of instructor. A participatory seminar where graduate students condense, review, and present research findings on focused topics. Subject matter varies by semester. May be repeated for credit.

6251. **Analytical Toxicology Laboratory (2:0:2)**. Corequisite: ENTX 6351 or consent of instructor. Extraction, cleanup, and quantitative analysis of environmental chemicals and their degradates. Reinforces and applies theories taught in ENTX 6351. (Writing Intensive)
6300. **Advanced Topics in Environmental Toxicology (3:3:0)**. Special areas of current interest not generally covered in other courses. Content normally different each time offered. May be repeated for credit.
6312. **Biological Threats in the Environment (3:3:0)**. Prerequisite: Undergraduate biological background or consent of instructor. Detailed examination of characteristics, surveillance, and control of naturally-occurring zoonoses and diseases exploitable as biological weapon agents. (Writing Intensive)
6314. **Chemical Warfare and Protective Countermeasures (3:3:0)**. Coverage of chemical warfare agents, their protective measures, and technologies. Suitable for science and engineering majors.
6325. **Principles of Toxicology I (3:3:0)**. Prerequisite: Graduate standing in the department or consent of instructor. First half of two semester course. Examines the foundations of toxicological sciences. Covers principles, disposition, and first half of toxicity mechanisms. (Writing Intensive)
6326. **Principles of Toxicology II (3:3:0)**. Prerequisite: ENTX 6325. Second half of two semester course. Covers remaining mechanisms, toxic agents, and applied toxicology. (Writing Intensive)
6327. **Molecular Toxicology (3:3:0)**. Prerequisite: ENTX 6325 and 6326 or consent of instructor. Molecular mechanisms and control of phase I and phase II xenobiotic metabolizing enzymes, oxidative stress, and carcinogenesis. Emphasizes prototypical chemicals with multiple modes of action.
6331. **Reproductive and Developmental Toxicology (3:3:0)**. Prerequisite: ENTX 6325 and 6326 or consent of instructor. Mechanistic treatment of chemical effects on reproductive and developmental processes and the resulting impacts on reproductive function, fertility, and the developing offspring.
6332. **Biotoxin Detection Methods (3:2:1)**. Prerequisite: ENTX 6326. Toxic effects of mycotoxins, bacteria, and cyanobacteria toxins. Historic and current status of biotoxin research. Laboratory stresses breadth for biotoxin detection.
6351. **Analytical Toxicology Lecture (3:3:0)**. Prerequisite: ENTX 6445 or consent of instructor. Theory of isolation, detection, identification, and quantification of toxic substances and their transformation products in environmental and biological samples.
6361. **Environmental and Wildlife Toxicology (3:3:0)**. Prerequisite: Organic chemistry, ecology, or consent of instructor. Examines exposure and effects of chemicals in wildlife, their study in the lab and field, and use of conducting ecological risk assessments.
6365. **Fundamentals of Aquatic Ecotoxicology (3:3:0)**. Prerequisite: Graduate or advanced undergraduate background in biological, chemical, or environmental sciences or consent of instructor. Covers effects of water pollution on aquatic organisms and human health. Subjects include fate and transport in aqueous systems, acute toxicity and toxicity tests, and effects of pollutants on aquatic systems from molecular to global levels.
6366. **Advanced Environmental Toxicology (3:3:0)**. Prerequisite: ENTX 6325 and 6326, 6445, or consent of instructor. Examines toxicological principles at population, community, and ecosystem levels stressing population dynamics, life history changes, community composition, and ecosystem dynamics.
6367. **Advanced Wildlife Toxicology (3:3:0)**. Prerequisite: ENTX 6325 and 6326, 6445, or consent of instructor. Environmental contaminant effects on reproduction, health, and well being of wildlife species and applications to ecological risk assessment.
6371. **Procedures and Techniques in Ecological Risk Assessment (3:3:0)**. This course is designed to provide students with a solid foundation in risk assessment methods. Students will learn how the ecological risk assessment framework developed by the U.S. EPA is used to assess the potential hazards of chemicals.
6385. **Statistical Applications in Environmental Toxicology (3:3:0)**. Prerequisite: STAT 5302 or equivalent. Designed for students who wish to understand the interrelationships of statistical distributions and particular statistical approaches to environmental toxicology data analysis.

Graduate Program

The Institute of Environmental and Human Health integrates the efforts of Texas Tech University, the School of Law, and the Health Sciences Center in a joint venture to assess the impacts of toxic chemicals and other stressors on the natural environment. Attracting graduate students at both the master's and doctoral level, TIEHH includes faculty with backgrounds in biological sciences, medicine, epidemiology, biostatistics, engineering, chemistry, computer science, law, mathematics, pharmacology, physiology, and wildlife biology.

Because of the multidisciplinary nature of environmental toxicology, prospective students should contact the graduate advisor to discuss prerequisites and prior training. Generally, a strong background in the natural, physical, or health sciences will provide the necessary preparation. Students interested in pursuing a degree must complete online applications to the Graduate School (www.gradschool.ttu.edu) and to the Environmental Toxicology Graduate Program (www.tiehh.ttu.edu).

The M.S. program (36 hours) and the Ph.D. program (72 hours) are composed of coursework emphasizing the principles of toxicology, the environmental fate of chemicals, statistical approaches to study design, data handling, and data analysis, and seminars in environmental toxicology. Supplemental coursework, research, and thesis or dissertation hours are chosen by the student with the guidance of their committee, allowing for focus on the student's particular research emphasis. Students pursuing either degree must perform an original research project, prepare a written thesis or dissertation, and defend the work in a public defense.

6391. **Modeling and Simulation in Ecotoxicology (3:2:1)**. Prerequisite: Calculus. Model development, implementation, and simulation applied to ecotoxicology; stressor responses; toxicokinetics; individual organism effects; individual-based models; population, community, and landscape effects; parameter estimation; design and analysis of simulation experiments; and model validation.
6431. **Biomarkers in Toxicology (4:2:2)**. Prerequisite: ENTX 6325 and 6326. Lecture and laboratory on biomarker theory and use. Biochemical, physiological, histological responses to chemical exposure, effects and susceptibility are studied. Laboratory stresses individual and team approaches.
6445. **Chemical Sources and Fates in Environmental Systems (4:4:0)**. Prerequisite: Organic and analytical or environmental chemistry or consent of instructor. Environmental phenomena and physical properties of chemicals are used to understand processes governing chemical fate in the environment from global to micro scales.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Toxicology (TOX)

(To interpret course descriptions, see page 8.)

Graduate Courses

6105. **Introductory Seminar in Environmental Toxicology (1:1:0)**. Prerequisite: Graduate standing. A tour through the discipline of environmental toxicology focusing on its composition and workings. Demonstrations of laboratory, field, computational, presentation, safety, quality assurance, permitting, and career components.
6115. **Interdisciplinary Seminar in Environmental Toxicology (1:1:0)**. Prerequisite: Graduate standing or consent of instructor. Seminar on timely topics by experts in aspects of environmental toxicology. Focuses on basic and applied research, regulatory decision-making, and industry perspectives. Required for all environmental toxicology students. May be repeated for credit.

Department of Geosciences

Faculty

James E. Barrick, Ph.D., Chairperson

Horn Professor: Chatterjee

Professors: Barnes, Barrick, Güven, Haragan, Leary, Lehman

Associate Professors: Chang, Gurrola, Karlsson, Nagihara, Ridley, Schroeder, Yoshinobu

Assistant Professors: Basu, Holterhoff, Leverington, Weiss

Adjunct Faculty: Correa, Johnson

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Geosciences
- Bachelor of Science in Geosciences
- Master of Science in Atmospheric Science
- Master of Science in Geosciences
- Doctor of Philosophy in Geosciences

Areas of concentration at the undergraduate level include geology and geophysics and a minor in atmospheric science.

Undergraduate Program

Geology Concentration, B.S. Degree. The geology concentration for the Bachelor of Science degree is designed to prepare the student for admission to a graduate program in geology and employment as a professional geologist. Each student must complete a senior research project (GEOL 4312) as part of the degree requirements. The minor must be in a field of science, mathematics, engineering, or an approved composite of courses from these fields. A well-prepared student should be able to complete the B.S. in geology with a minimum of about 40 hours in geosciences, 18 hours in the minor, and 22 hours in mathematics and physical sciences. For other students, leveling courses may be required. The residency requirement for the major is 12 hours; for the minor, 6 hours.

Geophysics Concentration, B.S. Degree. The geophysics concentration for the Bachelor of Science degree is flexible, allowing the student to design a plan to prepare for employment as a professional geophysicist or to enter a graduate program in geophysics, atmospheric sciences, or related areas. A geophysics degree requires a minor in mathematics, physics, atmospheric sciences, geology, engineering, or an approved composite of courses from these fields. The courses required for the geophysics major will vary depending on the chosen minor. The geophysics major combined with the appropriate minor (or adjunct classes) must include the following courses: GEOL 1303, 1101, 1304, 1102, 2305, 3102, 3302, 3310, 3421, 4101; G PH (two of the following) 4300, 4322, 4323; CHEM 1307, 1107; PHYS 1408, 2401; MATH 1351, 1352, 2350, and 2360 (or 3350); an additional 15 hours of approved upper-level electives chosen from atmospheric science, geology, geophysics, physics, engineering, or mathematics (at least 6 hours of these electives must be in fields other than geology); and a senior research project (GEOL 4312) in a topic related to geophysics.

Geology Concentration, B.A. Degree. The geology program leading to the Bachelor of Arts degree is designed to provide a broad liberal arts background and basic training in the principles of geosciences. The program is designed for students with strong interests in earth processes and the history of nature's initiation of and response to continuous change. Students interested in professional employment or graduate degrees in geology should complete the B.S. degree program, not the B.A.

The B.A. program with a major in geology requires GEOL 1303, 1101, 1304, 1102, 2305, 3302, 3421, 3428, at least 13 hours of junior-senior level geosciences electives (six hours of which must

include a laboratory), and a senior research project, GEOL 4312. Adjunct requirements include MATH 1321, CHEM 1307, 1107, PHYS 1403. The minor may be in any area approved by the college.

Geosciences Minors. The department offers three minors. The geology minor requires GEOL 1303, 1101, 1304, 1102, and 12 additional hours of geology courses, 6 of which must be at the junior-senior level and one course that must include a laboratory. The geophysics minor requires 9 hours in geophysics and 9 hours of related science or mathematics coursework; 6 hours must be at the junior-senior level. The atmospheric science minor requires ATMO 1300, 1100, 2301, 2316, 3301, 4300, and GEOL 3322 or another approved science or mathematics course.

Teacher Education. The department cooperates with the College of Education in preparing individuals for science certification in the programs in Multidisciplinary Studies (middle-level education) and Multidisciplinary Science (composite science certification). The student should consult the College of Education and the Department of Geosciences for requirements.

Geosciences—Geology Concentration Curriculum, B.S. Degree

		FIRST YEAR	
		Fall	Spring
GEOL 1303, Physical Geology	3	GEOL 1304, Historical Geology	3
GEOL 1101, Physical Geol. Lab.	1	GEOL 1102, Historical Geol. Lab	1
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. I (Lab.)	1	CHEM 1108, Prin. Chem. II (Lab.)	1
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
Personal Fitness and Wellness†	1	Personal Fitness and Wellness†	1
TOTAL	15	TOTAL	15
		SECOND YEAR	
		Fall	Spring
GEOL 2305, Intro. Crystal. & Min.	3	GEOL 3421, Petrology	4
Oral Communication†	3	GEOL 4320, Optical Mineralogy	3
Physics#	4	Physics#	4
Foreign Language	5	Foreign Language	5
TOTAL	15	TOTAL	16
		THIRD YEAR	
		Fall	Spring
GEOL 3302, Structural Geology	3	Geosciences Elective	3-4
GEOL 3102, Field Methods	1	Minor^	3-4
GEOL 3310, Quant. Meth. Geol. or MATH 2300, Stat. Meth.	3	HIST 2301, U.S. Hist. Since 1877†	3
HIST 2300, Hist. of U.S. to 1877†	3	Foreign Language	3
Foreign Language	3	English Literature†	3
English Literature†	3	TOTAL	15-17
TOTAL	16		
		SUMMER	
Geology Field Course††	6		
		FOURTH YEAR	
		Fall	Spring
Geosciences Elective	3	Geosciences Elective	3-4
GEOL 4101, Undergrad. Seminar	1	GEOL 4312, Research	3
Minor^	3-4	Minor^	3-4
Minor^	3-4	Visual or Performing Arts Elect.†	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Policy	3
Social or Behavioral Sci. Elect.†	3	TOTAL	15-17
TOTAL	16-18		

Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. The student must take the Mathematics Placement Examination.

PHYS 1408, 2401 or PHYS 1403, 1404

^ Minor coursework must be in mathematics, sciences, or engineering.

† Select from Arts and Sciences General Degree Requirements. Coursework also must satisfy the multicultural requirement and the Core requirement for Technology and Applied Science.

†† Summer field course must be approved by the department before enrollment.

Graduate Program

Master's degree candidates may specialize in areas within geology, atmospheric science, and geophysics. At the doctoral level, research concentrations for the major in geoscience are available in (a) sedimentology, sedimentary petrology, petroleum geology; (b) clay mineralogy and low temperature geochemistry, igneous petrology, high temperature geochemistry, and stable-isotope geochemistry; (c) paleobiology and biostratigraphy; (d) geophysics, structural geology, tectonics; and (e) integrated studies in earth and atmospheric sciences. Details concerning the specific makeup of these groups are available from the department.

General degree requirements are those of the Graduate School. Admitted students are strongly encouraged to associate themselves with a faculty member or members by the end of their first semester in residence. The instructor(s) will serve as the student's principal advisor and will be responsible for the student's degree program.

The department encourages students with bachelor's degrees from other sciences to enter the geosciences graduate program. Required leveling work will be determined on an individual basis, primarily by the staff member(s) in the student's field of interest. A graduate minor may be taken either inside or outside this department.

Requirements for the master's degree in atmospheric science beyond those stipulated by the Graduate School, if any, are determined in each case by the student's thesis committee. Requirements for the master's degree in geoscience are completion of 27 graduate hours in geology, geophysics, or related fields; 3 hours in science or engineering beyond those required for an undergraduate degree; and 6 hours of thesis credit. A 36-hour nonthesis option in geoscience is also available.

Requirements for the doctor's degree follow those of the Graduate School. The first-year Ph.D. student will be expected to prepare and defend a research proposal. The intent of this work is to determine whether the individual is capable of Ph.D.-level research. In the second year, the student will formalize the dissertation topic and committee. Under normal circumstances, the committee will consist of 3 to 5 members, including the faculty advisor. The Comprehensive Examination will be completed before the end of the fourth long semester in residence. One tool subject is required. Tool subjects include foreign language, computer science, and statistics and are determined by the graduate advisor and the student's dissertation committee. The tool can be met by taking two successive courses in the tool subject for a total of at least 6 semester hours, except for foreign language as outlined in the Graduate School section of this catalog.

Atmospheric Science (ATMO)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1100.* [GEOL 1147, 1447] **Atmospheric Science Laboratory (1:0:2)**. Discussion and practical experience in weather analysis, methods of instrumentation, and observational meteorology.
- 1300.* [GEOL 1347, 1447] **Introduction to Atmospheric Science (3:3:0)**. An investigation of atmospheric properties and physical processes that determine current weather events and long-term climate conditions.
- 2301.** **Weather, Climate, and Human Activities (3:3:0)**. Observation and analysis of the impacts of weather and climate on human activity, e.g., storms, climate change, forecasting, weather modification, health, energy, transportation.
2316. **Severe and Hazardous Weather (3:3:0)**. Prerequisite: ATMO 1100, 1300. Basic meteorology of severe or hazardous

weather, focusing on events affecting the U.S., especially the Great Plains and adjacent regions of Texas.

- 3301.** **General Meteorology (3:3:0)**. A basic study of atmospheric processes and the principles that control them.
4300. **Independent Studies in Atmospheric Science (3:3:0)**. Prerequisite: Consent of instructor. Independent studies in atmospheric science. May be repeated once for credit.

Graduate Courses

5101. **Atmospheric Science Seminar (1:1:0)**. Discussions of current research or selected topics of interest. May be repeated for credit.
5301. **Individual Studies in Atmospheric Science (3:3:0)**. Prerequisite: Consent of instructor. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
5302. **Weather, Climate, and Applications (3:3:0)**. Basic principles of atmospheric science, with particular emphasis on applications, including severe weather, air pollution, and global climate change.
5315. **Atmospheric Convection (3:3:0)**. Observations and models of convection in the atmosphere. Governing equations for shallow and deep convection. Natural and man-made plumes. Numerical and laboratory simulation of atmospheric convection.
5316. **Dynamics of Severe Storms (3:3:0)**. Observations and theoretical studies of severe storms. Conceptual and numerical models of storm structure and development.
5317. **Wind Storm Hazards (3:3:0)**. Comprehensive survey of damaging storm phenomena, their analysis, forecasting, and impacts.
5319. **Boundary Layer Meteorology (3:3:0)**. Boundary-layer turbulent transfer processes are examined, including diffusion, mixing, diabatic modification, low-level jet formation, and moisture discontinuities.
5320. **Mesometeorology (3:3:0)**. Temporal and spatial analysis of mesoscale phenomena, including thunderstorms. Models of mesoscale circulations.
5321. **Cloud and Precipitation Physics (3:3:0)**. Processes of cloud droplet nucleation; initial growth of droplets and cloud droplet size spectra; theories of natural precipitation processes and techniques for precipitation enhancement.
5327. **Radar Meteorology (3:3:0)**. Applications of radar to investigation of precipitating weather systems. Emphasis is given to analysis and interpretation of radar data in conjunction with other data sources.
5328. **Synoptic Meteorology (3:2:3)**. Basic techniques of interpreting meteorological data. Applications of analysis techniques to basic research and weather forecasting.
5331. **Analysis of Geophysical Data Fields (3:3:0)**. The application of Fourier analysis, time series and spectral analyses, and objectives analysis to geophysical data fields.
5332. **Regional Scale Numerical Weather Prediction (3:3:0)**. Regional scale dynamics, numerical solution of geophysical problems, and numerical prediction of severe weather events such as tornadic storms and flash floods.
5351. **Meteorological Data Acquisition and Instrumentation Systems (3:2:3)**. Exploration, design, integration and application of meteorological data acquisition and instrumentation systems.
5352. **Meteorologic Research Methods (3:3:0)**. Comprehensive survey of the meteorological research process using available data sets, current analysis and presentation methods, and interpretation and dissemination of results.
5353. **Meteorologic Field Experiments (3:3:0)**. An overview of designing, planning, and completing atmospheric field experiments.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Geochemistry (G CH)

Graduate Courses

5300. **Individual Studies in Geochemistry (3:3:0)**. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
5303. **Trace Element Geochemistry (3:3:0)**. Theoretical basis for trace element distribution and fractionation. Trace element "fingerprints," use of stable and radioactive isotopes and rare-earth elements in petrology.

* May be used in fulfilling natural (laboratory) science requirements.

** May be used in fulfilling technology and applied science requirements.

5305. **Environmental and Aqueous Geochemistry (3:3:0)**. Prerequisite: Inorganic chemistry or equivalent. Theoretical and applied aspects of geochemistry occurring in the upper crust. May be repeated for credit.
5307. **X-Ray Powder Diffraction Methods (3:2:3)**. Fundamental and practical aspects of X-ray diffraction on polycrystalline substances such as minerals, rocks, and other solids.
5309. **Clay Mineralogy (3:2:3)**. Atomic structures of clay minerals in relation to physical, engineering, and colloid chemical properties of these materials. Instrumental methods of clay analysis such as X-ray diffraction and ion exchange methods.
5350. **Isotope Geochemistry (3:3:0)**. Principles of isotope chemistry as applied to the earth and solar system. Radioactive and stable isotope systematics.
5405. **Inorganic Geochemistry (4:4:0)**. Origin of elements and isotopes. Theory and application of isotopic systems, element mobility, thermodynamics, solution geochemistry, and geochemical cycles.

Geology (GEOL)

Undergraduate Courses

- 1101.* [GEOL 1103, 1403] **Physical Geology Laboratory (1:0:2)**. Laboratory study of rocks, minerals, and geologic mapping.
- 1102.* [GEOL 1104, 1404] **Historical Geology Laboratory (1:0:2)**. Prerequisite: GEOL 1101. Laboratory study of fossils, geologic maps, and geologic structure.
- 1105.* **History of Life Laboratory (1:0:2)**. Introduction to and applications of methods employed by paleontologists to interpret the fossil record. Not for credit for majors.
- 1303.* [GEOL 1303, 1403] **Physical Geology (3:3:0)**. Beginning course. A study of earth materials (rocks and minerals), gradation (erosion and deposition), diastrophism (earth movements and mountain building), vulcanism and earth resources.
- 1304.* [GEOL 1304, 1404] **Historical Geology (3:3:0)**. Prerequisite: GEOL 1303. A study of the history and evolution of the earth and life from the beginning of time to the present.
- 1350.* **History of Life (3:3:0)**. A survey of the evolution of life on earth as interpreted from the fossil record and the processes that produced extinct and modern ecosystems. Not for credit for majors.
2305. [GEOL 2309, 2409] **Introduction to Crystallography and Mineralogy (3:2:3)**. Prerequisite: GEOL 1101, 1303, and CHEM 1307. Introduction to symmetry, crystal chemistry, and atomic structures of minerals. Classification of minerals and description of rock-forming minerals.
3102. **Field Methods in Structural Geology (1:0:3)**. Corequisite: GEOL 3302. Topics include field structural analysis and an introduction to geologic mapping.
3301. **Geomorphology and Aerial Photointerpretation (3:2:3)**. Prerequisite: GEOL 1303, 1101, or consent of instructor. Introductory course in processes that produce morphogenic changes at earth's surface. Evolutionary development of hill slopes and drainage channels. Illustrated by aerial photos.
3302. **Structural Geology (3:2:3)**. Prerequisite: GEOL 2305. Topics include rock mechanics, folds, joints, faults, structural petrology, and crystalline-rock structures. Laboratory work concerns structural aspects of surface and subsurface mapping and interpretation, including the use of stereonet. Required field trip. (Writing Intensive)
3310. **Quantitative Methods in Geology (3:3:0)**. This class will emphasize error propagation in geologically sampled data, and computer methods to process and model these data.
3322. **Oceanography (3:3:0)**. Prerequisite: GEOL 1303 or GEOG 1401 or ATMO 1300. The physiography and origin of ocean basins and the processes and systems operative in them including physical, chemical, and biological factors as well as sedimentation patterns.
- 3323.** **Environmental Geology (3:3:0)**. Prerequisite: GEOL 1303 or GEOG 1401. Study of geological processes that affect human activities, emphasizing natural hazards, water resources, waste disposal, energy, mineral resources, and land use and planning.
3421. **Petrology (4:2:6)**. Prerequisite: GEOL 2305. Origin, identification, and mode of occurrence of rocks. Systematic classification of igneous, metamorphic, and sedimentary rocks, with emphasis on field-based methods. Required field trip. (Writing Intensive)
- 3428.** **GIS in Natural Science and Engineering (4:3:3)**. Prerequisite: MATH 1320 or equivalent. Survey of the broad band spectrum of geoinformation science and technology applied to research in natural science and engineering. Involves computer lab exercises.

3450. **Paleontology and Paleoecology (4:3:3)**. Classification, evolution, and paleobiology of invertebrate fossils. Applications of paleontological data in geological dating, correlation, and paleoenvironmental analyses.
4001. **Problems in Geosciences (V1-6)**. Independent study under guidance of faculty member.
4101. **Undergraduate Seminar (1:1:0)**. May be repeated for credit.
4300. **Independent Studies in Geology (3:3:0)**. Prerequisite: Consent of instructor. Independent studies in geology. May be repeated for credit.
4312. **Undergraduate Research (3)**. Prerequisite: Senior standing. Independent research in an area of current interest in the geosciences. Prior approval from specific professor required.
4318. **Geology of Texas (3:3:0)**. A comprehensive study of the structure, stratigraphy, and economic geology of Texas and parts of adjacent states.
4320. **Optical Mineralogy (3:2:3)**. Prerequisite: GEOL 2305. Principles of transmitted light within isotropic and anisotropic crystals, and the identification of minerals by observation and measurement of their behavior in plane-polarized light. Emphasis on variations due to chemical changes in the common rock-forming silicates.
4321. **Igneous and Metamorphic Petrography (3:2:3)**. Prerequisite: GEOL 4320. The study of rock texture and paragenesis in thin section.
4324. **Geology of Hydrocarbons (3:3:0)**. A study of the world-wide distribution and geologic setting of petroleum in addition to methods of exploration.
4331. **Digital Imagery in Geosciences (3:2:3)**. Prerequisite: MATH 1320 or equivalent. Introduction to digital image processing, visualization, and raster GIS modeling applied to geosciences. Involves computer lab exercises.
4332. **Spatial Data Analysis and Modeling in Geosciences (3:2:3)**. Prerequisite: MATH 2300 or equivalent. Introduction to vector GIS data manipulation, geostatistics, and spatial modeling applied to geosciences. Involves computer lab exercises.
4361. **Advanced Structural Geology (3:3:3)**. Prerequisite: GEOL 3302. Topics include deformation mechanisms and rheology, tectonic evolution of oceanic lithosphere and evolution of arcs.
4362. **Tectonics (3:3:0)**. Prerequisite: Senior standing in geology or consent of instructor. Survey of the plate tectonic paradigm in terms of historical development and modern application.
4420. **Sedimentology and Stratigraphy (4:3:3)**. Prerequisite: Senior standing in geosciences or approval of instructor. Sedimentary textures and structures, classification, petrography, and diagenesis of sedimentary rocks, lithostratigraphy, facies, and basin models.

Graduate Courses

5001. **Problems in Geosciences (V1-6)**. Independent study under guidance of a faculty member.
5101. **Seminar (1:1:0)**.
5211. **Sedimentary Petrology (2:2:0)**. Origin, classification, and diagenesis of siliciclastic and carbonate sediments and sedimentary rocks. May be repeated for credit.
5212. **Sedimentary Petrology Methods (2:0:6)**. Textural analysis, mineral separation, and thin section petrography of siliciclastic and carbonate sediments and sedimentary rocks. May be repeated for credit.
5300. **Individual Studies in Geology (3:3:0)**. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
5303. **Advanced Igneous Petrology (3:3:0)**. Phase relations, geochemistry, and tectonic setting of igneous rocks. Emphasis on modern concepts of magma origin and differentiation. May be repeated for credit.
5305. **Tectonic Evolution of Western North America (3:3:0)**. Prerequisite: Consent of instructor. Survey of the geologic and tectonic evolution of the western margin of North America over the past 3 billion years.
5310. **Advanced Quantitative Methods in Geology (3:3:0)**. This class will emphasize computer methods of error analysis, data processing, and modeling of geological data. Applications to current research problems will be included.
5311. **Micropaleontology (3:2:3)**. Lectures and labs are designed to acquaint the student with basic lab techniques, morphology, and classification within the major microfossil groups, and to

* May be used in fulfilling natural (laboratory) science requirements.

** May be used in fulfilling technology and applied science requirements.

- demonstrate the usefulness and importance of microfossils as biostratigraphic and paleoecologic tools.
5314. **Problems in Stratigraphy (3:3:0)**. Analysis of selected stratigraphic units emphasizing geometry, paleogeography, environments of deposition, depositional models, and theoretical problems.
5322. **Sedimentary Processes (3:3:0)**. Principles of fluid dynamics important in sedimentation, interpretation of primary sedimentary structures, and description of depositional environments.
5323. **Depositional Systems and Basin Analysis (3:3:0)**. Sedimentary Facies models for clastic and carbonate depositional systems and models for sedimentary basins in different tectonic settings.
5325. **Petrophysics (3:3:0)**. Physical properties of reservoir rocks, including porosity, permeability, composition, and texture. Interrelationships between rock characteristics and electric log responses in geologic exploration and exploitation.
5327. **Problems in Paleontology (3:2:3)**. Subjects include origin of life, Precambrian life, origin and relationships of fish, amphibians, reptiles, dinosaurs, pterosaurs, birds, and primates; mass extinction and impact cratering processes.
5340. **Advances in Historical Geology (3:3:0)**. Survey of currently important topics in earth processes and history for science educators, with an emphasis on how geologists interpret modern and past geologic events.
5341. **Digital Imagery in Geosciences (3:2:3)**. Introduction to digital image processing, visualization, and raster GIS modeling applied to geosciences. Involves computer lab exercises.
5342. **Spatial Data Analysis and Modeling in Geosciences (3:2:3)**. Introduction to vector GIS data manipulation, geostatistics, and spatial modeling applied to geosciences. Involves computer lab exercises.
5361. **Advanced Structural Geology (3:3:3)**. Prerequisite: GEOL 3302. Topics include deformation mechanisms and rheology, tectonic evolution of oceanic lithosphere, and evolution of arcs. May be repeated once for credit.
5362. **Advanced Tectonics (3:3:0)**. Survey of the plate tectonics paradigm in terms of its historical development and modern application.
5399. **Advanced Petrophysics (3:3:0)**. Analysis of complex reservoirs, such as shaly sands, carbonates with complex pore geometries, fractured reservoirs, and gas-bearing dolomites. The development and use of new logging tools is also covered.
5410. **Vertebrate Paleontology (4:3:3)**. An introduction to the principles of paleontology governing evolution, morphology, and phylogeny of major groups of vertebrates.
5420. **Geological Correlation (4:2:6)**. Principles and methods of correlation of stratigraphic units with the geological time scale including chronostratigraphy, biostratigraphy, ecostratigraphy, sequence stratigraphy, event stratigraphy, chemostratigraphy, and related techniques.
5428. **GIS in Natural Science and Engineering (4:3:3)**. Survey of the broad spectrum of geo-information science and technology applied to researches in natural science and engineering. Involves computer lab exercises.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Geophysics (G PH)

Undergraduate Courses

4300. **Independent Studies in Geophysics (3:3:0)**. Prerequisite: Consent of instructor. Independent studies in geophysics. May be repeated for credit.
4321. **Seismic Exploration Methods (3:2:3)**. Prerequisite: GEOL 3302 or MATH 1351 or consent of instructor. Methods to collect, process, and interpret seismic data are discussed.
4323. **Applied Electrical Methods (3:2:3)**. Prerequisite: GPH 4321. Electromagnetic, resistivity, and ground penetrating radar methods of geophysical investigation are discussed.

Graduate Courses

5221. **Advanced Seismic Exploration Methods (2:1:3)**. Methods to collect, process, and interpret seismic data are discussed.
5223. **Advanced Applied Electrical Methods (2:1:3)**. Electromagnetic, resistivity, and ground penetrating radar methods of geophysical investigation are discussed.
5231. **Seismology (2:2:0)**. Seismic wave and ray theory is discussed.
5233. **Electrical Methods (2:2:0)**. Theory and numerical representation of electromagnetic and electrical methods are discussed.

5300. **Individual Studies in Geophysics (3:3:0)**. Prerequisite: Consent of instructor. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
5310. **Geophysical Fluid Dynamics (3:3:0)**. Survey of dominant modes of wave motion in the atmosphere. Scale analysis for problems in atmospheric dynamics with application to mid-latitude synoptic scale systems.
5324. **Radiative Transfer (3:3:0)**. Principles of radiation, the radiative transfer equation. Applications to absorption, emission, and scattering processes. Determination of physical properties from satellite measurements.

Department of Health, Exercise, and Sport Sciences

Faculty

Professors: Carter, McComb, Reeve

Associate Professors: Burns, Hart, Lochbaum, Massey-Stokes, Meaney, Miller, Roncevalles, Tacón, Williams

Assistant Professors: Bae, Boros, Kim, Sawyer

Instructors: Griffin, Wiedenfeld

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Exercise and Sport Sciences
- Bachelor of Science in Exercise and Sport Sciences
- Bachelor of Science in Health
- Master of Science in Exercise and Sport Sciences
- Master of Science in Sports Health

These academic programs prepare individuals for professional careers, advanced graduate study, and entry into allied health programs. The department also participates in collaborative Ph.D. degree programs in physiology (with the Department of Physiology, Texas Tech Health Sciences Center), in curriculum and instruction (with the Department of Curriculum and Instruction, College of Education), and in sport and exercise psychology (with the Department of Educational Psychology and Leadership, College of Education). In addition, the department offers courses for all university students in the personal fitness and wellness program.

Undergraduate Program

Bachelor of Science, Bachelor of Arts Exercise and Sport Sciences

Students majoring in exercise and sport sciences may choose from one of four tracks: physical education teacher education; exercise and health promotion; exercise science; or sport studies. The minimum number of hours for the major is 36, including 24 junior-senior level hours. Departmental faculty members will provide information about career options associated with each track. A four-year plan for each track is presented in this section. Students must meet with a departmental advisor to verify appropriate courses and other degree requirements for each track. Students in pre-allied health fields should consult with the departmental advisor for information on required courses and acceptable substitutions.

Bachelor of Science in Health

Students interested in careers in health promotion should choose to major in health, which requires 48 hours. The two tracks in this major are the community health track and the school health track.

School Health Track

The school health track prepares students for careers in teaching health in EC-12 schools. A 2.5 GPA is required to enroll in teacher education courses. Also, students must meet other requirements outlined by the College of Education.

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, (recommended)*	3	MATH or PHIL 2310 *	3
BIOL 1402 or BIOL 1403 or CHEM 1305 & 1105 or PHYS 1401	4	POLS 2302, Am. Public Policy	3
POLS 1301, Amer. Govt., Org.	3	ZOOL 2403, Human Anatomy	4
HLTH 1300, Patterns of Healthful Living	3	PF&W 1112, Diet and Exercise	1
TOTAL	16	HLTH 1302, Found. of Health	3
		TOTAL	17

SECOND YEAR			
Fall		Spring	
ENGL 2300-level (except ENGL 2371)**	3	ENGL 2300-level (except ENGL 2371)**	3
Sophomore Foreign Language***	3	Sophomore Foreign Language***	3
EDIT 2318, Computing/Information Tech	3	HIST 2301 or HIST 3310	3
HIST 2300, History of U.S. to 1877	3	COMS 2300 (recommended)	3
HLTH 1305, Human Sexuality	3	Visual and Performing Arts	3
PF&W	1	HLTH 3312, Hlth. Cons. Sp. Pop.	3
TOTAL	16	TOTAL	18

THIRD YEAR			
Fall		Spring	
HLTH 3311, Comm. & Chronic Dis.	3	HLTH 3314, Health for Adol.	3
HLTH 3313, Preadolescents	3	HLTH 3325, Hlth Con. Chem. Dep.	3
HLTH 4312, Psychosocial Health	3	HDFS 3326 or HD 3306	3
ESS 3321, First Aid	3	EDSE 4310, Lrng, Cogn, Inst Des.	3
EDSE 2300, Schools, Soc., & Div.#	3	EDLL 4380, Lit. in Content Areas	3
Elective	3	Elective	3
TOTAL	18	TOTAL	18

FOURTH YEAR			
Fall		Spring	
HLTH 4307, Hlth Prog Plan & Eval.	3	EDSE 4000, Stud. Teaching Sec.	6
HLTH 4330, Coord. School Hlth Prog	3	EDEL 4000, Stud. Teaching Elem.	3
EDSE 4311, Cur. Plan, Dev., & Eval	3	EDSE 4330, Capstone	3
EDSE 4320, Instructional Methods	3	TOTAL	12
EDSE Senior-level course	3		
Elective	3		
TOTAL	18		

Designated health electives: ESS 3314, HLTH 2302, HLTH 2307, HLTH 3301, and HLTH 3302

- * Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply.
- ** ENGL 2371 does not fulfill the requirement for 3 hours of sophomore English.
- *** Foreign language requires 6 hours of sophomore-level courses. A high school transcript is needed if two years of language were not taken in high school. If two years were taken in high school, a placement test or review course will be required before enrolling in sophomore-level courses. This model assumes that the student passed the Foreign Language Placement exam and is permitted to enroll in 6 hours of sophomore-level foreign language courses. Students who do not score high enough to place into the sophomore-level courses will need to take the review course in addition to two sophomore courses.
- # In this model, EDSE 2300 fulfills both the multicultural requirement and the individual/group behavior requirement.

The minor for this track is 27 hours of education courses needed for teacher certification. To begin this minor, students must file an application with the College of Education one semester before beginning these classes, have a GPA of 2.5, and have passed the TSI test. These courses are to be completed in the last 3 semesters of this degree. Check with the College of Education for curriculum changes.

University and College of Arts and Sciences degree requirements must be satisfied.

Community Health Track

The community health track prepares students for careers in public and private agencies that provide health information and interventions to a variety of individuals and groups.

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. of Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, (recommended)*	3	MATH or PHIL 2310*	3
BIOL 1402 or BIOL 1403 or CHEM 1305 & 1105 or PHYS 1401	4	POLS 2302, Am. Public Policy	3
POLS 1301, Amer. Govt., Org.	3	ZOOL 2403, Human Anatomy	4
HLTH 1300, Patterns of Healthful Living	3	PF&W 1112, Diet and Exercise	1
TOTAL	16	HLTH 1302, Foundations of Health	3
		TOTAL	17

SECOND YEAR			
Fall		Spring	
ENGL 2300-level (except ENGL 2371)**	3	ENGL 2300-level (except ENGL 2371)**	3
Sophomore Foreign Language***	3	Sophomore Foreign Language***	3
COMS 2300 (recommended)	3	HIST 2301 or HIST 3310	3
HIST 2300, History of U.S. to 1877	3	Designated Multicultural#	3
HLTH 2360, Community Health	3	Visual and Performing Arts	3
PF&W	1	HLTH 2275, Prac. Com. Health	2
TOTAL	16	TOTAL	17

THIRD YEAR			
Fall		Spring	
HLTH 3311, Com. and Chronic Dis.	3	HLTH 3312, Hlth Con. of Sp. Pop.	3
HLTH 3325, Hlth. Chem. Depend.	3	ESS 3321, First Aid	3
COMS 3332 or COMS 3365	3	Elective	3
CS 1300 or EDIT 2318 (recommended)	3	Minor	6
Minor	3	TOTAL	15
Elective	3		
TOTAL	18		

FOURTH YEAR			
Fall		Spring	
HLTH 4307, Prog. Plan. and Eval.	3	HLTH 4475, Inter. in Com. Health	4
HLTH 4312, Psychosocial Health	3	Minor	3
ESS 3314 or PSY 4330	3	Elective	3
Elective	3	TOTAL	10
Minor	6		
TOTAL	18		

Designated health electives - Choose a minimum of 9 hours from the following courses: ESS 2222, ESS 4363, HLTH 1305, HLTH 2302, HLTH 2307, HLTH 3301, HLTH 3302, PSY 4332. Departmental advisor may approve other electives depending on student's career interest.

- * Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply.
- ** ENGL 2371 does not fulfill the requirement for 3 hours of sophomore English.
- *** Foreign language requires 6 hours of sophomore-level courses. A high school transcript is needed if two years of language were not taken in high school. If two years were taken in high school, a placement test or review course will be required before enrolling in sophomore-level courses. This model assumes that the student passed the Foreign Language Placement exam and is permitted to enroll in 6 hours of sophomore-level foreign language courses. Students who do not score high enough to place into the sophomore-level courses will need to take the review course in addition to two sophomore courses.

This model assumes that a 3-hour course that fulfills the multicultural requirement will also fulfill the individual/group behavior requirement.

University and College of Arts and Sciences degree requirements must be satisfied. Elective courses may be required to fulfill the 121-hour degree with 40 hours of 3000-4000 level courses; 24 hours of these courses must be from health. IMPORTANT: Only a possible 34 hours of the required 40 hours of 3000-4000 level courses will come from this track with only 6 hours of designated electives at the 3000-4000 level. By completing at least 6 hours in a minor at the 3000-4000 level, students will fulfill the 40 hours of 3000-4000 level coursework and avoid the need of extra coursework to fulfill the 40-hour requirement of 3000-4000 level courses.

A minor of 18 hours minimum is required.

Sport Studies Track

The sport studies track provides for the study of interdisciplinary ideas, concepts, and issues related to sport and physical activity from social and cultural perspectives. Upon graduation, students may pursue management and/or coaching opportunities in youth, intercollegiate, or professional sports. Additionally, students may pursue the advanced study of sport at the graduate level. Students interested in coaching interscholastic (junior/high school) sports should pursue teacher certification through the PETE track.

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320 (recommended)*	3	MATH or PHIL 2310*	3
COMS 2300 (recommended)	3	HIST 2300, History of U.S. to 1877	3
BIOL 1402 or BIOL 1403	4	POLS 1301, Amer. Govt., Org.	3
or CHEM 1305 & 1105 or PHYS 1401		ZOOL 2403, Human Anatomy	4
ESS 1301, Introduction to ESS	3	TOTAL	16
TOTAL	16		

SECOND YEAR			
Fall		Spring	
ENG 2300-level (except ENGL 2371)**	3	ENGL 2300-level (except ENGL 2371)**	3
POLS 2302, American Public Policy	3	Visual & Performing Arts	3
Sophomore Foreign Language***	3	Sophomore Foreign Language***	3
HIST 2301 or HIST 3310	3	ESS 3301, Biomechanics	3
CS 1300 or EDIT 2318 (recommended)	3	ESS 3354, Sport in World Culture	3
PF&W	1	(Recommended)	
		PF&W	1
TOTAL	16	TOTAL	16

THIRD YEAR			
Fall		Spring	
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Dev.	3
ESS 3305, Exercise Physiology	3	Major, minor, or electives	12
ESS 3318, Exercise & Sport Psyc.	3	TOTAL	15
Major, minor, or elective	8		
TOTAL	17		

FOURTH YEAR			
Fall		Spring	
ESS Major	6	ESS Major	6
Major, minor, or electives	9	Major, minor, or electives	9
TOTAL	15	TOTAL	15

* Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply.

** ENGL 2371 does not fulfill the requirement for 3 hours of sophomore English.

*** Foreign language requires 6 hours of sophomore-level courses. A high school transcript is needed if two years of language were not taken in high school. If two years were taken in high school, a placement test or review course will be required before enrolling in sophomore-level courses. This model assumes that the student passed the Foreign Language Placement exam and is permitted to enroll in 6 hours of sophomore-level foreign language courses. Students who do not score high enough to place into the sophomore-level courses will need to take the review course in addition to two sophomore courses.

This model assumes that a 3-hour course fulfilling the multicultural requirement will also fulfill the individual/group behavior requirement.

A minor of 18 hours minimum is required.

University and College of Arts and Sciences degree requirements must be satisfied. Additional support and elective courses may be required to total the minimum of 121 hours with 40 of those hours at the 3000-4000 level; 24 hours should be ESS courses.

Exercise and Health Promotion Track

Students majoring in exercise and sport sciences seeking careers in commercial, corporate, or clinical exercise settings should complete the exercise and health promotion track. The knowledge, abilities, and skills gained in this track prepare students to pursue nationally recognized certifications, such as those offered by the American College of Sports Medicine and other professional fitness organizations.

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. of Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320 (recommended)*	3	MATH or PHIL 2310*	3
HIST 2300, History of U.S. to 1877	3	HIST 2301 or HIST 3310	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, American Public Policy	3
ESS 1301, Introduction to ESS	3	ESS 2222, Resist. Trng. Cond.	2
TOTAL	15	Visual Performing Arts	3
		TOTAL	17

SECOND YEAR			
Fall		Spring	
ENGL 2311 (except 2371)**	3	ENGL 2300-level (except 2371)**	3
CHEM 1305 & 1105 (recommended)	4	ZOOL 240, Human Anatomy	4
Sophomore Foreign Language***	3	Sophomore Foreign Language***	3
ESS 3354, Sport World Culture	3	CS 1300 or EDIT 2318	3
(recommended)		(recommended)	
ESS 2275, Prac. Ex. & Health Prom.	2	COMS 2300 (recommended)	3
ESS 3321, First Aid	3	TOTAL	16
TOTAL	18		

THIRD YEAR			
Fall		Spring	
ESS 3301, Biomechanics	3	ESS 3305, Exercise Physiology	3
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Dev.	3
ESS 3318, Exer. and Sport Psych.	3	ESS 4363, Ex. Psy.	3
ZOOL 2404, Human Physiology	4	NS 1325, Nut., Foods, & Healthy Living	3
Minor	3	Minor	3
TOTAL	16	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ESS 3368, Ex. Testing & Pres.	3	ESS 4475, Intern Ex. and Hlth.	4
ESS 4368, Applied Exercise Phys.	3	Minor	6
ESS 4372, Mgt. in Ex. and Hlth. Prom.	3	ESS designated electives	6
Minor	6	TOTAL	16
TOTAL	15		

Exercise and health promotion designated electives include ESS 3323, ESS 4345, ESS 4398, HLTH 3301, HLTH 3311, HLTH 4307, NS 4330, and PSY 4330.

* Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply.

** ENGL 2371 does not fulfill the requirement for 3 hours of sophomore English.

*** Foreign language requires 6 hours of sophomore-level courses. A high school transcript is needed if two years of language were not taken in high school. If two years were taken in high school, a placement test or review course will be required before enrolling in sophomore-level courses. This model assumes that the student passed the Foreign Language Placement exam and is permitted to enroll in 6 hours of sophomore-level foreign language courses. Students who do not score high enough to place into the sophomore-level courses will need to take the review course in addition to two sophomore courses.

This model assumes that a 3-hour course fulfilling the multicultural requirement will also fulfill the individual/group behavior requirement.

These courses should be taken in the following order: ZOOL 2403, ESS 3305, ESS 3368, plus ESS 4372 before ESS 4475.

A minor of 18 hours minimum is required.

University and College of Arts and Sciences degree requirements must be satisfied. Additional elective courses may be required to fulfill the required 121-hour degree with 40 hours of 3000-4000 level courses; 24 hours should be ESS courses.

Physical Education Teacher Education Track

Students majoring in exercise and sport sciences pursue teacher certification through the physical education teacher education (PETE) track. The certification program prepares students to teach physical education in the EC – 12 grade levels. In addition to the required courses in the PETE track, students must complete the minor in education. A 2.5 GPA is required to enroll in teacher education courses. Also, students must meet other requirements outlined by the College of Education. Students interested in teaching physical education or sport coaching in junior and senior high schools should complete the requirements in this track.

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320 (recommended)*	3	MATH or PHIL 2310*	3
HIST 2300, History of U.S. to 1877	3	HIST 2301 or HIST 3310	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Public Policy	3
ESS 1301, Introduction to ESS	3	PF&W	1
PF&W	2	Visual & Performing Arts	3
TOTAL	17	TOTAL	16

SECOND YEAR			
Fall		Spring	
ENGL 2300-level (except ENGL 2371)**	3	ENGL 2300-level (except ENGL 2371)**	3
BIOL 1402 or BIOL 1403 or CHEM 1305 & 1105 or PHYS 1401	4	ZOOL 2403, Human Anatomy	4
Sophomore Foreign Language***	3	EDIT 2318, Educ. Info. Tech.	3
EDSE 2300, Schools, Soc., & Div.#	3	Sophomore Foreign Language***	3
ESS 2245, Practical Exp in Phys Ed	3	COMS 2300 (recommended)	3
PF&W	2	ESS electives	2
TOTAL	17	TOTAL	18

THIRD YEAR			
Fall		Spring	
ESS 3301, Biomechanics	3	ESS 3305, Exercise Physiology	3
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Dev.	3
ESS 3318, Ex. & Sport Psyc.	3	ESS 3345, Adapted Phy. Activities	3
ESS 3342, Prin. Tchng. Sk. Themes	3	EDSE 4310, Lrn., Cogn., Inst. Des.	3
ESS Electives	6	EDLL 4382, Read & Write Sec.	3
TOTAL	18	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ESS 4445, School-Based P.E.	4	EDSE 4000, Student Teaching	6
ESS 4345, Assess. of Physical Perf.	3	EDEL 4000, Student Teaching	3
EDSE 4311, Curr Plan, Dev. & Eval.	3	EDSE 4330, Capstone	3
EDSE 4322, Div. & Learning	3	TOTAL	12
EDSE 4300-level	3		
TOTAL	16		

PETE core requires a minimum of 5 hours of PF&W. ESS electives include 11 hours from PF&W (2 additional hours maximum), ESS 2222, ESS 3321, ESS 3352, ESS 3354, ESS 3356, ESS 4398 (see advisor for appropriate topics).

* Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply.

** ENGL 2371 does not fulfill the requirement for 3 hours of sophomore English.

*** Foreign language requires 6 hours of sophomore level courses. A high school transcript is needed if two years of language were not taken in high school. If two years were taken in high school, a placement test or review course will be required before enrolling in sophomore level courses. This model assumes that the student passed the Foreign Language Placement exam and is permitted to enroll in 6 hours of sophomore-level foreign language courses.

In this model, EDSE 2300 fulfills both the multicultural requirement and the individual/group behavior requirement.

The minor for this track is 27 hours of education courses needed for teacher certification. To begin this minor, students must file an application with the College of Education one semester before beginning these classes, have a GPA of 2.5, and have passed the TSI test. These courses are to be completed in the last three semesters of this degree. Check with the College of Education for curriculum changes. Students are strongly encouraged to pursue additional coursework in a second teaching content area.

University and College of Arts and Sciences degree requirements must be satisfied.

Exercise Science Track

The exercise science track provides students an opportunity for concentrated study in the scientific foundations of exercise and physical activity. Students are prepared for advanced graduate study in biomechanical, physiological, and psychological aspects of exercise. Students pursuing entry into allied health programs (e.g., physical therapy, occupational therapy, medical school) may select this track. Students interested in admission to allied health programs must consult with the departmental advisor regarding prerequisites for those programs.

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calculus I (recommended)*	3	MATH 1352 (recommended)*	3
CHEM 1307 & 1107 (recommended)	4	HIST 2300, History of U.S. to 1877	3
ESS 1301, Introduction to ESS	3	POLS 1301, Amer. Govt., Org.	3
COMS 2300 (recommended)	3	ZOOL 2403, Human Anatomy	4
TOTAL	16	TOTAL	16

SECOND YEAR			
Fall		Spring	
ENGL 2311 (recommended)**	3	ENGL 2300-level (except ENGL 2371)**	3
HIST 2301 or HIST 3310	3	ESS 3301, Biomechanics	3
Sophomore Foreign Language***	3	Sophomore Foreign Language***	3
CS 1300 or EDIT 2318 (recommended)	3	ESS 3354 (recommended)	3
POLS 2302, American Public Policy	3	Visual & Performing Arts	3
PF&W	1	PF&W	1
TOTAL	16	TOTAL	16

THIRD YEAR			
Fall		Spring	
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Dev.	3
ESS 3305, Exercise Physiology	3	ESS 4392, Res. Methods in ESS	3
ESS 3318, Exercise & Sport Psyc.	3	Major, minor, or electives	9
Major, minor, or electives	8	TOTAL	15
TOTAL	17		

FOURTH YEAR			
Fall		Spring	
ESS major	6	ESS major	6
Major, minor, or electives	9	Major, minor, or electives	9
TOTAL	15	TOTAL	15

Exercise science core electives must include a minimum 9 hours from the following: ESS 3323, ESS 3368, ESS 4361, ESS 4363, ESS 4365, ESS 4366, and ESS 4368.

Exercise science designated electives (select 6 hours): C E 2301, C E 3302, CHEM 2303, ESS 4000 (6-hour max), ESS 4395, ESS 4398, HLTH 3301, HLTH 3311, PSY 3317 or PSY 3327, ZOOL 2404, and other electives as approved by departmental advisor.

The following courses do not apply to the required 40 hours of 3000-4000 level courses: C E 2301, CHEM 2303, ZOOL 2404.

Add electives (if needed) to equal a minimum 121 hours with 40 hours of 3000-4000 level courses; at least 24 hours of these should be ESS courses.

IMPORTANT: Only a possible 33 hours of the required 40 hours of 3000-4000 level courses will come from this track with 6 hours of designated electives at the 3000-4000 level. By completing at least 7 hours in a minor at the 3000-4000 level, students will fulfill the 40 hours of 3000-4000 level coursework and avoid the need of extra coursework.

* Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply.

** ENGL 2371 does not fulfill the requirement for 3 hours of sophomore English.

*** Foreign language requires 6 hours of sophomore-level courses. A high school transcript is needed if two years of language were not taken in high school. If two years were taken in high school, a placement test or review course will be required before enrolling in sophomore-level courses. This model assumes that the student passed the Foreign Language Placement exam and is permitted to enroll in 6 hours of sophomore-level foreign language courses. Students who do not score high enough to place into the sophomore-level courses will need to take the review course in addition to two sophomore courses.

This model assumes that a 3-hour course that fulfills the multicultural requirement will also fulfill the individual/group behavior requirement.

A minor of 18 hours minimum is required.

Minor in Exercise and Sport Sciences

The minors in exercise and sport sciences require a minimum of 18 hours in ESS courses with at least 12 hours from 3000 level or above ESS courses. No more than 3 hours from ESS 4000 may be counted. Six credit hours of ESS courses are required in residency. See a departmental advisor for additional information and completion of the minor in exercise and sport sciences on the degree plan.

Minor in Health

The minors in health require a minimum of 18 hours in HLTH courses with at least 12 hours from 3000 level or above HLTH courses. No more than 3 hours from HLTH 4300 may be counted. Six credit hours of HLTH courses are required in residency. See a departmental advisor for additional information and completion of the minor in health on the degree plan.

Athletic Training

Students who wish to become athletic trainers must contact the Athletic Training Program in the Texas Tech Department of Intercollegiate Athletics. Students must be accepted into the student athletic training program and complete a noncredit internship of at least 1800 hours over a 3-year period. Students must complete the following courses: ZOO 2403, ESS 3301, 3305, 3323, 4325, and one course from health, nutrition, or first aid (ESS 3321). Beginning September 2004, coursework in therapeutic exercise-modalities will be required. Upon satisfactory completion of these requirements students will be qualified to take the Texas Athletic Training Licensure Examination.

Personal Fitness and Wellness Program

University students interested in learning sport skills, improving their physical fitness, and developing knowledge about sport, exercise, and physical activity should enroll in courses in the personal fitness and wellness program. To satisfy the College of Arts and Sciences requirement of two hours of fitness and wellness, students may complete any two personal fitness and wellness (PF&W) courses. For a specific activity, the completion of the course sequence is allowed if the sequence is taken in the appropriate order from beginning to advanced levels. Students participating in varsity athletics may enroll in the personal fitness and wellness course that corresponds to their varsity sport. A maximum of 1 credit hour per academic year per sport may be earned in this manner.

Exercise and Sport Sciences (ESS)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1301 [PHED 1164, 1238, 1301]. **Introduction to Exercise and Sport Sciences (3:3:0)**. An introduction to the professions in exercise and sport sciences including the history, ideas, events, people, and programs that shaped those professions.
2222. **Resistance Training and Conditioning (2:0:4)**. Principles of resistance training and other methods of physical conditioning with emphasis on program planning and implementation.
2225. [PHED 2255] **Water Safety Instructor and Lifeguard Training (2:1:2)**. Prerequisite: Swimming proficiency. Skills and knowledge in progressive swimming courses and emergency water safety. American Red Cross Water Safety Certification is possible.
2245. **Practical Experiences in Physical Education (2:1:2)**. Prerequisite: ESS 1301. Teaching experiences in physical education settings.
2275. **Practicum in Exercise and Health Promotion (2:0:4)**. Prerequisite: ESS 1301. Supervised experiences in clinical, commercial, and corporate exercise and health facilities.
3301. **Biomechanics (3:2:2)**. Prerequisite: ZOO 2403 or equivalent. The mechanical analysis of human motion with emphasis on biomechanical principles and techniques.
3303. **Motor Learning (3:2:2)**. A study of the many aspects of learning and performance of motor skills. (Writing Intensive)
3305. **Exercise Physiology (3:2:2)**. Prerequisite: ZOO 2403 or equivalent. A study of the various physiological systems as they function during exercise and training.
3314. **Life Span Motor Development (3:2:2)**. Examines factors that influence human motor development from conception through adulthood. Discusses theoretical perspectives and practical applications of motor development principles throughout the life span. (Writing Intensive)
3318. **Exercise and Sport Psychology (3:2:2)**. Emphasis on the social and psychological factors pertaining to participation in sport and exercise.
3321. **First Aid (3:2:2)**. Skills and knowledge in First Aid and CPR. American Red Cross certification is possible.
3323. **Care and Prevention of Athletic Injuries (3:3:0)**. Prerequisite: ZOO 2403 or equivalent. An introduction to athletic training and the qualifications and functions of the athletic trainer including emphasis on common athletic injuries.
3335. **Health and Physical Education for Children (3:3:0)**. Prerequisite: Junior standing. Knowledge and experiences in planning and implementing developmentally appropriate health and physical education programs for early childhood settings and elementary schools.
3342. **Principles of Teaching Skill Themes and Movement Concepts (3:2:2)**. Knowledge and experiences in teaching skill themes and movement concepts. (Writing Intensive)
3345. **Adapted Physical Activities (3:2:2)**. Prerequisite: ESS 2245 and ESS 3342. Theory and practice in administering and interpreting screening tests and adapting motor activities to the needs of the disabled.
3352. **Gender Issues in Sport (3:3:0)**. Examination of the ways sport experiences differ for males and females emphasizing historical, social, behavioral, and physiological dimensions. (W S 3307)
3354. **Sport in World Cultures (3:3:0)**. Historical and philosophical aspects of contemporary sport and leisure patterns across cultures, emphasizing the role of sport in society.
3356. **Principles of Sport Coaching (3:3:0)**. Principles of effective coaching including team motivation and organization, managing coach - athletic relationships, and administering personnel, facilities, and contests.
3368. **Exercise Testing and Prescription (3:2:2)**. Prerequisite: ESS 3305. Physiological theory and its practical application to exercise testing and prescription. Emphasis on hands-on physiological testing.
4000. **Independent Studies in Exercise and Sport Sciences (V1-6)**. Prerequisite: Departmental approval. A structured independent study under the guidance of a faculty member. May be repeated for credit up to 6 hours. (Writing Intensive)
4325. **Advanced Techniques of Athletic Training (3:3:0)**. Prerequisite: ESS 3323. Administration of an athletic training program. Includes the use of therapeutic modalities and the advanced care, prevention, and treatment of athletic injuries.
4326. **Practicum in Athletic Training (3)**. Prerequisite: ESS 3323, 4325, or departmental approval. Supervised clinical experience in athletic training. May be repeated once for credit.
4327. **Therapeutic Exercise and Modalities (3:3:0)**. Prerequisite: ESS 3323 and departmental approval. Examines therapeutic modalities and rehabilitative techniques to reduce trauma and pain and to restore normal function following traumatic or overuse injury.
4345. **Assessment of Physical Performance (3:3:0)**. Methods of measurement and evaluation, including statistical applications, used in assessing fitness and motor skills.
4358. **Sport Management (3:2:2)**. Fundamental concepts and theories for management in sport programs. (Writing Intensive)
4361. **Applied Biomechanics (3:3:0)**. Prerequisite: ESS 3301. Study and application of biomechanical principles and methods in exercise, sport and clinical assessment and applied research.
4363. **Principles and Theories in Exercise Psychology (3:3:0)**. Prerequisite: ESS 3318. Psychological principles and theories related to exercise behavior in apparently healthy individuals and special populations. (Writing Intensive)
4365. **Applied Motor Behavior (3:3:0)**. Prerequisite: ESS 3303 and 3314. Analysis and application of motor behavior principles to special and clinical populations with motor problems.
4366. **Motor Control (3:3:0)**. Prerequisite: ESS 3303 and 3305, or equivalents. Multi-level approach to the neural foundations and theories underlying the control movements.
4368. **Applied Exercise Physiology (3:3:0)**. Prerequisite: ESS 3305. Examination of physiological adaptations including changes in metabolic energy pathways, cardiorespiratory and

Graduate Program / Health, Exercise, and Sport Sciences

The M.S. in Exercise and Sport Sciences provides advanced study in biomechanics, exercise physiology, motor behavior, sport and exercise psychology, sports management, or teaching physical education and sport. The degree program consists of a minimum of 36 hours of graduate work; thesis and nonthesis options are available. The department will determine and prescribe any necessary leveling work. No foreign language is required.

The M.S. in Sports Health is designed to prepare students to work in medically based health and fitness settings. These clinical settings use exercise as a tool to improve health and fitness or as a means of rehabilitation (cardiovascular, pulmonary, or musculoskeletal). This program integrates sports medicine and exercise science and is appropriate for clinical exercise scientists and allied health professionals who wish to pursue careers in fields related to exercise science (e.g., clinical exercise physiologist, nurse, athletic trainer, physical therapist, physician). Students complete courses offered by the Department of Health, Exercise, and Sport Sciences in the College of Arts and Sciences and the Department of Rehabilitation Sciences at the Health Sciences Center. The knowledge, skills, and abilities required for certifications by leading organizations such as the American College of Sports Medicine and the National Strength and Conditioning Association serve as the foundations for the courses in this degree program.

Both thesis and nonthesis options are available for the degree which is administered through the Department of Health, Exercise, and Sport Sciences. The thesis option requires 42 hours of coursework including 6 hours of thesis credit. The nonthesis option requires 42 hours of coursework and the completion of comprehensive examinations covering course content. In consultation with their academic advisor, students have the option to select courses that are aligned with their career goals to fulfill degree requirements. Current course descriptions may be found in the listings of the various departments.

Program Courses

AHAT 5300	Advanced Anatomy (3:3:0)
ESS 5002	Internship in Sports Health (V1-6)
ESS 5305	Motor Learning (3:3:0)
ESS 5306	Biomechanics (3:3:0)
ESS 5307	Motor Development (3:3:0)
ESS 5310	Biomechanics of Musculoskeletal System (3:3:0)

ESS 5312	Behavioral and Psychological Aspects of Exercise (3:3:0)
ESS 5314	Methods in Biomechanics Research (3:3:0)
ESS 5315	Research Methods in Exercise and Sport Sciences (3:3:0)
ESS 5332	Applied Physiology of Exercise (3:3:0)
ESS 5334	Clinical Exercise Testing and Prescription (3:3:0)
ESS 5335	Cardiopulmonary Exercise Physiology (3:3:0)
ESS 5336	Skeletal Muscle Physiology (3:3:0)
ESS 5337	Electrocardiography (3:3:0)
ESS 6000	Master's Thesis (V1-6)
ESS 7000	Research (V1-12)
HLTH 5313	Health Behavior and Health Promotion (3:3:0)
HLTH 5344	Psychosocial Aspects of Health (3:3:0)

Students seeking either degree should consult with the chairperson of the department or the departmental secretary for graduate programs about their programs before enrolling in any courses.

The department also participates in a three collaborative Ph.D. programs in the areas of physiology (with the Department of Physiology, Texas Tech Health Sciences Center), in curriculum and instruction (with the Department of Curriculum and Instruction, College of Education), and in sport and exercise psychology (with the Department of Educational Psychology and Leadership, College of Education).

The collaborative Ph.D. program in physiology is designed to include both basic and applied physiology coursework with laboratory experiences using animal and human models.

The collaborative Ph.D. program in curriculum and instruction is designed to meet the needs of students who wish to teach, conduct research, and serve as faculty members in departments of kinesiology, exercise science or physical education within institutions of higher education. Within the departments, these faculty members would be engaged in preparing future physical education teachers and coaches.

The collaborative Ph.D. program in sport and exercise psychology is designed to meet the needs of students who wish to become faculty members in institutions of higher education. The student will be prepared to serve as faculty in departments of kinesiology as well as educational psychology and leadership. In addition, students wishing to earn a Ph.D. will be prepared for applied sport psychology careers as well as coaching.

musculoskeletal systems to training, environmental stresses, and in special populations.

4372. **Management in Exercise and Health Promotion (3:3:0)**. Prerequisite: ESS 2275. Applied knowledge for the operation of fitness centers, emphasizing development of practical skills for management of commercial, corporate, and clinical centers.
4392. **Research Methods in Exercise and Sport Sciences (3:3:0)**. Prerequisite: Junior standing or departmental approval. Research methods, designs, and analysis and interpretation of data. (Writing Intensive)
4395. **Senior Research Project (3)**. Prerequisite: ESS 4392 and consent of instructor. Student conducted and faculty supervised research project in exercise and sport sciences. Student must consult with a faculty advisor regarding project topic.
4398. **Seminar in Exercise and Sport Sciences (3:3:0)**. Prerequisite: Senior standing. Selected topics in exercise and sport including fitness, health, and human performance. May be repeated once for credit.
4445. **School – Based Physical Education (4:3:2)**. Prerequisite: ESS 2245 and 3342. Theory, practice, and instructional methodologies appropriate for teaching physical education in school settings. (Writing Intensive)
4475. **Internship in Exercise and Health Promotion (4:0:8)**. Prerequisite: ESS 3368, 4372, and current CPR Certification. Provides work-related experiences in exercise and health promotion organizations, including commercial, corporate, and clinical settings.

Graduate Courses

5002. **Internship in Sports Health (V1-6)**. Prerequisite: 12 hours of approved coursework in sports health and/or departmental approval. A maximum of 6 hours credit may be earned in one or more semesters.
5003. **Internship in Sports Administration (V1-6)**. Prerequisite: 18-24 hours of approved coursework in sports administration and departmental approval. A maximum of 6 hours credit may be earned in one or more semesters.
5302. **Motor Control (3:3:0)**. This course provides an examination of the neural structure and processes involved in the control of movement and in the maintenance of body posture.
5303. **Psychology of Sport (3:3:0)**. Theory and practice of the major psychological dimensions underlying the behavior of the coach and athlete in the sport context.
5305. **Motor Learning (3:3:0)**. The study of the principles and concepts of human behavior related to and affected by human movement with emphasis on motor skill learning.
5306. **Biomechanics (3:3:0)**. A study of the laws and principles governing human motion. Analysis of human movement across the age span and applicable for people with or without special needs.
5307. **Motor Development (3:3:0)**. The study of human development from conception through adulthood. Examines and discusses theoretical perspectives and motor development research throughout the life span.

5309. **Children in Sport (3:3:0)**. The study of the physiological, psychological, and sociological variables that influence children's participation in sport.
5310. **Biomechanics of the Musculoskeletal System (3:3:0)**. Structure and function of the musculoskeletal system. Emphasis on tissue loading, joint and muscle function, and biomechanical considerations for human performance and injury prevention.
5312. **Behavioral and Psychological Aspects of Exercise (3:3:0)**. The study of psychological processes and behaviors as they relate to exercise adoption, participation, and adherence. Motivation, personality, and behavior modification research will be discussed.
5313. **Applied Psychology of Sport (3:3:0)**. Applied aspects of psychological skills in sport and exercise and how individuals can use these skills to positively affect sport and exercise participation, performance, motivations, and enjoyment.
5314. **Methods in Biomechanics Research (3:3:0)**. Prerequisite: ESS 5306 or consent of instructor. Examination of methods of research, instrumentation, and quantitative application of kinematic and kinetic concepts in the biomechanical analysis of human movement.
5315. **Research in Exercise and Sport Sciences (3:3:0)**. Research methods, research design, treatment and interpretation of data.
5317. **Seminar in Exercise and Sport Sciences (3:3:0)**. Specific research topics in exercise and sport sciences will be studied. May be repeated for credit.
5320. **Sport Leadership (3:3:0)**. The study of leadership theory and its application to the effective management of sport programs. The course will also examine current sport leadership research.
5321. **Financial Management in Sport (3:3:0)**. Financial concepts and issues related to the sport industry, including methods and sources of revenue acquisition, financial analysis techniques, and economic impact.
5322. **Management of Sport and Athletics (3:3:0)**. Methods of organizing and administering sport and athletic programs. Study of staff, program, budget, health and safety, facilities, publicity, history, duties of an athletic director, and national, state, and local controls.
5323. **Historical Perspectives in Exercise and Sport Sciences (3:3:0)**. Examination of significant historical people and events that shaped the scientific study of exercise and sport.
5324. **Marketing and Promotion in Sport (3:3:0)**. Understanding the sport industry. Developing knowledge and skills of marketing process in sport operations. Sport sponsorship, promotion, and public relations.
5325. **Legal and Ethical Aspects of Sport (3:3:0)**. Ethical theory and professional ethics of sport managers. The principles of laws (constitutional, tort, contractual, labor, and antitrust laws, etc.) effecting sport management.
5327. **Sport Facility Planning and Management (3:3:0)**. Principles, terminology, and standards for planning, construction, use, and maintenance of facilities.
5328. **Sport in American Culture (3:3:0)**. Analysis of the place of sport in American society and the impact of sport on American culture.
5329. **Sport Event Management (3:3:0)**. The study of management principles and procedures specific to the design, operation, and implementation of sporting events.
5332. **Applied Physiology of Exercise (3:3:0)**. Prerequisite: ESS 5308 or equivalent. Applied principles of exercise physiology including cardiorespiratory, biochemical, and environmental considerations.
5334. **Clinical Exercise Testing and Prescription (3:3:0)**. Advanced theory and practical application to clinical aspects of exercise testing and prescription. Concentration on diseased and disabled populations.
5335. **Cardiopulmonary Exercise Physiology (3:3:0)**. Structure and function of the human cardiopulmonary system during exercise.
5336. **Skeletal Muscle Physiology (3:3:0)**. Structural and functional characteristics of skeletal muscle and the regulation of energy pathways that support muscle contractile activity.
5337. **Electrocardiography (3:3:0)**. An in-depth study of exercise-electrocardiography (ECG) preparation, administration, and interpretation.
5339. **Laboratory Techniques in Exercise Physiology (3:3:0)**. Prerequisite: ESS 5336 or consent of instructor. Selected research methods used in the quantitative assessment of exercise tolerance, muscle metabolism, and training adaptations.
5341. **Curriculum and Instruction in Physical Education and Sport (3:3:0)**. An examination of contemporary curriculum and methodologies for effective instruction in physical education and sport.
5343. **Applied Research in Physical Education and Sport (3:3:0)**. Prerequisite: ESS 5315 or consent of instructor. Survey of physical education and sport research focusing on contemporary issues. In-depth study of systematic observation of teaching and learning.
5347. **Practicum in Teaching Physical Education and Sport (3:2:2)**. Supervised laboratory and field experience in schools and community agencies.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Health (HLTH)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1300. **[PHED 1304, 1305] Patterns of Healthful Living (3:3:0)**. A study of patterns of mental, physical, and social development of the individual including relationships of individual and community health.
1302. **Foundations of Health (3:3:0)**. Basic knowledge of the health field for persons pursuing a degree in health. Principles of the discipline as well as historical overview will be addressed.
1305. **[PSYC 2306, SOCI 2306] Human Sexuality (3:3:0)**. Examination of the structural and functional traits of sexuality and how they affect well-being; covers relationships, reproduction, and lifestyle alternatives. (W S 1305)
2275. **Practicum Community Health (2:0:4)**. Prerequisite: HLTH 2360. Supervised field experience in community health setting.
2302. **Environmental Health and Awareness (3:3:0)**. Examines critical issues and relationships affecting biospheric health including personal, community, and international ecology.
2307. **Understanding Death and Dying (3:3:0)**. Exploration of issues concerning the death and dying process, including death anxiety, bereavement, grief, and mourning. Biological, psychological, social, and cultural aspects will be addressed.
2360. **Community Health (3:3:0)**. An introduction to community health, including an overview of the competency areas of a health education specialist and their applicability in community settings. (Writing Intensive)
3301. **Epidemiology (3:2:2)**. Principles and practices in cause, prevention, and control of diseases in school, community, national, and international settings. Includes examination of culture, belief, and values in disease transmission.
3302. **Current Trends in Health (3:3:0)**. An in-depth analysis of current issues that govern the politics, policies, and practices in the health field.
3311. **Communicable and Chronic Diseases (3:3:0)**. Examines etiology of diseases from a body-systems approach, with special emphasis on sexually transmitted diseases, cancer, and cardiovascular disease.
3312. **Health Considerations of Special Populations (3:3:0)**. A process-oriented course addressing health needs and/or problems of various ethnic, cultural, and socio-economic groups.
3313. **Health for Preadolescents (3:3:0)**. Prerequisite: Junior standing. An in-depth study of health issues relating to children as well as emphasis on behaviors that would affect health for children.
3314. **Health for Adolescents (3:3:0)**. Prerequisite: Junior standing. Studies health factors that affect the adolescent; addresses social, emotional, and physical factors of health.
3325. **Health Concerns in Chemical Dependencies (3:3:0)**. A holistic approach to the nonuse, use, and misuse of substances that alter mood and behavior, focusing on the implications to family relationships and personal health. [PHED 1346]
4300. **Individual Studies in Health (3:3:0)**. Prerequisite: Departmental approval. An independent study program allowing students to pursue an area of special interest under the guidance of a professor. (Writing Intensive)
4307. **Health Program Planning and Evaluation (3:3:0)**. Principles and applications of planning and implementing health programs in a variety of school and community settings including monitoring techniques. (Writing Intensive)
4312. **Psychosocial Health (3:3:0)**. Prerequisite: Junior standing. The role of psychological, social, and stress-related factors in health, illness, and recovery processes, including mental, emotional, social, and spiritual aspects of well-being.
4330. **Coordinated School Health Program (3:3:0)**. Prerequisite: HLTH 3313 and 3314. Analysis of the philosophy, organization, and administration of the coordinated school health program. (Writing Intensive)

4475. **Internship in Community Health (4:0:8)**. Prerequisite: Senior standing, HLTH 2275, ESS 3321 or current certification in first aid, and HLTH 4307. Advanced, supervised field work in a community health setting.

Graduate Courses

5313. **Health Behavior and Health Promotion (3:3:0)**. Provides an overview of various health behavior theories and their application to health promotion and education.

5344. **Psychosocial Aspects of Health (3:3:0)**. This course is an examination of psychosocial factors and processes that influence health status, health beliefs, behaviors, and outcomes.

Personal Fitness and Wellness (PF&W)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1110. **Adventure Activities (1:0:2)**. "Challenge by choice" atmosphere in nontraditional games and adventure. Includes but is not limited to indoor rock climbing and ropes course activities.

1111. **Aerobic Dance (1:0:2)**. Introduction to aerobic dance, fitness, and physiological response to exercise.

1112. **[PHED 1338] Diet and Exercise (1:0:2)**. A concepts-based activity course in which the student learns to create and participate in an individualized lifetime physical activity program.

1113. **Golf (1:0:2)**. Basic golf rules, etiquette, and mechanics. Four full rounds of golf must be completed by semester's end. Class meets off campus. Extra fee required.

1114. **Jogging (1:0:2)**. Principles and practice of recreational jogging for cardiovascular health. Includes flexibility training, individual progression instruction, complementary weight training, and nutritional practices.

1116. **Tai Chi (1:0:2)**. Basic techniques and applications of martial art of yang style tai chi chuan; also includes philosophy and theory.

1117. **Walking (1:0:2)**. Topics include walking technique, principles and practice of personal walking programming, interval, and circuit training, flexibility and muscular endurance training.

1118. **Weight Training (1:0:2)**. Basic principles and practice of weight training, developing and modifying an individual program. Includes flexibility and cardiovascular fitness.

1119. **Yoga (1:0:2)**. Basic poses, principles of movements and balance in yoga. Breathing techniques, stress reduction, relaxation, advanced poses, and twists will be covered.

1120. **Aikido (1:0:2)**. Provides students with a basic understanding of the philosophy of self-defense and practical application of aikido, a soft martial arts style.

1121. **Jui Jitsu (1:0:2)**. Basic principles of Brazilian jui jitsu. Opportunity to safely learn, practice, and use jui jitsu as an approach to self-defense.

1122. **Karate (1:0:2)**. Practical self-defense techniques and strategies; an appreciation of karate on an aesthetic level through the practice of kata.

1123. **Racquetball (1:0:2)**. Introduction to rules, shots, and strategies for singles, doubles, and cut-throat.

1124. **Self-Defense (1:0:2)**. Emphasizes philosophy, practical applications of both hard (karate) and soft (aikido) martial arts styles, and a better understanding of individual physical capabilities and limitations.

1125. **Tennis (1:0:2)**. Concepts of stroke mechanics, skill development, offensive and defensive strategies, rules, game play, singles and doubles, organization and communication, flexibility, and conditioning for tennis.

1126. **Tae Kwon Do (1:0:2)**. Teaches techniques and applications of Olympic style Tae Kwon Do. Students will also learn Hapkido self-defense techniques, cardiovascular workouts, philosophy, breathing techniques, and stress management.

1130. **Basketball (1:0:2)**. Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility and conditioning for basketball.

1131. **Sand Volleyball (1:0:2)**. Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for sand volleyball.

1132. **Soccer (1:0:2)**. Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for soccer.

1133. **Softball (1:0:2)**. Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for softball.

1134. **Volleyball (1:0:2)**. Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for volleyball.

1140. **[PHED 1153] Lifeguard Training (1:0:2)**. Prerequisite: Swimming proficiency. Skills and knowledge in lifesaving, standard first aid, and CPR for the professional rescuer. American Red Cross Lifeguard Training Certification is possible.

1141. **[PHED 1151, 1152, 1251, 1252] Scuba (1:0:2)**. Allows the student to explore the underwater in a warm, pristine environment. Scuba and snorkeling gear are provided. SSI. Certification is possible.

1142. **Beginning Swimming (1:0:2)**. Swimming principles, basic stroke mechanics, breathing technique, and conditioning for beginning swimmers.

1155. **Special Topics in Fitness (1:0:2)**. Skill development, conditioning, and strategies for various activities including in-line skating, ice skating, cycling, triathlons, and water polo. May be repeated once for credit.

1160. **Varsity Baseball (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1161. **Varsity Men's Basketball (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1162. **Varsity Women's Basketball (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1163. **Varsity Cross Country (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1164. **Varsity Football (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1165. **Varsity Golf (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1166. **Varsity Soccer (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1167. **Varsity Softball (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1168. **Varsity Tennis (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1169. **Varsity Track and Field (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

1170. **Varsity Volleyball (1)**. For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

2113. **Advanced Golf (1:0:2)**. Improvement and refinement of stroke mechanics. Seven full rounds of golf must be completed before the final. Class meets off campus. Extra fee required.

2118. **Advanced Weight Training (1:0:2)**. Advanced principles of weight training, individualized weight training programs, goal specific lifting, flexibility and cardiovascular fitness.

2125. **Advanced Tennis (1:0:2)**. Refinement of stroke mechanics, skill development, offensive and defensive strategies, flexibility, and conditioning for tennis. For players with varsity-level experience and ability.

2130. **Advanced Basketball (1:0:2)**. Refinement of skill development, offensive and defensive strategies, organization and communication, game play and officiating, flexibility and conditioning for basketball. For players with club-level ability.

2132. **Advanced Soccer (1:0:2)**. Refinement of skill development, offensive and defensive strategies, team organization and communication, game play, flexibility and conditioning for soccer. For players with club-level ability.

2134. **Advanced Volleyball (1:0:2)**. Refinement of skill development, offensive and defensive strategies, organization and communication, game play and officiating, flexibility and conditioning for volleyball. For players with club-level ability.

2142. **[PHED 2155] Advanced Swimming (1:0:2)**. Review and refinement of strokes. For students with the ability to complete multiple lengths of the pool while correctly performing the basic strokes.

2143. **Swim Conditioning (1:0:2)**. For students with the ability to complete multiple lengths of the pool with sound stroke mechanics. Techniques for fitness improvement through swimming will be addressed.

Department of History

Faculty

Jorge Iber, Ph.D., Chairperson

Horn Professor: Kuethe

Professors: Bell, Carlson, Howe, Iber, Inglis, Rainger, Reckner, Steinhart, Walker

Associate Professors: Brink, D'Amico, Forsythe, McBee, Miller, Mosher, Pelley, Stoll, Willet

Assistant Professors: Adams, Alford, Fallwell, Hart, Hahn, Milam, Shulman, Wilson, Wong

Lecturers: Kreidler, Monroe, Tydeman

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in History
- Master of Arts in History
- Doctor of Philosophy in History

The department also participates in the Latin American and Iberian Studies and Russian Language and Area Studies programs leading to the Bachelor of Arts degree; a minor in women's studies; Honors College programs; and Arts and Sciences minors in Asian studies, community and urban studies, environmental studies, ethnic studies, European studies, family life studies, humanities, and religion studies.

Undergraduate Program

The broad liberal arts foundation available through a major in history can deepen students' understanding of the complex world in which they live, stimulate intellectual attitudes conducive to effective participation in contemporary society, and cultivate those mental skills required for meaningful employment in many areas of the modern economic system. A history student may consider a career in teaching within colleges, universities, or public schools; in park administration; in regional and local historical society work; in archives and records management; in museum work; in various branches of government work; and in business and industry generally. Many students use their undergraduate history major as a preparation for advanced studies in such areas as law, medicine, and theology.

Bachelor of Arts. Students seeking an undergraduate degree in history will complete 30 hours of history, including the following:

- HIST 1300 and 1301
- 6 hours of U.S. history
- 18 hours in advanced courses, including HIST 4398 and 3 hours each of U.S.; European; and African, Asian, or Latin American history
- Six hours of the major in addition to HIST 4398 must be in writing intensive 4000-level courses.
- With prior departmental consent, 3 advanced hours in related disciplines may be counted toward the major.
- At least 12 of the 30 hours required for a history major must be taken in residence, including 9 upper-division hours.

Art History Concentration. The department offers an art history concentration in conjunction with the School of Art. It consists of 33 hours as follows:

- 21 hours of history approved by the undergraduate history advisor, at least 12 of which must be at the advanced level and include HIST 4398 and at least 6 hours of U.S. history.
- 12 hours of art history courses from the Department of Art, including one of the courses from ART 3310, 3315, 4310, or 4311. In exceptional cases, HIST 4397 may be substituted with the prior consent of the undergraduate history advisor.

History of Religions Emphasis. The department also offers a history major with a history of religions emphasis. This program consists of 36 hours as follows:

- 6 hours of Western Civilization (HIST 1300-1301).
- 6 hours of American history.
- 15 hours of advanced history (including HIST 4398 and 3 hours each in American; European; and African, Asian, or Latin American).
- 9 hours chosen from courses taught outside the department and having an emphasis on the study of religion.
- At least 9 of the total history hours must be chosen from HIST 3301, 3302, 3328, 3342, 3344, 3348, 4347, 4349, and 4374. HIST 4397 may be chosen with consent of instructor.
- All courses must be chosen with the approval of the undergraduate history advisor.

History Minor. A minor in history consists of 18 hours, including the following:

- 6 hours must be in U. S. history.
- 6 hours must be in non-U.S. history.
- 9 hours, including 3 at the 4000 level, must be in advanced courses.
- At least 6 of the 18 hours required for a history minor must be taken in residence, including 3 at the 4000 level and 3 in an advanced course.

General Requirements. Under state law, all students who receive bachelor's degrees from Texas Tech must complete 6 hours in American history. Students will normally fulfill this requirement by completing HIST 2300 and 2301. However, juniors, seniors, or students with approval by the department undergraduate advisor may satisfy this requirement by completing any 6 hours from among the American history courses listed as (US) in the course list.

All courses numbered above 3000 are advanced courses. All courses above 4000 are writing intensive courses and require junior standing or consent of the instructor. A student must receive at least a C in any history course if it is to count toward the major or minor.

Teacher Education. In the teacher education certification programs, history may be used at the secondary level as either a teaching field or as part of the composite field of social studies.

Teaching Field Options:

Secondary Education Teaching Field in History

(36 hours—6 hours must be 4000-level)

- HIST 1300 and 1301, also 2300 and 2301
- HIST 3310 (History of Texas) and 3 advanced hours in U.S. History
- HIST 2322 or 2323 (Studies in World History) and 3 advanced hours in African, Asian, or Latin American History
- 6 advanced hours in European History
- 6 advanced hours in history (including HIST 4398)

Secondary Education Teaching Field in Social Studies

(69 hours— 6 hours must be 4000-level history courses and 3 hours must be HIST 4398)

- HIST 1300 and 1301; HIST 2300 and 2301; HIST 3310 or 3316
- 15 advanced hours in history, including 3 in U. S., 3 in European, and 3 in African, Asian, or Latin American
- POLS 1301 and 2302; also two from 3323, 3325, 3327, and 3351
- GEOG 1401 and 1300; 3353 or 3360; and 3352, 3354, or 3356
- ECO 2301, 2302, and 3311
- PSY 1300
- SOC 1301

Graduate Program / History

Information on departmental admission standards, prerequisites, and other matters dealing with graduate study in history may be acquired by writing the graduate advisor or the chairperson of the department or by consulting the departmental Web site.

A student in the standard master's degree program must complete 30 hours of graduate courses including, HIST 5304. HIST 6301 is the required seminar in the 6000 course series. HIST 5304 must be taken in the first semester that it is offered after admission, and HIST 6301 must follow in the next semester offered after the student has completed HIST 5304. Students must also complete a 6-hour nondepartmental minor and 6 hours in thesis work. Coursework is planned in consultation with the graduate advisor or thesis director soon after admission to the graduate program. The department requires a reading knowledge of one foreign language. Instead of the standard master's degree requirement of a 6-hour minor taken in another department, students with an interest in archival administration can substitute a 6-hour minor composed of HIST 5309 and 3 hours of archival practicum taken as HIST 7000.

To provide a program of study for persons whose interests may not be oriented toward formal research, the department offers a nonthesis master's plan designed to contribute significantly to their intellectual development. The plan is not recommended for students contemplating doctoral work. To complete the program, a student must offer a minimum of 30 semester hours in history and 6 in a minor. Of the history hours, 6 must be from HIST 5304, 6301, and either 5305 or 5306. Students must also take an additional 6000-level class and earn a grade of B or better in both courses under two or more instructors. No more than 18 semester hours may be offered in any of the three geographical areas: North America, Europe, or World. Students following the nonthesis route must pass a comprehensive examination during the semester they plan to graduate.

The department offers doctoral work in three major geographical areas—North America, Europe, World—and in certain approved thematic and/or interdisciplinary areas of study. For purposes of examining students, these areas are usually subdivided into the fields listed below. Students may propose other fields, which will require approval by the student's Ph.D. committee and the graduate advisor.

North America: Chronological grouping—Colonial and early Republic, 19th century United States, and 20th century United States history. Topical grouping—African American, cultural, diplomatic, economic, environmental, Hispanic-Latino, immigration, intellectual, legal and constitutional, military, Native American, popular culture, science and technology, social, South, sports, Texas, urban, West, and women's history.

Europe: Ancient, medieval, early modern Europe to 1789, modern Europe, modern Britain and the Empire-Commonwealth, science and technology. Early modern European history and modern European history may each be subdivided into two topical or chronological fields. Topics may include social, gender, family and demography, urban, cultural, intellectual, colonial/postcolonial, race and ethnicity, diaspora and immigration, political, diplomatic, science and technology, and military history.

World History: Africa, regional and national histories; Asia, regional and national histories; Latin America, colonial and national histories. Thematic areas: colonial histories, nationalist and anticolonial movements, postcolonial histories, religious studies, social history, economic history, diasporic studies, cultural and intellectual history.

Thematic and/or Interdisciplinary: Religion and such other fields as approved by the student's Ph.D. committee and the graduate advisor.

Doctoral students must choose four fields of study for their programs. Students should have two fields in one geographic area, one field in a different geographic area, and one thematic and/or

interdisciplinary field. Thematic and/or interdisciplinary fields include colonial/postcolonial, cultural, ethnic, gender, intellectual, military, public history, religion, science and technology, social, and other topics. A student may do a 15-hour outside minor for the fourth field. Students will define their fields in consultation with their Ph.D. advisor and with approval by their Ph.D. committee and the graduate advisor. A student choosing two fields in North America or Europe should select at least one field from the chronological grouping. Dissertations may be written in North American, European, or World history (projects in other areas require the specific approval of the department's Graduate Studies Committee). All doctoral programs must include HIST 5305 and two seminars in the 6000-course series, or their equivalents. All doctoral students who have not previously taken HIST 5305 are required to take it in the first fall semester of their Ph.D. program. Doctoral and master's students must take HIST 6301 in the first semester it is offered after the student has earned a grade of B or higher in HIST 5304.

Within the first year of a student's doctoral program, the student and his or her Ph.D. committee chair will put together a preliminary degree plan. Prior to approval of the plan by the graduate advisor, the plan will then be discussed and refined in a joint meeting of the student and the full Ph.D. committee. In the qualifying examination, the student is expected to show command of four fields.

All Ph.D. students must demonstrate minimum research competency in foreign language. Students may do so by fulfilling one of the options listed below. Students must obtain approval of their committee for the option they choose and complete the requirement to the committee's satisfaction. The language requirement must be completed before taking the qualifying examination. Among foreign languages offered, students will normally choose German, French, Latin, or Spanish. For dissertation projects in the area of Southeast Asia utilizing the Vietnam Archive, the approved languages are normally French and Vietnamese. Some dissertation proposals may require proficiency in more than two non-English languages.

1. Complete two foreign language programs of study, each of which will be the equivalent of two years of university study as defined in the "Foreign Language Requirement" section of this catalog. After completion of each language, a student will need to prove competency by successfully translating an assigned passage of text.
2. After completing one foreign language program of study, which is the equivalent of two years of university study as defined in the "Foreign Language Requirement" section of this catalog, and after successfully translating an assigned passage of text, the student may continue work in that language with a faculty member in the department. Students must demonstrate "advanced proficiency" as defined by the American Council on the Teaching of Foreign Languages Proficiency Guidelines (revised 1999) and will need to translate historically relevant text in a manner acceptable to both the student's Ph.D. committee and the graduate advisor.
3. After completing one foreign language program of study, which is the equivalent of two years of university study as defined in the "Foreign Language Requirement" section of this catalog, and after successful translating an assigned passage of text, the student may complete the requirement by gaining competency with a research tool broadly relevant to the student's research program and career interests. That will require taking at least two graduate level classes or their equivalent pertaining to that research tool. The graduate advisor will maintain a listing of possible research tool courses. Students may propose other research tool courses, which will require approval by the student's Ph.D. committee and the graduate advisor. Research tool courses may not be counted toward a student's Ph.D. fields.

History (HIST)*(To interpret course descriptions, see page 8.)*

Courses in U.S.; European; and African, Asian, or Latin American history are identified as (US), (E), and (AAL).

Undergraduate Courses

1300. [HIST 2311] **Western Civilization I (3:3:0)**. Western civilization from its dawn to the 17th century. Culture and the arts stressed alongside politics. (E)
1301. [HIST 2312] **Western Civilization II (3:3:0)**. The revolutionary transformations of European civilization in the 17th, 18th, and 19th centuries; world dominion and the world wars; intellectual and cultural developments. (E)
1325. **Introduction to Mexican American History (3:3:0)**. A broad survey of Mexican-American life in the United States. Culture and economics stressed alongside politics. (US)
2300. [HIST 1301] **History of the United States to 1877 (3:3:0)**. This course and HIST 2301 satisfy the legislative history requirement. Most sections combine political, military, constitutional, and social history. Special sections emphasize technology, agriculture, business, and family life. (Honors section offered.) (US)
2301. [HIST 1302] **History of the United States Since 1877 (3:3:0)**. Continuation of HIST 2300. (Honors section offered.) (US)
2322. [HIST 2321] **World History to 1500 (3:3:0)**. Introduction to basic narrative and major themes in world history from origins to 1500. Satisfies university's humanities and multi-cultural requirements. (AAL)
2323. [HIST 2322] **World History Since 1500 (3:3:0)**. Introduction to basic narrative and major themes in world history since 1500. Satisfies university's humanities and multi-cultural requirements. (AAL)
3301. **Ancient Civilization I (3:3:0)**. Introduction to the study of the ancient Near East and classical Greece. (E)
3302. **Ancient Civilization II (3:3:0)**. Introduction to the study of ancient Rome. (E)
3304. **The Southern Frontier (3:3:1)**. Examines earliest U.S. frontier from European exploration and colonization to statehoods. Special emphasis on confrontation and accommodation among Spanish, French, British and southeastern woodland Indians. (US)
3305. **Creating the American Nation, 1785-1840 (3:3:0)**. This course examines the political and cultural processes by which the U.S. was formed in the decades following the American Revolution. (US)
3306. **African American History to 1877 (3:3:0)**. This course surveys the history of African Americans from the African background through the Civil War and Reconstruction. (US)
3307. **African American History from 1877 to Present (3:3:0)**. This course surveys the history of African Americans from the Post-Reconstruction period through Civil Rights years and new forms of activism in the 1900s to the present. (US)
3308. **United States Diplomatic History to 1913 (3:3:0)**. A survey of U.S. diplomatic history from the American Revolution to 1913 with an emphasis on the development of the U.S. as a world power. (US)
3309. **United States Diplomatic History Since 1913 (3:3:0)**. A survey of U.S. diplomatic history from 1913 to the present with an emphasis on the U.S. as a world leader. (US)
3310. **History of Texas (3:3:0)**. A survey of Texas history beginning with the Native American occupation and tracing the major social, political, and economic developments of the state into the modern era. (US)
3311. **Social and Cultural History of the Southwest (3:3:0)**. Survey of the history of the varied cultures of the American Southwest, emphasizing Anglo-American, Spanish-Mexican, and Indian backgrounds. (US)
3312. **Spanish-Speaking Peoples in the United States: A Chronological Survey of Mexican Americans, Cuban Americans, and Puerto Ricans (3:3:0)**. This course will explore the history of Mexican Americans, Cuban Americans, and Puerto Ricans in the United States during the 19th and 20th centuries. (US)
3313. **The Old South (3:3:0)**. Explores the society, politics, economics, and race relations of the antebellum South, the development of sectionalism, and the impact of the Civil War. (US)
3314. **The South Since the Civil War (3:3:0)**. Explores the degree to which the South has remained a separate region socially, politically, economically, and in race relations from Reconstruction to the present. (US)
3315. **North American Ranching History (3:3:0)**. A history of North American ranching from Columbus to the present. (US)
3316. **Mexican American History of Texas (3:3:0)**. Surveys the history, culture, and contribution of Mexican Americans to the history and economic development of Texas. (US)
3317. **The Frontier and American West (3:3:0)**. Explores the settlement of the American West to 1900, with emphasis on trapping, mining, transportation and farming frontiers, Spanish borderlands, and Indian-United States relations. (US)
3318. **The Plains Indians (3:3:0)**. Culture and history of the Plains Indians; cultural developments prior to contact with the Whites; Plains Indians-White relations; Plains Indians in the 20th century. (US)
3320. **History of Film and American Society (3:3:0)**. A history of American film from its beginnings to the present with focus on film and the role it plays in reflecting or changing American society. (US)
3321. **Twentieth Century American West (3:3:0)**. An examination of the history and development of the American West from ca. 1900 to the present. (US)
3323. **The History of Women in America (3:3:0)**. Examines the gender expectations from 1607 to the present that have produced for women and men different experiences, strengths, and perceptions of American history. (US) (W S 3323)
3325. **History of Mexican Americans in the United States (3:3:0)**. Survey of the history of Mexican Americans of the United States during the 20th century, relating their daily life and institutional experience to United States and Mexican history. (US)
3326. **History of Native Americans in the United States (3:3:0)**. Survey of the history of American Indians from their earliest migrations through the acculturation, termination, and civil rights movements of the 20th century. (US)
3327. **Survey of American Environmental History (3:3:0)**. Prerequisite: Junior standing or consent of instructor. A survey of American environmental and conservation history from pre-Columbian America through contemporary environmental awareness. (US)
3328. **History of Religion in America (3:3:0)**. Traces the development of religious groups in America from colonial times to the present. Emphasizes beliefs and interaction with society. (US)
3329. **Development of Modern Science (3:3:0)**. Examines the historical development of the intellectual, institutional, and social dimensions of Western science from the 17th century to the present. (E)
3330. **The Vietnam War (3:3:0)**. Prerequisite: HIST 2300, 2301, or equivalent. Explores the military, diplomatic, political, and social dimensions of the war from its origins in the 1940s through its conclusion in the 1970s. (US)
3331. **History of United States Military Affairs to 1900 (3:3:0)**. Explores American military history from the Colonial period through the Spanish-American War, with an emphasis on strategy and the development of military institutions. (US)
3332. **History of United States Military Affairs Since 1900 (3:3:0)**. Examines 20th American military history up to the present. (US)
3334. **Technology in Modern America (3:3:0)**. An analysis of major developments in American technology since 1870 and their impact on society, culture, politics, and the economy. (US)
3335. **Progressive Reforms and Arts (3:3:0)**. Reforms of the Progressive era 1880-1930, roots and legacies; focusing on arts as a tool in economic, political, social, and cultural reforming efforts at local, national levels.
3337. **Science in American Society (3:3:0)**. An examination of major developments in American science with an emphasis on the 20th century and their impact on society, politics, and the economy. (US)
3338. **History of Sports and Recreation in the U.S. (3:3:0)**. Study of the development and role of sports and recreation in American social history with emphasis on organized amateur and professional sports. (US)
3339. **The History of Baseball: A Mirror on America (3:3:0)**. Examines the history of the national pastime with an eye to how the sport has reflected and influenced American society since the late 19th century. (US)
3341. **Women in European Civilization (3:3:0)**. What women were supposed to do; what women did, from prehistory to the vote in 1920. (E) (W S 3341)
3342. **Religion and Science (3:3:0)**. Through analysis of historical development from antiquity to the present, the course will examine the relationship between religion and science in the western tradition. (E)
3343. **Development of Modern Medicine (3:3:0)**. A chronological study of concepts and treatment of disease and medicine as a social institution in Western culture. (E)
3344. **History of Christianity (3:3:0)**. Surveys Christianity from immediate pre-Christian era to present. Emphasizes various churches and organizations, theology and Biblical studies, and Christianity's impact on Western culture. (E)

3345. **The Birth of Europe (3:3:0).** Examines the confrontation between the Later Roman Empire and its barbarian invaders, which ultimately produced new economic, political, social, and cultural structures a new civilization. (E)
3346. **The Age of Chivalry (3:3:0).** Medieval Europe, 1000-1450, witnesses the domestication of a warrior aristocracy through chivalric ideals, feudal monarchy, and the rise of a powerful bourgeoisie. (E)
3348. **The Crusades (3:3:0).** Surveys the origins of the holy war ideal, the military campaigns and their leaders, life in the Crusader States, and the Crusades' ultimate results. (E)
3351. **History of Spain (3:3:0).** A survey of Spanish history from ancient times to the present, including the Roman and Medieval heritage, the Golden Age, Enlightenment, and modern developments. (E)
3352. **History of Modern Italy (3:3:0).** This course examines major historical movements in Italy from the unification in 1861 to the present. Topics include nationalism, empire, race, criminology, and politics.
3353. **History of Modern France (3:3:0).** Surveys French political, social, and cultural history from the middle of the 18th century to the present. (E)
3354. **Twentieth Century Europe (3:3:0).** Survey of European history from the immediate origins of World War I to the present. (E)
3355. **Europe in Transformation, 1815-1914 (3:3:0).** Transformations in the social, cultural, political, and economic structures of Europe, including Russia and Great Britain during the 19th century. Revolution, nationalism, industrialism, and mass culture. (E)
3356. **The Lands Between: Eastern Europe 1789-1989 (3:3:0).** Survey of East European history from the French Revolution to the collapse of communism. (E)
3358. **Modern Germany, 1648-1918 (3:3:0).** Surveys the history of Germany from the Peace of Westphalia (1648) through World War I. (E)
3359. **The Nazi Era, 1919-1945 (3:3:0).** Surveys post-World War I Germany, the rise of national socialism, Hitler in power, the Nazi State, and Germany in World War II. (E)
3360. **The British Isles to 1688 (3:3:0).** Examines the social, cultural, and political history of British Isles to 1688, focusing on institutions, religious beliefs, literature, art, and everyday life. (E)
3361. **British Politics, Society, and Culture Since 1688 (3:3:0).** Examines the social, cultural, and political history of Britain since 1688, focusing on the expansion of government, social movements, industrialization, popular culture, and the world wars. (E)
3366. **The First World War (3:3:0).** Surveys the social, political, and cultural effects of the First World War, which brought down the last major empires and created the modern world.
3367. **The Second World War (3:3:0).** A history of the major diplomatic, military, social, and economic developments associated with the Second World War. (E)
3372. **Tsarist Russia (3:3:0).** Political, economic, cultural, and social development as well as the territorial expansion of Russia from the earliest times to the beginning of the 20th century. (E)
3373. **Revolutionary Russia, 1894 to 1924 (3:3:0).** Studies the decline of Tsarist Russia, growth of a revolutionary movement, and events and consequences of the Revolutions of 1905 and 1917 and the Civil War. (E)
3374. **History of Soviet and Post-Soviet Russia (3:3:0).** Russian history from the revolutions of 1917 to the present, emphasizing the Soviet state's internal development, role in international relations, and collapse. (E)
3381. **Colonial Latin America (3:3:0).** General introduction to the formation of Latin American civilization, including the Indian empires, voyages of discovery, conquest, extraction of treasure, pirates, and royal administration. (AAL)
3382. **Modern Latin America (3:3:0).** Survey of the principal events in Latin American history beginning with the independence movement and reaching into the contemporary scene. (AAL)
3383. **Modern Mexico and Central America (3:3:0).** This course covers major themes in Mexico and Central America since Independence. (AAL)
3384. **History of Brazil (3:3:0).** Brazil from preconquest times to the present with emphasis on unique characteristics of Brazilian culture in the context of world history. (AAL)
3389. **The British Empire, 1783 to Present (3:3:0).** Studies the growth of the British Empire in the 19th century and its later decline in the 20th century under the impact of war and nationalism. (E)
3394. **Religion, Family, and the State in Asia (3:3:0).** Surveys the main religious traditions of Asia and modern transformations; explores traditional and modern notions of family; examines changing political patterns. (AAL)
3395. **Africa: Empires and Civilizations (3:3:0).** A survey of the development of Africa's civilizations and cultures from ancient Egypt to the West African trading states of the 18th century. (AAL)
3396. **Africa: Revolution and Nationalism Since 1800 (3:3:0).** Surveys the colonial impact on African political, social, and economic life; the rise of African nationalism; and the creation of new nations. (AAL)
3398. **The Modern Middle East, 1800 to the Present (3:3:0).** The history of the Middle East from ca. 1800 to the rise of Arab and other nation-states and the coups and revolutions of recent decades. (AAL)
3399. **Readings in History (3:3:0).** Prerequisite: Junior standing and consent of instructor. An independent study course involving in-depth reading. May be repeated for credit.
4301. **The Founding of the American Colonies (3:3:0).** An exploration of why and how Elizabethan England spawned thirteen disputatious and diverse societies on the Atlantic seaboard. (US)
4302. **The American Revolution and Colonial Society (3:3:0).** An exploration of why and how thirteen disputatious and diverse colonies united to wage a revolution and form a nation. (US)
4304. **Civil War and Reconstruction, 1850-1877 (3:3:0).** Prerequisite: Junior standing or consent of instructor. Explores the causes of the Civil War; the military, political, economic, and social aspects of the war; and the issues and results of Reconstruction. (US)
4305. **Rise of Modern America, 1877-1919 (3:3:0).** Prerequisite: Junior standing or consent of instructor. Focuses on the economic, social, political, and military impact of the transformation of the United States into an urban, industrial nation. (US)
4306. **Roaring Twenties, Depression, and War, 1920-1945 (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines political, social, economic, and military developments in the United States during the 1920s, the Great Depression, the New Deal, and World War II. (US)
4307. **The United States, 1945 to the Present (3:3:0).** Prerequisite: Junior standing or consent of instructor. The study of American society from the Second World War through the 1970s, including political developments, wars, and cultural conflicts. (US)
4308. **United States Urban and Immigration History (3:3:0).** Prerequisite: Junior standing or consent of instructor. Explores the economic and political issues surrounding U.S. urban and immigration policy and how these policies affected the lives of "ordinary" men and women. (US)
4309. **United States and the Cold War (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines the causes, course, and consequences of the Cold War between the U.S. and the Soviet Union. (US)
4311. **The Nuclear Age (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines the historical development of nuclear weaponry and power and their impact on 20th century American politics, society, and culture. (US)
4317. **The American Culture of Curiosity, 1800-1860 (3:3:0).** Examines the creation of a mass culture which combined education and amusement in print and commerce between the Revolution and the Civil War.
4323. **Nature and Americans (3:3:0).** Prerequisite: Junior standing or consent of instructor. History of the relationship between Americans and their land from prehistory to the present. (US)
4324. **Courts and Capitalism (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines relationship between law and economic development from the writing of the Constitution through the regulatory state. Considers court decisions and changing meaning of property rights. (US)
4325. **Major Issues in U.S. Women's History (3:3:0).** Prerequisite: Junior standing or consent of instructor. Prerequisite: HIST 2300 and 2301, or 3323. In-depth study of the evolution of gender roles, women in literature, the suffrage movement, and modern feminism. (US) (W S 4325)
4326. **A History of Sexuality in the United States (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines the history of sexuality in the United States. Themes and topics include relations of power, sexual identities, commercialization of sex, courtship, marriage, and reproduction. (US)
4327. **Gender, Race, and Class in United States Law (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines law's treatment of gender, race, and class; legal impact of struggles of women, African-Americans, and workers; meaning of liberty, citizenship, public/private spheres. (US) (W S 4327)
4328. **Citizenship, War, and Dissent (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines evolution of citizenship and the Bill of Rights through the study of political

- trials and Supreme Court decisions during periods of war and domestic conflict. (US)
4337. **History of American Seapower (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines history of the American Navy, organizational and technological development, evolution of strategic planning, and impact on foreign relations. (US)
4341. **Ancient Greece (3:3:0)**. Prerequisite: Junior standing or consent of instructor. From the origins of classical Greek civilization to the Roman conquest. Tyranny and democracy, imperialism, the Hellenistic age. (E)
4342. **Ancient Rome (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Imperialism and its consequences from the early Republic through the partial collapse of the Empire in the 5th century A.D.; Christianity and the Empire. (E)
4343. **Alexander the Great (3:3:0)**. This course is a detailed study of the rise of ancient Macedonia, the reign of Alexander the Great, and the Hellenistic world. (E)
4344. **The History of Early Rome (3:3:0)**. This course is a detailed study of the numerous problems surrounding the history of Rome's early institution and conquest of Italy. (E)
4347. **History of the Medieval Church (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Origins of the Roman Church, the papacy, monasticism, scholastic and mystical theology, church-state relations, and the decline of medieval Christendom. (E)
4348. **The Renaissance (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Cultural and political history of Italy, France, and England from 1300-1600; the "rebirth" of wisdom through art, architecture, literature, music, economics, and religion. (E)
4349. **The Protestant Reformation (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Europe from 1517 to 1648. Religious revolt and the establishment of Protestantism; the age of religious wars; attempts at religious peace. (E)
4350. **European Urban History 1300 to 1800 (3:3:0)**. This course will explore social, economic, political, and cultural structures of Western European cities from the 14th to the 18th century. (E)
4353. **The French Revolution and Napoleon (3:3:0)**. Prerequisite: Junior standing or consent of instructor. The Old Regime and the Enlightenment. The Revolution and its drama, ideas, events, personalities, and complexities. Napoleon: heir, paladin, or liquidator of the Revolution? (E)
4355. **Let's Talk Women; Let's Talk War: Women and Conflict in 20th Century Europe (3:3:0)**. Prerequisite: Junior standing or consent of instructor. The course will examine the involvement and reactions of European women to situations of war and revolution in the 20th century. (E)
4357. **France and Algeria: From the Colonial to the Postcolonial (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Ideological and cultural relationship between France and Algeria from 1800 to the present. (E)
4358. **The Habsburg Monarchy in Grandeur and Decline (3:3:0)**. Prerequisite: Junior standing or consent of instructor. History of this multinational dynastic state and its legacies in East Central Europe. (E)
4360. **Germany Since 1945: A Divided Nation Confronts Its Past (3:3:0)**. A comparative study of capitalism and communism in West and East Germany emphasizing problems of national unity and efforts to atone for Nazi crimes. (E)
4363. **Emergence of New Nations in Latin America (3:3:0)**. Prerequisite: Junior standing or consent of instructor. This 19th century course covers the formation of political systems, challenges to social stability, abolition of slavery, and relationship to North Atlantic world. (AAL)
4370. **Great Cities (3:3:0)**. Seminar on the history of a single major city, using it as a microcosm to study political, social, cultural, and intellectual development over time. May be repeated when topics vary.
4371. **Race, Nation, and Identity (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Nineteenth and twentieth century concepts of difference as construed by race, nation, and identity. (E)
4372. **History of Comparative Genocide (3:3:0)**. Examines the history of the term "genocide" and analyzes modern and contemporary examples of mass exterminations.
4373. **Tudor-Stuart England, 1450-1688 (3:3:0)**. Prerequisite: Junior standing or consent of instructor. This course deals with enormous and seminal changes religious, political, constitutional, intellectual, and geographical that took place in England from 1450 to 1688. (E)
4374. **Love, Death, and Magic in Europe, 1500-1800 (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Topics in social and cultural history. Underside of civilization, population, social structure, family and household, economic growth, and crisis. Attitudes toward love and death, popular religion and culture, witchcraft, violence, revolt. (E) (W S 4374)
4375. **Social and Cultural History of Europe, 1800 to the Present (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Modernization, industrialization, urbanization, gender, household, new professions, old occupations, and labor unrest. Bourgeois and working-class culture, avant-garde and masses, war, genocide, Europe today. (E)
4376. **History of the Italian Mafia (3:3:0)**. This course discusses the origins and development of the Mafia in the context of Italian politics, economy, and society in the 19th and 20th centuries. (E)
4377. **Twentieth Century Britain in Film (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines the history of Britain and British entities in the 20th century through the study of film. (E)
4378. **History of Italian Fascism (3:3:0)**. This course examines the origins of Italian Fascism and its development from the 1920s through 1940s, including the topics of propaganda, race, imperialism, gender, and war.
4380. **A History of Masculinity (3:3:0)**. Examines the history of masculinity and manhood in Great Britain and the United States since the mid-nineteenth Century.
4381. **Colonial Mexico and the Spanish Borderlands (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Study of the Spanish conquest of Mexico and the evolution of the Spanish Empire in North America until Mexican independence in 1821. (AAL)
4391. **Modern South Africa (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Description and analysis of the social, economic, and political development of South African society, focusing on the struggle against apartheid. (AAL)
4392. **Modern South Asia (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Social, economic and political history of India and Pakistan from Mughal Empire to present, including the British Empire, partition and independence.
4393. **Modern China (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Chinese history from late Ming and early Qing period (17th century) until contemporary times. Emphasis on social, cultural, and political history. (AAL)
4394. **Modern Japan (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Social, cultural, political, and economic history of Japan (17th to 20th century). Focus on merchant culture, Tokugawa times, civic training of Meiji period, militarism, postwar period. (AAL)
4395. **Modern Vietnam (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Covers the social, political, and cultural history of Vietnam, beginning with the emergence of frontier society in the 16th century and concluding with the Vietnamese diaspora. (AAL)
4397. **Readings and Research in History (3:3:0)**. Prerequisite: Senior standing and consent of instructor. An independent study course involving in-depth reading and intensive historical writing. May be repeated for credit.
4398. **Senior Seminar in History (3:3:0)**. Prerequisite: Senior standing or completion of 18 hours in history. Required of history majors. An intensive study in historical methodology, document analysis, retrieval and collection of data, and synthesis into well-written history. May be repeated once for credit.

Graduate Courses

5101. **Teaching of History in College (1:1:0)**. An observation-and-advice course rather than a seminar. Concerned with supervision of teaching assistants: classroom visitation, judgment on performances, and advice and assistance to individual instructors.
5303. **Oral History Methodology (3:3:0)**. This course offers materials on the theory and methods for the collection and analysis of oral histories uses in reconstructing US, European, and non-Western history.
5304. **Historical Methods (3:3:0)**. Research methods; bibliography, government documents, newspapers, dissertations, archives and manuscripts, oral history, quantitative history, historical archeology; literary organization and style; footnote and bibliographic forms.
5305. **Historiography (3:3:0)**. A survey of major historians and historical works from Herodotus to the present, emphasizing the development of history as an intellectual orientation and as an academic discipline.
5306. **Recent Interpretations of American History (3:3:0)**. A survey of recent major works discussing chronological periods and topics in American history. Required of some master's and doctoral students.

5307. **Studies in World History (3:3:0).** This course provides an overview of the field of world history emphasizing both the global past and methodological debates.
5308. **Historical Studies of Religion (3:3:0).** A survey of scholarly attempts to understand the history of religion emphasizing historiographical achievements and methods.
5309. **Administration of Archival and Manuscript Collections (3:3:0).** An intensive study of archival principles and techniques emphasizing current trends and challenges, with an opportunity for professional management and/or research facility enhancement through in-service training.
5310. **Studies in American Cultural and Intellectual History (3:3:0).** Examines the intersection of intellectual and cultural history at various periods in American history. May be repeated once for credit when topics vary.
5311. **Studies in United States Colonial and Revolutionary History (3:3:0).** Topics vary from semester to semester, including seventeenth-century Massachusetts, the coming of the American Revolution, and the new nation after 1776.
5312. **Studies in Nineteenth-Century United States History (3:3:0).** Selected topics in the history of the United States, 1789-1890 with emphasis on bibliography and problems of interpretation. Extensive readings of monographs and journals.
5313. **Studies in Recent United States History (3:3:0).** Selected periods in twentieth-century American history: the Progressive Era and the 1920s, the New Deal and World War II, and the postwar years.
5315. **Studies in Texas History (3:3:0).** Topics vary with interests and needs of each class; emphasis on Spanish heritage, Texas Revolution, Republic, political, economic, and social developments, ethnic groups.
5316. **Studies in Southern History (3:3:0).** An analysis of the major issues and controversies of the South with emphasis on the period from the American Revolution to the present.
5317. **Studies in Frontier and Western American History (3:3:0).** An examination of selected areas with emphasis on exploration, settlement, Anglo-American expansion, foreign and Indian conflicts, life-ways, and resulting changes in American institutions.
5319. **Studies in Native-American History (3:3:0).** A reading seminar on the literature of Native-American history and the Native Americans of the plains and the southwest.
5321. **Studies in American Legal and Constitutional History (3:3:0).** An examination of selected topics concerning the history of the bar, judiciary, police, corrections, legal doctrines, and statutory law.
5322. **Studies in United States Diplomatic History (3:3:0).** American diplomacy and foreign policy with emphasis on either pre-1900 or post-1900 periods. Stress on the literature of United States diplomatic history.
5323. **Studies in the History of Science and Technology (3:3:0).** Topics vary to include 20th-century American science, the industrial revolution, and the social relations of science and technology.
5324. **Studies in American Religious History (3:3:0).** A survey of recent major works covering the social, political, and cultural implications of American religious history. Topics may vary.
5325. **Studies in American Economic History (3:3:0).** Historical analysis and interpretation of growth and change in the United States economy, with emphasis on ideas and institutions in business and agriculture.
5326. **Studies in American Environmental History (3:3:0).** A reading in American environmental and conservation historical literature from the Age of Discovery to the present environmental movement.
5327. **Studies in United States Immigration and Urban History (3:3:0).** Explores a series of problems in United States immigration and urban history since the mid-nineteenth century.
5328. **Studies in American Military and Naval History (3:3:0).** A study of American military and naval history. Emphasis on development of institutions and national struggles.
5333. **Studies in African-American History (3:3:0).** Studies of African influences, racial ideas, slavery, and post-emancipation efforts to achieve civil and political rights, education, economic opportunity and the creation of social institutions.
5337. **Studies of Women in American History (3:3:0).** A survey of significant literature and analysis of problems related to the study of women in American history.
5338. **Studies in American Social History (3:3:0).** Reading, analysis, and critical reviews of pivotal works. Emphasis on varieties and impact of social history on topics such as family, community, race, gender, and work.
5339. **Studies in Ancient Greek History (3:3:0).** Studies of selected topics in the political or intellectual history of ancient Greece based upon a study of sources, in translation if advisable.
5340. **Studies in Ancient Roman History (3:3:0).** Studies of selected topics in the political or intellectual history of ancient Rome based upon a study of sources, in translation if advisable.
5341. **Studies in Medieval History (3:3:0).** Study of selected topics in the intellectual history of the early and high middle ages. Individual reports discussed in a seminar situation.
5342. **Studies in Renaissance and Reformation History (3:3:0).** Study of selected topics in the intellectual or religious history of the Renaissance or the Reformation. Individual reports discussed in a seminar situation.
5343. **Studies in Eighteenth-Century European History (3:3:0).** Examines the social, cultural, and intellectual history of Europe in the era of the Enlightenment and the French Revolution.
5344. **Readings in European Nationalism (3:3:0).** Takes a cross-disciplinary approach to the study of European nationalism. Emphasizes historians' contribution to this field. May be repeated for credit.
5345. **Studies in the History of Fascist and Related Right-Wing Movements in Europe (3:3:0).** Examines individually and collectively themes of nationalism, anti-Semitism, militarism, and anti-Marxism, chiefly in the period 1918-1945.
5346. **Studies in Modern European History (3:3:0).** Examines the social, cultural, and political history of Europe from 1815 to the present.
5347. **Studies in British History (3:3:0).** An organized studies course covering selected topics in British history. Topics vary according to the students' needs.
5348. **Studies in Roman Law (3:3:0).** Topics in the historical development of classical Roman law. Designed to meet the needs of both law and graduate students.
5349. **Readings in Modern East Central European History (3:3:0).** The history and historiography of modern East Central Europe from the Revolutions of 1848 to the collapse of Communism in 1989. May be repeated twice for credit.
5350. **Studies in African History (3:3:0).** A survey of African history focusing on major problems of interpretation. Includes political, economic, religious, and cultural change; pre-colonial and colonial encounters.
5351. **Slavery in a World Perspective (3:3:0).** An examination of the main areas and epochs in which slavery institutions were central: Antiquity, Medieval Europe, Pre-Colonial Africa, the West Indies, and Southern U.S.
5352. **Studies in Asian History (3:3:0).** A reading and research course in Asian history focusing on developments in nineteenth- and twentieth-century social, political, and cultural history.
5355. **Studies in Colonial Latin American History (3:3:0).** Explores the principal historical literature and interpretations for Colonial Spanish America from the conquest to independence.
5356. **Studies in National Latin American History (3:3:0).** Examines the history of the areas since independence with emphasis on modernization. Includes consideration of Latin America as a civilization while revealing unique characteristics of the individual countries.
5362. **Studies in the History of Aging and the Family (3:3:0).** Examines topics in historical demography and the history of childhood, gender, family types, aging, the aged, and death. Emphasis on Europe and the United States.
5366. **Studies in Religious History (3:3:0).** Investigations of the development of religious institutions, the relationship between religion and society, and cross-cultural religious phenomena.
6000. **Master's Thesis (V1-6).**
6301. **Research Methods Seminar (3:3:0).** Prerequisite: HIST 5304. Continues advanced examination of historical methods, emphasizing particular approaches to historical investigation and the writing of an ambitious piece of original work.
6304. **Seminar in American History (3:3:0).** A research course featuring formal papers on selected topics. Topics chosen in consultation with the instructor.
6305. **Seminar in European History (3:3:0).** Research seminar, with stress on methodology, types of research materials available in our library in European history, delivery of reports, and submission of an extensive term paper.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Department of Mathematics and Statistics

Faculty

Lawrence E. Schovanec, Ph.D., Chairperson

Horn Professors: C. Martin, Ruymgaart

Dick and Martha Brooks Regents Professor: Ghosh

Professors: E. Allen, L. Allen, Barnard, Bennett, D. Gilliam, Harris, Ibragimov, Lewis, Mansouri, Pearce, Schovanec, Smith, Strauss, Victory, Wang

Associate Professors: Byerly, Drager, Gelca, Hadjicostas, Iyer, Kirby, Korchagin, Lee, Neusel, Paige, Seaquist, Seshaiyer, Solynin, Surles, Trindade, Weinberg, Williams

Assistant Professors: Aulisa, Christensen, Dwyer, Juan, Ledet, Manservisi, Monico, Roeger, Seo, Toda

Instructors: X. Gilliam, Temple

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Mathematics
- Bachelor of Science in Mathematics
- Master of Arts in Mathematics
- Master of Science in Mathematics
- Master of Science in Statistics
- Doctor of Philosophy in Mathematics

In addition, the department supervises programs leading to minors in mathematics and to teacher certification in mathematics at the elementary and secondary levels.

Undergraduate Program

Flexibility of elective courses in mathematics is designed to allow the student to prepare to enter the industrial job market, graduate school or professional school, or a teaching career. Recent Texas Tech mathematics graduates have been employed by companies in aerospace (NASA, defense), electronics (computers, telecommunications), engineering, finance (banks, brokerage, insurance), government (federal agencies, offices, laboratories), petroleum (geophysical, oil), security, entertainment, and education. Some graduates have entered law school or medical school, while many have pursued graduate degrees at various universities.

The curricula leading to the Bachelor of Arts or Bachelor of Science degrees follow the general patterns described in the Arts and Sciences section of this catalog. Immediately upon declaring a major in mathematics, students should consult with the department's Director of Undergraduate Studies for the design and approval of their individual mathematics degree programs. A typical program includes proficiency in calculus at the level of MATH 2350, plus MATH 2360, 3310, 3354, 3360, 4350 and at least one of MATH 4343, 4351, 4354, and 4360 for the B.A. degree and at least two of MATH 4343, 4351, 4354, and 4360 for the B.S. degree. In addition, candidates for the B.A. degree must take at least 3 additional hours of approved electives in mathematics at the 3000 level and above, while candidates for the B.S. degree must take at least 9 additional hours of approved electives in mathematics at the 3000 level and above.

For a major in mathematics, a minimum of 30 to 39 hours of mathematics is required, depending on where the student can start in calculus and which degree the student seeks. Also, a student must have a grade of C or better in each mathematics course counted toward the degree.

Candidates for the B.S. degree must choose their minor from the following: atmospheric science, biology, botany, chemistry, chemical engineering, civil engineering, computer science, economics, electrical engineering, exercise and sport sciences, geosciences, industrial engineering, mechanical engineering, microbiology, petroleum engineering, physics, or zoology. A minor must include 18 semester hours in the minor department, 6 of which must be advanced. Courses counted for the minor must be approved by the minor department.

In addition to the minor, candidates for the B.S. degree must complete 8 hours of laboratory science (biology, botany, chemistry, geosciences, microbiology, physical geography, physics, or zoology) outside their minor area.

Dual Degree. The Department of Mathematics and Statistics also participates with the Department of Computer Science to offer a dual-degree program in mathematics and computer science. This is a five-year program that culminates in a B.S. degree with a major in mathematics and a minor in computer science from the College of Arts and Sciences as well as a B.S. degree in computer science from the College of Engineering. Students should consult with an academic advisor in each college and may declare either as their primary college. See the Department of Computer Science catalog section for curriculum information.

A minor in mathematics requires 18 semester hours, at least 6 of which must be at the 3000 level or above and must be approved by the Director of Undergraduate Studies. The minor sequence is MATH 1351, 1352, 2350, and 2360 plus 6 semester hours of approved courses at the 3000 level or above. Students cannot receive minor credit for both MATH 3350 and 3354. Students must receive a grade of at least C in all courses counted toward a minor in mathematics.

For the minor and major in mathematics, at least one half of the upper-level mathematics courses must be taken in the Department of Mathematics and Statistics at Texas Tech University. This residency requirement will be waived by the department only in very exceptional circumstances.

Teacher Education. The Department of Mathematics and Statistics cooperates with the College of Education in offering plans for teacher certification in mathematics at both the middle 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. The student should consult the Department of Mathematics and Statistics concerning teacher certification. A student must have a grade of C or better in each mathematics course counted toward middle or secondary education certification.

The courses offered in mathematics for students intending to prepare themselves for elementary teaching are MATH 1320, 2370, 2371, 3370, 3371, 4370, and 4371.

The minimum requirements for the teaching field in mathematics (option II) at the secondary level are:

- MATH 1351, 1352, 2350, 2360, 3430, and 4331
- One of MATH 2300, 3342, or 4342
- One of MATH 3354 or 3360
- One of MATH 3430 or 4371

Mathematics Placement. Placement for students into entry-level mathematics courses (0301-2345) is based on either appropriate previous prerequisite collegiate mathematics credit or the results of the departmentally administered Mathematics Placement Examination (MPE). The MPE will be given on the first day of each summer orientation for students enrolling in the fall and during the open registration periods prior to each semester and term. Students without appropriate prerequisite collegiate mathematics credit will be placed into entry-level courses based on the results of the MPE. Students may retake the MPE if necessary. Students who have scored at least 610 on the SATM or at least 26 on the ACTM may enroll in any entry-level mathematics course independent of whether they have the appropriate previous prerequisite collegiate mathematics credit or the appropriate MPE score. However, they are encouraged to take the MPE during an orientation session to provide them with a current assessment of their mathematics skills for advisement purposes.

Students having 6 hours or less of basic mathematics requirements in their degree program may wish to satisfy the requirements by

choosing from among the following courses: MATH 1300, 1320, 1321, 1330, 1331, 1350, 1351, 1352, 1420, 2300.

The following list describes the mathematics courses most frequently taken by freshmen:

- MATH 0301 and 0302 are remedial courses and do not carry any degree credit. Students earning a grade of A or B in MATH 0302 will be eligible to enroll in MATH 1300, 1320, 1330, or 1550.
- MATH 1300 Contemporary Mathematics
- MATH 1320 College Algebra
- MATH 1330 Introductory Mathematical Analysis
- MATH 1321 Trigonometry
- MATH 1350 Analytical Geometry
- MATH 1351 Calculus I
- MATH 1420 College Algebra with Review
- MATH 1430 Introductory Mathematical Analysis with Review
- MATH 1550 Precalculus
- Only one course from among MATH 1300, 1320, and 1420 can be counted towards the mathematics and logical reasoning Core Curriculum requirement.

NOTE: Satisfactory score on the placement exam is required for entrance to all above courses. TSI students who have not passed the mathematics section of the TSI test may not enroll in MATH 1320 or 1321 until they have successfully completed their prescribed program of TSI mathematics skills development. See course listings for descriptions and prerequisites for the courses listed above.

Mathematics (MATH)

(To interpret course descriptions, see page 8.)

Developmental Courses

- 0301. Essential Mathematics (3:3:0).** A developmental course for students with weak preparation in fundamental mathematics, high school algebra, and geometry. MATH 0301 counts in the student's semester load and is recorded on the transcript, but the hours do not count as part of the minimum number of hours required for graduation in any degree program of the university. Grades are awarded for the semester, but they are not computed in the student's grade point average. This course counts for TSI math skills development provided the student has met with an advisor in the TSI Skills Development Office in 72 Holden Hall.
- 0302. Intermediate Algebra (3:3:0).** Prerequisite: Score on the Mathematics Placement Examination of 2 or higher or a grade of B or better in MATH 0301. A developmental course for students with weak preparation in algebra or who need a review of high school algebra before enrolling in MATH 1320 or higher. MATH 0302 counts in the student's semester load and is recorded on the transcript, but the hours do not count as part of the minimum number of hours required for graduation in any degree program of the university. Grades are awarded for the semester, but they are not computed in the student's grade point average. This course counts for TSI math skills development provided the student has met with an advisor in the TSI Skills Development Office in 72 Holden Hall.

Undergraduate Level Courses

- 1300. [MATH 1332] Contemporary Mathematics (3:3:0).** Prerequisite: Score on mathematics placement examination of 3 or higher or a grade of B or better in MATH 0302. Quantitative literacy and problem solving with applications to finance, population dynamics, politics, and business. MATH 1300 and 1320 cannot both be counted towards the mathematical and logical reasoning core requirements.
- 1320. [MATH 1314] College Algebra (3:3:0).** Prerequisite: Score on the mathematics placement examination of 3 or higher or a grade of B or better in MATH 0302. Inequalities, determinants, theory of equations, binomial theorem, progressions, mathematical induction. MATH 1300 and 1320 cannot both be counted towards the mathematical and logical reasoning core requirements.
- 1321. [MATH 1316] Trigonometry (3:3:0).** Prerequisite: Score on the mathematics placement examination of 4 or higher MATH 1320, or a grade of A in MATH 0302. Trigonometric functions,

Graduate Program

Students seeking an advanced degree in mathematics or statistics should consult with the Graduate Director of the department before enrolling in any courses. The department offers a number of graduate courses that are suitable for students who wish to complete a minor in mathematics or statistics.

The department does not have a foreign language requirement for the master's degree. Any foreign language requirement for the Ph.D. degree will be at the discretion of the student's dissertation advisor.

The M.A. degree in mathematics consists of 36 hours of graduate work, including 3 hours of credit for a departmental report. The student must complete three sequences chosen from algebra, analysis, geometry, probability and statistics, modeling and applications, and computer literacy. This degree is offered primarily for those students who wish to teach mathematics at the secondary level or at a junior/community college.

The M.S. degree in mathematics consists of 36 hours of graduate work, including 3 hours of credit for a departmental report, or 30 hours of graduate work including 6 hours of credit for the master's thesis. The student must complete at least two of the core sequences listed on the Ph.D. program for the 36-hour plan and at least one of the core sequences for the 30-hour plan. In the 36-hour plan a minor of 9 hours is permitted and in the 30-hour plan a minor of 6 hours is permitted. In each case the minor must be approved by the graduate advisor.

A master's degree in mathematics with an emphasis in computer science is also offered. The degree consists of 36 hours with 3 hours of credit for a departmental report. This plan calls for 18 to 21 hours of graduate coursework in mathematics and 12 to 15 hours of graduate coursework in computer science. Of the 18 to 21 hours of mathematics coursework, at least two sequences from the list in the departmental handbook must be completed. The 12 to 15 hours of computer science coursework constitute adjunct requirements and must be approved by the graduate advisor.

The M.S. degree in statistics consists of 36 hours of graduate work including 3 hours of credit for a departmental report or 6 hours of credit for the master's thesis. Up to 3 hours of graduate work are permitted in other areas such as agriculture, biology, business, economics, engineering, psychology, sociology, or fields as approved by the graduate advisor.

Each doctoral student will undergo a preliminary examination as early as possible during graduate training. The examinations will be administered annually in May and the results evaluated by the Graduate Programs and Policies Committee of the department. Details concerning the preliminary examinations can be found in the departmental handbook. Each doctoral student must also pass a qualifying examination in a specialty area and have a degree plan that has been approved by the graduate advisor.

- radians, logarithms, solutions of triangles, identities, trigonometric equations, complex numbers, De Moivre's Theorem.
- 1330, 1331. [MATH 1324, 1325, 1425] Introductory Mathematical Analysis (3:3:0 each).** Prerequisite-1330: Score on the mathematics placement examination of 3 or higher or a grade of B or better in MATH 0302 or 1300; prerequisite-1331: Score on the mathematics placement examination of 4 or higher or MATH 1330. MATH 1330 contains pre-calculus topics of interest to students of business and the social sciences. These include mathematics of finance, probability and statistics, and Markov processes. MATH 1331 contains an introduction to regression analysis and topics from differential and integral calculus that

- are of interest to students of business and the social sciences. May not receive credit for both MATH 1330 and 1430.
1350. [MATH 1348, 2312, 2412] **Analytical Geometry (3:3:0)**. Prerequisite: Score on the mathematics placement examination of 6 or higher and knowledge of basic trigonometry or MATH 1320 and 1321. Fundamental concepts of analytical geometry.
1351. [MATH 2313, 2413, 2417, 2513, 2517] **Calculus I (3:3:0)**. Score on the mathematics placement examination of 7, MATH 1350, 1550, or score on MPE of 5 and MATH 1321. Differentiation of algebraic and transcendental functions, applications of the derivative, differentials, indefinite integrals, definite integrals. (Honors section offered.)
1352. [MATH 2314, 2414, 2419, 2519] **Calculus II (3:3:0)**. Prerequisite: MATH 1351 or consent. Methods of integration, parametric equations, polar coordinates, hyperbolic functions, applications. (Honors section offered.)
1420. [MATH 1414] **College Algebra With Review (4:3:2)**. Prerequisite: MPE code 2 or higher or grade of B in MATH 0301. Review of topics from high school algebra, inequalities, functions and graphs, linear systems, sequences, mathematics induction. Cannot receive credit for both 1320 and 1420.
1430. **Introductory Mathematical Analysis With Review (4:3:2)**. Prerequisite: MPE code 2 or higher or a grade of B in MATH 0301. Review of topics from high school algebra, pre-calculus topics of interest to students of business and the social sciences. These include mathematics of finance, probability and statistics, and Markov processes. Cannot receive credit for both MATH 1330 and 1430.
1550. [MATH 2412] **Precalculus (5:5:0)**. Prerequisite: Score on the MPE of 3 or higher or a grade of A in MATH 0302. Topics from college algebra, trigonometry, and analytical geometry that are necessary prerequisites for calculus I.
2300. [MATH 1342, 1442, 2305, 2342, 2442] **Statistical Methods (3:3:0)**. Prerequisite: Score on MPE of 4 or higher, MATH 1300, 1320, or equivalent. Methods of analyzing data, statistical concepts and models, estimation, tests of significance, introduction to analysis of variance, linear regression, and correlation.
2322. **Analytical Geometry and Calculus for Engineering Technology I (3:3:0)**. Prerequisite: Score on MPE of 6 or higher or MATH 1320 and 1321. This course is intended for students of engineering technology. It covers selected topics in analytical geometry and stresses the geometric and physical aspects of calculus.
2323. **Calculus for Engineering Technology II (3:3:0)**. Prerequisite: MATH 2322. This course is a continuation of MATH 2322.
2345. **Introduction to Statistics with Application to Business (3:3:0)**. Prerequisite: At least a C in MATH 1330. Statistics and probability for business. Data collection, description, interpretation, prediction, inference, and computer software.
2350. [MATH 2315, 2415] **Calculus III (3:3:0)**. Prerequisite: MATH 1352. Partial differentiation, functions of several variables, multiple integrals, line integrals, surface integrals, Stokes Theorem. (Honors section offered.)
2360. [MATH 2318, 2418] **Linear Algebra (3:3:0)**. Prerequisite: MATH 1352. Finite-dimensional vector spaces, linear transformations and matrices, eigenvalues and eigenvectors.
2370. [MATH 1350] **Elementary Analysis I (3:3:0)**. Prerequisite: MATH 1320, and sophomore standing. Analytic geometry and the real number system with applications. Not for engineering, science, or mathematics majors.
2371. **Elementary Analysis II (3:3:0)**. Prerequisite: MATH 1350 or 2370. Elementary differential and integral calculus with application. Not for engineering, science, or mathematics majors.
3310. **Introduction to Mathematical Reasoning and Proof (3:3:0)**. Prerequisite: MATH 1351. Logic, techniques of proof, induction, writing proofs involving sets, relations, functions, graphs, number theory, and construction of real numbers. (Writing Intensive)
3322. **Higher Mathematics for Engineering Technology (3:3:0)**. Prerequisite: MATH 2323. Topics include differential equations, Laplace transform, Fourier series, and vector and matrix algebra.
3342. **Mathematical Statistics for Engineers and Scientists (3:3:0)**. Prerequisite: MATH 2350. Descriptive statistics, elementary probability, random variables and distributions, mean, variance, parameter estimation, hypothesis testing, regression, analysis of variance. MATH 3342 and 4332 cannot both be counted toward a mathematics major or minor.
3350. **Higher Mathematics for Engineers and Scientists I (3:3:0)**. Prerequisite: MATH 2350 or concurrent registration with departmental consent. Ordinary differential equations. Laplace transforms. Other selected topics. MATH 3350 and 3354 may not both be counted toward a mathematics major or minor.
3351. **Higher Mathematics for Engineers and Scientists II (3:3:0)**. Prerequisite: MATH 3350 or 3354. Partial differential equations and numerical methods. MATH 3351 and 4354 cannot both be counted toward a mathematics major or minor.
3354. **Differential Equations I (3:3:0)**. Prerequisite: MATH 2350 and 2360. Solutions of ordinary differential equations, geometric and physical applications. MATH 3350 and 3354 may not both be counted toward a mathematics major or minor.
3360. **Foundations of Algebra I (3:3:0)**. Prerequisite: MATH 2360. Fundamental concepts of abstract algebra. Primarily group theory. (Writing Intensive)
3370. **Elementary Geometry (3:3:0)**. Prerequisite: MATH 2370 and junior standing. Congruence and measures of plane and solid figures, similarity, areas, volumes, and a brief introduction to concepts in probability and statistics.
3371. **Elements of Finite Mathematics (3:3:0)**. Prerequisite: MATH 1331, 1351, or 2371. Combinatorics, probability theory. Bayes' Theorem, Bernoulli Trials. Probability distributions and statistics. Not for engineering, science, or mathematics majors.
3430. **Computational Techniques for Science and Mathematics (4:3:2)**. Prerequisite: MATH 2360. Emphasis on scientific computing and problem solving techniques using state-of-the-art mathematics software packages. Restricted to mathematics majors or students enrolled in a secondary mathematics teacher program.
4000. **Selected Topics (V1-3)**. Prerequisite: Consent of undergraduate program director. Selected topics in upper-division mathematics. May be repeated for credit.
4310. **Introduction to Numerical Analysis I (3:3:0)**. Prerequisite: MATH 3350 or 3354, including an elementary knowledge of programming or consent of instructor. Interpolation, approximations, numerical integration, and differentiation.
4312. **Introduction to Numerical Analysis II (3:3:0)**. Prerequisite: MATH 2360, including an elementary knowledge of programming or consent of instructor. Numerical techniques in linear algebra.
4330. **Mathematical Computing (3:3:0)**. Prerequisite: Consent of the Director of Undergraduate Programs, Department of Mathematics and Statistics. Topics from computational mathematics and programming.
4331. **Advanced Geometry (3:3:0)**. Prerequisite: MATH 2350. Euclidean and non-Euclidean geometries.
- 4342, 4343. **Mathematical Statistics (3:3:0 each)**. Prerequisite: MATH 2350. Frequency functions, moments, probability, correlation and regression, testing hypotheses, small sample distributions, analysis of variance, nonparametric methods, sequential analysis. 4342 is prerequisite for 4343. MATH 3342 and 4342 cannot both be counted toward a mathematics major or minor.
- 4350, 4351. **Advanced Calculus (3:3:0 each)**. Prerequisite: MATH 2360 (MATH 3360 recommended). Sets, functions, vector fields, partial derivatives, power series, theory of integration, line, surface, and multiple integrals. 4350 is prerequisite for 4351. (4350 Writing Intensive)
4354. **Differential Equations II (3:3:0)**. Prerequisite: MATH 3354 or 3350. Partial differential equations and boundary value problems. MATH 4354 and 3351 may not both be counted toward a mathematics major or minor.
4356. **Elementary Functions of Complex Variables (3:3:0)**. Prerequisite: MATH 2360 (MATH 4350 is recommended). The complex number system, functions of a complex variable, differentiation, elementary functions, and contour integration.
4360. **Foundations of Algebra II (3:3:0)**. Prerequisite: MATH 3360. Continuation of MATH 3360. Rings, fields, and applications.
4362. **Theory of Numbers (3:3:0)**. Prerequisite: MATH 2360 (MATH 3360 is recommended). Prime numbers, congruencies, theorems of Fermat, Euler, and Wilson, residues, reciprocity law, Diophantine Equations.
4370. **Elementary Problem Solving (3:3:0)**. Prerequisite: MATH 2371, or equivalent. Techniques of problem solving using elementary number theory.
4371. **Basic Computer Literacy and Programming (3:3:0)**. Prerequisite: MATH 2371 or equivalent. Computer literacy, structured programming, and problem solving using modern mathematical computing technology. (For students seeking elementary school certification as mathematics specialists).

Graduate Courses

5101. **Seminar in Algebra (1:1:0)**. Discussion of current research and topics of interest in algebra. Must be taken pass-fail. May be repeated for credit.
5102. **Seminar in Analysis (1:1:0)**. Discussion of current research and topics of interest in analysis. Must be taken pass-fail. May be repeated for credit.
5103. **Seminar in Control Theory (1:1:0)**. Discussion of current research and topics of interest in control theory. Must be taken pass-fail. May be repeated for credit.
5104. **Seminar in Statistics (1:1:0)**. Discussion of current research and topics of interest in statistics. Must be taken pass-fail. May be repeated for credit.
5105. **Seminar in Topology (1:1:0)**. Discussion of current research and topics of interest in topology. Must be taken pass-fail. May be repeated for credit.
5106. **Seminar in Applied Mathematics (1:1:0)**. Discussion of current research and topics of interest in applied mathematics. Must be taken pass-fail. May be repeated for credit.
5107. **Seminar in Biomathematics (1:1:0)**. Discussion of current research and topics of interest in biomathematics. Must be taken pass-fail. May be repeated for credit.
- 5310, 5311. **Principles of Classical Applied Analysis I, II (3:3:0 each)**. Fourier series and integrals, discrete Fourier series, Laplace transforms, calculus of variations, Sturm-Liouville problems, integral equations, equations of fluids and solids, and ordinary and partial differential equations.
5312. **Control Theory I (3:3:0)**. Prerequisite: MATH 2360, 3354, 4351, or consent of instructor. Linear dynamical systems, stability, frequency response and Laplace transform, feedback, state-space description, and geometric theory of linear systems. (M E 5312)
5313. **Control Theory II (3:3:0)**. Prerequisite: MATH 5312, 5316, 5318, or consent of instructor. Quadratic regulator for linear systems, Kalman filtering, non-linear systems, stability, local controllability, and geometric theory of non-linear systems. (M E 5313)
5316. **Applied Linear Algebra (3:3:0)**. Prerequisite: Consent of instructor. Solution of linear systems, matrix inversion, vector spaces, projections, determinants, eigenvalues and eigenvectors, Jordan form, computational methods, and applications.
- 5318, 5319. **Intermediate Analysis I, II (3:3:0 each)**. The real number system, introduction to metric spaces, sequences, continuity, differentiation, Riemann integration, power series, functions of several variables, and differential forms.
- 5320, 5321. **Functions of a Complex Variable I, II (3:3:0 each)**. Prerequisite: MATH 4350 or 4356. Analytic functions as mappings, Cauchy theorems, Laurent series, maximum modulus theorems and ramifications, normal families, Riemann mapping theorem, Weierstrass factorization theorem, Mittag-Leffler theory, analytic continuation, and harmonic functions.
- 5322, 5323. **Functions of a Real Variable I, II (3:3:0 each)**. Prerequisite: MATH 5319 or equivalent. General measure and integration theory, L_p theory, differentiation theory, and basic functional analysis.
- 5324, 5325. **Topology I, II (3:3:0 each)**. Prerequisite: MATH 4350 or consent of instructor. Point set theory, introduction to combinatorial topology and homology theory.
- 5326, 5327. **Modern Algebra I, II (3:3:0 each)**. Prerequisite: MATH 3360 or consent of instructor. Groups, rings, fields, linear algebra, Galois theory.
- 5330, 5331. **Theory of Ordinary Differential Equations I, II (3:3:0 each)**. Prerequisite: MATH 4351, 4354, or consent of instructor. Existence and uniqueness results, continuation of solutions, continuous dependence on data, linear equations, oscillation and comparison theorems, boundary value problems, and stability analysis.
5332. **Partial Differential Equations I (3:3:0)**. Prerequisite: MATH 4351, 4354, or consent of instructor. Topics include first order equations, method of characteristics, parabolic, hyperbolic and elliptic equations, variational and Hilbert space methods.
- 5334, 5335. **Numerical Analysis I, II (3:3:0 each)**. Prerequisite: MATH 5316 or equivalent. Stability and error analysis, numerical solution of ordinary and partial differential equations, integral equations.
- 5340, 5341. **Functional Analysis I, II (3:3:0 each)**. Prerequisite: MATH 5322. Hilbert and Banach space theory, linear operator theory, the closed graph theorem, the open mapping theorem, the principle of uniform boundedness, linear functionals, dual spaces and weak topologies, distribution theory, topological vector spaces, spectral theory of compact and unbounded self-adjoint and unitary operators, and semigroup theory.
- 5342, 5343. **Advanced Topics in Analysis I, II (3:3:0 each)**. Prerequisite: Consent of instructor. Current topics in analysis. May be repeated for credit.
- 5344, 5345. **Topics in Numerical Analysis I, II (3:3:0 each)**. Prerequisite: MATH 5335. Current advanced topics in numerical analysis, research work using computers. May be repeated for credit.
5346. **Advanced Topics in Applied Mathematics I (3:3:0)**. Prerequisite: Consent of instructor. Current topics in applied mathematics. May be repeated for credit.
5347. **Advanced Topics in Control Theory (3:3:0)**. Prerequisite: Consent of instructor. H theory of linear and non-linear systems, stochastic control, geometric theory of non-linear systems, distributed parameter control systems, and computational methods in control.
5354. **Biomathematics I (3:3:0)**. Prerequisite: Differential equations and linear algebra or consent of instructor. Qualitative and quantitative behavior of deterministic biological models are studied.
5355. **Biomathematics II (3:3:0)**. Prerequisite: Statistics, differential equations, and linear algebra or consent of instructor. Qualitative and quantitative behavior of stochastic biological models are studied.
5356. **Topics in Biomathematics (3:3:0)**. Prerequisite: Biomathematics II or consent of instructor. Current topics in biomathematics are studied such as biomechanics, mathematical epidemiology, mathematical neurology, mathematical ophthalmology, and image processing. May be repeated for credit.
- 5360, 5361. **Advanced Mathematics for Teachers I, II (3:3:0 each)**. Prerequisite: Consent of instructor. Selected topics in mathematics. May be repeated for credit.
5362. **Theory of Numbers (3:3:0)**. Prerequisite: MATH 4362. Diophantine equations, binary quadratic forms, algebraic numbers, theory of number-theoretic functions, partitions, the prime number theorem.
- 5364, 5365. **Computer Literacy and Programming I, II (3:3:0 each)**. Development of computer literacy and programming ability, algorithms and data structures, and recursion.
- 5382, 5383. **Advanced Probability I, II (3:3:0 each)**. Prerequisite: MATH 5319 or consent of instructor. Measure and integration, axiomatic foundations of probability theory, random variables, distributions and their characteristic functions, stable and infinitely divisible laws, limit theorems for sums of independent random variables, conditioning, Martingales.
5399. **Advanced Problems (3)**. Prerequisite: Graduate standing in mathematics. May be repeated for credit.
6000. **Master's Thesis (V1-6)**.
6310. **Master's Report (3)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Statistics (STAT)

(To interpret course descriptions, see page 8.)

Graduate Courses

- 5302, 5303. **Applied Statistics I, II (3:3:0 each)**. Prerequisite: Consent of instructor. Graphical presentation of data, histograms, confidence intervals for binomial probabilities, one-sample and two-sample t-test, regression and correlation with two variables, hypothesis testing and confidence intervals, multivariate regression and correlation, partial correlation coefficients, analysis of variance and covariance, multiple comparison procedures. Emphasis on analysis of research data. Not for mathematics, statistics, engineering, or physical science majors; these students should take STAT 5384, 5385.
5326. **Statistical Analysis (3:3:0)**. Prerequisite: Calculus or consent of instructor. Descriptive statistics, testing and estimation in one- and

two-sample problems, analysis of variance, multiple comparisons, linear regression and correlation, nonparametric methods.

- 5328, 5329. Intermediate Mathematical Statistics I, II (3:3:0 each).** Prerequisite: MATH 2350 or consent of instructor. Probability space, special families of distribution functions, expectations, conditional distributions, sampling distributions, point and interval estimation, hypothesis testing, distribution of functions of random variables, regression, nonparametric techniques.
- 5370. Decision Theory (3:3:0).** Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Game theory, statistical decision, Bayesian statistics.
- 5371. Regression Analysis (3:3:0).** Prerequisite: STAT 5326 and 5329. Estimation and testing in linear regression, residual analysis, influence diagnostics, multicollinearity logistic regression, nonlinear regression.
- 5372. Nonparametric Statistical Inference (3:3:0).** Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Statistical inference, rank order statistics, chi-square and slippage tests, Kolmogorov and Smirnov type tests, confidence intervals and bands, runs tests, applications.
- 5373. Design of Experiments (3:3:0).** Prerequisite: MATH 4343 or STAT 5329 Principles of design and analysis of experiments, Latin squares, split plots, incomplete block designs, efficiency.
- 5374. Theory of Linear Statistical Models (3:3:0).** Prerequisite: MATH 4343 or STAT 5329. Multivariate normal, covariance matrix and operations, distribution of quadratic forms, general linear hypothesis of full and non-full rank, specific linear models.
- 5375. Statistical Multivariate Analysis (3:3:0).** Prerequisite: STAT 5329 or consent of instructor. Multivariate normal distribution, estimation of the mean vector and covariance matrix, distribution of sample correlation coefficients, the generalized T2 statistic, classification, distribution of the sample covariance matrix.
- 5376. Advanced Statistical Methods (3:3:0).** Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Applied regression analysis, cluster analysis, factor analysis, modeling, special topics in designs, sensitivity analysis, non-linear estimation. May be repeated for credit.
- 5377. Statistical Sampling Theory (3:3:0).** Prerequisite: MATH 4343 or STAT 5329. Theory of simple random sampling, stratified random sampling, cluster sampling, ratio estimates, regression estimates, other sampling methods.
- 5378. Stochastic Processes (3:3:0).** Prerequisite: STAT 5329. Markov chains, Markov processes in discrete and continuous time, diffusion processes, Brownian motion and transformations of Brownian motion, non-Markovian processes.
- 5379. Time Series Analysis (3:3:0).** Prerequisite: STAT 5329 or consent of instructor. Stationary and nonstationary time series, finite linear models, identification, filtering, and diagnostic checks of such models, spectral analysis of time series data, forecasting and control.
- 5380, 5381. Advanced Mathematical Statistics I, II (3:3:0 each).** Prerequisite: STAT 5329; STAT 5380 is prerequisite for STAT 5381. Theory of estimation and tests of statistical hypotheses, sequential analysis.
- 5384. Statistics for Engineers and Scientists I (3:3:0).** Prerequisite: MATH 2350 or consent of instructor. Probability, descriptive statistics, distributions, estimation, hypothesis testing, nonparametric statistics, data analysis using the computers. Not for mathematics or statistics majors.
- 5385. Statistics for Engineers and Scientists II (3:3:0).** Prerequisite: STAT 5384 or consent of instructor. Continuation of STAT 5384; simple and multiple regression analysis, analysis of variance, nonparametric statistics, categorical data analysis, quality control, reliability, data analysis using the computer. Not for mathematics or statistics majors.
- 5386. Statistical Computing and Simulation (3:3:0).** Prerequisite: Consent of instructor. Methods of approximating functions and probabilities, computational methods in linear algebra, introduction to theory and applications of random number generation, testing generators.
- 6000. Master's Thesis (V1-6).**
- 6310. Master's Report (3).**
- 7000. Research (V1-12).**

Department of Philosophy

Faculty

Peder George Christiansen, Ph.D., Chairperson

Professors: Christiansen, Curzer

Associate Professors: Nathan, Schaller, Webb

Assistant Professors: Di Poppa, Hazlett, Kim, Ribeiro, Weiner

Adjunct Faculty: Suppe

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Philosophy
- Master of Arts in Philosophy

The department also participates in the natural history and humanities major as well as the humanities minor in the Honors College; the fine arts doctoral program in the College of Visual and Performing Arts; a minor in women's studies; and minors in European studies, environmental studies, and linguistics in the College of Arts and Sciences.

Undergraduate Program

Education in philosophy develops the ability to think critically, increases understanding of normative issues, provides a unique interdisciplinary perspective on the place of human beings in the universe, gives opportunities for critically examining methods of inquiry, yields a grasp of the development of human ideas in a cross-cultural perspective, and increases one's ability to understand and communicate with others effectively. Philosophy majors may qualify for graduate work in philosophy in preparation for college or university teaching careers, but a major in philosophy is also recognized by many professional schools and employers as fine preparation because students of philosophy are able to think for themselves in a critical and objective manner.

Evidence that a philosophy education has broad application to various fields can be seen in the remarkable performance of majors on graduate and professional school admission examinations and in their high rate of admission to professional schools. Over recent years, they have scored higher on average than business majors on admissions tests to business schools (GMAT), higher than any other humanities or social science areas on the graduate record examinations (GRE), and third out of 30 disciplines on the law school admission test (LSAT). Additionally, philosophy majors have been more likely than almost any other major to gain admission to medical schools. No other undergraduate discipline can match such a record of achievement across the entire range of professional and graduate schools.

The Philosophy Department brings distinguished guest speakers to campus for public lectures, classroom discussions, and visits with philosophy majors and graduate students. These visits provide a unique chance to talk informally about philosophical topics with world famous scholars.

Students majoring in philosophy must complete 30 hours in philosophy, including PHIL 2310, 2320, 3301, 3303, and either 4330 or 4340. Majors may not count PHIL 1310 toward fulfilling the 30-hour requirement, but they may substitute PHIL 4310 for the 2310 requirement. Minors are required to complete 18 hours in philosophy, at least 6 of which must be at the 3000 or 4000 level. For transfer students, at least 9 hours of the major or 6 hours of the minor must be completed in residency at Texas Tech. Philosophy students must receive at least a C in any philosophy course for it to satisfy major or minor requirements. Many students combine a philosophy major with a second major.

Philosophy (PHIL)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1310. [PHIL 2303] **Reasoning (3:3:0)**. Prerequisite: Freshman or sophomore standing. Basic methods of objective thinking. Considers elementary forms of reasoning, problem-solving techniques, and avoidance of common fallacies. Emphasis is upon developing skills in the practice of everyday logic.
2300. [PHIL 1301] **Beginning Philosophy (3:3:0)**. An introduction to philosophical thinkers, ideas, and methods.
2310. **Logic (3:3:0)**. Development of formal methods for evaluating deductive reasoning. Additional topics may include uses of language, definition, nondeductive inference. Satisfies the Core Curriculum mathematics requirement (in conjunction with a mathematics course).
2320. [PHIL 2306] **Introduction to Ethics (3:3:0)**. Discussion of moral problems and theories of morality. Includes the application of philosophical techniques to issues of contemporary moral concern.
2350. [PHIL 1304] **World Religions and Philosophy (3:3:0)**. Philosophical study of the doctrines and practices of the major world religions, including Hinduism, Buddhism, Christianity, Judaism, and Islam.
3301. **Classical Greek Philosophy (3:3:0)**. Study of the major philosophical ideas as originally developed in the Western world by thinkers such as Socrates, Plato, Aristotle, and others. Satisfies the Core Curriculum multicultural requirement. (Writing Intensive)
3302. **Asian Philosophy (3:3:0)**. Study of the major philosophical ideas originating in India and China, and developed generally in Asia. Satisfies the Core Curriculum multicultural requirement.
3303. **Modern European Philosophy (1600-1800) (3:3:0)**. Study of the major philosophical ideas as they developed in Great Britain and on the European continent since the Renaissance, covering such figures as Descartes, Hume, and Kant. (Writing Intensive)
3304. **Existentialism and Phenomenology (3:3:0)**. Consideration of the meaning of human existence through study of thinkers such as Nietzsche, Heidegger, Husserl, Merleau-Ponty, Sartre, and others.
3320. **Introduction to Political Philosophy (3:3:0)**. Basic issues and concepts in political philosophy, including discussion of such topics as justice, freedom, equality, authority, community, and the nature of politics and the state. (POLS 3331)
3321. **Philosophy of Law (3:3:0)**. Discussion, based on study of philosophical writings, of various conceptions of law and their relation to morality. Includes philosophical problems about liberty, privacy, justice, and criminal punishment. Satisfies the Core Curriculum social and behavioral sciences requirement. (Writing Intensive)
3322. **Biomedical Ethics (3:3:0)**. Discussion of conceptual and moral problems surrounding such issues as abortion, euthanasia, genetic research, behavior control, allocation of medical resources, health, and disease.
3323. **Business Ethics (3:3:0)**. Discusses theories of justice and morality, particularly as they relate to business. Concentrates on application to issues that arise in the conduct of business.
3324. **Philosophy of Religion (3:3:0)**. An examination of general philosophical problems that arise in connection with religion. Topics may include the nature of religion, the existence of God, the problem of evil, the relation between faith and reason, and the relation between religion and morality.
3325. **Environmental Ethics (3:3:0)**. Discussion of conceptual and moral questions surrounding human population and consumption of resources, loss of biodiversity and wilderness areas, and human use of nonhuman animals.
3330. **Philosophy of Science (3:3:0)**. Inquiry into the nature of science including the examination of basic scientific concepts and the forms of scientific reasoning. Satisfies the Core Curriculum technology and applied science requirement.
3331. **Philosophy of Social and Human Sciences (3:3:0)**. Study of selected approaches, concepts, and methods in the social and human sciences, especially as these are related to the question of the nature of man and of human society. Satisfies the Core Curriculum social and behavioral sciences requirement.
3332. **Feminism and Philosophy (3:3:0)**. Feminist philosophical perspectives on issues in such areas as ethics, legal theory, epistemology, and the study of race, gender, and sexuality.

Graduate Program

The master's degree program is aimed at providing a broad background in philosophy while encouraging complementary work in an approved minor field of study.

The student may choose to complete 24 hours of graduate coursework plus 6 hours of thesis research. Alternatively, the student may complete 33 hours of graduate coursework and then take an oral exit examination over a significant research paper. Up to one third (but no more than 9 hours) of the student's coursework may consist of graduate courses in disciplines other than philosophy, subject to the approval of the departmental graduate advisor.

For specific information on admission to the program, prospective students should contact the Department of Philosophy and the Graduate School. Students from fields other than philosophy are encouraged to apply, although they may be required to complete a certain amount of philosophy leveling work during their first year of enrollment.

3334. **Philosophy of Biology (3:3:0)**. Study of the nature and scope of biological theories. Topics may include evolution and creation, natural selection and design, sociobiology, or genetic engineering.
3335. **Philosophy of Technology (3:3:0)**. Gives students a chance to reflect on ethical, epistemological, and ontological issues lying behind the production and use of technology.
3340. **Minds, Brains, and Computers (3:3:0)**. Study of the nature of mental entities and how they fit into the causal structure of the world, with particular reference to recent developments in the cognitive sciences.
3341. **Philosophy of Literature (3:3:0)**. Philosophical ideas in literature, including the nature of evil, free will, personal identity, the mind-body problem, and the philosophical status of literature.
3342. **Philosophy and Film (3:3:1)**. Philosophical examination of issues raised by film, such as cinematic representation, realism, film genre, the power of cinema, and the interpretation of film. Required screenings.
4000. **Philosophical Problems (V1-3)**. Prerequisite: Previous coursework in philosophy and consent of instructor. Directed individual studies or conferences on selected advanced topics. May be repeated for credit.
4301. **Seminar in Ancient Philosophy (3:3:0)**. Prerequisite: Previous philosophy coursework or consent of instructor. In-depth study of one or two philosophical texts or themes from the ancient world. Topics vary.
4310. **Advanced Logic (3:3:0)**. Prerequisite: PHIL 2310 or consent of instructor. Full treatment of sentential logic and first-order predicate logic. May also treat topics such as identity, definite descriptions, axiomatic systems, completeness. Satisfies the Core Curriculum mathematics requirement (in conjunction with a mathematics course).
4320. **Ethics (3:3:0)**. Prerequisite: PHIL 2320 or consent of instructor. Advanced topics in ethical theory, with special emphasis on the meaning and justification of moral judgments, the possibility of ethical knowledge, and the nature of moral standards.
4321. **Political Philosophy (3:3:0)**. Prerequisite: Previous coursework in philosophy or consent of instructor. Study of contemporary writings in political philosophy. Discussion of selected philosophical issues concerning liberalism, conservatism, communitarianism, liberal neutrality, social choice theory, and political obligation.
4323. **Aesthetics (3:3:0)**. Prerequisite: Previous coursework in philosophy or consent of instructor. Discussion of the nature of art and the principles of aesthetic judgment. Emphasis on philosophical problems arising in interpretation and evaluation within the arts.
4330. **Epistemology (3:3:0)**. Prerequisite: Previous coursework in philosophy or consent of instructor. An examination of the nature and scope of knowledge, and the justification of various types of knowledge claims.
4331. **Philosophy of Language (3:3:0)**. Prerequisite: Previous coursework in philosophy or consent of instructor. General theory of significance, meaning, and interpretation.

4333. **Comparative Epistemology (3:3:0)**. Examination of various forms of knowledge and ways of acquiring knowledge including such methods as naturalistic observation, empathetic insight, and culture-based trial and error.
4340. **Metaphysics (3:3:0)**. Prerequisite: Previous coursework in philosophy or consent of instructor. Consideration of the nature of what there is (ontology) or of the nature of the universe as a whole (cosmology).
4341. **Great Figures in Philosophy (3:3:0)**. Prerequisite: Previous coursework in philosophy or consent of instructor. In-depth study of the works of just one or two great philosophers.

Graduate Courses

5301. **Studies in Greek Philosophy (3:3:0)**. Studies in the Pre-Socratics, Plato, Aristotle, and Hellenistic philosophy. May be repeated as topic varies.
5302. **Studies in Modern Philosophy (1600-1800) (3:3:0)**. Studies in major philosophical works of the modern period drawn from such philosophers as Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant. May be repeated as topic varies.
5308. **Basic Issues in Contemporary Philosophy (3:3:0)**. Major philosophical theories and controversies of the twentieth century. Works will be drawn from such philosophers as Wittgenstein, Russell, Heidegger, Husserl, Quine, Davidson, and Kripke. May be repeated as topic varies.
5310. **History of Aesthetics (3:3:0)**. Major philosophical theories of art and beauty from classical Greece to the present. May be repeated as topic varies.
5311. **Issues in Logic and Epistemology (3:3:0)**. A study of one or two questions about the justification of our knowledge of the external world, the mind, mathematics, or logic. May be repeated as topic varies.
5314. **Contemporary Aesthetics (3:3:0)**. Current problems in aesthetics: the nature of a work of art, of aesthetic experience and judgment; issues of interpretation and evaluation in the arts. May be repeated as topic varies.
5320. **Seminar in Ethics (3:3:0)**. Selected topics in ethical theory: relativism, moral reasons, the nature of moral value, deontological and teleological ethics. May be repeated as topic varies.
5321. **Social and Political Philosophy (3:3:0)**. Study of selected social or political philosophers or of selected topics such as justice, liberty, equality, liberalism, conservatism, and rights. May be repeated as topic varies.
5322. **Law and Philosophy (3:3:0)**. Study of works of legal philosophers on central issues in philosophy of law such as legal obligation, nature of law, interpretation, privacy, law and morality. May be repeated as topic varies.
5323. **Business Ethics (3:3:0)**. Discussion of theories of justice and morality, particularly as they relate to business. Concentrates on application to issues that arise in the conduct of business.
5324. **Philosophy of Religion (3:3:0)**. Central issues in philosophy of religion including the nature of religion, the existence of God, the relation between faith and reason, and the problem of evil. May be repeated as topic varies.
5330. **Philosophy of Science (3:3:0)**. Methodological and conceptual issues in the physical and social sciences. Emphasis upon scientific investigation as a way of knowing. May be repeated as topic varies.
5331. **Philosophical Psychology (3:3:0)**. Central issues in philosophy of the mind, including the nature of the mental and the relation between mental and physical. Emphasis on thought and perception. May be repeated as topic varies.
5340. **Seminar in Metaphysics (3:3:0)**. An intensive study of one or two topics which include the nature of existence, cause, identity, kinds and their instances, change, and/or mind. May be repeated as topic varies.
5341. **Great Figures in Philosophy (3:3:0)**. In-depth study of the works of just one or two great philosophers. May be repeated as topic varies.
5350. **Seminar in Teaching Philosophy (3:3:0)**. Theory, practice, and problems teaching philosophy for beginning instructors. Development of course objectives, syllabi, and teaching techniques. Practical pedagogical and associated philosophical issues.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Physics

Faculty

Lynn L. Hatfield, Ph.D, Chairperson

Horn Professor: Estreicher

Bucy Professor: Wigmans

Professors: Borst, Cheng, Hatfield, Holtz, Lichti, Lodhi, Myles, Quade

Associate Professors: Akchurin, Gibson, Glab, Huang, Lamp, Thacker

Assistant Professors: Grave De Peralta, Lee, Sanati, Volobouev, Wilhelm

Adjunct Faculty: Gangopadhyay, Papadimitriou, Scully

Joint Faculty: Dallas, Kristiansen, Krompholz, Poirier, Quitevis, Temkin

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Physics
- Master of Science in Physics
- Master of Science in Applied Physics
- Doctor of Philosophy in Physics

The department also supervises an applied physics option leading to the Ph.D. degree. The B.S.E.P program in engineering physics is listed under the College of Engineering. These interdisciplinary options afford flexibility in coursework and area of research concentration. Specializations in chemical physics (in cooperation with the Department of Chemistry and Biochemistry) and biophysics (in cooperation with the Health Sciences Center and the University Medical Center) are also available. An M.S. degree involving industry internships is available to selected graduate students. The department also offers the B.S. with an emphasis in medical physics. This curriculum prepares the student to enter the postgraduate program leading to a doctoral-level degree and certification by the American Board of Radiology.

Undergraduate Program

A typical sequence of courses in physics begins with PHYS 1305, 1408, 2401, and 2402, totalling 15 hours at the introductory level. These are followed by the intermediate and advanced sequences: PHYS 3304, 3401, 3305, 3306, 4302, 4304, and 4307. The department recommends that students who intend to pursue graduate work in physics take courses in advanced topics such as Computational Physics (4301), Solid State Physics (4309), and Nuclear and Particle Physics (4312).

The required mathematics courses for physics majors are MATH 1351, 1352, 2350, 3350, and 3351. The sequence MATH 3354 and 4354 can be substituted for MATH 3350 and 3351. Students planning to pursue graduate work in physics should consult the physics advisor about which math courses to take.

In fulfilling degree requirements, undergraduate majors in this department must have a grade point average of 2.0 or better in physics courses, at least 37 hours of physics in which a grade of C or better was received, and meet the general requirements of the degree they are seeking (as described in this catalog). The minimum number of hours required for a degree in physics is 120. Credit for transferred physics hours will be handled by the departmental advisor on an individual basis.

Students are encouraged to devote time to undergraduate research. Research in the department includes atomic, molecular, and optical physics, condensed matter physics, nuclear physics, particle physics, biophysics, astro physics, and physics education. Applied physics is pursued in fluorescence spectroscopy, pulsed power, semiconductor, materials, and surfaces.

A broad variety of minor subjects can be elected by a student majoring in physics. These include such traditional choices as mathemat-

Physics Curriculum

FIRST YEAR	
<i>Fall</i>	<i>Spring</i>
PHYS 1305, Engr. Phys. Anal. I	3 PHYS 2401, Prin. of Phys. II
PHYS 1408, Prin. of Phys. I.	4 CHEM 1307, Prin. of Chem. I
MATH 1351, Calculus I	3 CHEM 1107, Prin. of Chem. I Lab.
ENGL 1301, Ess. Coll. Rhetoric	3 MATH 1352, Calculus II
Health and Physical Fitness	1 ENGL 1302, Adv. Coll. Rhetoric
TOTAL	14 Health and Physical Fitness
	15 TOTAL
SECOND YEAR	
<i>Fall</i>	<i>Spring</i>
PHYS 2402, Prin. of Phys. III	4 PHYS 3304, Modern Phys. Lab
MATH 2350, Calculus III	3 MATH 3350, Math. Eng. & Sci.
CHEM 1308, Prin. of Chem. II	3 POLS 2302, Amer. Pub. Pol.
CHEM 1108, Prin. Chem. II Lab.	1 English
POLS 1301, Amer. Govt., Org.	3 Foreign Language
Foreign Lang.	3 Social or Behavioral Science
TOTAL	17 TOTAL
	18
THIRD YEAR	
<i>Fall</i>	<i>Spring</i>
PHYS 3305, Elect. & Magnet. †	3 COMS 2300, Public Speaking
PHYS 3401, Optics	4 PHYS 3306, Elect. & Magnet. †
MATH 3351, High. Math. Eng. & Sci.	3 HIST 2301, History of U.S. Since 1877
HIST 2300, History of U.S. to 1877	3 Electives
English	3 TOTAL
TOTAL	16
	15
FOURTH YEAR	
<i>Fall</i>	<i>Spring</i>
PHYS 4307, Quant. Mechanics	3 PHYS 4301, Comp. Phys. †
Adv. Physics Elective	3 PHYS 4302, Stat. and Therm. †
Adv. Electives*	3 PHYS 4304, Mechanics †
PHYS 3000	1 Adv. Electives*
TOTAL	10 TOTAL
	15

Total program hours—120

Select from Arts and Sciences General Degree requirements. See English requirements.

† Offered in alternating years. Check with undergraduate advisor.

* Computer language and advanced physics courses recommended.

ics, chemistry, and geophysics, but also other areas such as computer science, business, and electrical engineering. Students contemplating minors outside the College of Arts and Sciences should seek advice from the departmental advisor before beginning that minor.

A minor in physics requires 18 semester hours, at least 6 of which must be at the 3000 level or above and must be approved by the undergraduate advisor. The minor sequence is PHYS 1408, 2401, and 2402, plus 6 semester hours of approved courses at the 3000 level or above. Students must receive a grade of at least C in all courses counted toward a minor in Physics. The astronomy courses may not be used to satisfy requirements for the physics major or minor.

Students are encouraged to join The Society of Physics Students, which sponsors the “Physics Circus” and many other academic and social activities.

Teacher Education. Students seeking secondary certification to teach physics and other sciences should consult the undergraduate advisor in the Physics Department and the College of Education section of this catalog. The College of Education also should be consulted for information on certification in physical or composite sciences.

Astronomy (ASTR)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1400. [PHYS 1411] **Solar System Astronomy (4:3:2).** This course covers the sun, planets, moons, asteroids, comets, gravitation, and formation. (Honors section offered.)
1401. [PHYS 1412] **Stellar Astronomy (4:3:2).** This course covers stars, star formation, galaxies, and cosmology models. (Honors section offered.)

Graduate Program / Physics

A core curriculum consisting of PHYS 5301, 5303, 5305, and 5306 forms the nucleus of the Master's and Ph.D. programs and is the basis for the master's final examination and the Ph.D. qualifying examination. A student selecting any of the degree options may designate a minor consisting of a minimum of 6 hours of course credit in a related area and satisfy any additional requirements of the minor department. (These 6 hours may be taken in the Physics Department.) Full-time study towards the master's degree should be completed in about two years.

All graduate students must enroll in PHYS 5101 for the first four semesters and PHYS 5104 whenever on a teaching assistantship. PHYS 5312, 5322, and 5307 are tools courses that develop necessary skills for use in other courses and in research. They should be taken early.

M.S. Degree in Physics, Thesis Option: A minimum of 24 hours of course credit plus 6 hours of thesis research with a minimum of 18 hours in the department. The thesis is defended in a final oral examination.

M.S. Degree in Applied Physics, Thesis Option: A minimum of 24 hours of course credit plus 6 hours of thesis research with a minimum of 9 hours in a specified applied area. This may be in a subfield of physics or in a related discipline, with the master's thesis from that area. The thesis is defended in a final oral examination.

M.S. Degree in Applied Physics, Internship Option: 24 hours of course credit with a separate course sequence as discussed with the graduate advisor, plus two semesters of internship in a regional industry or research laboratory arranged through the

department. A report is written following each internship period and defended in an oral examination. Twelve hours of internship or report credit is required beyond the coursework.

M.S. Degree in Physics, Nonthesis Option: 36 hours of course credit with a minimum of 24 hours in the department, plus passing a comprehensive master's qualifying examination.

Ph.D. Degree in Physics: The core courses for the Ph.D. degree are the same as those for the M.S. degree, plus PHYS 5302 and 6306. Further selections should be made from PHYS 5304, 5307, 5311, 5322, 7304, and 5300 (which may be repeated in different topics).

Students seeking the Ph.D. degree must pass a preliminary examination and a qualifying examination as described in the departmental Graduate Booklet and in accordance with Graduate School requirements. The examination topics are from general undergraduate physics and graduate core courses. Students perform Ph.D. thesis research. After completing the research, the candidate prepares the dissertation and makes a public oral defense before the dissertation committee.

Students are encouraged to get involved in research early by taking PHYS 7000, which may count toward the degree. Thesis hours in PHYS 6000 (6 hours for the M.S. with thesis option) and 12 hours of PHYS 8000 (for the Ph.D.) should be taken as early as possible. Students must maintain a B average in the core courses in addition to the overall B average required by the Graduate School.

Physics (PHYS)**Undergraduate Courses**

1304. **Physics: Basic Ideas and Methods (3:3:0)**. Intended to provide physics background to pre-engineering students. Examines basic concepts in physics. Problem-solving techniques, graphical representations, and pertinent mathematics.
1305. **Engineering Physics Analysis I (3:3:0)**. The profession of engineering physics and its relation to energy, materials, resources, computers, communication, and control. Basic computer programming. Synthesis and analysis of typical engineering physics problems.
1401. **[PHYS 1410] Physics for Non-Science Majors (4:3:2)**. This covers the basic laws and vocabulary of science using a minimum of mathematics and counts toward fulfillment of the natural science requirement in A&S.
1403. **[PHYS 1401] General Physics I (4:3:2)**. Prerequisite: MATH 1320 and 1321 or 1550. This course is non-calculus introductory physics covering mechanics, heat, and sound, thus providing background for study in science-related areas.
1404. **[PHYS 1402] General Physics II (4:3:2)**. Prerequisite: PHYS 1403. This course is non-calculus introductory physics covering electricity, magnetism, light, and modern physics, thus providing background for study in science-related areas.
1406. **Physics of Sound and Music (4:3:3)**. Designed to acquaint the student with the principles of physics used in the production of sound and music. A minimum of mathematics will be used. Some of the physical principles are exemplified in laboratory sessions. Satisfies natural science requirement in Arts and Sciences.
1408. **[PHYS 2425] Principles of Physics I (4:3:2)**. Prerequisite or corequisite: MATH 1351. This course is calculus-based introductory physics covering mechanics, kinematics, energy, momentum, and thermodynamics. (Honors section offered)
2401. **[PHYS 2426] Principles of Physics II (4:3:2)**. Prerequisite: PHYS 1408; prerequisite or corequisite: MATH 1352. This course is calculus-based introductory physics covering electric and magnetic fields, electromagnetic waves, and optics. (Honors section offered)
2402. **[PHYS 2427] Principles of Physics III (4:3:3)**. Prerequisite: PHYS 2401. Study of atomic, molecular, and nuclear phenomena. Relativity, quantum effects, hydrogen atom, many electron atoms, some molecular physics. Includes laboratory.
3000. **Undergraduate Research (V1-6)**. Individual and/or group research projects in basic or applied physics, under the guidance of a faculty member.
3302. **Cosmophysics: The Universe as a Physics Lab (3:3:0)**. Prerequisite: PHYS 2402. This course deals with topics from astrophysics, cosmology, and cosmic ray physics of interest to all physicists.
3304. **Modern Physics Laboratory (3:0:6)**. Prerequisite: PHYS 2402. Laboratory course on advanced physical principles, including experiments in optics, atomic, molecular, solid state, and nuclear physics.
- 3305, 3306. **Electricity and Magnetism (3:3:0 each)**. Prerequisite: PHYS 2401 and adequate mathematical background. Electric and magnetic fields, electrostatics, magnetostatics, electrodynamics, electromagnetic waves and radiation, special relativity, and Maxwell's equations throughout both courses.
3400. **Fundamentals of Physics (4:3:3)**. Prerequisite: MATH 1320. This course teaches the fundamentals of physics and strategies for teaching these fundamentals. This course is not open to engineering, science, or mathematics majors.
3401. **Optics (4:3:3)**. Prerequisite: PHYS 1408 and 2401. This course covers geometrical and physical optics, waves, reflection, scattering, polarization, interference, diffraction, modern optics, and optical instrumentation. (Writing Intensive)
4000. **Independent Study (V1-4)**. Prerequisite: Approval of advisor. Study of advanced topics of current interest under direct supervision of a faculty member.
4301. **Computational Physics (3:2:2)**. Prerequisite: PHYS 1408, 2401, 2402. Numerical modeling of physical systems. Data acquisition and analysis. Graphics for displaying complex

results. Quadrature schemes, solution of equations. Use of microcomputers in assignments.

4302. **Statistical and Thermal Physics (3:3:0)**. Prerequisite: PHYS 2402 and knowledge of differential equations. Introduction to statistical methods in physics. Formulation of thermodynamics and statistical mechanics from a unified viewpoint with applications from classical and quantum physics.
4304. **Mechanics (3:3:0)**. Prerequisite: PHYS 1408, 2401, or equivalent, and differential equations. Dynamics of particles and extended bodies, both rigid and fluid, using Newtonian mechanics and the Euler-Lagrange equations from Hamilton's principle. Nonlinear systems and chaos with numerical modeling. Applications of the Navier Stokes equation.
4306. **Senior Project (3)**. Prerequisite: Senior standing in physics or engineering physics. Individual research project under the guidance of a faculty member. (Writing Intensive)
4307. **Introduction to Quantum Mechanics (3:3:0)**. Prerequisite: MATH 3350. Experimental and conceptual bases. Dualism, uncertainty principle. Mathematical framework. Schroedinger equation, solutions. Hydrogen atom. Pauli principle, spin. Periodic table. Perturbation theory.
4309. **Solid State Physics (3:3:0)**. Prerequisite: PHYS 3305 and knowledge of elementary quantum mechanics. The structural, thermal, electric, and magnetic properties of crystalline solids. Free electron theory of metals. Concept of energy bands and elementary semiconductor physics.
4312. **Nuclear and Particle Physics (3:3:0)**. Prerequisite: PHYS 4307. This is a course dealing with modern nuclear physics covering such topics as nuclear structure models, radioactivity, nuclear reactions, elementary particles, nuclear conservation, forces, and symmetry.

Graduate Courses

5000. **Independent Study (V1-3)**. This course is to offer independent study under the direct supervision of a faculty member. This course is not to be used for thesis or dissertation research or writing.
5001. **Master's Internship (V1-12)**. Internship in an industrial or research laboratory setting. Arranged through the department and directly related to degree program with approval of Internship Coordinator.
5101. **Seminar (1:1:0)**. Must be taken by every graduate student for at least the first four semesters. Taken pass-fail.
5104. **Instructional Laboratory Techniques in Physics (1:1:0)**. Laboratory organization and instructional techniques. Does not count toward the minimum requirement of a graduate degree. Must be taken pass-fail by all teaching assistants when on appointment.
5300. **Special Topics (3:3:0)**. Prerequisite: Approval of graduate advisor. Topics in semiconductor, plasma, surface, particle physics, spectroscopy, and others. May be repeated in different areas.
5301. **Quantum Mechanics I (3:3:0)**. Experimental basis and history, wave equation, Schrödinger equation, harmonic oscillator, piecewise constant potentials, WKB approximation, central forces and angular momentum, hydrogen atom, spin, two-level systems, and scattering. M.S. and Ph.D. core course.
5302. **Quantum Mechanics II (3:3:0)**. Prerequisite: PHYS 5301 or equivalent. Quantum dynamics, rotations, bound-state and time-dependent perturbation theory, identical particles, atomic and molecular structure, electromagnetic interactions, and formal scattering theory. Ph.D. core course.
5303. **Electromagnetic Theory (3:3:0)**. Electrostatics and magnetostatics, time varying fields, Maxwell's equations and conservation laws, electromagnetic waves in materials and in waveguides. M.S. and Ph.D. core course.
5304. **Solid State Physics (3:3:0)**. Prerequisite: PHYS 5301 or equivalent. A survey of the microscopic properties of crystalline solids. Major topics include lattice structures, vibrational properties, electronic band structure, and electronic transport.
5305. **Statistical Physics (3:3:0)**. Elements of probability theory and statistics; foundations 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. M.S. and Ph.D. core course.

5306. **Classical Dynamics (3:3:0)**. Lagrangian dynamics and variational principles. Kinematics and dynamics of two-body scattering. Rigid body dynamics. Hamiltonian dynamics, canonical transformations, and Hamilton-Jacobi theory of discrete and continuous systems. M.S. and Ph.D. core course.
5307. **Methods in Physics I (3:3:0)**. Provides first-year graduate students the necessary skill in mathematical methods for graduate courses in physical sciences; applications such as coordinate systems, vector and tensor analysis, matrices, group theory, functions of a complex variable, variational methods, Fourier series, integral transforms, Sturm-Liouville theory, eigenvalues and functions, Green functions, special functions and boundary value problems. Tools course.
5309. **Atomic and Molecular Physics (3:3:0)**. Prerequisite: PHYS 5301 or equivalent. A survey of atomic and molecular physics. Major topics include group theory, molecular orbital theory, and energy transfer processes.
5311. **Nuclear Physics (3:3:0)**. Prerequisite: PHYS 5301. This is a course dealing with nuclear physics covering such topics as nuclear structure models, interactions, reactions, scattering, and resonance. Nuclear energy is discussed as an application.
5322. **Computational Physics (3:2:2)**. Numerical modeling of physical systems. Data acquisition and analysis. Graphics for displaying complex results. Quadrature schemes and solution of equations. Use of minicomputers and microcomputers. Tools course.
5324. **Classical Mechanics I (3:3:0)**. Prerequisite: PHYS 1308, MATH 3350, 3351, or equivalent. Introduction to Newtonian Mechanics, Euler-Lagrange Equations, and Hamilton's Principle. For graduate students in departments other than physics.
5330. **Semiconductor Materials and Processing (3:3:0)**. Survey of semiconductor materials deposition, characterization, and processing techniques with emphasis on the fundamental physical interactions underlying device processing steps.
5332. **Semiconductor Characterization and Processing Laboratory (3:1:4)**. A hands-on introduction to semiconductor processing technology and materials characterization techniques. Intended to accompany PHYS 5330.
5335. **Physics of Semiconductors (3:3:0)**. Theoretical description of the physical and electrical properties of semiconductors; Band structures, vibrational properties and phonons, defects, transport and carrier statistics, optical properties, and quantum confinement.
5336. **Device Physics (3:3:2)**. Principles of semiconductor devices; description of modeling of p/n junctions, transistors, and other basic units in integrated circuits; relationship between physical structures and electrical parameters.
5371. **Conceptual Physics for Teachers (3:3:0)**. Inquiry-based course in elementary physical principles of mechanics, heat, electricity, and magnetism.
5372. **Astronomy for Teachers (3:3:0)**. Inquiry-based course in solar system, stellar, and galactic astronomy. Discusses history of human understanding of the universe.
5380. **Introduction to Microsystems (3:3:0)**. Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces basic microsystem design, analysis, simulation, and manufacture through several case studies using representative devices.
6000. **Master's Thesis (V1-6)**.
6002. **Master's Report (V1-6)**.
6306. **Advanced Electromagnetic Theory (3:3:0)**. Prerequisite: PHYS 5303. Classical theory of electromagnetic fields, radiation, scattering and diffraction, special theory of relativity and electrodynamics, special topics. Ph.D. core course.
7000. **Research (V1-12)**.
7304. **Condensed Matter Physics (3:3:0)**. Prerequisite: PHYS 5304. Problems of current interest in condensed matter physics. Topics include transport properties in solids, superconductivity, magnetism, semiconductors, and related topics.
8000. **Doctor's Dissertation (V1-12)**.

Department of Political Science

Faculty

Philip Howard Marshall, Ph.D., Chairperson

Professors: Cochran, Dometrius, Khan, Lee, Marshall, Mayer

Associate Professors: Barkdull, Collins, Longoria, Patterson

Assistant Professors: Allen, Biglaiser, Goodman, Kim, McKenzie, Murray, Nokken, Opp, Prins, Thames

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Political Science
- Master of Arts in Political Science
- Master of Public Administration
- Doctor of Philosophy in Political Science

The department also participates in both the Latin American and Iberian Studies program and the Russian Language and Area Studies program leading to the Bachelor of Arts degree; a minor in women's studies; Honors College programs; and Arts and Sciences minors in urban studies, international studies, ethnic studies, Asian studies, and religion studies.

Undergraduate Program

The political science curriculum is designed to provide students with a solid foundation and broad understanding of the discipline of political science and allow them to specialize in areas of particular substantive interest. Students seeking an undergraduate degree in political science must complete 30 hours of coursework within the department. Political science majors are required to take POLS 1301. Although POLS 2302 is required, students who received an A or B in POLS 1301 may substitute another approved POLS course. All majors are required to take POLS 3310, 3361, 3371, and 15 hours of upper-level POLS courses (must include 6 hours of writing intensive courses).

The requirement for a minor in political science is 18 hours, including POLS 1301 and 2302. Students who received an A or B in POLS 1301 may substitute another approved POLS course for POLS 2302. Political science minors are also required to take either POLS 3361 or 3371 plus 9 hours of upper-level POLS courses.

Political science provides excellent instruction for students interested in politics, law, journalism, teaching, or civil service. Insight into political values, domestic policy issues, and foreign policy are invaluable for students interested in such careers as well as for careers in business.

Under state law, all students who receive bachelor's degrees from Texas Tech must have received credit for 6 semester hours in political science, covering the federal and Texas constitutions. Students will normally fulfill this requirement by completing POLS 1301, which is a prerequisite for all upper-division political science courses, and POLS 2302. A student who earns an A or B in POLS 1301 may substitute in place of POLS 2302 one of the upper-level courses marked with an asterisk in the course list. Permission of the instructor may be required for such substitution.

Teacher Education. Students seeking certification to teach in the secondary schools of Texas may qualify for such certification by completing requirements for the Bachelor of Arts. Consult the political science advisor and the College of Education for details.

Requirements and Prerequisites. POLS 1301 is a prerequisite for all upper-division political science courses. A student must receive at least a C in courses in political science that apply to major, minor, or teaching field requirements.

Joint Bachelor's and Master's Degree Program. Undergraduate political science majors may apply for admission to the political science master's program during their junior year. If accepted, they will begin taking graduate courses during their senior year. Nine hours of graduate coursework taken during the senior year will count toward both undergraduate and graduate degree requirements. For more information, contact the graduate advisor at polsgrad@ttu.edu or visit the department.

Political Science (POLS)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1301. [GOVT 2301, 2305] **American Government, Organization (3:3:0).** Constitutions and organization of the governments of the United States, the states in general, and Texas in particular.
2302. [GOVT 2302, 2306] **American Public Policy (3:3:0).** Completion of POLS 1301 not required but strongly recommended before enrolling in POLS 2302. The policy-making process in the governments of the United States, the states in general, and Texas in particular.
3300. **Selected Topics in Political Science (3:3:0).** Topics of contemporary interest, varying from semester to semester. Consult the department for current topic. Open to all students. May be repeated for credit with changing topics.
3310. **Introduction to Political Analysis (3:3:0).** Survey of methods of and approaches to the study of politics and their underlying assumptions as they apply to the major concepts of the discipline.
3311. **Political Data (3:3:0).** Prerequisite: Consent of instructor. An introduction to political data sources, their strengths and weaknesses and their uses in research.
- 3323.* **Legislation (3:3:0).** Factors involved in the framing and enactment of statutory law with emphasis upon the work of the Congress of the United States.
- 3325.* **Political Parties (3:3:0).** Party history, functions, organization, finance, nominations, campaign methods, and elections.
- 3326.* **Women in Politics (3:3:0).** A study of female political participation in the United States, including voting, campaign activity, interest group activity, and office holding. (W S 3326)
- 3327.* **The American Presidency (3:3:0).** The presidency, its constitutional basis, structure, powers, functions, and responsibilities.
3330. **Ancient and Medieval Political Theory (3:3:0).** Political ideas of the great thinkers in the Western world from the time of the Golden Age of Greece until the rise of modern political thought.
3331. **Introduction to Political Philosophy (3:3:0).** Basic issues and concepts in political philosophy, including discussion of such topics as justice, freedom, equality, authority, community, and the nature of politics and the state. (PHIL 3320)
3332. **Modern Political Theory (3:3:0).** Major political thinkers starting with Machiavelli and Hobbes and movements such as liberalism, conservatism, utilitarianism, socialism, and communism.
3333. **Contemporary Political Theory (3:3:0).** Political thought since World War II; liberalism, conservatism, socialism, communism, and existentialism are examined and criticized. Attention is given to the roots of contemporary thought in the 19th century.
- 3339.* **Religion and Politics (3:3:0).** Exploration of various aspects of the relationship between major world religions and politics, including questions of church and state.
- 3340.* **Fiscal Administration (3:3:0).** Governmental budgeting and revenue raising, emphasizing theories, techniques, procedures, implementation, the political environment in which such activities take place, and possible alternatives to existing practices.
- 3341.* **The Administrative Process (3:3:0).** A survey of the field of public administration. Principles of administrative organization; distribution of administrative functions together with the structure of government charged with the carrying out of public policy.
- 3346.* **Public Policy Analysis (3:3:0).** The study of public policy formulation, implementation, and evaluation at various levels of government. Particular focus on health, social, and development policies. Attention to policy analysis skills and approaches used in government and consulting.
- 3350.* **Criminal Process (3:3:0).** An introduction to the law and government in action when man and state are in conflict. Areas examined include the nature and rationale of punishment, legislative problems in defining criminal behavior, and judicial problems in adjudicating within the legislative framework.
- 3351.* **The Judicial Process (3:3:0).** Analysis of the judicial process as part of the political process; judicial personnel and organization; sources and instruments of judicial power; judicial reasoning and behavior; and impact of judicial activity.

- 3352.* **Constitutional Law-Powers (3:3:0).** A case study of American constitutional law emphasizing constitutional bases of governmental power. Leading cases demonstrating the principles of separation of powers, judicial review, taxation, commerce, and implied powers.
- 3353.* **Constitutional Law-Limitations (3:3:0).** Primarily a case study of American constitutional law emphasizing the constitutional limitations on government, with particular emphasis on personal, civil, and political liberties. The administrative process with particular emphasis on public law relating to the powers and procedures of administrative agencies having powers of adjudication and rule making.
- 3360.* **United States Foreign Policy (3:3:0).** Examines the patterns and processes that shape U.S. foreign policy.
3361. **International Politics (3:3:0).** Introduction to global issues, actions and processes: north-south relations, post-cold war issues, the role of the state, and leading theories of international relations.
3363. **International Organization (3:3:0).** A comparative study of the major organizations of the League of Nations and the United Nations; approaches to peaceful settlement of disputes, collective security, disarmament, regional organizations, and the future of world order.
3364. **Comparative Foreign Policy (3:3:0).** Surveys theories that connect domestic politics with foreign policy and applies them to a variety of countries.
3365. **War and Security (3:3:0).** Considers the basic problem in international relations; how to survive. How do countries attempt to secure themselves against foreign threats?
3366. **International Political Economy (3:3:0).** Explores interaction of politics and economics in trade, investment, finance, and development.
3368. **Transnational Issues (3:3:0).** Survey of current politics of human rights, migration, environment, and technological change.
3371. **Comparative Politics (3:3:0).** The primary institutions (e.g., parties, groups, executives, legislatures) and processes (e.g., voting, instability) of politics as well as relevant social structures are viewed in various national settings. Questions of how and why to compare also are considered.
3372. **Governments of Russia and the Commonwealth of Independent States (3:3:0).** Examination of the politics, governments, and cultures of Russia and the republics of the former Soviet Union.
3373. **Governments of Western Europe (3:3:0).** Political culture, party systems, institutions, and behavior in selected countries of Western Europe. Primary attention paid to France, Germany, and Italy. Comparison between European and American political systems will be emphasized.
3374. **Governments of Mexico and the Caribbean (3:3:0).** Culture and constitutional development, ideologies, and functions of political parties and pressure groups in Mexico and selected countries of Central America and the Caribbean. Special attention will be given to problems of nationalism, revolution, and interaction with foreign powers and corporations.
3375. **South American Governments (3:3:0).** The government and politics of countries such as Argentina, Bolivia, Brazil, Chile, and Peru. Includes consideration of special problems such as land tenure and terrorism.
3376. **Asian Governments and Politics (3:3:0).** Political culture, party systems, political structure, policy-making, and foreign policy in selected Asian countries. Primary attention focused on Japan, China, and South Korea.
3378. **Middle Eastern Governments and Politics (3:3:0).** Major political institutions in the nations of the Middle East; the impact of Islam on the Ottoman Empire; nationalism, constitutionalism, parliaments, parties, and governments in Turkey, Egypt, Syria, Lebanon, Iraq, Jordan, Saudi Arabia, Iran, and Israel.
4397. **Practicum in Politics (3).** Prerequisite: Consent of instructor. Practical experience integrated with academic study of politics through study programs or work experience. Credit or no credit. (May be repeated once for credit.)
4399. **Individual Studies (3).** Prerequisite: 15 hours of political science and consent of instructor. Independent research under the guidance of a staff member. (May be repeated once for credit.)

Graduate Courses

5100. **Colloquium in Political Science (1:1:0).** Prerequisite: Consent of instructor. Presentations of current research and

* A student who earns an A or B in POLS 1301 may substitute in place of POLS 2302 one of the upper-level courses marked with an asterisk. Permission of the instructor may be required for such substitution.

Graduate Program / Political Science

For the M.A. and Ph.D. degrees, the department emphasizes and encourages specialization in the following areas of political science: American institutions and behavior, comparative politics, and international relations. In addition, the department offers graduate courses in political theory, methodology, public policy, and public administration.

To be admitted to the M.A. or Ph.D. program, the student must submit a department application form along with three letters of reference. In addition, the student must complete the Graduate School admission process, including the Graduate School application form, submission of GRE scores, and submission of official transcripts showing prior graduate and undergraduate work. Students applying to any of these programs should have an overall GPA of at least 3.0 in undergraduate and graduate work. M.A. and Ph.D. students must develop their courses of study in consultation with the department's director of political science graduate programs.

Master's Programs

Master's degree work may follow either of two plans: 24 hours of coursework plus a thesis or 36 hours of coursework without a thesis. M.A. students are required to take POLS 5381 and 5482. The M.P.A. program requires 36 hours of coursework and an internship assignment. Courses are scheduled so that the M.P.A. degree may be obtained in evening study.

Master of Public Administration. The program for the Master of Public Administration degree is designed to prepare students to assume administrative positions in government and nonprofit agencies with particular emphasis on municipal government and specialty tracks associated with it. Persons already employed in government can be prepared to assume more advanced positions. Applicants to the M.P.A. program should complete the Graduate School application process and submit two letters of reference if they wish to be considered for a teaching assistantship.

Students are required to take 36 hours of graduate courses, including a specified core curriculum of 18 hours of public administration courses. All degree candidates lacking substantial prior administrative experience must also register for 6 hours of internship credit and complete internship responsibilities in a government or non-profit agency. Students will not be allowed to graduate with less than a B grade in any core course. A core course may be retaken only once. There are no foreign language or thesis requirements. M.P.A. students must develop their courses of study in consultation with the department's M.P.A. director. Comprehensive examinations are given during the last semester of the candidate's coursework.

Specialty tracks include public management, fiscal administration, policy analysis, health administration, health policy and planning, and nonprofit management.

Doctoral Programs

The doctoral degree requires a minimum of 60 semester hours of graduate work beyond the bachelor's degree, exclusive of credit for the dissertation. A minimum tool requirement for all Ph.D. students is the successful completion of POLS 5381 and 5382

(or their equivalents) plus POLS 5383. Additional language or tool requirements may be imposed at the time of the student's preliminary examination and will be tailored to the student's field of specialization. Students may be admitted directly into the doctoral program without first having completing a master's degree.

Students are required to complete coursework in one major field and two minor fields, one of which may be taken outside the department. For the qualifying examination, the student will select one major field and one minor field, and will be tested in those fields only. However, if the student chooses to take a minor outside the department, the outside field will automatically be counted as the second minor field and will be exempted from examination.

Additional information and application materials for these programs can be found at www.depts.ttu.edu/politicalscience. Interested students may also address questions and information requests to polsgrad@ttu.edu for the M.A. and Ph.D. programs and to mpa@ttu.edu for the M.P.A. program. A brochure providing additional information may also be obtained by writing to the department.

Joint Programs

Master of Public Administration—Master of Arts in Economics. The Department of Political Science and the Department of Economics and Geography, both in the College of Arts and Sciences, offer a 54-hour joint degree program leading to the Master of Public Administration and Master of Arts in Economics degrees. The program is designed primarily for students who wish to complement their administrative skills with knowledge of economics. The joint M.P.A.–M.A. in Economics degree program will be particularly helpful to students intending to specialize in areas such as fiscal administration, health administration, and policy analysis.

Students wishing to pursue this dual degree program must apply to, and be accepted by, both the M.P.A. program in the Department of Political Science and the Department of Economics and Geography. To fulfill the requirements of the dual-degree program, the student must take 18 hours of core courses in public administration, 18 hours of core courses in economics, and 12 hours of approved elective courses in public administration, economics, or in a related field, plus 6 hours of internship in public administration for a total of 54 hours. The first two years of study will consist entirely of the core courses in public administration and economics. The third year will consist of the balance of coursework in specialized areas in public administration or economics.

Doctor of Jurisprudence—Master of Public Administration. The Department of Political Science, in association with the School of Law, offers a program which enables the student to earn both the J.D. and M.P.A. degrees in approximately four years of full-time study. Both degrees can be completed with 102 hours of public administration and law courses (plus 6 hours of internship) instead of the 129 hours plus internship required if pursued separately. Application must be made and approved by both the School of Law and the Graduate School. No student may complete the M.P.A. program in less than 12 months.

- discussions of the political science profession by department and visiting faculty. Credit-no credit. May be repeated.
5200. **Teaching College Political Science (2:2:0).** Prerequisite: Consent of instructor. Strategies and innovations in teaching political science at the college level, including supervised teaching. May be repeated and taken as independent study. Credit-no credit. Does not count toward minimum degree requirements.
5321. **Seminar in Political Behavior (3:3:0).** Current research on mass political behavior, including public opinion, political socialization, and voting behavior. Topics vary each semester. May be repeated for credit.
5322. **Pro-Seminar in American Politics (3:3:0).** Advanced study in subjects relevant to an understanding of how the political process is affected by the environment of politics.
5324. **The Executive (3:3:0).** Study of the executive branch of government in the United States, with particular emphasis on the presidency.
5325. **The United States Congress (3:3:0).** An examination of the Congress, from formal organization, member recruitment, and theories of representation, to Congressional reform, policy-making, and interbranch relations.

5327. **Selected Topics in American Government and Politics (3:3:0).** Problems in American government and politics. Varying topics from semester to semester.
5330. **Ancient and Medieval Political Theory (3:3:0).** Political ideas of the great thinkers in the Western world from the time of the Golden Age of Greece until the rise of modern political thought in the 16th century.
5335. **Modern Political Theory (3:3:0).** Major political thinkers beginning with the 16th century and ending with Fascism.
5339. **Seminar in Political Theory (3:3:0).** Examination of ideas and concepts such as liberty, authority, justice, equality, and nationalism.
5356. **Judicial Behavior (3:3:0).** Political analysis of actors in the judicial decision-making arena.
5360. **Pro-Seminar in International Relations (3:3:0).** Survey of contending theories of world politics, focusing on those that emphasize the role of power and interest in shaping state behavior.
5361. **Interdependence and World Order (3:3:0).** Survey of contending theories of world politics focusing on those that emphasize interdependence, democratization, transnationalism, non-stage actors, and the potential for system transformation.
5363. **International Organization (3:3:0).** Theoretical examination of the rise of global, regional, and functional international organizations and their role in the solution of economic, social, environmental, and political problems.
5365. **Special Topics in International Relations (3:3:0).** Intensive research on topics in international relations. Subjects vary.
5367. **International Political Economy (3:3:0).** An exploration of the interaction of international politics and international economic trends. The course surveys the theories in the field, particularly as they relate to the political economy of trade, foreign investment, finance, and development.
5369. **International Security Studies (3:3:0).** This course examines how states maintain their security in a dangerous world.
5370. **Pro-Seminar in Comparative Politics (3:3:0).** Critical survey of the major theories and literature in comparative politics, the logic of cross-national and cross-cultural inquiry, and the major concepts and approaches.
5371. **Area Studies in Comparative Politics (3:3:0).** The culture and political system of a major geographical area like Western Europe, Latin America, or Asia. Topics vary each semester. May be repeated for credit.
5376. **Selected Topics in Comparative Government (3:3:0).** Studies in comparative politics, with topics varying from semester to semester.
5378. **Politics of the Developing Areas (3:3:0).** Substantive and theoretical-methodological issues in the study of the development process, emphasizing the political aspects of development.
5380. **Data Management (3:3:0).** This course covers locating and using data, including creating, accessing, and merging data files, preparing data for analysis, and dealing with data problems. Graded credit/no credit.
5381. **Research Design (3:3:0).** Design and execution of political research.
5382. **Data Analysis (3:3:0).** Techniques of analyzing political data, including descriptive and inferential statistics and computer applications. Concurrent registration in 5482 lab required.
5383. **Advanced Quantitative Research Methods in Political Science (3:3:0).** Prerequisite: POLS 5382 or equivalent. Extensions of the least squares model to such techniques as regression and diagnostics, structural equations, factor analysis and/or time series, and computer programs applicable to political data.
5384. **Advanced Political Analysis (3:3:0).** Prerequisite: Consent of instructor. Examination of contemporary methods for investigating selected political topics. Topics may vary from semester to semester. May be repeated for credit.
5396. **Research Practicum in International Relations (3:3:0).** Prerequisite: Consent of instructor. Organized professional research on major issues in international relations. May be repeated twice for credit.
5397. **Research Practicum in Comparative Politics (3:3:0).** Prerequisite: Consent of instructor. Organized professional research on major issues in comparative politics. May be repeated twice for credit.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Public Administration (PUAD)

(To interpret course descriptions, see page 8.)

Graduate Courses

5100. **Colloquium in Public Administration (1:1:0).** Prerequisite: Consent of instructor. Discussion of current issues in public administration led by department and visiting faculty. Credit-no credit.
5320. **Program Evaluation and Quantitative Analysis (3:3:0).** Prerequisite: Consent of instructor. Introduction to the design, logic, and politics of research methods appropriate for the evaluation of policies and programs before, during, and after their implementation.
5321. **Advanced Quantitative Methods in Public Policy and Administration (3:3:0).** Prerequisite: Consent of the instructor. Quantitative methods and approaches for analyzing public policy questions and data, including inferential statistics and the use of computer-based statistical programs.
5326. **Information Technology in Public Administration (3:3:0).** The role of information and communication systems are examined as well as applications used by public administrators. Emphasis is placed on understanding the systemic issues facing the application of information technology in the public sector.
5331. **U.S.-Mexico Border Administration (3:3:0).** Discussion of the history, politics, and social problems of the U.S.-Mexico borderlands, with an emphasis on the policy challenges posed by regional integration.
5333. **Environmental Policy and Administration (3:3:0).** Analysis of the formulation, implementation, and evaluation of environmental and natural resources policy, emphasizing theoretical foundations, political contexts, and principles of administering environmental policies.
5334. **Healthcare Policy and Administration (3:3:0).** Prerequisite: Consent of instructor. Analysis of the formulation, implementation, and evaluation of healthcare policy and service delivery, emphasizing skills and knowledge in policy-making, management, and decision-making.
5335. **Management of Nonprofit Organizations (3:3:0).** Study of the third sector and the administration of nonprofits, including laws, boards, personnel, volunteers, finances, grant writing, fundraising, marketing, and planning.
5337. **Public Organization Theory (3:3:0).** The major political and administrative theories applicable to public sector organizations are examined. Contemporary trends in organization theory and public management are emphasized.
5340. **Seminar in Public Administration (3:3:0).** Prerequisite: Consent of instructor. Critical survey of the field of public administration.
5341. **Public Policy Theory and Process (3:3:0).** Introduction to competing theoretic explanations of U.S. public policy making. Course will explore interactions between institutional actors, logic of administrative structure and delegated authority, and bureaucratic discretion.
5342. **City Management (3:3:0).** The political implications and administrative functions of city government are examined. Contemporary issues of municipal management are emphasized.
5343. **Public Personnel Administration (3:3:0).** Prerequisite: Consent of instructor. Description and analysis of the personnel function in public agencies.
5344. **Public Budgeting (3:3:0).** Political aspects of the budgetary process as the central mechanism for public resource allocation and executive planning.
5345. **Administrative Ethics (3:3:0).** Prerequisite: Consent of instructor. Considers applications of ethical systems and thinking in public organizations. Particular emphasis on the ethical dilemmas caused by administrative discretion and defining the public interest.
5346. **Public Financial Management (3:3:0).** Prerequisite: PUAD 5344 or consent of instructor. An in-depth study of government finance function with emphasis on fund structure, financial reporting, and related management practices including cash, debt, risk, and inventory management.
5347. **Internship in Public Administration (3:3:0).** Prerequisite: Consent of instructor. Service assignment in a public agency to enhance professional skills for students in the Masters in Public Administration program. Graded pass-fail and may be repeated for credit.
5348. **Selected Topics in Public Administration (3:3:0).** Special studies on subjects in public administration. Topics will vary from semester to semester.
5352. **Public Policy Analysis (3:3:0).** Introduction to analytic tools for evaluating public policies; examines policy choices given resources and informational constraints. Topics include risk assessment, cost-benefit analysis, and market failures.

Department of Psychology

Faculty

M. David Rudd, Ph.D., Chairperson

Horn Professor: C. Hendrick, S. Hendrick

Professors: Clopton, Cogan, Delucia, Durso, R. Maki, W. Maki, Marshall, McGlynn, Richards, Rudd, Taraban, Winer, Young

Associate Professors: Borrego, Cohen, Cook, Epkins, Garos, Harter, Morgan, Mumma, Reich, Robitschek

Assistant Professors: Bleckley, Cukrowicz, Hardin, Jones, Larsen,

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Psychology
- Master of Arts in Experimental Psychology
- Doctor of Philosophy in Clinical Psychology
- Doctor of Philosophy in Counseling Psychology
- Doctor of Philosophy in Experimental Psychology

The advanced degree programs in experimental psychology offer concentrations in cognitive/applied cognitive psychology, human factors, and social psychology. The clinical and counseling doctoral programs are fully accredited by the American Psychological Association. The Human Factors program is accredited by the Human Factors and Ergonomics Society. A combined B.A.–M.A. degree is also offered. The B.A. is in Psychology and the M.A. is in Experimental Psychology with a specialization in Human Factors.

Undergraduate Program

The undergraduate psychology curriculum is designed to provide a core of knowledge of the subject matter in experimental, theoretical, and applied psychology. Sufficient curricular flexibility is provided to permit a student to emphasize the acquisition of useful skills for later life, both vocational and personal; prepare for a graduate degree program in psychology or related fields; or both.

All undergraduate psychology majors must complete the following core program: PSY 1300, 3401, and 3400 or MATH 2300. All majors also must select at least one course from each of five areas:

1. Cognitive and Physiological Bases of Behavior: PSY 3317, 3327, 4323, or 4324.
2. Personality, Social, and Abnormal Bases of Behavior: PSY 3304, 3306, 3341, or 4305.
3. Developmental Bases of Behavior: PSY 3318, 4301, 4310, or 4330.
4. Applications: PSY 3334, 4302, 4320, 4321, 4326, 4327, 4334, 4342, 4343, or 4380.
5. Additional Topics in Psychology: PSY 2301, 2305, 3301, 3310, 3398, 4000, 4300, 4316, 4322, 4325, 4331, 4332, 4336, 4344, or 4384.

The required number of hours for the major is 34, including two writing intensive courses in psychology (PSY 3317, 3401, 4320, and 4336 are always WI; other courses are WI on a rotating basis). At least 21 hours of the total credits towards the major must be from 3000-4000 level courses. Transfer students who major in psychology must complete at least 9 credit hours in psychology at Texas Tech. All psychology majors must have a minor.

Students who are majoring in some field other than psychology and wish to minor in psychology must complete at least 18 credit hours in psychology, including PSY 1300 and at least three courses numbered at the 3000 or 4000 level. Transfer students who minor in psychology must complete at least 6 credit hours in psychology at Texas Tech.

Teacher Education. See the College of Education section of this catalog for teacher certification requirements.

Grades below C in psychology courses will not be acceptable for fulfilling major, minor, or teacher certification requirements.

In addition to offering regularly structured courses, the department provides opportunities to participate in various research and ser-

vice activities of faculty members. These are particularly valuable for the student who intends to pursue a career in psychology. Interested students should confer with an advisor or any of the faculty with whom they come into contact. Such activities may contribute to the completion of major and/or minor requirements through enrollment in PSY 4000 during the junior and senior years. Six hours of PSY 4000 may be counted toward the major and 12 hours may be counted toward the degree.

Psychology (PSY)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1300. [PSYC 2301] **General Psychology (3:3:1).** Introduction to fundamental concepts in psychology. Emphasis on the physiological, social, emotional, and environmental determinants of behavior. (Honors section offered)
2301. [PSYC 2308, 2309, 2310] **Child Psychology (3:3:0).** A study of the developmental processes and environmental factors that shape the personality and affect the achievement of the child.
2305. [PSYC 2307, 2313] **Adolescent Psychology (3:3:0).** A review of approaches to the understanding of the social behavior and development of the adolescent. Physical, mental, and emotional growth and adjustment are covered.
3301. **An Introduction to the Psychology of the Arts (3:3:0).** An introduction to various psychological perspectives on artistic production and appreciation.
3304. **Introduction to Social Psychology (3:3:0).** Prerequisite: PSY 1300. Study of individual experience and behavior in relation to social stimulus situations. Survey of experimental work and reports on current problems.
3306. **Personality (3:3:0).** Prerequisite: PSY 1300. Principles of normal personality structure.

Psychology Curriculum

		FIRST YEAR			
		Fall		Spring	
PSY 1300, General Psychology	3	ENGL 1302, Adv. Coll. Rhetoric	3		
ENGL 1301, Ess. Coll. Rhetoric	3	Oral Communication	3		
MATH 1300 (or above)	3	HIST 2301, History of Since 1877	3		
HIST 2300, History of U.S. to 1877	3	POLS 2302, Amer. Pub. Policy	3		
POLS 1301, Amer. Govt., Org.	3	Technology & Applied Science	3		
TOTAL	15	TOTAL	15		
		SECOND YEAR			
		Fall		Spring	
Minor Elective	3	Foreign Language	5		
Foreign Language	5	Minor Elective	3		
Natural Science	4	Natural Science	4		
MATH 2300, Statistical Methods	3	PSY-Group 2 (P)	3		
Health & Physical Fitness†	1	Psychology Elective	3		
TOTAL	16	TOTAL	18		
		THIRD YEAR			
		Fall		Spring	
Foreign Language	3	Foreign Language	3		
PSY 3401, Research Methods	4	Minor Elective	3		
English Literature	3	English Literature	3		
PSY-Group 3 (D)	3	PSY-Group 1 (C-P)	3		
Minor Elective	3	Humanities††	3		
TOTAL	16	TOTAL	15		
		FOURTH YEAR			
		Fall		Spring	
Psychology Elective	3	Psychology Elective	3		
PSY-Group 4 (App.)	3	Psychology Elective	3		
PSY-Group 5 (Add.)	3	Minor Elective	3		
Minor Elective	3	Humanities††	3		
Health & Physical Fitness†	1	Visual and Performing Arts	3		
Visual and Performing Arts	3	TOTAL	15		
TOTAL	16				

Choose from Core Curriculum requirements.

PSY 3401 is always writing intensive. Another writing intensive psychology course is also required.

† Select from health and physical fitness section of the Arts and Sciences General Degree requirements.

†† Some humanities classes also count toward the multicultural requirement.

Graduate Program

The advanced degree programs encompass a number of specialties within clinical, counseling, and experimental psychology. The clinical and counseling doctoral programs are fully accredited by the American Psychological Association. Both are based on a scientist-practitioner model. The experimental program offers master's and doctoral degrees. Students may concentrate in social, cognitive/applied cognitive, or human factors. The human factors specialty is accredited by the Human Factors and Ergonomics Society and offers a combined B.A.–M.A. degree in addition to the M.A. and Ph.D.

Admission to a graduate program in psychology requires the recommendation of the department as well as the approval of the graduate dean. Admission to degree programs is competitive and decisions on admission normally are made each spring for the following fall semester. Application instructions may be obtained by contacting the department or viewing www.psychology.ttu.edu. Students who are not officially approved for a degree program may not enroll in courses with a practicum component. Students may not take courses with a practicum component toward a minor in psychology without approval of the instructor.

- 3310. Psychology and Religion (3:3:0).** Prerequisite: PSY 1300. Examines historical perspectives on the psychology of religion, the experience of religion and spirituality from a psychological perspective, and the relations between psychology and religion.
- 3317. The Psychology of Learning (3:2:2).** Prerequisite: PSY 2400. A critical survey of methods, results, and interpretations of human and animal studies of learning processes. The laboratory paradigms will highlight principles discussed in lecture. (Writing Intensive)
- 3318. The Development of Children's Thinking (3:3:0).** Prerequisite: PSY 1300. Considers cognitive development from infancy to adulthood with attention to topics such as spatial cognition, concepts and categories, problem-solving, and language.
- 3327. Introduction to Physiological Psychology (3:3:0).** Prerequisite: PSY 1300. Introduction to neuroanatomy, electrophysiological measuring techniques, and the mechanisms of receptor and effector systems. A study of the relationships between behavior and the physiological substrate.
- 3334. Introduction to Professional Psychology (3:3:0).** Prerequisite: PSY 1300. Introduction to current practices of clinical and counseling psychologists, including clinical, diagnostic, and intervention strategies. Survey of career opportunities, professional issues, and ethical problems.
- 3341. Close Relationships (3:3:0).** Prerequisite: PSY 1300. Social psychology theory and research on topics in close relationship literature, including attitudes toward love and sexuality, friendship, intimacy, power, conflict, and divorce.
- 3398. Ethnic Minority Psychology (3:3:0).** Prerequisite: PSY 1300 and junior standing. Focus is on the psychosocial aspects that impact the four predominant ethnic minority populations in the United States. This course may be used to fulfill the multicultural requirement. (Writing Intensive)
- 3400. Statistical Methods (4:3:2).** Prerequisite: PSY 1300 or EPSY 3330. Introduction to descriptive and inferential statistics. Emphasis is placed on application to psychological research problems and an introduction to computer functions.
- 3401. Research Methods (4:3:2).** Prerequisite: PSY 1300; corequisite: PSY 3400 or MATH 2300. Survey of research methods in psychology. Emphasis on critical aspects of experimentation such as designing, conducting, and critiquing experiments, as well as interpreting and communicating results. (Writing Intensive)
- 4000. Individual Problems Course (V1-6).** Prerequisite: PSY 1300 and consent of instructor. Independent work under the individual guidance of a faculty member. May be repeated for up to 12 hours credit, only 6 of which may count toward fulfillment of the major in psychology.
- 4300. Psychology of Human Sexual Behavior (3:3:0).** Prerequisite: Junior standing. Study of human sexual behavior from a psychosocial viewpoint with emphasis on contemporary research methods and findings. (W S 4302) (Writing Intensive)
- 4301. Developmental Psychology (3:3:0).** Prerequisite: PSY 1300. An advanced study of the process of development through consideration of data, theories, and contemporary research issues.
- 4302. Service Learning in Psychology (3:1:8).** Prerequisite: Consent of instructor. Provides undergraduate psychology majors with an opportunity to earn credit doing supervised service in the community. May be repeated one time for credit toward overall degree requirements.
- 4305. Abnormal Psychology (3:3:0).** Prerequisite: PSY 1300 and junior standing. Personality deviations and maladjustments; emphasis on clinical descriptions of abnormal behavior, etiological factors, manifestations, interpretations, and treatments.
- 4306. Constructivist and Narrative Psychologies (3:3:0).** Prerequisite: PSY 3401 or consent of instructor. Introduction to theories, research, and applications of meaning-making psychologies, including constructivist, narrative, social constructionist, and feminist approaches. (Writing Intensive)
- 4310. Abnormal Child Psychology (3:3:0).** Prerequisite: PSY 1300 and junior standing. Description, classification, assessment, treatment, and research methods pertaining to behavioral and emotional disorders of childhood and adolescence.
- 4316. History of Psychology (3:3:0).** Prerequisite: PSY 1300 and junior standing. A survey of the historical development of modern psychology.
- 4320. Psychoanalytic Theory and Research (3:3:0).** Prerequisite: PSY 1300 and junior standing. From readings in psychoanalytic theory, a hypothesis will be chosen and tested by the group. The results will be discussed with psychoanalysts. Topics will vary. (Writing Intensive)
- 4321. Interviewing Principles and Practices (3:3:0).** Prerequisite: PSY 1300. Review of interviewing principles. Emphasis on skills that will apply directly to interview situations, such as industrial, clinical, and vocational counseling. Demonstration, recordings and discussion.
- 4323. Perception: Theories and Applications (3:3:0).** Prerequisite: PSY 1300. Survey of methods and findings in perception. Emphasis on demonstrations of perceptual phenomena; theories of visual perception (cognitive and ecological); applications. Topics include illusions, depth, motion.
- 4324. Cognition (3:3:0).** Prerequisite: PSY 3401. Introduction to cognitive psychology, including perception, attention, memory, language, problem-solving, decision-making, and the development of expertise.
- 4325. Drugs, Alcohol, and Behavior (3:3:0).** Prerequisite: PSY 1300. Survey of psychological factors involved in drug use and an introduction to chemotherapy used in treatment of mental illness.
- 4326. Human Factors Psychology (3:3:0).** Prerequisite: PSY 3401. Introduction to methods and findings in human factors psychology. Applications of psychological research to designs of machines, environments, and tasks.
- 4330. Psychology of Lifespan Development and Aging (3:3:0).** Prerequisite: Sophomore standing. Designed to give an overview of the physiological, cognitive, social-role, and motivation changes that occur with age from a psychological development viewpoint.
- 4331. Social Psychology of Groups (3:3:0).** Prerequisite: PSY 3304. Social psychology theory and research on topics in group dynamics, including group structure, influence, conflict, performance, decision making, and leadership.
- 4332. Health Psychology (3:3:0).** Prerequisite: PSY 3401. Introduces students to the contributions of psychology as a discipline to the understanding of health and illness.
- 4334. Introduction to Counseling and Psychotherapy (3:3:0).** Prerequisite: PSY 1300. Survey of current practice and theory in counseling and psychotherapy. Consideration of the research support for counseling and psychotherapy as an agent of change of behavior.
- 4336. Research in Personality and Social Psychology (3:2:2).** Prerequisite: PSY 3400 or MATH 2300; PSY 3401 and junior standing. Design, execution, and write-up of an individual research project in personality and social psychology. Discussion of research methods specific to these areas. (Writing Intensive)
- 4343. Language and Literacy Research and Applications (3:2:2).** Prerequisite: PSY 1300. Integration of the study of language, reading, and comprehension with research and tutoring experiences.
- 4344. Cognitive Science and Contemporary Culture (3:3:0).** Prerequisite: PSY 1300. Introduction to topics in the cognitive sciences, including language, intelligence, memory, and consciousness with connections to contemporary culture and artifacts.
- 4384. Forensic Psychology (3:3:0).** Prerequisite: PSY 3401 and 4305. Introduces students to the interface of psychology and law with a focus on forensic psychology (e.g., forensic psychological assessment, expert testimony).

4380. Intermediate Statistics for Psychologists (3:3:0). Prerequisite: PSY 3400 or MATH 2300. Second course in psychological statistics recommended for students planning to attend graduate school. Includes probability, correlation and regression, basic parametric and nonparametric inferential statistics.

Graduate Courses

5001. Problems in Psychology (V1-6). Prerequisite: 12 advanced hours of psychology and prior permission of instructor. Independent work under individual guidance of a staff member.

5002. Advanced Practicum in Counseling and Clinical Psychology (V1-6). Prerequisite: PSY 5316 or 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.

5003. Practicum in Human Factors (V3-6). Prerequisite: PSY 5370, 5372, 5380, and prior consent of the human factors program coordinator. Supervised practice in the profession of human factors with selected sites on or off campus. Emphasis is on real-world settings. May be repeated.

5004. Doctoral Internship in Counseling and Clinical Psychology (V1-6). Prerequisite: By arrangement with department chairperson. Full-time supervised internship in an appropriate facility. Enrollment required four times to complete one calendar year.

5101. Colloquium in the Teaching of Psychology (1:2:0). An overview of teaching methods as applied to the teaching of Psychology in the college classroom. Graded pass-fail.

5303. Developmental Psychopathology (3:3:0). Prerequisite: Consent of instructor. An examination of psychopathology in children, with consideration of the developmental course of various psychological disorders through childhood and adolescence.

5304. Practicum in Intelligence Testing (3:3:0). Prerequisite: Consent of instructor. A review of the historical and theoretical bases of intelligence testing in addition to instruction and supervised practice in scoring, interpreting, and reporting results from individual intelligence tests.

5306. Seminar in Contemporary Professional Issues (3:3:0). Prerequisite: Consent of instructor. A survey of the employment practices and prevailing legal and ethical standards in contemporary professional psychology.

5308. Vocational Psychology (3:3:0). Prerequisite: Consent of instructor. Review of theories, assessment tools, and interventions in vocational psychology including the integration of vocational issues into psychotherapy.

5309. Clinical Neuropsychology (3:3:0). Prerequisite: PSY 5304, 5338, and doctoral standing in psychology. Foundational course in brain-behavior relationships, neuropathology for neuropsychologists, neuropsychological assessment, and other clinical applications.

5310. Seminar in Child Assessment (3:3:0). Prerequisite: PSY 5303 and consent of instructor. A review of the procedures used in a comprehensive child assessment and the integration of this information for diagnosis and report writing.

5311. Introduction to Psychotherapeutic Intervention and Management (3:3:0). Prerequisite: Consent of instructor. Didactic introduction to psychotherapy procedures plus a practicum element.

5312. Introduction to Child and Adolescent Psychological Treatment (3:3:0). Prerequisite: Consent of instructor. Introduction to empirically-based treatment approaches pertaining to children, adolescents, and families, with a focus on case formulation and treatment planning.

5314. Projective Testing (3:3:0). Prerequisite: Second-year graduate status in clinical-counseling psychology or consent of instructor. A survey of projective assessment with emphasis on administration, scoring, and interpretation of the Rorschach.

5315. Objective Personality Assessment (3:3:0). Prerequisite: Graduate standing in the department, permission of instructor, and PSY 5338. Survey of objective personality and psychodiagnostic assessment including supervised practicum experience and methodological, empirical, theoretical, cultural, and ethical issues.

5316. Introduction to Counseling Psychology (3:3:0). Prerequisite: Admission to counseling psychology doctoral program or consent of instructor. Professional identity, research themes and strategies, and ethical standards of counseling psychology. Exploration of theories and techniques of counseling.

5317. Behavioral Assessment (3:3:0). Corequisite: PSY 5002 and consent of instructor. Principles of behavioral assessment including idiographic and time series analysis, cognitive / behavioral case formulation, and outcome evaluation. Practicum application to adults.

5318. Introduction to Clinical Psychology (3:3:0). Prerequisite: Admission to clinical psychology doctoral program. Supervised experience in interviewing. A study of different approaches to psychotherapy with adults.

5321. Nonparametric Statistical Analysis Techniques for Psychological Research (3:3:0). Includes one, two, and k sample designs plus measures of association. Some coverage of single case studies.

5322. Family Psychology (3:3:0). Prerequisite: PSY 5002 or 5311. An introduction to the field of family psychology and therapy. Ideas and techniques of the major approaches to family psychology and therapy.

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.

5326. Human Motivation: A Social Psychological Approach (3:3:0). Prerequisite: Consent of instructor. Examination of motivation from a social psychological perspective. Includes consideration of theoretical frameworks of motivation and application to a wide variety of research areas.

5327. Seminar in Social Cognition (3:3:0). An examination of research and theory on the mental activities that underlie social information processing and behavior.

5328. Seminar in Social Psychology (3:3:0). Prerequisite: PSY 3304. Contemporary attitude theory and research; systematic theory in social psychology; social structure and personality; the psychology of social movements and current research trends.

5329. Emotion (3:3:0). Prerequisite: PSY 3304 or equivalent. Advanced study of normal human emotion. Emphasis on social, cognitive, and physiological aspects of emotion.

5330. Attitudes and Attitude Change (3:3:0). Prerequisite: PSY 3304 or equivalent. Advanced study of the formation, organization, and change of social attitudes. Emphasis on current theory and research.

5331. Small Group Behavior (3:3:0). Prerequisite: PSY 3304. Advanced study of the nature and origin of small groups and interaction processes. Emphasis on data obtained from empirical studies rather than theoretical or logical analysis.

5332. Constructivist and Narrative Therapies (3:3:0). Prerequisite: PSY 5338 or equivalent. Introduces constructivist and narrative approaches to psychotherapy. Including theoretical bases, empirical research, clinical applications, training/supervision issues, and therapist development.

5333. Cognitive Behavioral Therapy (3:3:0). Prerequisite: PSY 5002 and 5318 or 5316. A critical analysis of the major concepts of psychological intervention approaches derived from contemporary learning and cognitive theory.

5334. Theories and Techniques of Psychotherapy (3:3:0). Prerequisite: PSY 5316. Consideration of theories of vocational development and counseling. Discussion of professional issues and problems related to the area of counseling psychology.

5335. Psychology of Trauma and Abuse (3:3:0). Prerequisite: Graduate standing and consent of instructor. Seminar examining theoretical models, empirical research, and professional issues related to effects of trauma and abuse, recovery processes, and psychotherapy.

5336. Child and Adolescent Development (3:3:0). A survey of the theoretical foundations of modern child psychology; psychoanalytic theories, social learning theories, cognitive-developmental theories, and comparative ecological theories, research strategies and appropriate models of development.

5338. Seminar in Psychopathology (3:3:0). Prerequisite: Graduate standing in the department or consent of instructor. A survey of theoretical perspectives and research findings concerning the causes, diagnosis, and treatment of psychopathology.

5340. Automaticity and Control in Social Behavior (3:3:0). Prerequisite: PSY 3304 or equivalent. Exploration of the automatic and controlled aspects of social behavior and thought across several areas of social psychology.

5345. Research Seminar in Clinical and Counseling Psychology (3:3:0). Prerequisite: PSY 5347. Survey of methods and approaches to research in these areas.

5347. Advanced Correlational Methods and Factor Analysis (3:3:0). Prerequisite: Consent of instructor. Comprehensive survey of multivariate analysis including multiple correlation and factor analysis and other correlational techniques. Review of analysis of co-variance.

5348. Advanced Multivariate Analysis for Psychologists (3:3:2). Prerequisite: PSY 5347. Covers topics in multivariate analysis including canonical correlation, multiway frequency tables, MANOVA, profile analysis, discriminant analysis, logistic regression, and time series analysis.

5350. **History and Systems of Psychology (3:3:0).** 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. **Psychophysiology (3:3:0).** Prerequisite: PSY 3327 or equivalent. Advanced study of human psychophysiology, including a survey of psychophysiological methods and their use to study selected topics in social and cognitive psychology.
5352. **Seminar in Learning Theory (3:3:0).** An examination of the general areas of learning and memory with particular attention on current theory and data.
5354. **Seminar in Perception: Theories and Applications (3:3:0).** Theoretical and applied issues in perception. Emphasis on demonstrations of perceptual phenomena (e.g., illusions, motion perception), theories of visual perception, and discussions of human-factors literature.
5356. **Seminar in Cognition (3:3:0).** A survey of the research and theory on human mental activities such as attention, memory, concepts, language processing, problem solving, and reasoning.
5357. **Seminar in Psycholinguistics (3:3:0).** Current models of language, reading, and comprehension with attention to topics such as syntax, prepositional representation, metacognition, decoding, beginning reading instruction, and related computational models.
5360. **Structural Equation Modeling for Psychologists (3:3:0).** Prerequisite: PSY 5347 and 5380 or equivalent. Advanced statistics course focusing on structural equation modeling, confirmatory factor analysis, and path analysis.
5367. **Analysis of Single-Subject and Time-Ordered Designs (3:3:0).** Prerequisite: PSY 5347 and 5380. Analysis of single-subject designs, including time-series regression and factor analysis, multilevel daily process designs, latent growth curve analysis, and psychological research applications.
5370. **Human Factors Psychology (3:3:0).** Survey of topics in human factors including human-machine interaction, visual performance, and transportation. Emphasis on presenting solutions to practical design problems and discussing applied literature.
5372. **Human Factors Methodology (3:3:0).** Overview of human factors methodology including task analysis, usability evaluation and its role in human-computer interaction, assessment of risk, human reliability, and error.
5373. **Cognitive Ergonomics (3:3:0).** Consideration of cognition in complex work environments with overviews of basic processes (e.g., attention, knowledge, comprehension), applied domains (e.g., sports, driving, industrial systems), and the modern concerns that arise (e.g., automation, teamwork).
5377. **Behavioral Medicine (3:3:0).** Prerequisite: PSY 5338 or equivalent. Introduces graduate students in the applied social sciences to the contributions of psychology to the understanding of health and illness.
5379. **Human-Computer Interaction (3:3:0).** Fundamentals of human-computer interaction including user interface design, usability and usability methods, cognition and user psychology, user-centered design, and understanding how designers think.
5380. **Experimental Design (3:3:0).** Prerequisite: Consent of instructor. Logical principles governing sound experimentation: conventional designs using analysis of variance. Introduction to complex analysis of variance designs and trend tests.
5382. **Psychopharmacology of Psychoactive Drugs (3:3:0).** Prerequisite: PSY 3327 or equivalent. Survey of neurophysiological and psychopharmacological effects of psychoactive drugs, including issues of treatment of mental illness and substance abuse.
5384. **Psychology and the Law (3:3:0).** Survey of the interface between psychology and law including topics in forensic psychology, expert testimony, and psychologists' influence in policy legislation.
5385. **Life Span Development: Psychobiological and Cognitive Processes in Aging (3:3:0).** Prerequisite: Consent of instructor. Study in theory and research involving changes in cognitive and physiological processes in adults with emphasis on middle-aged as well as older individuals.
5396. **Multicultural Counseling (3:3:0).** Prerequisite: PSY 5002 or 5311. Impact of privilege and culture (race, gender, sexual orientation, religion, disability, etc.) on individual experience and implications for culturally competent practice.
5398. **Ethnic Minority and Community Interventions (3:3:0).** Course focuses on research and clinical issues related to mental health services for ethnic minority populations and establishing community prevention-intervention programs.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Department of Sociology, Anthropology, and Social Work

Faculty

Jeffrey P. Williams, Ph.D., Chairperson

Professors: Dennis, D.P. Johnson, E. Johnson, Peek, Roberts, Tsai, Williams

Associate Professors: Dunham, Elbow, Hall, Koch, Paine, Schneider, Smithey, Walter

Assistant Professors: Durband, Houk, Lowe, Morrow, Ramirez, **Instructor:** Phelps

Adjunct Faculty: Stein, Way

About the Programs

This department supervises the following degree programs:

- Bachelor of Arts in Anthropology
- Bachelor of Arts in Social Work
- Bachelor of Arts in Sociology
- Master of Arts in Anthropology
- Master of Arts in Sociology

In addition, the department participates in the Latin American and Iberian Studies program leading to the Bachelor of Arts degree. The department also participates in the women's studies, urban studies, ethnic studies, environmental studies, family life studies, religion studies, Asian studies, and substance abuse studies minor programs. The minimum number of hours required for majors in all baccalaureate programs in the department is a total of 120 hours.

Undergraduate Programs

Sociology Program

The sociology program includes most of the major substantive areas of the discipline, ranging from interpersonal relations in families and elsewhere to the growth of cities and complex organizations to international relations. The department also offers a criminology concentration for sociology majors who wish to specialize in this area. Areas of faculty expertise include criminology and delinquency, marriage and the family, minority relations, gender, gerontology, social psychology, international development, medical sociology, sociology of religion, social research methods, and social theory. A major or minor in sociology is beneficial to students planning careers in a variety of areas, including business, law and law enforcement, international development, medicine, and social work. Courses in sociology fulfill Core Curriculum requirements in the social and behavioral sciences in Arts and Sciences and the university.

A student majoring in sociology must complete 30 hours in sociology; 18 hours should be advanced. A maximum of 9 hours of transfer credit may be accepted for the major. Specific course requirements are as follows:

1. SOC 1301, 3391, 3392, and 4395.
2. Either SOC 3393 or 3394. Students expecting admission to graduate work in sociology should take both of these courses.

Criminology Concentration. Sociology majors who wish to specialize in the study of criminology and receive the notation "Criminology Concentration" on their transcripts are required to complete five three-hour courses (15 hours) with a grade of C or better from two groups of courses as specified below.

1. Three core courses as follows, all of which must be taken: SOC 3327, 3329, and 4325

2. Two alternate courses to be chosen from among the following: ANTH 2305, 4343, PSY 4384, SOC 3368, 3383, and 4327

The sociology major with a concentration in criminology requires a total of 36 hours.

A student minoring in sociology must complete 18 hours of sociology, including SOC 1301. No more than 6 hours of transfer credit will be accepted for the minor.

Students must receive a grade of C or better in each sociology course if they wish it to count toward a major or minor in sociology or in the criminology concentration.

The minimum prerequisite that is recommended for all advanced courses is SOC 1301 or consent of instructor, unless otherwise indicated in the course description. Freshmen and sophomores who wish to take an advanced course are required to obtain the consent of the instructor in writing. All sociology courses except SOC 3391 provide credit in the individual or group behavior category of the university's social and behavioral sciences Core Curriculum requirements.

Teacher Education. Consult the College of Education section of this catalog for teacher certification requirements.

Anthropology Program

The Anthropology Program reflects the broad scope of the discipline, including the four areas of sociocultural and physical anthropology, archaeology, and linguistics. Well-equipped laboratories support research in archaeology and physical anthropology. The Summer Field School in Archaeology and field trips in Texas and the surrounding region are highlights of the curriculum. Sociocultural anthropology includes special emphasis on the multicultural United States, Latin America, Caribbean, and Southeast Asia.

A student majoring in anthropology must complete 31 semester hours in anthropology, including ANTH 2100, 2300, 2301, 2302 (or 1301), 3304 or 4305, 3345, 3305 or 3351, and 3310 or 3311. A maximum of 9 hours of transfer credit may be accepted for the major. With prior departmental approval, 3 advanced hours in related disciplines may be counted toward the major. A minor in anthropology consists of 18 hours, with at least 6 hours in upper-level courses. No more than 6 hours of transfer credit will be accepted for the minor. A grade of C or better must be received in each anthropology course by those working for a major or minor in the subject. No more than 6 hours of individual studies or field courses may be credited to the major.

Anthropology courses provide distribution credit in three areas of Arts and Sciences: humanities, natural science, and social and behavioral sciences. Courses so indicated give humanities or natural science credit; some others give social and behavioral sciences credit. In addition, anthropology courses fulfill a variety of humanities and social science requirements in other colleges of the university. Students in these colleges should check with advisors in their major departments to learn which anthropology courses fulfill their college and Core Curriculum requirements.

Social Work Program

The Bachelor of Arts degree in social work (usually referred to as a B.S.W.) at Texas Tech is accredited by the Council on Social Work Education. The program also offers a minor in social work. The curriculum is based on the generalist social work model which is intended to prepare graduates to work in a wide variety of social work settings with diverse populations. A graduate of the program should be prepared for several types of entry-level social work positions in public, private, and voluntary social agencies. The curriculum may also serve as a foundation for those interested in and qualified to continue their study toward a master's degree in social work (M.S.W.). Certain professional concentrations in social work

require completion of the M.S.W., which is not currently offered at Texas Tech.

In addition to the Core Curriculum requirements of the university and enhancements by the College of Arts and Sciences, social work majors are expected to complete courses covering social services (S W 2301), human behavior and the social environment (S W 3311 and 3312), diverse populations (S W 3331), social work practice (S W 3332, 3333, and 3334), social work evaluation and research (S W 3339), social welfare policy (S W 4311), and an integrative seminar with a supervised field practicum (S W 4340 and 4611). A minimum of 4 hours in human biology is also required. SOC 1301 must be taken before or with S W 2301. MATH 2300 or SOC 3391 (both are statistics) must be taken before S W 3339.

Since most social work classes are sequential (that is, they build on the previous classes), students are strongly encouraged to visit with the program director as soon as they declare a major or minor in social work to plan their course sequencing. However, the following may be used as a guide.

Social work majors are expected to complete these courses first:

- SOC 1301 either before or with S W 2301
- S W 2301 with either S W 3311 or 3312
- S W 3331 with S W 3311 or 3312

After completion of the above courses, social work majors should take the following courses:

- S W 3332 and 3333 together before 3334
- S W 3334
- S W 3339 (after Math 2300 or SOC 3391)

Finally, social work majors should take S W 4311, 4340, and 4611 together in their last semester.

Due to the nature and scheduling of the field placement, it may not be possible to take classes other than S W 4611 and 4340 during the field placement semester. No other coursework should be attempted during this final semester. Therefore, students are encouraged to meet all other requirements listed by the College of Arts and Sciences for the B.A. degree prior to this field placement semester.

In addition to the above 36 social work hours and their prerequisites, all social work majors are required to declare an 18-hour minor in another field at the time their degree plan is filed. Social work majors frequently minor in sociology, anthropology or psychology; other fields considered as minors include foreign language, human sciences, business, or education. The department recommends that social work majors discuss their options for a minor with the social work program director.

Requirements for Continuing as a Social Work Major

- Successful completion of S W 2301, 3311, 3312, and 3331 (grade of C or better in each).
- A cumulative social work grade point average of 2.5. (Students with a social work GPA of 2.0 to 2.49 may continue provisionally but must have a social work GPA of 2.5 by the end of the following semester.)
- Demonstrate compatibility with the social work profession.
- Demonstrate potential for success in the social work profession.

Social Work Minor. Sometimes students majoring in other fields choose to enhance their programs by selecting a minor in social work. All Texas Tech students are encouraged to consider this option, especially those who may be working with diverse populations or in social service agencies. A minor in social work could be a helpful adjunct for nursing students, education majors, psychology majors, pre-med students, and students in several of the areas of other human sciences. Required courses for the minor in social work include social services (S W 2301), human behavior and the social environment (S W 3311 and 3312), diverse populations (S W 3331), social work evaluation and research (S W 3339), and social welfare policy (S W 4311).

Graduate Programs

The graduate degree programs are designed to provide broad training for students who wish to enter a Ph.D. program, prepare for undergraduate or community college teaching, or pursue a nonteaching career for which M.A.-level training in sociology or anthropology is appropriate and useful. Both programs emphasize training in basic theory and methods.

Students in the sociology program may select the thesis option or nonthesis option. The thesis option is strongly recommended for students who plan to continue their graduate studies by applying to a doctoral program. Students choosing the thesis plan in sociology are required to take 30 hours of coursework (including two required courses in theory and two in methods) plus 6 hours of thesis credit. They are also required to complete a thesis that is acceptable to the student's departmental thesis committee and demonstrate proficiency in a computer language. Students may petition the Graduate Committee to substitute another organized course from within the department for one of the required theory and/or methods courses. Students choosing the nonthesis plan are required to take 36 hours of coursework (including one course in theory, two courses in methods, and 3 hours of SOC 5331). They are also required to complete a paper on a topic related to their professional interests that is acceptable to the student's departmental committee.

The sociology program allows coursework specialization in such areas as family, criminology and deviance, social psychology, social change, minority relations, demography, urban problems, medical sociology, gerontology, and sociology of religion. Six of the 30 hours required may be taken as a minor outside the department. Selection of a minor requires approval of the graduate committee. In the sociology program, in lieu of a foreign language, each student is required to demonstrate proficiency in computer analysis of data. A grade of B or better is required for graduate credit.

The anthropology core curriculum requires courses in the following four basic subfields: archeology, biological anthropology, linguistics, and cultural anthropology. The minimum requirements are 30 hours of coursework plus 6 hours of thesis credit. Students in the anthropology program are encouraged to use the minor to develop an area of emphasis either within the department (such as linguistics or sociology) or outside (such as biology, Latin American and Iberian studies, or museum science). A grade of B or better is required for graduate credit.

In both the sociology program and the anthropology program, a final examination is required. In the sociology program the final examination in the thesis plan involves at least one of the various areas in sociology listed above. In the nonthesis plan the examination includes coursework taken, work experience outside the department, and the topic of the formal paper. In the anthropology program the final examination is related to the general area of the thesis topic.

Decisions on the program of study, specific courses, and thesis topics are made through consultation with the graduate advisor in each program and other faculty members as appropriate on the basis of the individual student's background, interests, and objectives. With departmental approval, requirements may be amended for individuals with exceptional qualifications, or additional courses may be required for applicants with inadequate undergraduate preparation.

General admission requirements are those established by the Graduate School. The best preparation is an undergraduate major in the same field, either sociology or anthropology, or equivalent. However, students from other fields are also encouraged to apply. More specific information regarding admission procedures or other aspects of the graduate programs may be obtained from either the sociology or the anthropology graduate advisor.

Due to course requirements, the department recommends that social work minors take these courses in the following order (although more than one may be taken at a time): SOC 1301, S W 2301, S W 3311, S W 3312, S W 3331, MATH 2300 or SOC 3391 (must be taken before S W 3339), S W 3339, and S W 4611.

For further information, contact the program director at 806.742.2401 ext. 244.

Anthropology (ANTH)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1301. **Understanding Multicultural America (3:3:0)**. Cultural diversity in the U.S. as studied by anthropologists. Ethnographic descriptions of African-Americans, Hispanics, Native Americans and other groups. (Fulfills the state standard requirement in multicultural education for education majors.)
2100. **[ANTH 2101] Physical Anthropology Laboratory (1:0:3)**. Corequisite: ANTH 2300. Study of human and nonhuman primary biodiversity via skeletal biology and evolution concepts. Topics include anthropometrics, diet surveys, genetics, and exercises designed to explore human biodiversity issues.
2300. **[ANTH 2301] Physical Anthropology (3:3:0)**. Corequisite: ANTH 2100. Topics include human genetics, health, diet, and issues of human and nonhuman primate evolution. This course along with ANTH 2100 satisfies the College of Arts and Sciences Core Curriculum natural science requirement.
2301. **[ANTH 2302] Introduction to Archaeology (3:3:0)**. Introduces archaeology and what it has told us about our past, from the earliest beginnings to the birth of civilization.
2302. **[ANTH 2351] Cultural Anthropology (3:3:0)**. The rich complexity of peoples and cultures in the world as studied by anthropologists. Discussion of basic concepts such as ethnography, ethnocentrism, kinship systems, gender, and culture exchange. (Honors section and Spanish language section offered in some semesters.)
2305. **Forensic Anthropology (3:3:0)**. An introductory lecture course covering forensic anthropology. Topics include skeletal biology, forensic archaeology, age/sex identification, DNA and bone trauma, and courtroom and ethical responsibilities of the forensic anthropologist.
3300. **Anthropology and Contemporary Life (3:3:0)**. An anthropological approach to topics of current interest in American culture. Content varies. Topics have included anthropology and literature, the writings of Carlos Castañeda, evolution vs. creation, and sex and gender. May be repeated for credit.
3304. **Global Forces and Local Peoples (3:3:0)**. Prerequisite: ANTH 2302 or consent of instructor. Anthropological perspective on critical problems facing humanity: the aftermath of colonialism, the fate of indigenous peoples, changing family systems, and the reassertion of ethnic identity.
3305. **Anthropological Linguistics (3:3:0)**. A survey of the origins and development of human language, phonological and grammatical characteristics of languages, and distribution and relationship of languages and language families.
3306. **Women in Culture and Society (3:3:0)**. A comparative study of sex and gender in human society; biological and cultural factors that influence women's roles, status, and their contributions to cultural institutions. Counts toward women's studies minor. (W S 3306)
3310. **Human Evolution (3:2:3)**. Prerequisite: ANTH 2300 or consent of instructor. Study of human origins and evolution as a mammal, primate, and bioculturally adapting species. Emphasizes principles in evolution and systematics and recent discoveries in paleoanthropology. (Writing Intensive)

3311. **Human Variation (3:2:3)**. Prerequisite: ANTH 2300 or consent of instructor. ANTH 3310 is not a prerequisite. Study of human heredity, biodiversity, and adaptations. Survey of the physical and genetic variations of modern populations throughout the world. (Writing Intensive)
3312. **Primate Behavior (3:3:0)**. A survey of the biological and behavioral diversity of nonhuman primates. Emphasizes issues concerning evolution, social organizations, and conservation of prosimians, anthropoids, and hominoids. (Writing Intensive)
3314. **Human Ecology and Adaptation (3:3:0)**. Prerequisite: ANTH 1301 or 2300 and 2100, or consent of instructor. Survey of human biological adaptability, the dual inheritance of genes and culture, human survival, emerging infectious disease.
3315. **Health, Medicine, and Culture (3:3:0)**. The anthropology of health; concepts of illness, health, and aging in different cultures, including the role of the healer in the Third World. Recommended for health preprofessionals.
3317. **Anthropology, Epidemiology, and Global Health (3:3:0)**. Prerequisite: ANTH 1301 or 2300 and 2100, or consent of instructor. Introduction to communicable-disease epidemiology; covers theory and methods, transmission, surveillance and control, emerging infectious diseases.
3323. **Religion and Culture (3:3:0)**. A cross-cultural examination of religious phenomena including belief systems, sacred symbols, ritual, shamanism, and revitalization movements. Emphasis is on nonwestern religions. Provides humanities credit in Arts and Sciences.
3325. **Anthropological Folklore (3:3:0)**. The role of folklore not only as entertainment but as explanation and validation of ways of life: myth, parable, legend, proverbs, riddles, and fairy tales. Gives humanities credit in Arts and Sciences. (Writing Intensive)
3331. **Indians of North America (3:3:0)**. The experience of Native American peoples from their discovery of the New World to their present status. Incorporates historical and ethnographic approaches; selected case studies. (Writing Intensive)
3332. **Peoples of Latin America (3:3:0)**. The anthropology of Latin America: the high cultures of prehispanic times, the conquest and colonial periods, and the tribal and peasant peoples of today, including such groups as Amazonian tribesmen, Andean peasants, and Chicanos. Recommended for Latin American and Iberian Studies students. (Writing Intensive)
3340. **Topics in Old World Archaeology (3:3:0)**. Through archaeology, examines the ancient civilizations of Egypt, Mesopotamia and the Indus Valley, and China in successive semesters. May be repeated twice when topics vary.
3341. **Laboratory Archaeology (3:0:3)**. Provides hands-on training in processing and analysis of archaeological materials in the laboratory and exposure to other aspects of archaeological research centered in the lab.
3342. **Prehistory of the Southwest (3:3:0)**. Introduction to the prehistory of the Southwest beginning with the first humans to enter the area up to the period of Spanish colonization.
3343. **Maya Archaeology (3:3:0)**. A survey of ancient Maya prehistory and archaeology with emphasis on religion, world view, iconography, and hieroglyphic writing.
3344. **South American Archaeology (3:3:0)**. Covers the prehistory of South America from the earliest colonization to the development of civilizations with special emphasis on the Central and South Central Andes.
3345. **North American Archaeology (3:3:0)**. Prerequisite: ANTH 2301 or consent of instructor. A study of the archaeological background of aboriginal Americans with a particular interest in artifacts and art and the architecture of past civilizations.
3346. **Ancient Civilizations of Middle and South America (3:3:0)**. Prerequisite: ANTH 2301 or 3304 or 3345 or consent of instructor. The origins, development, and cultural achievements of the great civilizations of Middle and South America: the Incas, Aztecs, Mayas, and their predecessors. Gives humanities credit in Arts and Sciences.
3347. **Texas Prehistory (3:3:0)**. Prerequisite: ANTH 2301 or consent of instructor. A comprehensive survey of 12,000 years of human activity in Texas; the major prehistoric sites and findings of archaeological studies.
3348. **Introduction to Historical Archaeology (3:3:0)**. Introduces students to the methods and theories of historical archaeology. The course will focus on the post-1492 era in North and South America.
3349. **Archaeology of the Northern Spanish Frontier (3:3:0)**. This course will familiarize students with the history and archaeology of the Spanish occupation of the borderlands in the New World with particular emphasis on the Southwest U.S.
3351. **Language and Culture (3:3:0)**. An inquiry into the interrelations of language and other aspects of culture; languages as reflecting or actively molding human perception and experience. Gives humanities credit in Arts and Sciences.
3371. **Peoples of the Southwest (3:3:0)**. A survey of this area's cultural heritage, including prehistoric and contemporary Indian peoples, and the immigrant Anglo, Hispanic, and other cultural groups of recent times. (Writing Intensive)
4000. **Individual Problems in Anthropology (V1-3)**. Prerequisite: ANTH 1301, 2300, 2301, or 2302 plus advanced standing and consent of instructor prior to registration. May be repeated for credit.
4305. **Doing Ethnography: Method and Theory (3:3:0)**. Prerequisite: ANTH 2302 or consent of instructor. The history of research in cultural anthropology, development of methodological and theoretical approaches, and the exploration of ethnographic fieldwork and writing.
4341. **Archaeological Methods and Techniques (3:2:3)**. Prerequisite: ANTH 2301 or consent of instructor. A presentation of the methods and techniques, such as field reconnaissance and site excavation, laboratory analysis, and reporting used by archaeologists to determine and define the ancient human past.
4343. **Human Skeletal Biology and Forensic Techniques (3:3:0)**. Prerequisite: ANTH 3310 or 3311. Intensive study of skeletal biology emphasizing subadult and adult morphological variation. Includes analysis of paleopathology, trauma, age sex, and stature estimation.
4345. **Paleopathology (3:3:0)**. Prerequisite: ANTH 2300, 2100, and 4343, or consent of instructor. This course offers students an appreciation of the dynamic nature of human bone as it relates to the health of prehistoric populations.
4347. **Evolution Medicine (3:3:0)**. Prerequisite: ANTH 2300 and 2100 or consent of instructor. Examines human evolutionary biology; biocultural context of health, illness, medicine, and reservoir-vector studies of human infectious diseases.
4372. **Society and Culture of Mexico (3:3:0)**. Mesoamerican culture history, emphasizing Indians villagers, migrants to the cities, and other groups studied by anthropologists. Study of the cultural processes that have created modern Mexico. Taught in Spanish some semesters.
4642. **Field Archaeology (6:2:8)**. Prerequisite: ANTH 2301 and 4341 or consent of instructor. A summer session field school providing instruction in basic archaeological field techniques, including site survey, test excavations, record keeping, mapping, and collection documentation.

Graduate Courses

5301. **Exploring Human Diversity (3:3:0)**. Human evolution and prehistory, world languages, and cultural diversity in the postmodern world. A one-semester graduate level introduction to the field for teachers and the general public.
5305. **Doing Ethnography: Method and Theory (3:3:0)**. The history of research in cultural anthropology; development of methodological and theoretical approaches, and the exploration of ethnographic fieldwork and writing.
5310. **Primate Behavior (3:3:0)**. A survey of the biological and behavioral diversity of nonhuman primates. Emphasizes issues concerning evolution, social organization and conservation of prosimians, anthropoids and hominoids.
5311. **Human Origins (3:2:2)**. A comprehensive examination of hominid evolution with emphasis on current discoveries, interpretations, and theories. Seminar on selected topics.
5312. **Human Diversity (3:2:2)**. Survey of biological variation and the processes producing it in human populations and races; seminar in selected topics. Laboratory emphasizing research approaches to current problems.
5313. **Human Skeletal Biology and Forensic Anthropology (3:3:0)**. Prerequisite: Graduate standing in anthropology, biology, museum science, or consent of instructor. Analysis of human skeletal remains for legal purposes. Methods of identification, techniques of recovery and examination, facial reconstruction, report writing, limits of inference, expert testimony.
5314. **Human Ecology and Adaptation (3:3:0)**. Survey of human biological adaptability, the dual inheritance of genes and culture, and human survival.
5317. **Anthropology, Epidemiology, and Global Health (3:3:0)**. Introduction to communicable-disease epidemiology; covers theory and methods, transmission, surveillance and control, emerging infectious diseases.
5322. **Social Anthropology (3:3:0)**. Seminar in contemporary social anthropology. Selected topics in kinship, social, and political organization; warfare and conflict resolution; and ritual and symbolism.

5323. **Topics in Cultural Anthropology (3:3:0)**. May be repeated for credit.
5341. **Method and Theory in Archeology (3:2:2)**. An intensive survey of the development and present status of method and theory in archeology.
5343. **Topics in Anthropological Archeology (3:3:0)**. Examination of either a currently important methodological topic in archeology or the archaeological knowledge extant from a site or geographic unit. May be repeated for credit. Also offered as a summer field course.
5345. **Paleopathology (3:3:0)**. Prerequisite: Consent of instructor. This course offers students an appreciation of the dynamic nature of human bone as it relates to the health of prehistoric populations.
5347. **Evolution Medicine (3:3:0)**. Examines human evolutionary biology; biocultural context of health, illness, and medicine; and reservoir-vector studies of human infectious diseases.
5349. **Field Studies on Infectious Disease Ecology, Surveillance, and Control (3:3:0)**. Prerequisite: Consent of instructor. Summer session field school providing instruction and experience in the field of epidemiology of infectious diseases, emphasizing original research in the developing world.
5352. **Ethnolinguistics (3:3:0)**. Survey of the nature of the inter-relationships between language and culture.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Social Work (S W)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

2301. **[SOCW 2361] Introduction to the Social Welfare Institution (3:3:0)**. Prerequisite or corequisite: SOC 1301. An examination of society's responses to human needs and social problems through the development of voluntary and governmental social policies and services. (Writing intensive.)
3311. **Human Behavior and the Social Environment I (3:3:0)**. Prerequisite or corequisite: S W 2301. An examination of the interaction of the person and his/her environment with emphasis on systemic-related behavior, populations-at-risk, and diversity.
3312. **Human Behavior and the Social Environment II (3:3:0)**. Prerequisite or corequisite: S W 2301. An examination of the interaction of the person and his/her environment with emphasis on biological, social, emotional, and cultural systems across the life-span.
3331. **Social Work with Diverse Populations (3:3:0)**. Integrated approach to the theory, values, and skills of social work practice with culturally diverse populations. The emphasis is empowering vulnerable populations to fulfill their potential.
3332. **Social Work Practice: Interaction Skills (3:3:0)**. Prerequisite: S W 2301, 3311, 3312 and 3331; corequisite: S W 3333. A foundation course in the theory and principles of interviewing and professional relationship-building skills for generalist social workers. Social work majors only.
3333. **Social Work Practice: Macro Systems (3:3:0)**. Prerequisite: S W 2301, 3311, 3312 and 3331; corequisite: S W 3332. Examination of knowledge base and application of intervention skills for generalist social work practice with organizations and communities. Social work majors only.
3334. **Social Work Practice: Micro Systems (3:3:0)**. Prerequisite: SW 3332 and 3333. An examination of the knowledge base and application of intervention skills for generalist social work practice with individuals, families, and small groups. Social work majors only.
3339. **Social Work Research and Evaluation (3:3:0)**. Prerequisite: MATH 2300 or SOC 3391. An introduction to the scientific approach of social work knowledge. Emphasis is on evaluation of social welfare programs and social work practice.
4300. **Independent Study in Social Work (3)**. Prerequisite: Consent of instructor and senior standing as a social work major or minor. Independent study in social work theory, practice, policy, research, or policy evaluation.
4311. **Social Policy and Social Welfare Legislation (3:3:0)**. Prerequisite: S W 2301, 3311, and 3312. In-depth analysis of the process of social policy with emphasis on social welfare and social service delivery systems. (Writing intensive.)
4340. **Social Work: Field Placement Integrative Seminar (3:3:0)**. Prerequisite: S W 3334; corequisite: S W 4611 or S W 3339 with permission of instructors for both classes. A seminar designed to increase the integration of social work knowledge,

skills, and values used in the student's individual practice of social work. Social work majors only.

4611. **Social Work: Field Experience (6:0:30)**. Prerequisite: S W 3334; corequisite: S W 4340. A closely supervised individual experience using social work knowledge, methods, skills, and ethics in a social agency selected and certified by the social work program. Must be taken pass-fail. Social work majors only. Professional liability insurance required.

Sociology (SOC)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1301. **[SOC1 1301] Introduction to Sociology (3:3:0)**. Human group behavior, influence on the individual, and relationships of individuals to each other as members of groups.
1320. **[SOC1 1306] Current Social Problems (3:3:0)**. Problems in basic social institutions as marriage and the family, community, economy, government, education, health and welfare, recreation, etc.
2331. **[SOC1 2301] The Sociology of Marriage (3:3:0)**. History, present status, and current problems of the marriage institution. (W S 2331)
3324. **American Minority Problems (3:3:0)**. Sociological analysis of the major racial and ethnic groups in the present United States.
3325. **Gendered Lives (3:3:0)**. Study of the gendered nature of society, emphasizing the experiences of women in such areas as family, health, and the economy. (W S 3325)
3327. **Sociology of Law and Policing (3:3:0)**. Examines social forces affecting the development and current operation of criminal law and policing. Special attention given to contemporary issues concerning each.
3329. **Sociology of Corrections (3:3:0)**. Prerequisite: SOC 1301. Introduction to U.S. corrections systems. Sociological examination of trends and issues in prisons, parole, probation, and community corrections. (Writing Intensive)
3331. **Sociology of the Family (3:3:0)**. Changing family life styles, mate roles, parent-child relationships, adoption, abortion, population control, technical-industrial impact on American family unit. (W S 3331)
3332. **Sociology of Bureaucracy (3:3:0)**. Governmental, business, and industrial bureaucracies in international perspective with an emphasis on internal structure, relationship between organization and society, and their impacts on human behavior.
3335. **Family Violence (3:3:0)**. Surveys definitions, prevalence, and theories of family violence. Focuses on impact of variations in definitions of family violence and societal responses to family violence.
3337. **Inequality in America (3:3:0)**. Inequality as expressed in occupational, class, ethnic, and sexual hierarchies is examined from varying sociological perspectives. (W S 3337)
3348. **Sociology of China and Japan (3:3:0)**. A sociological approach to the peoples and institutions of China and Japan. Emphasis is placed on comparing Chinese and Japanese ways of life vis-à-vis the American way of life.
3352. **Technology and Society (3:3:0)**. Explores the interrelationships between technology and society, emphasizing the impacts of technology on society and social factors contributing to the development and diffusion of technology.
3368. **Sociology of Deviance (3:3:0)**. Study of different forms of deviant behavior in Western societies, emphasizing the social relativity of deviance and theories that attempt to explain it. Examples of topics include tattooing, drug abuse, topless dancing, pedophilia, and mental illness.
3383. **Alcohol, Drugs, and Society (3:3:0)**. Analysis of social factors related to the use and abuse of alcohol and other drugs.
3391. **Introduction to Social Research I (3:3:0)**. Nature of research process; elementary problems of design; data collection and analysis; interpretation of research.
3392. **Introduction to Social Research II (3:3:0)**. Prerequisite: SOC 3391. Nature of research process; elementary problems of design; data collection and analysis, interpretation of research. (Writing Intensive)
3393. **Development of Sociological Theory (3:3:0)**. Emergence of systematic sociological theory out of social philosophy; evolution of sociology as a discipline in the late 19th century.
3394. **Contemporary Sociological Theories (3:3:0)**. Review of selected current perspectives on social behavior, such as functionalism and systems theory, conflict and critical theory, symbolic interactionism, rational choice, sociology of emotions, structuration theory, feminist theory, and postmodern perspec-

- tives. Special attention given to linkages between micro and macro levels of the social world. (Writing Intensive)
4307. **Individual Studies in Sociology (3)**. Prerequisite: Consent of instructor and high scholastic achievement. Independent study. May be repeated for credit.
4311. **Sociology of the Person (3:3:0)**. Prerequisite: SOC 1301. Effects of group membership on individual attributes and behavior; focuses on the influence of experience in primary groups and positions in social structure.
4316. **Aging and Society (3:3:0)**. Theory and research on aging; covering demographic, socio-cultural, economic, individual, and social factors.
4325. **Criminology (3:3:0)**. Crime and deviant behavior as a social process and their regulation in a democratic society. (Writing Intensive)
4327. **Juvenile Delinquency (3:3:0)**. Delinquency is reviewed as a form of deviant behavior. Attention is given to prevalent theories of causation, distribution, and frequency of delinquency, and the treatment, prevention, and control of delinquent patterns of behavior.
4331. **Religion and Society (3:3:0)**. The sociological study of religious groups and beliefs. The reciprocal relationships between religious institutions and society.
4362. **Cities and City Life (3:3:0)**. The modern city in its ecological, cultural, and social aspects.
4381. **Sickness, Health, and Society (3:3:0)**. The sociological study of the medical institution and its interrelationship with other societal institutions. Differential definitions of health and illness.
4382. **The Sociology of Mental Illness (3:3:0)**. Analysis of the problems of mental health and illness from the sociological perspective. Study of sociological approaches to the definition of mental illness; the social epidemiology of mental illness, problems of recognizing and defining conditions of mental illness, and hospital and community treatment of mental illness.
4395. **Senior Seminar (3:3:0)**. Prerequisite: Senior standing. A capstone course for sociology majors that integrates, extends, synthesizes, and applies sociological knowledge. (Writing Intensive)

Graduate Courses

5303. **Seminar in Contemporary Sociological Theory (3:3:0)**. Study of contemporary approaches to society, including conflict theory, functionalism, symbolic interaction, and ethnomethodology.
5308. **Seminar in the Origins of Social Theory (3:3:0)**. Development of sociological theory in the nineteenth and early twentieth centuries. Topics may vary, but emphasis usually will be on the work of Marx, Durkheim, and Weber.
5311. **Seminar in Criminology (3:3:0)**. Critical review of theory and research on selected topics in criminology.
5312. **Seminar in Urban Problems (3:3:0)**. Extensive analysis of the process and consequences of urbanization, with emphasis upon causation and critiques of proposed solutions.
5313. **Seminar in Minority Relations (3:3:0)**. American and world patterns of interethnic relations are covered with emphasis on recent and current trends.
5315. **Seminar in Social Change (3:3:0)**. Linear and cyclical theories; analysis of the idea of progress, stage theories, dialectical materialism, and the lag hypothesis.
5316. **Seminar in Social Gerontology (3:3:0)**. Theory and research on aging, covering demographic, sociocultural, economic, individual, and societal factors. Interdisciplinary aspects are stressed.
5320. **Social Psychology: Symbolic Interactionism (3:3:0)**. Central ideas of social psychology are analyzed and integrated in a contemporary model of symbolic interactionism, with focus on affect.
5325. **Seminar in Deviant Behavior (3:3:0)**. Critical review of current theory and research in deviance.
5327. **Seminar in Demography (3:3:0)**. Theory and skills of population analysis including use of census data in sociological and social science research.
5331. **Field Research (3)**. Individual research project off campus, covering entire term or longer. Research plans must be approved in advance by the student's major advisor. May be repeated for credit with permission.
5332. **The Research Organization (3:3:0)**. Participation in campus-based organized research project. Required at least once of research assistants; open to other students.
5334. **Quantitative Methods in Sociology (3:3:0)**. Prerequisite: Undergraduate introduction to quantitative methods. Decision making skills (from test selection to inferences from data) for quantitative analysis in sociology.
5335. **Seminar in Family Violence (3:3:0)**. Advanced examination of definitions, prevalence, and theories of family violence. Focuses on impact of variation in definitions of family violence and societal responses to family violence.
5336. **Seminar in Family Change (3:3:0)**. Analysis of how the family institution has changed, in relation to other institutions and society in general. Family is treated as both a dependent and independent variable.
5381. **Seminar in Medical Sociology (3:3:0)**. Theory and research on conceptions of health, illness, and medical care from the sociological perspective.
5382. **Seminar in Psychiatric Sociology (3:3:0)**. An examination of theories of mental illness, the commitment process, mental hospitals, mental health professions, and alternative treatment programs.
5384. **Seminar in the Sociology of Religion (3:3:0)**. Examination of the religious institution focusing on its sociological meaning, organizations, presence as a force in western society, and relationship to other social institutions.
5394. **Seminar in Sociological Research Methods (3:3:0)**. An examination of the research process including problem formation, case selection, data collection, and data organization.
6000. **Master's Thesis (VI-6)**.
7000. **Research (VI-12)**.



Rawls College of Business

Allen McInnes, Ph.D., Dean

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About the College

The Rawls College of Business offers educational programs in all areas of business while advancing knowledge through research, providing community service, and supporting the development of business in the global economy. Fulfilling these objectives creates a stimulating learning environment for the student and expands the frontiers of knowledge.

The baccalaureate and master's programs in business administration and accounting are fully accredited by the AACSB International, the national accrediting organization for business and management programs.

Degree Programs

The college offers programs leading to the following degrees:

- Bachelor of Business Administration
- Master of Business Administration
- Master of Science with a major in Business Administration
- Master of Science in Accounting
- International Master of Business Administration
- Doctor of Philosophy with a major in Business Administration

Dual-Degree/Joint Programs

- Bachelor of Business Administration/Bachelor of Science in Architecture
- Bachelor of Business Administration/Bachelor of Science in Agricultural and Applied Economics
- Bachelor of Science in Agribusiness
- Master of Business Administration/Master of Architecture
- Master of Business Administration/Master of Science in Environmental Toxicology
- Master of Business Administration/Master of Science in Personal Financial Planning
- Master of Business Administration/Doctor of Medicine
- Master of Business Administration/Master of Arts in Foreign Language
- Master of Business Administration/Doctor of Jurisprudence
- Master of Science in Accounting/Doctor of Jurisprudence
- Master of Science in Business Administration/Master of Science in Personal Financial Planning

At the undergraduate level, students may major in accounting, economics, finance, general business, international business, management, management information systems, marketing, and energy commerce. Joint majors with programs in other colleges include agribusiness, general business/agricultural and applied economics, and business/architecture.

Faculty

Horn Professors: Conover, J. Hunt, S. Hunt, Westfall

Professors: Blair, Boal, Browne, Burns, Clancy, Dowell, Duhan, Dukes, Ewing, Gardner, Goebel, Hein, Hoffman, Howell, Laverie, Lumpkin, Macy, Mann, McInnes, Mitchell, Nichols, Pasewark, Ricketts, R. Sorenson, Viator, Wetherbe, Wilcox, Wilkes, Winters, Yadav

Associate Professors: Arnett, Bremer, Buchheit, Cooney, Durrett, Ford, Gillan, Harrison, Jones, Krefting, Lin, Malone, Masselli, McDonald, Mercer, Ritchey, Short, Song, Wan

Assistant Professors: Bauguess, Brigham, Carlson, Cashman, Cogliser, D. Davis, Delgadillo, Hansen, Lightner, T. Payne, Quinn-Trank, Roman, Romanus, Stegemoller, Wagner, Walden, Whitby
Instructors: Allen, Anderson, Brown, Clark, Drennon, Duran, Edwards, Flamm, Giddens, Harper, Hoover, Hughes, Jones-Bigbee, Kelley, Kennedy, Lynn, McInturff, McWhorter, Nix, D. Payne, Reed, Schiermeyer, Schuetzeberg, Sloan, Smithee, Stevens, Stull, Westney, Whitebread

Accelerated Program: Joint B.B.A.—Master's

This is an accelerated program leading to a bachelor's in business administration and a master's in business administration or accounting. The program is designed for academically outstanding undergraduate students who wish to complete a master's degree at Texas Tech. Completion of this program can enhance starting salaries and career advancement.

The accounting joint B.B.A.—M.S. in Accounting (M.S.A.) is a 150-hour program that is designed for students who plan to take the CPA exam and have a professional career in accounting.

Students should apply to the graduate component of the program during their junior year. Graduate coursework cannot be taken prior to acceptance. Application materials are available in the Rawls College of Business Graduate Services Center. Admitted students will combine undergraduate and graduate courses during the final semester of their undergraduate work.

Undergraduate Program

Honors College for Business Majors. Students from all areas of the Rawls College of Business may enter the Honors College. Students with high grade point averages are encouraged to apply for admittance into this prestigious program. Honors sections are usually offered in the following business courses: ACCT 2300, 2301, 3304, 3307, MGT 3370, 3373, 4373, 4374, 4377, 4378, 4379, MKT 3350, and FIN 4326.

Lower-Division Curriculum. The lower-division requirements should be completed during the freshman and sophomore years. All students wishing to major in business are classified as COBA (College of Business Administration) until completion of the Lower-Division Business Core (B A 1101, ENGL 1301, 1302, MATH 1330, 1331, 2345, ACCT 2300, 2301, ISQS 2340, and ECO 2301, 2302) with grades of C or higher and attainment of a minimum 2.75 adjusted cumulative Texas Tech GPA. Upon the attainment of these minimum requirements, application may then be made to the Undergraduate Services Center for a specific major. Admission to the lower-division COBA designation does not assure admission to any upper-division major in the Rawls College of Business. Note that the minimum GPA for any major may increase due to limited space availability.

Mathematics Requirement. A mathematics course must be taken each enrollment until the requirement is fulfilled because both MATH 1330 and 1331 must be completed with grades of C or higher before taking some of the required sophomore business courses.

Foreign Language Requirement. Any student who is admitted to the university without two years of high school credit (8th through 12th grades) in the same foreign language must complete two semesters of a single foreign language in college. The college-level foreign language courses will replace free electives in the B.B.A. program.

Prelaw Studies. Students interested in attending law school after graduation may pursue any of the regular programs offered.

Graduation Requirements

The Bachelor of Business Administration degree will be awarded to all students who fulfill the following minimum requirements:

- Satisfactory completion of all courses and minimum hours as outlined for each major.
- A minimum Texas Tech adjusted 2.0 GPA.
- Completion of the last 30 hours following official admission into the Rawls College of Business.

Application for Graduation. At least one year before the proposed graduation date, application for the degree must be made through the Undergraduate Services Center. Graduation is attained by fulfilling the requirements for a B.B.A. degree using an eligible catalog edition. It is the student's responsibility to fulfill all catalog requirements.

Admission of Transfer Students

Students planning to take their first two years of work at a junior or community college should follow the lower-division degree plan. A maximum of 66 hours can be accepted provided none of the courses are vocational, career, or upper-division courses (with the exception of BLAW 3391).

Courses that are acceptable from a four-year institution are the lower-division requirements, junior-senior level economics courses (except ECO 3323 and 4332), free electives, and the following upper-division core: FIN 3320, ISQS 3344, MGT 3370, MKT 3350, and BLAW 3391. The last 30 hours must be taken while registered in the Rawls College of Business.

Students transferring from any institution must have at least a cumulative 2.75 GPA or higher on hours taken at any college or university (a minimum of 12). Transfer credit is not used in the calculation of a student's Texas Tech grade point average. The Rawls College of Business has the authority for determining which

transfer courses apply toward a B.B.A. degree program. Only free electives will be accepted as pass-fail. Official transcripts from all institutions are needed before the acceptance of transfer credit.

Students requesting permission to transfer from another college at Texas Tech must have a 2.75 adjusted cumulative GPA or higher on a minimum of 12 credit hours and must bring a copy of all transcripts to the Undergraduate Services Center prior to being officially admitted to the Rawls College of Business. A student is officially admitted to the college by a formal transfer completed by the Undergraduate Services Center. Upper-division business and economics courses will be used in the degree program if the student had an adjusted cumulative 2.75 GPA when the courses were taken and the B.B.A. lower-division business core was completed. No business administration minor course can be used in place of a major requirement.

The last 30 hours prior to graduation must be taken while enrolled in the Rawls College of Business.

General Standards and Requirements

Accreditation. The AACSB International prescribes that at least 50 percent of the total hours in the undergraduate program must be in General Education courses.

Catalog Selection. Students will use the catalog issued for the year in which they were first officially admitted to the Rawls College of Business or a more recent catalog if approved. However, if they later transfer to another institution or another college at Texas Tech, they will use the catalog in effect when they are readmitted to the Rawls College of Business. For these purposes, a catalog expires after seven years.

Correspondence Courses. Free electives, ENGL 1301, 1302, and lower division non-business or non-economics courses may be taken by correspondence, up to a maximum of 18 hours. Lower-division business core, upper-division core, and major courses are excluded. A correspondence course should not be used for graduation when completed during the student's last semester.

Course Load. The normal course load for a semester is 15 to 19 hours. The maximum load for a semester is 19 hours (8 hours for a summer term). Correspondence courses are included in a student's course load. The maximum course load for students on probation is 16 hours.

Course Prerequisites. Prerequisites are governed by the catalog in effect when the course is taken.

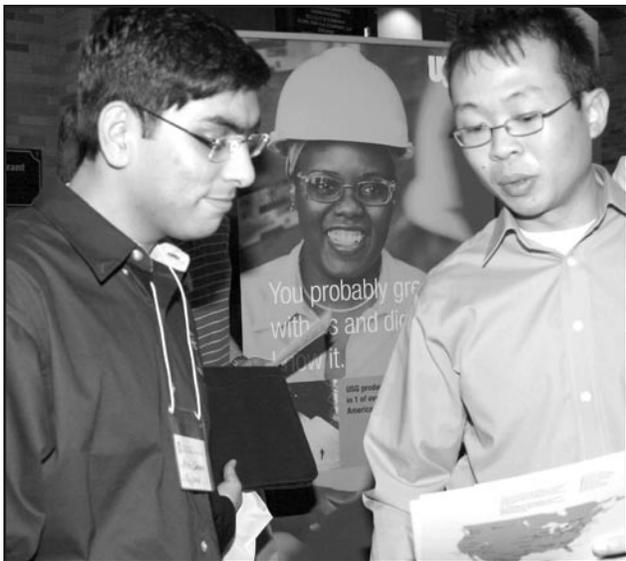
Grades of Incomplete. A grade of I (incomplete) must be removed at Texas Tech University, not by transfer credit.

Ineligible Registrations. The Rawls College of Business reserves the right to drop any ineligibly registered student from a course for reasons such as lower division/upper division rule infractions and lack of prerequisites, including required GPAs. Courses taken ineligibly are not used in the degree program.

Laptop Computers. Freshmen admitted for fall 2007 should be aware that laptop computers may be required for junior-level and higher courses starting fall 2008. The specifications for these laptops will not be set until spring 2008.

Nondegree Students. A nondegree form must be signed in the Undergraduate Services Center before registration. The nondegree status will continue until a written request for a change has been approved by the Undergraduate Services Center. All prerequisites and academic regulations based on GPA, such as probation and suspension, apply to nondegree students. Courses taken while in the nondegree status may not be used as part of a degree program.

Pass-Fail. Only free electives are eligible for the pass-fail option. No free elective in a student's major area may be taken pass-fail (e.g., accounting course for an accounting major) even if major courses have been completed, nor can a course be taken pass-fail that could be used for a group A or B requirement unless that group has been satisfactorily completed.



Probation and Suspension. See the Undergraduate Academics catalog section concerning probation and suspension policies.

Requirements to Declare an Upper-Division Major. The Rawls College of Business curriculum consists of two parts: A lower division and an upper division. The lower-division requirements should be completed during the freshman and sophomore years. All students majoring in business are classified as prebusiness majors (COBA designation) until completion of the lower-division business core with grades of C or higher and attainment of a minimum 2.75 adjusted cumulative Texas Tech GPA. Upon attainment of the minimum requirements, application may be made to the Undergraduate Services Center for a specific business major. Admission to the prebusiness major (the lower-division COBA designation) does not assure admission to any upper-division major in the college. Students must meet minimum GPA requirements in effect when a major is declared. Note that the minimum GPA for any major may increase due to limited space availability.

Second Undergraduate Degree. No second bachelor's degree is conferred until the candidate has completed at least 24 semester hours (exclusive of credit by exam) after admission for the second degree. Students must be approved by the Undergraduate Services Center to seek a second degree and have at least a 2.75 GPA in their first degree. A second bachelor's degree sought by a student who did not graduate from a public Texas university must include the required Core Curriculum.

Study Abroad. Students requesting permission to study abroad in business programs must have a minimum 2.75 adjusted Texas Tech GPA and lower-division core completed. Please check with the International Business programs office for specific program requirements.

Summer Work. Coursework to be taken at other institutions must be approved prior to enrollment by a Rawls College undergraduate advisor. Credit from other institutions is not calculated into the student's Texas Tech GPA.

Services

Advising. Each undergraduate student in the college is provided with an academic advisor located in the Undergraduate Services Center on the second floor of the BA building. Advisors have the expertise and capability to provide the necessary guidance during each student's degree program and are aided by a computerized degree audit.

Upper-division students should maintain contact with an advisor in the Undergraduate Services Center concerning degree requirements and with faculty advisors for help in selecting courses to achieve career objectives.

Dual-Degree, Joint Programs

B.B.A. and B.S. in Architecture. This dual-degree program is designed to provide a broad background for a variety of careers in business, government, architecture, and building-related industries with emphasis on developing analytical tools and skills with managerial perspectives, thereby enhancing worldwide career opportunities. See the College of Architecture section of this catalog for a full program outline. A 2.75 Texas Tech GPA is required.

B.B.A. and B.S. in Agricultural and Applied Economics. This dual program leads to two degrees: a Bachelor of Business Administration with a major in General Business and a Bachelor of Science with a major in Agricultural and Applied Economics. Students completing these dual-degree programs will have increased understanding of business management principles, concepts, and analytical abilities as applied to agribusiness. See the College of Agricultural Sciences and Natural Resources section for a full discussion of the program. A 2.75 Texas Tech GPA is required.

B.S. in Agribusiness. This distinctive Bachelor of Science joint program prepares students for careers in agribusiness by providing a curriculum that includes courses designed to develop interpersonal and communication skills, business-economics skills, technical-quantitative skills, and ethics. Courses in international business equip students for the world economy and provide marketability for a wide range of careers. This is a joint program administered by the College of Agricultural Sciences and Natural Resources and the Rawls College of Business. See the College of Agricultural Sciences and Natural Resources section of this catalog for a full program outline. A 2.75 Texas Tech GPA is required.

Minors

Minor for Non-Business Students. The requirements for a minor for students in other colleges are as follows:

- Must have a minimum 2.75 adjusted cumulative Texas Tech GPA to declare a minor.
- All prerequisites must be met prior to taking each course.
- A minimum grade of C is needed to complete minor requirements.
- All junior- and senior-level business courses must be taken at Texas Tech University.
- Correspondence courses cannot be used in the minor.

General Business Minor—18 hours

ECO 2302	Principles of Economics II.
B A 3301	Fundamentals of Marketing (Prerequisite: ECO 2302 and a minimum 2.75 adjusted cumulative GPA)
B A 3302	Financial and Managerial Accounting. (Prerequisite: minimum 2.75 adjusted cumulative GPA)
B A 3303	Foundations of Finance. (Prerequisite: minimum 2.75 adjusted cumulative GPA and B A 3302)
B A 3304	Operations Management. (Prerequisite: minimum 2.75 adjusted cumulative GPA)
B A 3305	Organization Management. (Prerequisite: minimum 2.75 adjusted cumulative GPA).

Lower-Division Curriculum

		FIRST YEAR		
		Fall		Spring
B A 1101, Fund. Bus. Professionalism	1	MATH 1331, Intro. Math. Anal.		3
MATH 1330, Intro. Math. Anal.	3	ENGL 1302, Adv. Coll. Rhetoric		3
ENGL 1301, Ess. Coll. Rhetoric	3	HIST 2301, Hist. U.S. Since 1877*		3
Humanities*†	3	Natural Science*†		4
(I B majors should substitute foreign language course)		Visual and Performing Arts*†		3
Natural Science*†	4	(I B majors should substitute foreign language course)		
(ENCO majors take GEOL 1303 & 1101)		TOTAL		16
HIST 2300, Hist. of U.S. to 1877*	3			
TOTAL	17			
		SECOND YEAR		
		Fall		Spring
ACCT 2300, Fin. Acct. ^	3	ACCT 2301, Man. Acct.**		3
ISQS 2340, Intro. Info. Sys. Bus.	3	MATH 2345, Intro. Stats. Bus.		3
ECO 2301, Prin. Economics I	3	ECO 2302, Prin. Economics II		3
POLS 1301, Amer. Govt., Org.*	3	POLS 2302, Amer. Pub. Pol.*		3
Multicultural course*†	3	Elective (Non B A or Non Eco.) or foreign language for I B majors,* and ENCO 3301 for ENCO majors		3
TOTAL	15	TOTAL		15

* Does not require a grade of C or higher.

† Choose from Core Curriculum requirements. Natural science must include both a lecture and a lab.

^ Accounting and finance majors must achieve A or B.

** Accounting majors must achieve A or B

Upper-Division Curriculum

Junior- and senior-level business and economics courses may be taken upon admission to the upper division of the college. Admission to upper division will be granted upon completion of the lower-division business core with grades of C or higher and attainment of a minimum 2.75 cumulative Texas Tech GPA. Upon attainment of these minimum requirements, application may then be made to the Undergraduate Services Center for a specific major. Admission to the lower-division COBA designation does not assure admission to any upper-division major in the Rawls College of Business. Note that the minimum GPA for any major may increase due to limited space availability.

Accounting Major

The primary objective of the undergraduate accounting program is to prepare students for accounting positions at the entry level in government, industry, and other organizations in the public and private sectors. A major in accounting is also excellent preparation for law school or graduate school. A 2.75 adjusted cumulative Texas Tech GPA and an A or B in ACCT 2300, 2301, and 3304 are required to declare accounting as a major. **Students should be aware that the undergraduate degree in accounting will not prepare them to sit for the CPA examination.** The requirements to take the CPA examination in Texas include a bachelor's degree, 30 hours of accounting beyond introductory courses, a minimum of 150 total hours, and a 3-hour approved course in ethics. The B.B.A. in accounting includes 18 hours of accounting beyond introductory. Accounting majors must also take ACCT 3101 as a prerequisite or corequisite to ACCT 3304 or 3305. Students who plan to take the CPA exam are encouraged to apply to the 150-hour M.S.A. program. Students in the 150-hour M.S.A. program should take the approved Business Ethics as a graduate class.

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ACCT 3304, Intermed. Acct. I [^]	3	ACCT 3305, Intermed. Acct. II	3
ACCT 3307, Income Tax Acct.	3	MKT 3350, Intro. to Marketing	3
Economics Course**	3	ACCT 3315, Acct. Systems	3
ISQS 3344, Intro. Prod. & Oper.	3	FIN 3320, Financial Mgt.	3
MGT 3373, Managerial Comm.	3	MGT 3370, Organiz. & Mgt.	3
ACCT 3101, Sem. in Prof. Practice	1	TOTAL	15
TOTAL	16		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
BLAW 3391, Business Law I	3	MGT 4380, Strategic Management	3
ENGL 3365, Prof. Rept. Writing* or COMS 3358, Bus. & Pro. Comm.	3	Non-accounting Electives* [#]	8
		Non B A / Non ECO Elective*	3
ACCT 3306, Prin. Cost & Mgr. Acct.	3	TOTAL	14
ACCT 4301, Principles of Auditing	3		
TOTAL	12		

Minimum hours required for graduation – 120

- * This course does not require a grade of C or higher.
- ** Any upper-level economics course except ECO 3323 and 4332.
- # These courses may be business (except accounting) or non-business.
- † Students going into the 150-hour program will have 18 hours of major courses and 8 hours of non-accounting electives. Elective hours may be adjusted to meet minimum hour requirement of 120.
- ^ Must achieve A or B to declare accounting major.

150-Hour Accounting B.B.A. / M.S.A. Major

The primary objective of the 150-hour program is to prepare students for careers in public accounting, consulting, industry, and other organizations and is strongly recommended for students who want to become certified public accountants. After admission to the 150-hour program, students must select a concentration from auditing-financial reporting or taxation. The program may differ if the student elects to participate in an internship. The appropriate graduate faculty accounting advisor should be consulted for approval of the graduate program prior to the seventh semester. Upon completion of all requirements for the M.S.A. degree, the B.B.A. degree will be granted.

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ACCT 3304, Intermed. Acct. I [^]	3	ACCT 3305, Intermed. Acct. II	3
ACCT 3307, Income Tax Acct.	3	MKT 3350, Intro. to Marketing	3
BLAW 3391, Business Law	3	ACCT 3315, Acct. Systems	3
ISQS 3344, Intro. Prod. & Oper.	3	FIN 3320, Financial Mgt.	3
MGT 3373, Managerial Comm.	3	MGT 3370, Organiz. & Mgt.	3
ACCT 3101, Sem. in Prof. Practice	1	TOTAL	15
TOTAL	16		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ACCT 4301, Prin. of Auditing	3	Graduate Courses	6
Economics Course**	3	ENGL 3365, Prof. Rept. Writing	3
ACCT 3306, Prin. Cost & Mgr. Acct.	3	Non-accounting elective*	3
Non-accounting electives*	6	TOTAL	12
TOTAL	15		

Minimum hours required for graduation – 150. Elective hours may vary to meet requirements.

- * These are the only courses not requiring a grade of C or higher. Courses may be business (except accounting) or non-business and can be taken pass/fail. If not already fulfilled, the multicultural requirement should be completed with an elective, but not taken pass/fail.
- ** Any upper-level economics course except ECO 3323 and 4332.
- ^ Must achieve A or B to declare accounting major.

Economics Major

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ECO 3311, Intermed. Macroecon.	3	BLAW 3391, Business Law I	3
FIN 3320, Financial Mgt.	3	ECO 3312, Intermed. Eco. Theory	3
MGT 3370, Organiz. & Mgt.	3	ECO 3323, Prin. of Money, Bnk. & Credit	3
MKT 3350, Intro. to Marketing	3	or FIN 3323, Intro. to Fin. Mkt. & Inst.	
ISQS 3344, Intro. Prod. Oper. Mgt.	3	MGT 3373, Managerial Comm.	3
TOTAL	15	Group A**	3
		TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ECO 4323, Monetary Theory	3	MGT 4380, Strategic Management	3
Group A**	3	Free Electives*	9
Group B†	6	TOTAL	12
Elective (Non B A / Non Eco.)*	3		
TOTAL	15		

Minimum hours required for graduation – 120

- * These are the only courses not requiring a grade of C or higher and may vary in number to meet 120-hour requirement.
- ** Group A – Choose two courses from ECO 3320, 4332 (or FIN 4328), FIN 4323, 4325, 4326, and 4329.
- † Group B – Choose two courses from ECO 3324, 3326, 3330, 3333, 3336, 4305, 4314, 4331, MGT 4372, or remaining Group A.

Accelerated Economics B.B.A. / Master's

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR			
Fall		Spring	
ECO 3311, Intermed. Macroecon.	3	BLAW 3391, Business Law I	3
FIN 3320, Financial Management	3	ECO 3312, Intermed. Eco. Theory	3
MGT 3370, Organiz. & Mgt.	3	ECO 3323, Prin. Money, Bank. & Cr.	3
MKT 3350, Intro. to Marketing	3	or FIN 3323, Intro. to Fin. Mkt. & Inst.	3
ISQS 3344, Intro. Prod. & Oper.	3	MGT 3373, Managerial Comm.	3
TOTAL	15	Group A**	3
		TOTAL	15

FOURTH YEAR			
Fall		Spring	
ECO 4323, Monetary Theory	3	MGT 4380, Strategic Management	3
Group A**	3	Graduate Courses	9
Group B (3 hours)†	3	TOTAL	12
Free Elective *	6		
TOTAL	15		

* These are the only courses not requiring a grade of C or higher.

** Group A – Choose two courses from ECO 3320, 4332 (or FIN 4328), FIN 4323, 4325, 4326, and 4329.

† Group B – Choose one course from ECO 3324, 3326, 3330, 3333, 3336, 4305, 4314, 4331, MGT 4372, or remaining Group A courses.

Finance Major

The goal of this major is to enhance leadership potential by providing a high-quality and thorough education as preparation for careers in banking, business finance, investment management, and real estate. To declare a finance major, students must make a B or better in ACCT 2300 and FIN 3320.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermed. Acct. I	3	ECO Elective***	3
BLAW 3391, Business Law I	3	FIN 3321, Fin. Statement Anal.	3
FIN 3320, Financial Management	3	FIN 3323, Intro. to Fina. Mkt & Inst.	3
MGT 3370, Organiz. & Mgt	3	MKT 3373, Managerial Comm.	3
MKT 3350, Intro. to Marketing	3	FIN 3322, Corp. Fin. I	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ECO Elective***	3	Group B †	3
FIN 4324, Investments	3	FIN 4385, Sr. Fin. Seminar	3
ISQS 3344, Intro. Prod. Oper. Mgt.	3	Elective (Non B A/Non Eco)*	3
Group A**	6	Group A**	3
TOTAL	15	Elective*	3
		TOTAL	15

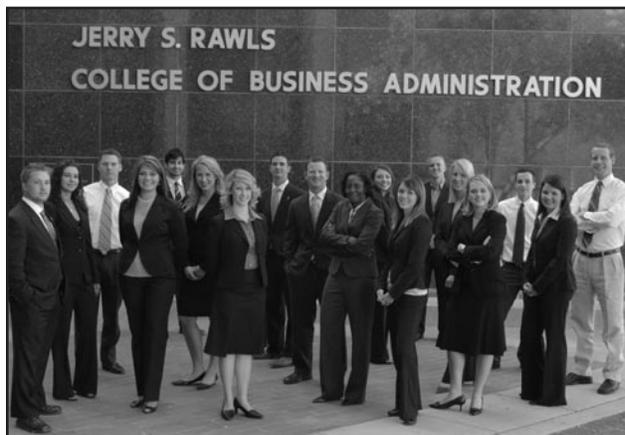
Minimum hours required for graduation – 120

* This is the only course not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

** Group A – Choose three courses from FIN 3332, 3334, 3335, 3336, 4323, 4325, 4326, 4327, 4328, 4329, 4330, 4333, 4336, and 4383.

*** ECO elective: choose two courses from 3311, 3320, 3324, 3326.

† Group B – Choose one course from ACCT 3305, 3306, 3315, BLAW 3393, ECO 3312, 3330, 4323, FIN 4382, MKT 3356 or remaining Group A.



Finance – Investment Emphasis

The goal of the Investment Emphasis is to provide an understanding of the various phases of the investment area. Following completion of the core investment course, students will study their choice of portfolio analysis; derivatives, securities and markets; fixed income analysis; real estate investments; or participate in the student-managed investment fund.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermed. Acct. I	3	FIN 3321, Fin. Statement Anal.	3
FIN 3320, Fin. Mgt.	3	FIN 3322, Corp. Fin. I	3
MGT 3370, Org. Mgt.	3	FIN 3323, Intro. Fin. Mkt. & Inst.	3
MKT 3350, Intro. Mkt.	3	Elective (Non B A/Non Eco)	3
MGT 3373, Managerial Comm.	3	TOTAL	12
TOTAL	15		

FOURTH YEAR			
Fall		Spring	
FIN 4324, Invest.	3	Group A*	6
Group A*	3	Group B +	3
ISQS 3344, Intro. Prod. Oper. Mgt.	3	Eco Elective **	3
Eco Elective **	3	FIN 4385, Sr. Fin. Seminar	3
BLAW 3391, Business Law I	3	TOTAL	15
TOTAL	15		

Minimum hours for graduation – 120

* Group A – Choose three courses from the following: FIN 3332, 4325, 4326, 4327, 4329, 4335

** ECO Electives – Choose two courses from ECO 3311, 3320, 3324, 3326

+ Group B – Choose one course from the following: Fin 3334, 3336, 4323, 4328, 4333, 4336, 4382, or remaining Group A courses.

Finance – Real Estate Emphasis

While all real estate courses and most other business courses offered at Texas Tech University can be used to satisfy in part the current education licensing requirements set forth by the Texas Real Estate Commission, they will not completely satisfy all of the current and proposed requirements. Additional courses will be needed that are not currently offered at Texas Tech, although the additional courses are offered via correspondence through the Center for Professional Development. For information on licensing requirements, contact the finance area. Finance majors must make a B or better in FIN 3320.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermed. Acct. I	3	ECO Elective***	3
BLAW 3391, Business Law I	3	FIN 3321, Fin. Statement Anal.	3
FIN 3320, Fin. Mgt.	3	FIN 3323, Prin. Money, Bank. Cre.	3
MGT 3370, Organiz. & Mgt.	3	FIN 3332, Real Estate Fund.	3
MKT 3350, Intro. to Marketing	3	MGT 3373, Managerial Comm.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ISQS 3344, Intro to Prod. & Oper. Mgt.	3	FIN 3322 Corp. Fin. I	3
FIN 4324, Investments	3	FIN 4385, Sr. Fin. Seminar	3
Group A**	3	Group A**	6
Elective (Non B A / Non Eco.)*	3	TOTAL	12
ECO Elective***	3		
TOTAL	15		

Minimum hours required for graduation – 120

* This is the only course not requiring a grade of C or higher. Elective hours may vary to meet 120 hour requirement.

** Group A – Choose three courses from FIN 3332, 3334, 3335, 3336, 4329, 4333, 4336 and BLAW 3393.

*** ECO Elective – Choose 2 courses from ECO 3311, 3320, 3324, 3326.

Finance – Managerial Finance Emphasis

The Managerial Finance track provides a broad range of skills preparing students for careers in corporate financial management, commercial banking, investment banking, and financial analysis.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermed ACCT I	3	FIN 3321, Fin. Statement Anal.	3
FIN 3320, Fin. Mgt.	3	FIN 3322, Corp. Fin. I	3
MGT 3370, Organiz. & Mgt.	3	FIN 3323, Intro. Fin. Mkt. & Inst.	3
MKT 3350, Intro.Mkt	3	FIN 4324, Invest.	3
MGT 3373, Managerial Comm.	3	ISQS 3344, Intro.Prod.Oper.Mgt.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	FIN 4330, Corp Fin II	3
FIN 4328, Int. Fin.	3	Group B+	3
Group A*	3	FIN 4385, Sr. Fin. Seminar	3
Eco Elective**	3	Eco Elective**	3
TOTAL	12	Elective (Non B A/Non Eco)	3
		TOTAL	15

Minimum hours for graduation – 120

* Group A – Choose one from FIN 3332, 4325, 4327 or 4383

** Eco Electives – Choose two courses from ECO 3311, 3320, 3324, 3326

+ Group B - Choose 1 course from FIN 3334, 3336, 4323, 4326, 4329, 4333, 4335, 4336, 4382, or remaining Group A courses.

Accelerated Finance B.B.A./Master's

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements, and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermed. Acct. I	3	ECO Elective***	3
BLAW 3391, Business Law I	3	FIN 3321, Fin. Statement Anal.	3
FIN 3320, Financial Management	3	FIN 3323, Intro Fin. Mkt. & Inst.	3
MGT 3370, Organiz. & Mgt.	3	ISQS 3344, Intro. Prod. Oper. Mgt.	3
MKT 3350, Intro. to Marketing	3	MGT 3373, Managerial Commun.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ECO Elective***	3	FIN 4385, Sr. Fin. Seminar	3
FIN 4324, Investments	3	Graduate Courses	9
Group A**	3	TOTAL	12
FIN 3322, Corp. Fin. I	3		
TOTAL	12		

* This is the only course not requiring a grade of C or higher.

** Group A – Choose one course from FIN 3332, 3334, 3335, 3336, 4323, 4325, 4326, 4327, 4328, 4329, 4330, 4333, 4336, and 4383

*** ECO elective: Choose 2 courses from 3311, 3320, 3324, 3326.

General Business Major

THIRD YEAR			
Fall		Spring	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Fin. Mgt.	3	MGT 3373, Managerial Comm.	3
ISQS 3344, Prod. & Oper. Mgt.	3	Major Courses+	9
MGT 3370, Organiz. & Mgt.	3	TOTAL	15
MKT 3350, Intro. to Marketing	3		
TOTAL	15		

FOURTH YEAR			
Fall		Spring	
Major Courses†	9	MGT 4380, Strategic Mgt.	3
Elective (Non B A / Non Eco.)*	3	Major Course+	3
Free Elective*	3	Free Electives*	7
TOTAL	15	TOTAL	13

Minimum hours required for graduation – 120

* These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

** Any upper-level economics course except ECO 3323 and 4332.

+ Major Courses – Choose 21 hours from at least three of the following areas if not used to fulfill another requirement: ACCT, ECO, FIN, ISQS, MGT, MKT. At least 9 hours must be senior-level courses.

General Business Major – Intelligence Emphasis

Required courses:

MKT 3356	Marketing Research and Analysis
B A 4000	Data and Text Mining for Business Intelligence (currently taught as BA 7000/will be cross-listed)
ISQS 3345	Object Oriented Systems

Any three from the following business courses:

ISQS 3346	Internet Programming
ISQS 3348	Data Base Management Systems
ISQS 4361	Web Application Design
B A 4000	Six Sigma (currently taught as BA 7000/will be cross-listed)

Any six from the following non-business courses:

MATH 3342	Mathematical Statistics for Engineers and Scientist
MATH 3371	Elements of Finite Mathematics
MATH 4330	Mathematical Computing
MATH 4342	Mathematical Statistics I
MATH 4343	Mathematical Statistics II
I E 3311	Operations Research I
I E 3341	Engineering Statistics
I E 3343	Quality Assurance in Engineering Statistics
I E 4311	Operations Research II
C S 3364	Design and Analysis of Algorithms
C S 4354	Concepts of Data Base Systems
GEOG 3300	Geographic Information Systems
GEOG 4400	Topics in Geographic Information Systems

General Business Major Project Management Emphasis

Required courses:

ISQS 3345	Object Oriented Systems
ISQS 4350	Information Systems Project Management
MGT 4376H	Honors Entrepreneurship
MKT 3356	Marketing Research and Analysis

Take two of the following six courses:

FIN 3332	Real Estate Fundamentals
FIN 3334	Real Estate Finance and Investments
FIN 3335	Real Estate Investments
BLAW 3393	Real Estate Law
FIN 4333	Real Estate Appraisal
FIN 4336	Urban Land Development

With construction engineering technology minor (18 hours):

CTEC 1312	Construction Methods
CTEC 2301	Surveying and Surveys
CTEC 4321	Construction Contacts and Specifications
CTEC 4341	Construction Management
CTEC 4342	Cost Estimating
CEEC 4343	Construction: Safety and Health

General Business Major Operations Management Emphasis

Required courses:

MKT 3353	Marketing Channels and Distribution Systems
ISQS 3345	Object Oriented Systems
ISQS 4348	Systems Analysis
ISQS 4361	Web Application Design
ISQS 4381	Individual Problems or ISQS 4382 Internship
MGT 4376H	Honors Entrepreneurship

With industrial engineering minor (18 hours):

I E 3301	Engineering Economic Analysis
I E 3311	Operations Research
I E 3341	Engineering Statistics
I E 3361	Work Analysis and Design

Take two of the following six courses:

I E 3343	Quality Assurance and Engineering Statistics
I E 3371	Production Control
I E 4311	Operations Research II
I E 4361	Engineering Design for People
I E 4362	Industrial Ergonomics
I E 4363	Work and Product Safety Engineering

General Business Major—Preprofessional Health Emphasis (Includes Premedicine)

30 hours:

- 21 hours upper-division core
- 3 hours economics (upper-level requirement)

Two additional upper-division courses:

- Operations service course
- HOM undergraduate course
- ISQS 4361 Web Application Design
- MGT 4371 Health Organization Management

38 hours required for medical school (27 hours upper division, 11 hours lower division):

- 27 hours of upper-division science courses (science support area). Note: This could include a minor.
- 8 hours of lower-division science courses plus a 3-hour elective. Must coincide with specific preprofessional health program.

Accelerated General Business B.B.A./Master's

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements, and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR			
Fall		Spring	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Financial Management	3	MGT 3373, Managerial Comm.	3
MGT 3370, Organiz. & Mgt.	3	Major Courses+	9
ISQS 3344, Prod. & Oper. Mgt.	3	TOTAL	15
MKT 3350, Intro. to Marketing	3		
TOTAL	15		

FOURTH YEAR			
Fall		Spring	
Major Courses+	9	MGT 4380, Strategic Management	3
Free Electives*	6	Graduate Courses	9
TOTAL	15	TOTAL	12

* These are the only courses not requiring a grade of C or higher.

** Any upper-level economics course except ECO 3323 and 4332.

+ Major Courses - Choose 18 hours from at least three of the following areas if not used to fulfill another requirement: ACCT, ECO, FIN, ISQS, MGT, MKT. At least 9 hours must be senior-level courses.

International Business Major

The goal of the undergraduate program in international business is to provide understanding of and experience with international environments and business practices. The foreign language requirement and recommended overseas study periods enhance the depth and breadth of this understanding. Minimum 3.0 GPA and 14 hours in same foreign language.

THIRD YEAR			
Fall		Spring	
I B 3105, Cross-Cultural Mgt. Skills	(1)+	BLAW 3391, Business Law I	3
Should be taken prior to Study Abroad Semester		FIN 3320, Financial Management	3
Study Abroad Semester	12	MGT 3370, Org. & Management	3
(May also be done in spring of 3rd year or fall of 4th year)		MGT 3373, Managerial Comm.	3
		MKT 3350, Intro. to Marketing	3
		TOTAL	15
TOTAL	12		

FOURTH YEAR			
Fall		Spring	
FIN 3323, Prin. Money, Bank., & Cr.	3	FIN 4328, Int'l. Finance	3
ISQS 3344, Prod. & Oper.Mgt.	3	MGT 4380, Strategic Management	3
MGT 4375, Int'l Management	3	MKT 4358, Int'l. Marketing	3
Group A*	6	Group B**	3
TOTAL	15	Language	3
		TOTAL	15

Minimum hours required for graduation - 125

Students interested in the international business major are required to complete the equivalent of three semesters of a single foreign language while in the lower division and then make application for the major. The humanities requirement will be satisfied with completion of the foreign language.

* Group A - Choose two courses from, GEOG 3358, 3363, 3364, 4305, HIST 3353, 3354, 3374, 3382, 3384, 4383, 4393, 4394, I B 3361, 4382, 4383, POLS 3361, 3363, 3366, 3373, 3374, 3375, 3376, 4364.

** Group B - Choose one course from ECO 3333 and 4331.

+ 1-hour course only for students participating in Study Abroad semester.

Marketing Major

The goal of the undergraduate program in marketing is to enhance leadership potential by providing a high-quality and thorough educational experience in preparation for careers in marketing. The required marketing courses and the major elective courses allow the breadth and depth in marketing and related subject areas.

THIRD YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	ISQS 3344, Int. Prod. & Oper. Mgt.	3
FIN 3320, Financial Management	3	Group A+	9
MGT 3370, Organiz. & Mgt.	3	Group B++	3
MGT 3373, Managerial Comm.	3	TOTAL	15
MKT 3350, Intro. to Marketing	3		
TOTAL	15		

FOURTH YEAR			
Fall		Spring	
Jr./Sr. Economics Course**	3	MGT 4380, Strategic Management	3
Group A+	6	Group A+	3
Free Elective*	3	Group B++	3
Elective (Non B A or Non Eco.)*	3	Free Elective*	3
TOTAL	15	TOTAL	12

Minimum hours required for graduation - 120

* These are the only courses not requiring a grade of C or higher.

** Any upper-level economics course except ECO 3323 and 4332.

+ Group A - Choose six courses from MKT 3352, 3353, 3356, 4351, 4354, 4358, 4359, 4360, and 4383.

++ Group B - Choose two additional junior- or senior-level business courses provided they are not used to fulfill another requirement.

Accelerated Marketing B.B.A./Master's

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements, and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	ISQS 3344, Intro. Prod. Oper. Mgt.	3
FIN 3320, Financial Management	3	Group A+	9
MGT 3370, Organiz. & Mgt.	3	Jr./Sr. Economics course**	3
MGT 3373, Managerial Comm.	3	TOTAL	15
MKT 3350, Intro. to Marketing	3		
TOTAL	15		

FOURTH YEAR			
Fall		Spring	
Group A+	6	Group A+	3
Free Electives*	6	Graduate Courses	9
MGT 4380, Strategic Mgt	3	TOTAL	12
TOTAL	15		

* These are the only courses not requiring a grade of C or higher.

** Any upper-level economics course except ECO 3323 and 4332.

+ Group A - Choose six courses from MKT 3352, 3353, 3356, 4351, 4354, 4358, 4359, 4360, and 4383.



Management Major

The undergraduate management program provides high-quality preparation for a wide range of managerial careers. It provides the broadest background of any of the business disciplines for understanding and managing organizations and behavior in these systems. Students may group courses to emphasize their particular interest. General management is particularly suited for management training programs sponsored by many larger firms and entry-level positions in smaller firms. These programs serve as the first step up the management ladder. A 2.75 or higher adjusted cumulative Texas Tech GPA is required to declare management as a major.

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Financial Management	3	ISQS 3344, Intro. Prod. Oper. Mgt.	3
MGT 3370, Organiz. & Mgt.	3	MGT 3376, Organ. Behavior	3
MGT 3373, Managerial Comm.	3	MGT 3379, Adv. Org. & Mgt.	3
MKT 3350, Intro. to Marketing	3	Group A+	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Group A+	6	MGT 4380, Strategic Management	3
Group B++	3	Free Electives*	6
Electives (Non B A / Non Eco.)*	3	Group A+	3
Free Elective*	3	TOTAL	12
TOTAL	15		

Minimum hours required for graduation – 120

* These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

** Any upper-level economics course except ECO 3323 and 4332.

+ Group A – Choose four courses from MGT 3374, 3375, 4370, 4371, 4372, 4375, 4376, 4386, and 4397.

++ Group B – Choose one additional junior- or senior-level business course, provided it is not used to fulfill another requirement.

Accelerated Management B.B.A./Master's

Upon admission to the graduate should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements, and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Fin. Mgt.	3	ISQS 3344, Intro.Prod.Oper.Mgt	3
MGT 3370, Organiz.&Mgt.	3	MGT 3376, Organ. Behavior	3
MGT 3373, Managerial Com	3	MGT 3379 Adv.Org.& Mgt.	3
MKT 3350, Intro.to Mkt.	3	Group A+	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Group A+	9	MGT 4380, Strat. Mgt.	3
Free Elective*	3	Grad Courses	9
Electives (Non-B A/ECO)*	3		
TOTAL	15	TOTAL	12

* These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

** Any upper-level economics course except ECO 3323 and 4332.

+ Group A – Choose four courses from MGT 3374, 3375, 4370, 4371, 4372, 4373, 4374, 4375, 4376, 4377, 4378, 4379, 4384, 4386, 4387, 4388, 4389, and 4397.

Joint Business/Engineering Certificate in Technology Entrepreneurship

The purpose of the Certificate in Technology Entrepreneurship (CTE) is to prepare students majoring in either engineering or business careers in technology-driven industries. The certificate program is designed for those students who would like to develop a cross-disciplinary perspective of technology using both engineering and business skills.

Undergraduate Certificate in Technology Entrepreneurship (coupled with a B.S. in Engineering or a Bachelor of Business Administration) – 9 total hours required

- Required Business Foundation Course for **Engineering Students:** B A 3302, Financial and Managerial Accounting..... 3 hrs.
- Required Engineering Foundation Course for **Business Students:** I E 4320, Fundamentals of Systems ... 3 hrs.
- Required Courses for **All Certificate Program Students:**
MGT 4376, Entrepreneurship II: Discovering Entrepreneurial Opportunity..... 3 hrs.
I E 4331, Individual Studies in Industrial Engineering: Engineering Entrepreneurship..... 3 hrs.

Management Information Systems (MIS) Major

The Information Systems and Quantitative Sciences (ISQS) area has a major field called Management Information Systems (MIS). The MIS graduate is prepared to be the liaison person between managers and computers and is therefore in great demand by industry. MIS majors may choose one of the following tracks: Telecommunications / Networking Track or Web Application Design Track.

TELECOMMUNICATIONS / NETWORKING TRACK

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
FIN 3320, Financial Management	3	BLAW 3391, Business Law I	3
ISQS 3349, Intro. Data Comm. Sys.	3	ISQS 3344, Prod. & Oper. Mgt.	3
ISQS 3348, Data Base Mgt. Sys.	3	ISQS 3351, Telecom. Sec. Linux	3
ISQS 3345, Obj. Oriented Sys.	3	ISQS 3360, Telecom. Sec. Theory	3
MGT 3373, Managerial Comm.	3	MKT 3350, Intro. Marketing	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Jr./Sr. Economics or Comp. Sci.**	3	ISQS 4349, Info. Sys. Des.	3
ISQS 4348, Systems Anal.	3	ISQS 4385, Strat IT/Telecom. Mgt.	3
ISQS 4350, Info. Sys. Proj. Mgt.	3	ISQS 4382, Internship in ISQS†	3
MGT 3370, Org. and Mgt.	3	ISQS Elective	3
Elective (Non BA / Non Eco.)*	3	Elective (Non BA / Non Eco.)*	3
TOTAL	15	TOTAL	15

WEB APPLICATION DESIGN TRACK

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
FIN 3320, Financial Management	3	BLAW 3391, Business Law I	3
ISQS 3349, Intro. Data Comm. Sys.	3	ISQS 3344, Prod. & Oper. Mgt.	3
ISQS 3348, Data Base Mgt. Sys.	3	ISQS 3346, Internet Prog.	3
ISQS 3345, Object Oriented Sys.	3	ISQS 3358, Business Intell.	3
MGT 3373, Managerial Comm.	3	MKT 3350, Intro. Marketing	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Jr./Sr. Economics or Comp. Sci.**	3	ISQS 4349, Info. Sys. Des.	3
ISQS 4348, Systems Anal.	3	ISQS 4382, Internship in ISQS†	3
ISQS 4350, Info. Sys. Proj. Mgt.	3	ISQS 4385, Strat. IT & Tele. Mgt.	3
MGT 3370, Org. and Mgt.	3	Elective (Non BA / Non Eco.)*	6
ISQS 4361, Web Applic. Design	3	TOTAL	15
TOTAL	15		

Minimum hours required for graduation – 120

* These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

** Any upper-level economics course except ECO 3323 and 4332 or any upper-level computer science course.

† ISQS 4382 or other with written approval.

Accelerated Management Information Systems (MIS) B.B.A./Master's

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements and the master's degree will be granted after completion of the remaining graduate courses. MIS majors may choose one of the following tracks in their undergraduate work: Telecommunications / Networking Track or Web Application Design Track.

TELECOMMUNICATIONS / NETWORKING TRACK

THIRD YEAR			
Fall		Spring	
FIN 3320, Financial Management	3	BLAW 3391, Business Law I	3
MGT 3373, Managerial Comm.	3	ISQS 3344, Int. Prod. & Oper. Mgt.	3
ISQS 3349, Intr. to Data Comm. Sys.	3	MKT 3350, Intro to Marketing	3
ISQS 3348, Database MGT Sys.	3	ISQS 3360, Tele. Comm. Theory	3
ISQS 3345, Object Oriented Sys.	3	ISQS 3351, Advanced Linux Net.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
Jr./Sr. Economics Course**	3	ISQS 4349, Info. Sys. Des.	3
ISQS 4348, Sys. Analysis	3	ISQS 4385, Strat. IT & Telecom. Mgt.	3
ISQS 4350, Info. Sys. Proj. Mgt.	3	Graduate Courses	9
MGT 3370, Org. & Mgt.	3	TOTAL	15
Elective (Non BA / Non Eco)*	3		
TOTAL	15		

WEB APPLICATION DESIGN TRACK

THIRD YEAR			
Fall		Spring	
FIN 3320, Financial Management	3	BLAW 3391, Business Law I	3
MGT 3373, Managerial Comm.	3	ISQS 3344, Int. Prod. & Oper. Mgt.	3
ISQS 3345, Object Oriented Sys.—Java	3	MGT 3370, Org. & Management	3
ISQS 3348, Database MGT Sys.	3	ISQS 3346, Internet Prog.	3
MKT 3350, Intro. to Marketing	3	ISQS 3358, Business Intell.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
Jr./Sr. ECO or C S Course**	3	ISQS 4349, Info. Sys. Des.	3
ISQS 4348, Systems Analysis	3	ISQS 4385, Strat. IT and Tele. Mgt.	3
ISQS 4350, Info. Sys. Proj. Mgt.	3	Graduate Courses	9
ISQS 4361, Web Applic. Design	3	TOTAL	15
Elective (Non BA / Non Eco)*	3		
TOTAL	15		

* This is the only course not requiring a grade of C or higher.

** Any upper-level economics course except ECO 3323 and 4332.

Energy Commerce Program

The goal of the undergraduate program in energy commerce is to enhance leadership potential by providing a high-quality and thorough educational experience in preparation for a business career in the energy industry. Primary skills involve obtaining the legal rights to explore for and produce natural resources and the responsibility for managing energy assets. Energy Commerce majors must take GEOL 1303 and 1101 to fulfill one of their lower-division laboratory science requirements. ENCO 3301 (Energy Industry Fundamentals) must be taken at the lower division as it is a prerequisite to the upper-division ENCO courses. It may be taken concurrently with ENCO 3385. Requires a 3.25 GPA to declare an ENCO major.

PETROLEUM LAND MANAGEMENT EMPHASIS

THIRD YEAR			
Fall		Spring	
ENCO 3385, Petroleum Land Mgt. I	3	ENCO 3386, Petro. Land Mgt. II	3
FIN 3320, Financial Management	3	GEOL 4324, Geol. Hydrocarbons	3
MGT 3370, Organization/Mgt.	3	BLAW 3391, Business Law I	3
MKT 3350, Intro. to Marketing	3	MGT 3373, Managerial Comm.	3
ENCO 4315, Int. Energy Policy	3	Group A*	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
BLAW 4395, Oil & Gas Law I	3	MGT 4380, Strategic Management	3
ISQS 3344, Prod. & Oper. Mgt.	3	BLAW 4396, Oil & Gas Law II	3
ENCO 4361, Adv. Petr. Prac.	3	Group A*	6
Group A*	3	TOTAL	12
Upper Division ECO**	3		
TOTAL	15		

* Group A—Choose four courses from ENCO 3361, 3390, 4321, 4325, 4363, 4382, GEOG 3300, and ENGL 3365.

** Any upper-level economics course except ECO 3323 and 4332.

ENERGY ASSET MANAGEMENT EMPHASIS

THIRD YEAR			
Fall		Spring	
ENCO 3385, Petroleum Land Mgt. I	3	ENCO 4325, Global Energy Future	3
ENCO 4315, Int'l. Energy Policy Law	3	MGT 3373, Managerial Comm.	3
FIN 3320, Financial Management	3	BLAW 3391, Business Law I	3
MGT 3370, Organization & Mgt.	3	Upper Division Economics**	3
MKT 3350, Intro. to Marketing	3	Group A*	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ISQS 3344, Prod. & Oper. Mgt.	3	MGT 4380, Strategic Management	3
ENGL 3365, Prof. Report Writing	3	ACCT 4310, Petro. Accounting	3
Group A*	6	ENCO 4321, Energy Trans. Fin.	3
ENCO 4363, Energy Alt.	3	Group A*	3
TOTAL	15	TOTAL	12

* Group A—Choose four courses from ENCO 3361, 3386, 4361, 4382, POLS 3366 or 3378, ATMO 2301, GEOG 3337.

** Any upper-level economics course except ECO 3323 and 4332.

Rawls College of Business



Energy Commerce Undergraduate Certificate

The purpose of the certificate program is to prepare students majoring in other subjects for careers in the energy industry utilizing the skills attained through their degree program. The certificate program is an immersion in the energy industry to give students a distinction in the marketplace. The certificate is available at the undergraduate and graduate levels. A GPA of 3.5 is required.

Undergraduate Certificate in Energy Commerce (coupled with accounting, finance or international business majors only)

Requires 5 Courses

Accounting Majors:

- ENCO 3301, Energy Industry Fundamentals
- ENCO 3385, Petroleum Land Management I
- ENCO 3386, Petroleum Land Management II
- ACCT 4310, Petroleum Accounting
- ENCO 4361, Advanced Petroleum Practices or ENCO 3361, Natural Gas Transportation and Marketing

Finance Majors:

- ENCO 3301, Energy Industry Fundamentals
- ENCO 3385, Petroleum Land Management I
- ACCT 4310, Petroleum Accounting
- ENCO 4321, Energy Transaction Finance
- FIN 4327, Derivative Securities and Markets

International Business Majors:

- ENCO 3301, Energy Industry Fundamentals
- ENCO 4315, International Energy Policy and Law
- ENCO 4363, Energy Alternatives
- ENCO 4325, Global Energy Future
- ECO 4331, Economics of Multinational Enterprise or ECO 3333, International Economics

Optional Internship: The Energy Commerce program will assist with an internship as a noncertificate elective with approval of the energy commerce program director.

ISQS Undergraduate Certificate in MIS

The purpose of the certificate program in MIS is for B A students in non-MIS majors to expand their knowledge of information technology (IT) as applied in business and to increase understanding of everyday IT. The MIS certificate program will provide valuable IT knowledge and skills for success in today's fast-paced and dynamic marketplace. The initial prerequisites are a grade of C or better in ISQS 2340, a 2.75 GPA, and admission to the upper-division major. The certificate will consist of four courses chosen from the following list. Any four may be chosen, but prerequisites must be met prior to enroll in the course.

- ISQS 3345, Object Oriented Systems. Prerequisite: ISQS 2340 with a C or better
- ISQS 3346, Internet Programming. Prerequisite: ISQS 3345 and 3348
- ISQS 3348, Database MGT Systems. Prerequisite: ISQS 2340 with a C or better
- ISQS 3349, Introduction to Data Communication Systems. Prerequisite: ISQS 2340 with a C or better
- ISQS 3351, Telecommunications Security Using Linux. Prerequisite: ISQS 3349
- ISQS 3358, Business Intelligence. Prerequisite: ISQS 3345 and 3348
- ISQS 3360, Telecommunication Securities Theory. Prerequisite: ISQS 3349
- ISQS 4361, Web Application Design. Prerequisite: ISQS 3346
- ISQS 4385, Strategic IT and Telecommunications Management. Prerequisite: ISQS 3351 and 3360

Accounting (ACCT)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 2300. [ACCT 2301] Financial Accounting (3:3:0).** Prerequisite: 2.75 adjusted cumulative GPA, sophomore standing, and a C or better in any college-level mathematics course. Concepts and terminology of accounting and financial reporting for modern business enterprises and the relationships between accounting information and business activities. Must make A or B to declare accounting or finance major.
- 2301. [ACCT 2302] Managerial Accounting (3:3:0).** Prerequisite: 2.75 adjusted cumulative GPA and ACCT 2300. Uses of accounting information for planning decisions about products and services, activities and processes, suppliers and customers, organizational subunits, and time periods as these relate to organizations in changing environments. Must make A or B to declare accounting major.
- 3101. Seminar in Professional Practice (1:1:0).** Structure of the accounting profession, requirements for certification, qualification for and preparation for professional practice in industry, government, and/or public accounting.
- 3304. Intermediate Accounting I (3:3:1).** Prerequisite: Grade of B or better in ACCT 2300. Net income concepts, corporations, current assets, and investments. Must make A or B to declare accounting major.
- 3305. Intermediate Accounting II (3:3:1).** Prerequisite: Grade of B or better in ACCT 3304; prerequisite or corequisite: ACCT 3101 for accounting majors. Fixed assets, liabilities and reserves, interpretation and analysis of financial statements, application of funds, cash flow statement, reorganizations, and price level impact on financial statements.
- 3306. Principles of Cost and Managerial Accounting (3:3:1).** Prerequisite: Grade of B or better in ACCT 2301. A study of principles and techniques of accounting information systems for organizations.
- 3307. Income Tax Accounting (3:3:0).** Prerequisite: Grade of B or better in ACCT 2300. A study in detail of certain provisions of the Internal Revenue Code, combined with elementary tax planning in business and individual transactions. (Writing Intensive)
- 3315. Accounting Systems (3:3:1).** Prerequisite: Grade of B or better in ACCT 3304. The theories, procedures, and techniques of accounting information systems for organizations.
- 4301. Principles of Auditing (3:3:1).** Prerequisite: Grade of B or better in ACCT 3304 and completion of or concurrent enrollment in ACCT 3305 & 3315. An introduction to the theory and practice of auditing, emphasizing auditor decision making through a cycle approach to an audit engagement.
- 4302. Public Sector Accounting (3:3:0).** Prerequisite: C or higher in ACCT 3304. Application of accounting principles to selected governmental and not-for-profit organizations, including state and local governments, universities, hospitals, and other public sector entities.
- 4310. Petroleum Accounting (3:3:0).** Prerequisite: B or higher in ACCT 2300 and 2301. Accounting for the production, refining, and distribution of oil and gas with emphasis upon production.
- 4314. International Accounting (3:3:0).** Prerequisite: ACCT 3304 or consent of instructor. Study of the accounting issues affecting organizations operating in a global economy. (Writing Intensive)
- 4381. Individual Problems in Accounting (3).** Prerequisite: Consent of instructor. For students with high academic achievement who are interested in enhancing their degree program by pursuing individual research or study under the guidance of an accounting faculty member.
- 4382. Internship in Accounting (3).** Prerequisite: Approval prior to employment. This course permits students to apply the concepts, principles, and techniques learned in the classroom. Up to 3 hours of internships can be applied toward a degree program. Must be taken pass-fail.

Graduate Courses

- 5302. Current Accounting Theory (3:3:0).** Prerequisite: ACCT 3305. Examination of current accounting literature, such as pronouncements of the Financial Accounting Standards Board.
- 5303. Accounting Systems Management and Control (3:3:1).** Prerequisite: ACCT 4301. A study of control implications and

Graduate Program / Business

Admission to graduate degree programs offered through the college is based on the undergraduate grade point average, test scores (e.g., GMAT), and individual profile. No thesis is required in any of our master's degree programs. As part of the comprehensive evaluation process for graduation, a master's student must successfully complete one of the following as approved by their specific area of concentration: A final comprehensive examination, a capstone course, or a project. These requirements must be completed in one of the last two semesters preceding graduation with a grade of B or better. Students may be directed to enroll in a specific section. The following graduate degree programs are available:

Master's Programs

Master of Business Administration. The college's M.B.A. program provides a broad background for multiple careers in business, government, and related activities with particular emphasis on developing managerial perspective, analytical tools, and skills. The program is sufficiently flexible to permit more depth in at least one academic area. M.B.A. students may expect to complete the program in 16 months. Students possessing any undergraduate degree are invited to apply. M.B.A. students are expected to complete their tool course requirements first.

A joint venture of the School of Medicine and the college offers a concentration in health organization management. This program is accredited by the Commission on Accreditation of Healthcare Management Education (CAHME) and includes a certificate in addition to the M.B.A. degree. The M.B.A. health organization management program prepares master's students with varying levels and types of work experience for post-graduate managerial roles within the health care industry, especially within medical group practices and other ambulatory care organizations.

International Master of Business Administration. The I.M.B.A. is a broad-based program designed for training students in the dynamic global economy. In addition to M.B.A.-like classroom experiences, the program requires competence in a foreign language and experience abroad.

Master of Science in Accounting. This M.S.A. program is designed to prepare graduates for professional careers in the practice of accounting. Concentrations are available in auditing/financial reporting and taxation. Graduates are prepared for professional service in a variety of fields. Most accept entry-level positions in public accounting and private industry.

Master of Science with a Major in Business Administration. This degree produces specialists in one of the following areas of business: finance, management information systems, operations management, or business statistics. The student may take from 18 to 30 semester hours of coursework in a specialty area, up to 6 semester hours of tool and quantitative courses, and/or 9 to 12 semester hours of electives in a concentration from one of the other specialty areas. Normally the student may expect to complete the program within one to two years depending on prior preparation.

Joint Bachelor of Business Administration—Master's Programs in Business Administration. These programs lead to a B.B.A. and a master's degree (either an M.B.A., M.S., or M.S.A.); a maximum of 9 semester hours of graduate work may apply to the B.B.A. and the other master's degrees. The total number of credit hours required for both degrees will vary depending on the program. The program is designed for academically outstanding undergraduate students who wish to complete a master's degree while at Texas Tech.

Students should apply and be accepted to the graduate component of the program before the first semester of their senior year. Application materials are available in the Graduate Services Center (BA 252) of the college. Upon successful completion of the required undergraduate courses plus 6-9 hours of designated graduate work, the B.B.A. degree will be granted (except for the B.B.A. and M.S.Acct. program which grants both degrees simultaneously). The final portion of graduate work will be completed during the fifth year.

Joint Master of Science—Master of Business Administration. The college, in association with other colleges and schools, offers programs that enable students to obtain selected M.S. degrees and the M.B.A. Applications should be made through and approved by the respective colleges involved in these programs: the College of Human Sciences (M.S. in Personal Financial Planning) and the College of Arts and Sciences (M.S. in Environmental Toxicology). These joint programs require 22 to 24 fewer hours than if both degrees were pursued separately.

Joint Master of Architecture—Master of Business Administration. Students pursuing a M.Arch. degree may begin taking selected business courses once admitted into the graduate program in architecture. These courses become part of the M.Arch. degree and the M.B.A. degree. Application for this program is made through the college and the Graduate School.

Joint Master of Arts in Foreign Language—Master of Business Administration. The college in association with the College of Arts and Sciences offers a joint program in French, German, and Spanish. This program is designed to save 24 semester credit hours in comparison to the total credit hours if the degrees were pursued separately. Application must be made to and approved by both the College of Arts and Sciences and the Rawls College of Business.

Doctoral Programs

Doctor of Jurisprudence—Master of Business Administration. The college, in association with the School of Law, offers a program that enables the student to earn both the Doctor of Jurisprudence and M.B.A. degrees in approximately three years of full-time academic work. A student without a business background may complete both degrees with 112 hours of law and business courses (a net savings of 24 credit hours from the total hours necessary if the degree programs were pursued separately). The first year of study is taken in the School of Law. Application must be made to and approved by both the School of Law and the Rawls College of Business.

Doctor of Jurisprudence—Master of Science in Accounting. The college, in association with the School of Law, offers a program that enables students to earn simultaneously both the Doctor of Jurisprudence and Master of Science in Accounting degrees. In many cases, the student in this program will be able to save numerous semester credit hours in comparison to those needed to complete both degrees separately. Application must be made to and approved by both the School of Law and the Rawls College of Business.

Doctor of Medicine—Master of Business Administration. The college, in association with the School of Medicine in the Texas Tech University Health Sciences Center, offers a program that gives students the opportunity to earn both the M.D. and the M.B.A. Students must be admitted to both the School of Medicine and the M.B.A. program with a concentration in

(Continued on next page)

health organization management. The program may be completed in four years.

Doctor of Philosophy with a Major in Business Administration. This degree is offered with first-field and second-field specializations in accounting and taxation, finance, management, marketing, management information systems, operations management, and business statistics. The program has three emphases for the student: to provide a broad, integrated knowledge of business; to develop specialized knowledge in at least two fields; and to develop research skills. Examinations must be passed to show competency in linear algebra and calculus as soon after commencement of the program as possible. By completing coursework with a minimum grade of B, students must satisfy requirements in advanced statistics and micro- and macro-economics early in the program. There is no foreign language requirement. The student who is successful continuously at each step in progress should complete degree requirements in four years of full-time study beyond the master's degree.

Academic Requirements

The Rawls College of Business requires that its master's program students maintain at least a 3.00 cumulative GPA. Doctoral students must maintain a 3.20 cumulative average. The GPA is computed on all graduate courses included on the degree program. Students falling below these averages will be subject to probationary action. To graduate, master's students must make at least three hours credit with a grade of A above a 3.00 cumulative GPA on all graduate courses in the program.

- control integration into the systems analysis, design, and implementation process, emphasizing information technology.
5304. **Federal Income Taxation of Corporations and Shareholders (3:3:1).** Study of corporate tax problem areas, including liquidations, formations, collapsibility, dividends, and "Subchapter S" treatments.
5305. **Accounting Research and Communication (3:3:1).** Prerequisite: Student must be enrolled in M.B.A., M.S., or Ph.D. accounting program. Written and oral communication of the results of individual studies of selected accounting topics. (Writing Intensive)
5306. **International Taxation (3:3:1).** Study of taxation of individual and business entities operating outside the States and foreign entities operating in the States. (Writing Intensive)
5308. **Federal Income Tax Law for Partnerships (3:3:1).** Analysis of accounting by partnerships and other pass-through entities including LLCs. Focus is on economic and tax consequences for investors operating business or investment activities through partnerships and other pass-through entities. (Writing Intensive)
5309. **Special Entity-Ownership Accounting Issues (3:3:0).** Prerequisite: ACCT 3305 or equivalent. A study of the accounting and reporting problems associated with selected entities or types of ownership, including partnerships and consolidated financial statements.
5310. **Seminar in Public Sector Accounting (3:3:0).** Prerequisite: A grade of C or higher in ACCT 3304. An advanced seminar in accounting-related problems of public sector entities such as federal, state, and local governments, hospitals, universities, and other public institutions.
5311. **Individual Study in Accounting (3).** Prerequisite: Consent of instructor. Directed individual study of advanced accounting problems varying with the need of each student. May be repeated for up to 9 hours credit if subject matter differs.
5314. **Issues in Cost and Managerial Accounting (3:3:1).** Prerequisite: ACCT 3306 or equivalent. Current issues in cost and managerial accounting. (Writing Intensive)
5315. **Estate and Gift Taxation (3:3:1).** Intensive study of federal taxation of the estate and trust entities and the transfer of property rights through gifts and bequest. (Writing Intensive)
5318. **Income Tax Research and Planning (3:3:1).** Fundamental procedures in research of income tax subject areas, such as property transactions, employment contracts, etc. Principles involved in necessary planning of actions for a desired tax result. (Writing Intensive)
5319. **Auditing Theory and Practice (3:3:1).** Prerequisite: ACCT 4301. A study of advanced concepts, theories, and techniques applied to external financial, governmental, and internal audit engagements. (Writing Intensive)
5320. **Advanced Topics in Auditing (3:3:0).** Prerequisite: Admission to MSA program, ACCT 3305 and 3315. A study of the historical, theoretical, and conceptual framework of auditing extended to current societal and professional issues including fraud investigation and advances in technology.
5323. **Advanced Topics in Accounting (3:3:0).** Prerequisite: ACCT 3305. Advanced study of selected topics in accounting. (Writing Intensive)
5324. **Issues in International Accounting (3:3:0).** Prerequisite: ACCT 5401 or equivalent. Current issues in international accounting. (Writing Intensive)
5327. **Advanced Income Taxation Accounting (3:3:0).** Prerequisite: A grade of A or B in ACCT 3304 and 3307. Study of advanced income tax affecting business and investment.
5330. **Electronic Commerce Systems Control and Assurance (3:3:0).** Prerequisite: ACCT 5303. Issues surrounding strategic accounting information systems with a focus on electronic commerce systems.
5331. **Management and Control of Integrated Business Processes (3:3:0).** Prerequisite: ACCT 5401. Management and control of activities that support business operations and controlled integration of e-business applications with ERP systems. Non-accounting majors only.
5332. **Ethics in Accounting (3:3:0).** Prerequisite: Completion or concurrent enrollment in ACCT 5305. Introduces students to accounting ethics and professionalism. Independence issues and the Code of Professional Ethics are highlighted.
5334. **Professional Accountancy Capstone (3:3:0).** Prerequisite: Must be taken in last full semester of study. Prepares students for the accounting profession through intensive study, testing, and preparation for professional certification.
5335. **Advanced Integrated Accounting Systems (3:3:0).** Prerequisite: ACCT 5303. Advanced integrated accounting systems with a focus on enterprise resource planning systems and their application.
5382. **Internship in Accounting (3).** Prerequisite: completion of ACCT 4301 for non-tax internships and ACCT 5318 for tax internships. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom.
5401. **Financial and Managerial Accounting (4:4:0).** This course examines financial accounting: The objectives, structure, and substance of financial reports; and management accounting: The use of accounting in the management of an organization.
6300. **Colloquium in Accounting Research (3).** Prerequisite: Admission to doctoral program. Studies in selected areas of accounting research. Topics vary by semester. (Writing Intensive)
6301. **Archival Research in Accounting (3:3:0).** Prerequisite: Admission to doctoral program. This seminar explores accounting research using empirical-archival methods, primarily with respect to the role of financial accounting in capital markets.
6303. **Seminar in Accounting Information Systems (3:3:0).** Prerequisite: ACCT 5330 and 5335 or consent of instructor. Seminar in accounting information systems.
6314. **Behavioral Research in Accounting (3:3:0).** Prerequisite: Admission to doctoral program. This seminar explores how accounting research uses experimentation to investigate the ways in which accounting impacts judgments and decisions.
6318. **Seminar in Tax Research Methodology (3).** Graduate seminar in tax research method.
6319. **Seminar in Auditing (3:3:0).** Prerequisite: Either ACCT 5319 or 5320, or consent of instructor. A study of the historical, theoretical, and conceptual framework of auditing extended to current societal and professional issues.

Business Administration (B A)**Undergraduate Courses**

1101. **Fundamentals of Business Professionalism (1:1:0)**. Prerequisite: 2.75 GPA. Integration of fundamental business principals from multiple disciplines and concepts of business professionalism and ethical behavior.
3301. **Fundamentals of Marketing (3:3:0)**. Prerequisite: ECO 2302, and a minimum 2.75 adjusted cumulative GPA. Focuses on the process of marketing products and services to consumers. Topics include marketing structures and agencies; motives and buying habits; types of middlemen, marketing institutions, and channels; current marketing practices; marketing of industrial and consumer goods. May not be used to satisfy business major degree requirements.
3302. **Financial and Managerial Accounting (3:3:0)**. Prerequisite: 2.75 GPA. Concepts and terminology of accounting and financial reporting for modern business enterprises and the relationships between accounting information and business activities. Additionally, the course covers uses of accounting information for planning decisions about products and services, activities and processes, suppliers and customers, organizational subunits, and time periods as these relate to organizations in changing environments. May not be used to satisfy business major degree requirements.
3303. **Foundations of Finance (3:3:0)**. Prerequisite: 2.75 GPA and BA 3302. Basic finance survey course for non-business majors. Covers financial markets, investment banking process, interest rates, time value of money, and security valuation. May not be used to satisfy business major degree requirements.
3304. **Operations Management (3:3:0)**. Prerequisite: 2.75 GPA. Focuses on the formulation of business and operational strategies, how products and services are designed, and how products and services are produced. May not be used to satisfy business major degree requirements.
3305. **Organization Management (3:3:0)**. Prerequisite: 2.75 GPA. Focuses on the management of people and organizations. Topics include leadership; team building; motivation groups; organizational design, and personnel management. May not be used to satisfy business major degree requirements.
4000. **Directed Experience (V1-6)**. Prerequisite: Consent of instructor and Dean of the College. Enhance the student's classroom knowledge through internships, projects in the workplace, mentoring experiences, and other approved experiences.
4182. **Business Administration Internship (1)**. Prerequisite: Consent of instructor. Enhance the student's knowledge within fields of business specialization through application of concepts, principles, and techniques learned in the classroom.
4381. **Individual Problems in Business Administration (3)**. Prerequisite: Senior standing. 3.0 GPA in major, 2.75 adjusted cumulative GPA, and written consent of instructor prior to registration. Independent problem research under guidance of a faculty member. Student should register for section appropriate to the academic area in which the work will be done.
4382. **Internship in Business Administration (3)**. Prerequisite: At least 6 hours of professional courses (excluding core courses) to be determined by the area faculty; other minimum standards determined by area; written approval form contains specific requirements for participation. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom. A maximum of 3 hours may be earned (with approval by faculty internship advisor prior to employment) by internships toward a degree program.
4383. **Special Topics in Business (3:3:0)**. Prerequisite: Determined by area. May be repeated once for credit by faculty approval only with no duplication of topic.

Graduate Courses

5380. **Directed Experience (3:3:0)**. Prerequisite: Admission to the MBA program. Students enhance their classroom knowledge through the rigorous analysis of internships, global filled experiences, mentoring experiences, and other approved experiences. May be repeated for credit up to 9 hours if subject matter differs.
5382. **Internship in Business Administration (3:3:0)**. Minimum standards determined by area. Written approval form required. This course permits students to enhance their knowl-

edge within their field of specialization through application of concepts, principles, and techniques learned in the classroom. May be repeated for credit.

5395. **Practicum in Higher Education for Business (3)**. Prerequisite: Consent of instructor. Supervised practice in teaching of business and administrative subjects.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Business Law (BLAW)**Undergraduate Courses**

3391. **Business Law I (3:3:0)**. Prerequisite: Minimum 2.75 adjusted cumulative GPA. Nature and source of law, courts and procedure, contracts, Texas law of separate and community property.
3393. **Real Estate Law (3:3:0)**. Rights in land, classification of estates, acquisition and creation of property rights, titles, and common conveyances.
4330. **E-Business and Cyber Law (3:3:0)**. Prerequisite: BLAW 3391. Study of the legal issues surrounding electronic commerce and other computer law matters.
4392. **Business Law II (3:3:0)**. Prerequisite: BLAW 3391. Second course in business law. Law of negotiable instruments, business organizations, partnership and corporation sales, with emphasis on subject matter appearing frequently in the CPA law examination.
4395. **Oil and Gas Law I (3:3:0)**. Case law based on the study of jurisprudence affecting the oil and gas industry. Emphasis is on the oil and gas titles, leases, and mineral ownership.
4396. **Oil and Gas Law II (3:3:0)**. Prerequisite: BLAW 4395. Case law based on the study of jurisprudence affecting the oil and gas industry. Emphasis is on regulation of oil and gas industry and selected current issues in energy law.

Graduate Courses

5290. **Legal, Regulatory, and Ethical Environment of Business (2:2:0)**. This course examines the legal, regulatory, and ethical issues that arise in the conduct of business to develop a capacity for recognizing and dealing with such issues.
5330. **E-Business Law (3:3:0)**. Prerequisite: BLAW 5290 or 3391. Study of the legal issues surrounding electronic commerce.
5392. **Advanced Business Law (3:3:0)**. Prerequisite: BLAW 3391 or 5290. Second course in business law. Emphasis on subject matter appearing frequently in the CPA law examination.

Energy Commerce (ENCO)**Undergraduate Courses**

3301. **Energy Industry Fundamentals (3:3:0)**. Prerequisite: Minimum 3.25 adjusted cumulative GPA. History and overview of the energy industry providing basics of oil and gas exploration, production and transportation, and electricity generation and transmission.
3361. **Gas Transportation and Marketing (3:3:0)**. Prerequisite: ENCO 3385. Midstream issues relating to right of way, gas gathering, processing, and compression. Marketing and transportation agreement. Pipeline regulation.
3385. **Petroleum Land Management I (3:3:0)**. Prerequisite: ENCO 3301, 3.25 adjusted cumulative GPA, or permission of the program director. Focuses on the fundamental knowledge and skills of the petroleum landman. Includes real property and contact law, land survey systems, and oil and gas leases.
3386. **Petroleum Land Management II (3:3:0)**. Prerequisite: ENCO 3385. Examines agreements utilized by oil and gas companies, including joint operating, farmout, surface use and utilization. Also Federal and Indian leasing issues will be covered.
3390. **Land Titles and Records (3:3:0)**. Prerequisite: ENCO 3386 and 3395 or permission of director. Practical skills training in tracing and chaining property titles. Combined classroom and courthouse experience. First Summer Session only
4315. **International Energy Policy and Law (3:3:0)**. Analysis and assessment of historical and current energy policies of the U.S and selected foreign governments. Examines cartels, alliance, treaties, geopolitics, and international law.
4321. **Energy Transaction Finance (3:3:0)**. Prerequisite: ENCO 3385, 3386. Examines capital formation options available to energy

companies. Emphasis on aspects of finance unique to the energy industry as well as use of financial risk management tools.

4325. **Global Energy Future (3:3:0)**. Examines supply and demand factors affecting the energy industry, such as U.S. and world demand trends and potential supply sources (e.g., solar, hydrogen, wind, and nuclear, oil and gas).
4361. **Advanced Petroleum Practices (3:3:0)**. Prerequisite: ENCO 3385 and 3386. Study includes joint operating agreements, gas balancing, federal units, secondary recovery units, advanced well trades, working and net revenue interest calculation, due diligence, title opinions and title curatives.
4363. **Energy Alternatives (3:3:0)**. Prerequisite: ENCO 3385. Compares market economics of conventional hydrocarbons to emerging non-conventional and alternative energy sources.
4382. **Energy Industry Internship (3)**. Prerequisite: ENCO majors and Energy Commerce certificate students only, with approval of the program director. Permits students to apply principles and concepts. Summers only.

Finance (FIN)

Undergraduate Courses

3320. **Financial Management (3:3:0)**. Prerequisite: ACCT 2300, 2301 ECO 2301, 2302, and MATH 2345 and a minimum 2.75 Texas Tech GPA. To declare a FIN major, student must make a B or better on first attempt. Survey course in finance introducing topics in corporate finance investments and financial institutions.
3321. **Financial Statement Analysis (3:3:1)**. Prerequisite: FIN 3320 with a grade of B or higher. The analysis and interpretation of financial statement reports. Effective financial statement evaluation examined from the perspective of managers, investors, and creditors. Proforma statement development for effective financial management.
3322. **Corporation Finance I (3:3:0)**. Prerequisite: FIN 3320 with a minimum grade of A or B. Topics include financial analysis, capital budgeting and source of funds.
3323. **Introduction to Financial Markets and Institutions (3:3:0)**. Prerequisite: FIN 3320 with B or better. Introduction to the US financial system covering various financial markets and institutions and key instruments.
3332. **Real Estate Fundamentals (3:3:0)**. Prerequisite: FIN 3320 with a grade of B or higher. Introduction to property law, finance, valuation, investment analysis and brokerage. Operations of the real estate market and the study of urban land use, including urban growth, city structure, and land use planning.
3334. **Real Estate Finance (3:3:0)**. Prerequisite: FIN 3320 with a grade of B or higher. Mechanisms of real estate financing, sources of funds and financial institutions, and government agencies.
3336. **Principles of Insurance (3:3:0)**. Prerequisite: FIN 3320 with grade of B or better. Fundamentals of risk management and insurance, including the nature and treatment of pure loss exposures; legal principles; and property, liability, life and health insurance.
4182. **Internship in Business Administration (1)**. Prerequisite: At least 6 hours of professional courses to be determined by the area. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom. Must be taken pass-fail.
4323. **Management of Financial Institutions (3:3:1)**. Prerequisite: FIN 3320, 3321, and 3323. Operation and management policies of depository financial institutions. Commercial bank management is stressed. Examines internal operation, regulation, and supervision of institutions studied. Problems and cases.
4324. **Investments (3:3:0)**. Prerequisite: FIN 3320 with a grade of B or higher. Overview of various investment media and markets associated with them. Emphasis on fundamental and technical analysis, sources of information, and the efficient markets concept.
4325. **Principles of Portfolio Management (3:3:0)**. Prerequisite: FIN 3321, 4324, and ACCT 3304. Advanced study of selecting and combining securities into a portfolio. Includes setting investment goals, diversification and risk reduction, capital market theory, and portfolio selection models.
4326. **Student-Managed Investment Fund (3:3:0)**. Prerequisite: FIN 3321, 4324 and consent of instructor. Advanced application of the process of selecting securities as well as forming

and managing a portfolio involving real money. Focus is on managing risk and return. May be repeated for credit.

4327. **Derivative Securities and Markets (3:3:0)**. Prerequisite: FIN 3320 with a grade of B or better and FIN 3321. Course studies risk allocation function of derivative financial securities and markets from the perspective of market users. It includes hedging and trading strategies, pricing relationships, and the roles of government/private regulation.
4328. **International Finance (3:3:0)**. Prerequisite: FIN 3320 and 3323. A study of the international monetary system in its theoretical and institutional setting. The position of an individual business firm in conducting international trade; procedures in financing international transactions.
4329. **Fixed Income Analysis (3:3:0)**. Prerequisite: FIN 3320 with a B or better; FIN 3321 and 3323. Analysis of interest rates, fixed income valuation and fixed income risk management.
4330. **Corporation Finance II (3:3:1)**. Prerequisite: FIN 3320 with a B or higher, FIN 3321, and ACCT 3304. Advanced study of corporation finance topics including capital budgeting, risk, cost of capital, capital structure, and dividend policy. Cases may be used.
4333. **Real Estate Appraisal (3:3:0)**. Prerequisite or corequisite: FIN 3332 or 3334. Appraisal and valuation techniques applied to residential, commercial, and industrial property.
4335. **Real Estate Investments (3:3:0)**. Prerequisite: FIN 3334. The framework for urban real estate investment decisions by individuals and institutions.
4336. **Urban Land Development (3:3:0)**. Prerequisite or corequisite: FIN 3332 or 3334. The land conversion process including feasibility analysis, market and merchandising targets, site selection, design, construction, and financial analysis. Land use controls, planning, and environmental constraints.
4381. **Individual Problems in Finance (3)**. Prerequisite: Senior standing, minimum 3.0 GPA in major, minimum overall adjusted cumulative GPA of 2.75, and consent of instructor. Independent problem research under guidance of a faculty member.
4382. **Internship in Finance (3)**. Prerequisite: Faculty advisor approval, and at least 6 hours of professional courses (excluding core courses) to be determined by the area faculty. This course permits students to apply the concepts, principles, and techniques learned in the classroom. Up to 3 hours of internships (with approval prior to employment) can be applied as a free elective toward a finance major. Must be taken pass-fail.
4383. **Special Topics in Finance (3:3:0)**. Prerequisite: Consent of instructor. Examination of specialized problems in such topics as working capital management, capital budgeting, cost of capital, commodity and financial future investment, and small business finance. May be repeated once for credit as topic varies.
4385. **Senior Finance Seminar (3:3:0)**. Prerequisite: FIN 3320 with a B or better, senior standing, finance majors only. To be taken in the last semester. Integrative experience that brings together the primary functional areas of finance: corporate, investments, institutions, and real estate.

Graduate Courses

5320. **Financial Management I (3:3:0)**. Prerequisite: ACCT 5300 or equivalent. Survey of financial management covering financial mathematics, capital budgeting, sources of capital, and financial analysis. Emphasis on working capital management.
5321. **Financial Management Case Analysis (3:3:1)**. Prerequisite: FIN 5421 or equivalent. In-depth analysis of financial decision-making in areas of capital budgeting, risk, capital structure, financial analysis, dividend policy, mergers, financial failure. Case studies and computer financial models are used.
5325. **Seminar in Security Analysis and Investments (3:3:1)**. Prerequisite: FIN 5421 or equivalent. Evaluation of various investment media (stocks, bonds), investment analysis (both fundamental and technical analysis), and the concept of efficient markets and market risk.
5326. **Seminar in Portfolio Theory and Management (3:3:1)**. Prerequisite: FIN 5325. New developments in portfolio theory. Efficient markets and capital asset pricing model. Evaluation and management of portfolios.
5327. **Student-Managed Fund (3:3:0)**. Prerequisite: FIN 5325 or equivalent and consent of instructor. Advanced application of the process of selecting securities, and forming and managing a portfolio involving real money. Focus is on managing risk and return. May be repeated for credit.

5328. **Options and Futures (3:3:1)**. Prerequisite: FIN 5421 or equivalent. Role of financial options and futures in hedging of financial risk. Develops relationships between options, futures, interest rates, and underlying assets.
5329. **The Money and Capital Markets (3:3:1)**. Prerequisite: ACCT 5401 or any 5000-level finance course. Determination of saving-investment, demand for funds, theory of interest rates, portfolio selection, security pricing. Examination of money markets, bond markets, mortgage markets, tax-exempt markets.
5333. **The U.S. Financial System in a Global Environment (3:3:0)**. Prerequisite: ACCT 5401 or any 5000-level finance course. Introduction to operations, mechanics, and structure of the financial system. Financial institutions, money and capital markets, financial instruments, regulations, monetary policy, international financial system.
5334. **Real Estate Finance (3:3:0)**. This course covers primary and secondary mortgage markets, alternative mortgage instruments, creative financing, loan underwriting, and risk management.
5336. **Individual Study in Finance (3)**. Prerequisite: Consent of instructor. Directed individual study of advanced finance problems. May be repeated or credit.
5338. **Multinational Financial Management (3:3:0)**. Prerequisite: FIN 5421 or equivalent. This course investigates issues in corporate financial management for multinational firms; including foreign exchange forecasting and risk management, multinational capital budgeting, multinational capital structure, and international financial markets.
5345. **Real Estate Analysis (3:3:0)**. A survey of the law, valuation, and financing of real estate, including secondary market analysis. Also, investigation into investment property ownership, feasibility, cash flow, and return calculations.
5382. **Internship in Finance (3)**. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom.
5421. **Financial Management Concepts (4:4:0)**. Prerequisite: ACCT 5401 or concurrent, ISQS 5345 or concurrent. Essential financial management concepts with applications to financial decision making in organizations. Special emphasis on cases and computer financial models.
6122. **Research Seminar in Finance (1:1:0)**. Seminar in current research topics and methodology in finance. Should be taken by doctoral students each semester of the program.
6331. **Seminar in Finance Foundations (3:3:0)**. Prerequisite: Consent of instructor. Doctoral seminar introducing students to foundational theories in finance and economics and to databases and software programs used by finance researchers.
6332. **Seminar in Corporate Finance (3:3:0)**. Prerequisite: Consent of instructor. Doctoral seminar covering the major theoretical and empirical studies in the area of corporate finance.
6333. **Seminar in Investments (3:3:0)**. Prerequisite: Consent of Instructor. Doctoral seminar covering the major theoretical and empirical studies in the area of investments.
6334. **Seminar in Financial Institutions (3:3:0)**. Prerequisite: Consent of Instructor. Doctoral seminar covering the major theoretical and empirical studies in the area of financial institutions.
6335. **Seminar in Financial Markets (3:3:0)**. Prerequisite: Consent of Instructor. Doctoral seminar covering the major theoretical and empirical studies in the area of financial markets.
6336. **Seminar in Special Topics in Finance (3:3:0)**. Prerequisite: Consent of Instructor. Doctoral seminar covering the major theoretical and empirical studies in the area of finance as determined by the instructor.
3344. **Introduction to Production and Operations Management (3:3:1)**. Prerequisite: ISQS 2340, MATH 2345, and a minimum 2.75 adjusted cumulative GPA. An overview of the production and operations function in organizations with examples of the application of computer and quantitative skills to management problems. Both design and operating problems are discussed.
3345. **Object Oriented Systems (3:3:0)**. Prerequisite: ISQS 2340 with a grade of C or better. A basic course in the design and creation of object-oriented programs, currently in Java.
3346. **Internet Programming (3:3:0)**. Prerequisite: ISQS 3345 and ISQS 3348. Internet programming using PHP, Python, .NET, Ruby, and/or any other advanced web application techniques of interest to the industry.
3347. **Data Structures and Programming Languages (3:3:1)**. Prerequisite: ISQS 2340 with a grade of C or better, and a 2.5 adjusted Texas Tech GPA. Introduces students to a structured programming language. Introduces algorithmic analysis, string processing, recursion, data structures, file processing techniques, and bulk storage devices.
3348. **Data Base Management Systems (3:3:0)**. Prerequisite: Minimum grade of C in ISQS 2340. Basic concepts of data base management systems; recent developments in the area of data base systems. Students develop a prototype data base application of their own.
3349. **Introduction to Data Communication Systems (3:3:0)**. Prerequisite: ISQS 2340 with a grade of C or better. Hands-on course introducing students to computer-to-computer communications technologies and the Linux operating systems.
3351. **Telecommunications Security Using Linux (3:3:0)**. Prerequisite: ISQS 3349. An advanced hands-on course in securing computer networks.
3358. **Business Intelligence (3:3:0)**. Prerequisite: ISQS 3345 and 3348. Introductory course to a broad range of applications and technologies for gathering, storing, analyzing, and providing access to data to help make business decisions.
3360. **Telecommunications Securities Theory (3:3:0)**. Prerequisite: ISQS 3349. A lecture/discussion course analyzing the basics of telecommunications theory. Best if taken concurrently with ISQS 3351.
4347. **MIS Seminar (3:3:0)**. Prerequisite: Minimum grade of C in ISQS 3348. Topics may include system maintenance, system security, intelligent systems, enterprise integration, and other contemporary topics. May be repeated once for credit.
4348. **Systems Analysis (3:3:1)**. Prerequisite: ISQS 3348. Methods for analyzing information needs and specifying application system requirements, the development life cycle and the life cycle phases leading to the determination of system requirements.
4349. **Information Systems Design (3:3:1)**. Prerequisite: ISQS 4348. Introduces the skills needed to develop a physical design and implement an operational system from the logical design of systems analysis.
4350. **Information Systems Project Management (3:3:1)**. Corequisite: ISQS 4348 if possible. Methods for management of software development projects; procurement and financial control; career and professional considerations.
4361. **Web Application Design (3:3:0)**. Prerequisite: ISQS 3346. The design and creation of web applications using a multi-tier internet technology such as Jakarta Struts and MySQL.
4381. **Individual Problems in Information Systems and Quantitative Sciences (3)**. Prerequisite: Consent of instructor. For students with high academic achievement who are interested in enhancing their degree programs by pursuing individual research or study under the guidance of an ISQS faculty member.
4382. **Internship in Information Systems and Quantitative Sciences (3)**. Prerequisite: Approval prior to employment. This course permits students to apply the concepts, principles, and techniques learned in the classroom. Up to 3 hours of internships can be applied toward a degree program. Must be taken pass/fail.
4383. **Special Topics in Information Systems and Quantitative Sciences (3:3:0)**. Prerequisite: 2.5 GPA. Examines specialized problems relating to information systems and quantitative sciences. May be repeated once for credit as topic varies.
4385. **Strategic IT and Telecommunications Management (3:3:0)**. Prerequisite: Final semester or ISQS under advisor approval. The design, management, and maintenance of information systems to provide strategic organizational advantage.

Information Systems and Quantitative Sciences (ISQS)

Undergraduate Courses

2340. [BCIS 1305] **Introduction to Information Systems in Business (3:3:0)**. Prerequisite: A 2.75 adjusted cumulative GPA and at least a C in any college level mathematics course. Survey of computer principles, procedures, hardware systems.
2341. **Business Computer Programming (3:3:1)**. Prerequisite: ISQS 2340 and a 2.5 adjusted cumulative Texas Tech GPA. Business problem solving using a programming language. The student is expected to demonstrate a basic competency in using the language to solve several problem situations.

Graduate Courses

5230. **Managerial Decision Theory (2:2:0)**. Corequisite: ISQS 5231. The course examines normative and behavioral theories of decision making in business.
5231. **Information Technology for Managers (2:2:0)**. Prerequisite: Proficiency in computer skills. Corequisite: ISQS 5230. The course examines information technology in organizations and its use in improving business processes and decisions for sustainable competitive advantage.
5338. **Information Technology for E-Business (3:3:1)**. E-commerce technology and business environment. E-commerce planning and implementation, Internet technologies, Multimedia on the Web. Web-based databases. Designing and building e-commerce site.
5341. **Business Problem Solving and Information Technology (3)**. Problem solving and decision making for business analysis, reengineering, and competitive advantage.
5343. **Operations Management and Management Science (3:3:0)**. Prerequisite: ISQS 5345. Fundamentals of the operations management function from a managerial perspective utilizing a quantitative models approach.
5345. **Statistical Concepts for Business and Management (3:3:0)**. Statistical applications using the personal computer, with emphasis on proper presentation and interpretation of statistics in managerial settings. Topics include descriptive statistics, graphical methods, estimation, testing, regression, forecasting, and quality control.
5347. **Advanced Statistical Methods (3:3:0)**. Prerequisite: ISQS 5345 or equivalent. Discrete and continuous probability distributions, maximum likelihood, statistical methods for learning, prediction, and decision making in business.
5348. **Applied Distribution-Free Statistics in Business (3:3:0)**. Prerequisite: ISQS 5345 or consent of instructor. Distribution-free statistical techniques of inference from non-normal populations and tests of nonparametric hypotheses applied to business problems.
5349. **Regression Analysis (3:3:0)**. Prerequisite: ISQS 5347 or equivalent. Foundations and major topics of regression analysis, model formulation, and methods to deal with standard and nonstandard regression applications in business.
5382. **Internship in Information Systems and Quantitative Science (3)**. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom.
6337. **Business Programming Languages (3:3:0)**. Prerequisite: ISQS 5341. Concepts of data structures and file processing as they relate to information systems. Emphasis on structured and object-oriented program design using JAVA.
6338. **Database Concepts (3:3:0)**. Prerequisite: ISQS 5341 and ACCT 5401. Model organizational data and business rules; logical and physical designs of relational databases, data warehousing, data mining, and data administration.
6339. **Database Application Development (3:3:0)**. Prerequisite: ISQS 6338; corequisite: ISQS 6337. Creation of working database application from concept to implementation. Build and populate an efficient relational database instance. Enforcement of business rules, client-server trade-offs.
6340. **Decision Support Systems (3:3:0)**. Prerequisite: 6338. Theories of decision making, DSS software and design, artificial intelligence in DSS, executive information systems, and institutionalization and behavioral factors.
6341. **Data Communications and Network Management (3:3:0)**. Prerequisite: ISQS 5341. Concepts and terminology of data communications, network design, client-server architecture, distributed information systems with focus on communications architecture, and management.
6342. **Strategic Uses of Information Systems Technology (3:3:0)**. The use of information technology for sustainable competitive advantage. IT in the global marketplace. Strategic use of information resources.
6343. **Advanced Telecommunications Network Management (3:3:0)**. Prerequisite: ISQS 6341 or B.B.A. in MIS. Design and management of telecommunication network for security, efficiency, durability, and profitability.
6347. **Data and Text Mining for Business Intelligence (3:3:0)**. Prerequisite: ISQS 5345 or consent of instructor. Examples and methods of data and text mining to produce enterprise intelligence. Use of data and text mining software.
6348. **Applied Multivariate Analysis (3:3:0)**. Prerequisite: ISQS 5347 or consent of instructor. Multivariate methods for business research, including classification, visualization, testing, clustering, and latent structure.
6349. **Advanced Business Forecasting (3:3:0)**. Prerequisite: ISQS 5347 or consent of instructor. Forecasting methods for business and econometrics. Smoothing; autocorrelations; spectra autoregressive, MA, and ARMA models; Box-Jenkins and REGARMA models.
7338. **Advanced Systems Analysis (3:3:0)**. Prerequisite: ISQS 6338, MGT 5371, FIN 5320 or 5421. Methods for analyzing information needs and specifying application system requirements. Included are applications development strategies, business process reengineering, object-oriented analysis, and CASE tools.
7339. **Advanced Information Systems Design (3:3:0)**. Prerequisite: ISQS 7338. Technological and managerial aspects of system design and implementation. Explores state-of-the-art systems design techniques including object-oriented and event-oriented design.
7340. **Management of Information Systems (3:3:0)**. Prerequisite: ISQS 7338 or 7339 as a corequisite. Study of information systems; their design, implementation, and contribution to management planning, decision-making and control. Capstone course for M.S.B.A.-MIS and Telecom-net; grade of A or B required.
7341. **Seminar in MIS Research and Methods (3:3:0)**. Prerequisite: Doctoral standing or consent of instructor. Seminar covering current MIS research methods and issues.
7342. **Advanced Topics in MIS (3:3:0)**. Prerequisite: Consent of instructor. Topics include system construction, system maintenance, artificial intelligence, expert systems, enterprise integration, international issues in MIS, and other contemporary topics. May be repeated two times.
7346. **Seminar in Cognitive and Behavioral MIS Research (3:3:0)**. Prerequisite: Doctoral standing or consent of instructor. Seminar covering cognitive and behavioral MIS research.
7347. **Seminar in Managerial and Organizational MIS Research (3:3:0)**. Prerequisite: Doctoral standing or consent of instructor. Seminar covering managerial and organizational MIS research.

International Business (I B)

Undergraduate Courses

3100. **Language Workshops (1:2:0)**. Prerequisite: Consent of director. Business language and cultural workshops taught in a foreign language. May be repeated for 3 credit hours.
3105. **Cross-Cultural Management Skills (1:1:0)**. Prerequisite: Consent of instructor. Overview of essential management skills for successful international business enterprises. Includes cross-cultural business techniques, topics, current issues, and theories.
3361. **International Commerce (3:3:0)**. Prerequisite: At least a C in MKT 3350. Develops a basic understanding of international trade as well as importing and exporting and the associated government regulations.
4382. **Internship in International Business (3:3:0)**. Prerequisite: Consent of instructor. Permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom.
4383. **Special Topics in International Business (3:3:0)**. Prerequisite: Consent of instructor. Examines specialized problems relating to international business such as exporting, international trade, etc. May be repeated once for credit as topic varies.

Management (MGT)

Undergraduate Courses

3370. **Organization and Management (3:3:0)**. Prerequisite: Minimum 2.75 adjusted cumulative GPA. The management function; basic principles, concepts, and practices in the operation of organizations.
3373. **Managerial Communication (3:3:1)**. Prerequisite: Junior standing, ISQS 2340, a C or better in ENGL 1301 and 1302, and a 2.75 GPA. The application of oral and written communication principles to managerial situations; an overview, simulation, and analysis of the communication process in the business environment.
3374. **Personnel Administration (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Principles and methods in general personnel management and work force maintenance.
3375. **Entrepreneurship I: New Value Creation (3:3:0)**. Introduces students to the knowledge and modes of thinking that are basic to new value creation.

3376. **Organizational Behavior (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Focuses on managerial and employee attitudes and behavior. Topics include performance, job satisfaction, motivation groups, and task design.
3379. **Advanced Organization and Management (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Study of the design and management of organizations in considerable depth beyond the basic course.
4370. **Consulting to Entrepreneurial Organizations (3:3:0)**. Prerequisite: A 2.5 Texas Tech GPA, FIN 3320, MKT 3350, MGT 3370, 3373, and BLAW 3391. Field Project in the Lubbock Community. Not an in-classroom class.
4371. **Health Organization Management (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Designed to provide an overview of the health care system and its managerial, social, behavioral, and economic aspects from an organizational viewpoint.
4372. **Labor Relations (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. A study of labor union development, organization, leadership, and operational techniques. Consideration of collective bargaining issues and procedures.
4373. **Leadership Ethics (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; MGT or Honors College student. Alternative perspectives of leadership and ethics are explored and applied to emergent ethical issues facing organizations.
4374. **International Entrepreneurship (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA. Focuses on how entrepreneurs and firms recognize and fulfill opportunities for wealth creation in an international context.
4375. **International Management (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher or ECO 3333. Exploration of organization and management issues in international enterprise.
4376. **Entrepreneurship II: Discovering Entrepreneurial Opportunities (3:3:0)**. Prerequisite: MGT 3375 or permission of instructor. Generates and refines entrepreneurial process, opportunity discovery, and entrepreneurial thinking skills; develops the knowledge base for entrepreneurial idea assessment and problem-solving skills required for application to the recognition of viable opportunities.
4377. **Family Enterprise (3:3:0)**. Prerequisite: Permission of instructor or previous experience with or in a family business. Exploration of major issues and strategies for initiating, building and managing a family business.
4378. **Clinical Aspects of Health Organization Management (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; MGT or Honors College student. Managerial implications of the natural history of disease, epidemiology, and health policies and their relevance to modern health care organizations.
4379. **Managed Care Aspects of Health Organization Management (3:3:0)**. Prerequisite: MGT 4378; 3.0 adjusted Texas Tech GPA; MGT or Honors College student. Fundamental issues surrounding today's managed care organizations and their impact on stakeholders.
4380. **Strategic Management (3:3:0)**. Prerequisite: Business students who have completed BLAW 3391, ISQS 3344, FIN 3320, MKT 3350, MGT 3370, and 3373 with grades of C or higher and are in their final semester. Strategy is an integrative course focusing on an organization's pursuit of superior economic performance by deciding what business to be in and how to compete.
4381. **Individual Problems in Management (3)**. Prerequisite: Consent of instructor. For students with high academic achievement who are interested in enhancing their degree program by pursuing individual research or study under the guidance of a management faculty member.
4382. **Internship in Management (3)**. Prerequisite: Approval prior to employment. This course permits students to apply the concepts, principles, and techniques learned in the classroom. Up to 3 hours of internships can be applied toward a degree program.
4383. **Special Topics in Management (3:3:0)**. Prerequisite: Consent of instructor. Examines specialized problems relating to management. May be repeated once for credit as topic varies.
4384. **Managing Conflict and Negotiations (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; MGT major or Honors College student. Develop the skills necessary to manage organizational stakeholders effectively. Emphasizes negotiation skills.
4386. **New Venture Creation (3:3:0)**. Prerequisite: MGT 4376 and permission of instructor. Students learn and apply due diligence, business planning, and venture creation skills needed to implement new business concepts.
4387. **History of Management Thought: Honors Seminar in Management (3:3:0)**. Prerequisite: A 3.0 adjusted Texas Tech GPA; MGT major or Honors College student. Offers interdisciplinary perspective on development of management knowledge.
4388. **Change and Innovation Processes (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; MGT major or Honors College student. Focuses on understanding and managing innovation and change processes.
4389. **Honors Senior Internship in Management (3:3:0)**. Prerequisite: consent of instructor. Under joint faculty-employer supervision, the student will intensively interrelate an experiential workplace component with an integrative written thesis.
4397. **Management and the Business Environment (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Study and cases in social responsibility, business ethics, and other problems in the external environment of the business organization.

Graduate Courses

5192. **Global Management Strategies (1:1:0)**. Corequisite: MGT 5391. Study of global strategy formulation and implementation.
5306. **HOM I: Introduction to Healthcare Systems (3:3:0)**. Prerequisite: Consent of instructor. Introduces the history and structure of the U.S. healthcare system. Students will learn policy analysis and managerial epidemiology competencies needed in future HOM courses.
5307. **HOM II: Managed Care Organizations (3:3:0)**. Prerequisite: MGT 5306 or consent of instructor. Examines fundamental and contemporary issues in the organization and management of managed health care organizations.
5308. **HOM III: Consumer-Driven Healthcare Design (3:3:0)**. Prerequisite: MGT 5307 or consent of instructor. A systems-based view of healthcare organizations emphasizing the safe provision of high quality care to populations.
5309. **HOM IV: Integrated Healthcare Operations (3:3:0)**. Prerequisite: MGT 5308 or consent of instructor. Analyzes and examines core healthcare legal, operational, and management issues through the use of targeted cases and projects.
5371. **Managing Organizational Behavior and Organizational Design (3)**. Examines management of individual, interpersonal, group and intergroup relations, organizational design, and the organization's role in a rapidly changing environmental and global context.
5372. **Leadership and Team-Building Skills (3:3:1)**. Prerequisite: MGT 5371. Emphasizes cognitive, skill, and experiential-practicum learning applied to ongoing leadership and organizational problems.
5373. **Entrepreneurship (3:3:0)**. Prerequisite: MGT 5376, ACCT 5401, and MKT 5360 or consent of instructor. Develops the new value creation skills and modes of thinking necessary for creating actionable opportunities in a variety of socioeconomic settings.
5374. **Negotiation and Conflict Management Skills (3:3:1)**. Prerequisite: Consent of instructor. Emphasizes negotiation skills and strategy development for managing organizational stakeholders.
5375. **Organization Theory (3:3:0)**. Prerequisite: MGT 5371. A study of basic organization theory concepts and application of these concepts to the analysis and structure of organizations.
5377. **Human Resource Management (3:3:0)**. Prerequisite: MGT 5371. Examination of the principles and methodology of personnel administration with emphasis on manpower planning, selection, development, and evaluation.
5378. **Managing the Family Enterprise (3:3:0)**. Prerequisite: Previous experience with or in a family business is encouraged; or with permission of instructor. Strategic, management, or business issues involved in running family firms. Emphasis is on entrepreneurial family firms.
5379. **Entrepreneurial Discovery (3:3:0)**. Prerequisite: MGT 5373 or permission of instructor. Further develops opportunity creation skills through understanding the entrepreneurial discovery process, to prepare for real-world opportunity recognition applications.
5381. **Managing Innovation and Change (3:3:0)**. Prerequisite: MGT 5371. This course focuses on understanding organization innovation and change and applying this knowledge to managing innovation and change processes.
5382. **Internship in Management (3)**. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom.

5384. **International Management (3:3:0)**. Prerequisite: MGT 5371. Comparative analysis of domestic, international, and multinational business operations, and the significance for organization and management.
5391. **Strategic and Global Management (3:3:0)**. Prerequisite: Completion of core and tool courses in M.B.A. or M.S.A. program. Global and local strategy formulation and implementation of corporate, business, and functional strategies. MBA/MSA capstone course.
5476. **Executive Skills (4:2:4)**. Prerequisite: Admission to the MBA program. Develop self-awareness of personal attributes and goals, enhance personal development, and impart skills needed to function as future executives.
6305. **Individual Study in Management (3)**. Prerequisite: Consent of instructor. Directed individual study of advanced management topics varying with the need of each student. May be repeated for credit.
6315. **Current Management Issues (3)**. Prerequisite: Consent of instructor. Study and integration of current management issues. May be repeated for credit.
6375. **Advanced Organization Behavior (3:3:0)**. Prerequisite: Doctoral student status or consent of instructor. A seminar which explores research and conceptual foundations of behavioral science and the role and contributions of microorganizational concepts in organization design and functioning.
6380. **Colloquium in Management Research (3:3:0)**. Prerequisite: Doctoral standing. Study of problems related to management for the individual student. Studies in selected areas of management research. May be repeated for credit.
6381. **Seminar in Advanced Management Topics (3)**. Organized seminar on specific advanced management topics in the areas of management of strategy, organizational studies, personnel and human resources management, or international business. May be repeated for credit.
6392. **Advanced Organization Theory (3:3:0)**. Prerequisite: Doctoral student status or consent of instructor. A seminar which explores the fundamental macro theories and concepts of organization design and functioning.
6395. **Advanced Strategic Management (3:3:0)**. Prerequisite: Doctoral student status or consent of instructor. A seminar which systematically examines the theoretical and empirical research literature on strategic management content and process.

Marketing (MKT)

Undergraduate Courses

3350. **Introduction to Marketing (3:3:0)**. Prerequisite: ECO 2301 (AAEC 2305 or ECO 2305 for non-business majors) and minimum 2.75 GPA. Marketing structures and agencies; motives and buying habits; types of middlemen, marketing institutions, and channels; current marketing practices; marketing of industrial and consumer goods.
3352. **Consumer Behavior (3:3:0)**. Prerequisite: At least a C in MKT 3350. The buyer as a problem solver; buying decision processes; factors influencing behavior; principles, theories, and models; behavioral research techniques.
3353. **Supply Chain Management (3:3:0)**. Prerequisite: At least a C in MKT 3350. An introduction to principles and practices used today in managing relationships among manufacturers, distributors, retailers, and consumers.
3356. **Marketing Research and Analysis (3:3:1)**. Prerequisite: At least a C in MKT 3350 and MATH 2345. Scientific marketing research methods; emphasis on collection, analysis, and interpretation of data as applied to the solution of marketing problems.
4351. **Retail Marketing (3:3:0)**. Prerequisite: ACCT 2300 and at least a C in MKT 3350. Comprehensive introduction to an evaluation of retailing with emphasis on profit elements, pricing and merchandising policies, inventory and merchandising control.
4354. **Market Promotion (3:3:0)**. Prerequisite: MKT 3352. Management of the promotional mix of advertising, personal selling, and sales promotion. Emphasizes the interaction and coordination of these three elements and relates them to the other components of the firm's marketing strategy.
4358. **International Marketing (3:3:0)**. Prerequisite: At least a C in MKT 3350. A survey of international marketing principles, cultural differences, world markets, and political constraints.
4359. **Sales Management (3:3:0)**. Prerequisite: At least a C in MKT 3350. Problems and methods of organization and administration of sales departments, sales operations, sales control, sales promotion, and sales policies.
4360. **Marketing in E-Business Environments (3:3:0)**. Prerequisite: At least a C in MKT 3350. Overviews the Internet and marketing-related technological developments. Primary focus is on strategic issues in creating market advantages in electronic commerce.
4381. **Individual Problems in Marketing (3)**. Prerequisite: Consent of instructor. For students with high academic achievement who are interested in enhancing their degree program by pursuing individual research or study under the guidance of a marketing faculty member.
4382. **Internship in Marketing (3)**. Prerequisite: At least 6 hours of approved marketing courses and approval prior to employment. Internship must include at least 10 consecutive calendar weeks of full-time employment; compensation must be commensurate with the work assignment for the entire internship.
4383. **Special Topics in Marketing (3:3:0)**. Prerequisite: Consent of instructor. Examines specialized problems relating to marketing. May be repeated once for credit as topic varies.

Graduate Courses

5350. **Marketing Foundations (3:3:0)**. An examination of marketing functions and the institutions which perform them, choice of criteria for marketing strategy decisions, marketing structural relationships, and the role of marketing. May not be taken for credit after MKT 5360.
5355. **Research Design (3:3:0)**. Prerequisite: Consent of instructor. A survey of quantitative methods for and issues in the analysis of marketing data.
5356. **Marketing Research for Decision Makers (3:3:1)**. Prerequisite: ISQS 5345, MKT 5360. Marketing research methods with emphasis on data collection and analysis for solving marketing problems.
5358. **Business-to-Business Marketing (3:3:0)**. Prerequisite: MKT 5360. Designed to provide an overview of the many diverse facets of business-to-business marketing. Specific topics include selling to large businesses, buyer-seller relationships, supply-chain management, strategic alliances, and the effect of the Internet on business-to-business marketing.
5359. **Individual Study in Marketing I (3:3:2)**. Prerequisite: Consent of instructor. Directed individual study of advanced marketing problems varying with the need of the particular student. Can be repeated for credit if subject matter is different.
5360. **Marketing Concepts and Strategies (3:3:0)**. This course examines marketing functions, the institutions which perform them, and the study of marketing planning, strategy, and tactics. Includes the organization, execution, and control of the marketing effort.
5361. **Marketing Administration (3:3:0)**. Prerequisite: MKT 5360 or equivalent. A study of marketing planning and strategic issues related to the marketing effort.
5362. **Multinational Marketing (3:3:0)**. Prerequisite: 5360. A survey of international marketing principles, cultural differences, world markets, and political restraints.
5363. **E-Marketing (3:3:0)**. Prerequisite: MKT 5360 or equivalent. Use of the Internet and related technologies to enhance marketing functions and processes so that organizations can function more effectively in a digital, networked economy.
5367. **Behavior in Markets (3:3:0)**. Prerequisite: MKT 5360 or equivalent. A study of marketing management's use of a broad range of behavioral information in establishing marketing policy and strategy.
5368. **Macromarketing (3:3:0)**. Prerequisite: MKT 5360 or equivalent. An examination of the various macro-environments within which the marketing manager works: the institutional environment, the social environment, the political-legal environment, and the cultural-behavioral environment.
5382. **Internship in Marketing (3)**. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom.
6352. **Marketing Thought (3:3:0)**. Prerequisite: Advanced graduate standing and consent of instructor. Evaluation of the contribution of marketing scholars to marketing thought, including the development of problems, theory, and principles.
6353. **Marketing Theory (3:3:0)**. Prerequisite: Advanced graduate standing and consent of instructor. A philosophy of science approach to the study of marketing theory and the components of marketing theory: hypotheses, law-like generalizations, empirical regularities, laws, models, and scientific explanations.
6355. **Theory Testing (3:3:0)**. An in-depth examination of measurement issues, including latent constructs and data-gathering procedures in marketing.

College of Education

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About the College

The College of Education is devoted to promoting excellence and equity through scholarship, research, and reflective practice in education. The college provides degree and certification programs for both undergraduate and graduate students who plan careers in education. For many individuals, this means a future in teaching. College faculty work closely with public school personnel and practitioners in the field to design programs that will prepare leading educators for the 21st century.

The college prepares teachers who will become certified to teach in elementary schools (from the early childhood years to grade four), at the middle level (from grades four to eight), and in secondary schools (from grades eight to twelve). The college offers undergraduate degree programs leading to certificates in middle level education, bilingual education, special education, and science. In addition, a variety of advanced degrees and certificates are available.

The College of Education is accredited by the State Board for Educator Certification, the Southern Association of Colleges and Schools, and the National Council for Accreditation of Teacher Education. Texas Tech University holds membership in the American Association of Colleges for Teacher Education. The teaching certificate earned at Texas Tech is accepted in a majority of the states in the nation through reciprocity agreements.

Programs in the college are housed in two departments. The Department of Curriculum and Instruction offers undergraduate programs leading to initial teaching certificates and graduate programs in bilingual education, curriculum and instruction, elementary education, language literacy, and secondary education. The Department of Educational Psychology and Leadership offers graduate programs in counselor education, educational leadership, educational psychology, higher education, instructional technology, and special education.

All students interested in becoming teachers or pursuing graduate programs in education should visit the college Web site for further information (www.educ.ttu.edu).

Educator Certification

The preparation of teachers and the provision of knowledge and skills for teachers seeking advanced certificates are important functions of Texas Tech University at both the undergraduate and graduate levels. The coordination of the educator certification programs is a responsibility of the College of Education.

Initial Teaching Certificates

Passing rates on licensing exams taken by students seeking initial teaching certificates are reported to the U.S. Department of Education. The certification rate for students taking their exams in 2004-2006 was 95 percent.

Certification at the Undergraduate Level

The College of Education prepares students for a variety of teaching certificates. For a list of available certificates, please see the college Web site (www.educ.ttu.edu/certification).

Students preparing to teach in secondary schools (grades eight to twelve) will generally complete an academic major within the Colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Visual and Performing Arts, Mass Communications or Human Sciences, with additional courses in professional education required for certification. Students interested in teaching composite science (certified to teach all sciences in grades eight to twelve) may complete a multidisciplinary science major through the College of Education or an academic major in one of the science teaching fields. Students preparing to teach grades four to eight will complete a multidisciplinary studies major in the College of Education. Those who wish to become certified as teachers of children from early childhood to grade four (EC-4) with specializations in special education, English as a second language, or bilingual education will major in the College of Education. Students seeking certification in EC-4 with a specialization in early childhood will do so through a degree from the College of Human Sciences. See www.educ.ttu.edu for degree and certification information.

General advice on specific degree requirements is available in the office of the academic dean of the college in which the student is enrolled. The student will be advised on certification requirements by an appropriate advisor in the College of Education. See www.educ.ttu.edu for additional information.

Degree and Teacher Certification Programs. Degree and teacher certification programs are two distinct programs. Freshmen or transfer students are admitted by an appropriate college to a degree program leading to a bachelor's degree. Eligible students at the junior level are admitted to a teacher certification program that leads to a Texas teaching certificate. The certification program culminates with the state-mandated Texas Examinations of Educator Standards (TExES) exams. Students must pass all appropriate TExES exams for certification, but not for the bachelor's degree. Language-related certification also requires passage of the Texas Oral Proficiency Test (TOPT).

Admission to the Teacher Certification (Education) Program. Admission to College of Education certification programs is open to all individuals on the basis of academic preparation, achievement, and availability of space in the program selected. When there are more qualified applicants than can be instructed adequately by the available faculty or accommodated in available facilities, the college will control enrollment in specific programs by limiting the admission of new students. The number of students accepted into the undergraduate early childhood, middle-level education, all-level education, secondary education, and career and technology programs is limited. Therefore, admission into a teacher education program is competitive and based on GPA and other criteria. A complete description of eligibility requirements is available in the Educator Certification Office in the College of Education. (Entrance criteria may be subject to change.)

Admission to a college degree program does not ensure admission to an upper-division teacher certification program. Students seeking teacher certification may apply to a certification program through an admission process. Application forms are available at www.educ.ttu.edu. The middle-level program and special education program accept applications once a year in the spring for the fall semester. Students seeking all other certificates may apply twice a year. Application deadlines are generally February for the fall semester and mid-September for the spring semester. For specific details, consult a College of Education advisor. To be considered for admission to teacher certification programs, students must meet the following minimum prerequisites:

1. Have a minimum of 60 semester hours (including current enrollment) with an acceptable scholastic GPA. Students seeking early childhood certification must have a 2.7 or better overall GPA. Students seeking all other certificates (middle-level, secondary, career and technology, and all-level) must have a 2.5 or better overall GPA.
2. Possess college-level skills in reading, oral and written communication, critical thinking, and mathematics.
3. Possess the personal and social qualities and the physical and mental health to indicate a fitness for the education profession.

Admission to upper-division teacher education programs will be subject to additional entrance criteria depending on availability of space in the program selected.

No otherwise qualified student will be denied admission to a degree program, certification program, or student teaching because of race, religion, national origin, age, gender, or disabling condition.

Under some circumstances a student may be requested to leave a certification program. Such a request can be initiated by the college or by the student. Due process will be observed during this time.

Individuals who lack the minimum GPA due to extenuating circumstances may also apply for admission to teacher education. The Admission Committee will review each request.

Transferability. Developmental courses (e.g., basic introductory reading and mathematics courses) and vocational courses (e.g., auto mechanics, nursing) will not transfer for degree or certification programs. Courses with D grades may or may not transfer, depending on the guidelines of the Coordinating Board of Higher Education, the university, and/or the college.

Certification Plan. Any undergraduate student working toward a teacher's certificate should file a certification plan in the College of Education after 60 hours or, for transfer students, during the first semester of attendance at Texas Tech. The student's advisors will assist in completing the certification plan. The requirement for filing a certification plan applies regardless of the degree sought, the subject that the student expects to teach, or the level (early childhood, middle-level, secondary, or all-level) at which he or she expects to be certified. 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 College of Education.

Certification plan forms must be obtained from the College of Education. Once the form is secured, the student is responsible for consulting with the appropriate advisors to complete the plan.

Admission to Student Teaching. Completing 12 semester hours in the student teaching semester, including all-day student teaching for one full semester, is required for certification. Normally a student will take the student teaching course in a single semester during fall or spring of the senior year. Because student teaching requires the majority of the student's time during the semester, the student should plan to register only for student teaching and the required corequisite capstone education course. Any request for an additional course with student teaching must be approved by the certification officer. The following are prerequisites for admission to student teaching:

1. The applicant must have completed all coursework prior to student teaching. Exceptions to this rule can be granted under some circumstances with permission from a College of Education advisor.
2. Each student—unless enrolled in agricultural science, family and consumer science, or art or music—must attend a student teaching information meeting and apply for student teaching through the Clinical Experience office during the semester preceding student teaching. Applications are due by April 1 for the fall semester and November 1 for the spring semester. Students in agricultural education, family and consumer sciences education, and art or music must consult their department chairperson regarding the proper time to file this application.
3. The student must have a grade point average of 2.5 or higher in professional education courses and in the teaching field(s) for middle-level and secondary teaching. Students seeking early childhood certification must have a 2.7 or higher overall GPA. Students seeking middle-level, secondary, and all-level certificates must have a 2.5 or higher overall GPA.
4. The student must be able to speak and understand the English language sufficiently to use it easily and readily in conversation and teaching.
5. The student must possess and demonstrate such personal and social qualities and physical and mental health to indicate a fitness for the education profession.
6. The student must have met all other criteria that may be established for the teacher certification program.

Under some circumstances a student may be requested to leave a student teaching placement. Such a request can be initiated by the college, by the student, or by the school district. Due process will be observed in considering whether an alternate placement will be made or the student teaching experience terminated.

TEXES and TOPT Exams. All persons who have completed teacher training programs and are candidates for initial Texas certification (i.e., those who do not hold a current valid Texas teaching certificate) must pass proficiency tests—Texas Examinations of Educators Standards (TEXES)—in their fields of certification. All candidates for initial teacher certification must pass a test on pedagogy and professional responsibilities at the appropriate level and a content specialization test in each area for which certification is sought. The Texas Oral Proficiency Test (TOPT) is also required of individuals seeking language-related certificates. A fee is associated with all such examinations. To be eligible to take the exams, a student must complete a registration process online. Students will find information about the exams and access to the registration process at www.educ.ttu.edu/certification/TEXES. Students should also consult the Web site for exam testing dates, dates to take practice exams, and test preparation opportunities.

Recommendation for Teacher Certification. An individual who has maintained the levels of performance stated as prerequisites for admission to student teaching; who has demonstrated the knowledge, dispositions, and skills to teach; and who has completed student teaching or an internship successfully is eligible to apply for the appropriate teaching certificate. The student must apply online to the State Board for Educator Certification at www.sbec.state.tx.us. The state requires that applicants complete a fingerprint criminal background check before they may be certified. The state charges a fee for the certification process. Upon completing all requirements, including the appropriate TEXES examinations, the College of Education recommends the student for certification. The TOPT also is required of individuals seeking language-related certificates.

While completing the requirements, a student must maintain a 2.5 GPA in the professional education courses and a 2.5 GPA in the teaching field(s). Grades of D are not acceptable in the professional education courses or in the teaching field(s). An acceptable overall GPA is required (2.7 for early childhood; 2.5 for middle-level, secondary, all-level, and career and technology). All students seeking initial teaching certification at Texas Tech must complete an electronic professional portfolio based on the Texas Education Standards.

Post-Baccalaureate Certification Programs

Post-baccalaureate programs are available to meet initial certification requirements for teaching in early childhood, middle-level, and secondary schools. Students must have a bachelor's degree. Those seeking a certificate to teach children from early childhood to grade four must have a 2.7 grade point average for their last 60 hours of undergraduate coursework. Those seeking all other certificates must have a 2.5 GPA in their last 60 hours. Although the professional certification programs require work at the graduate level, these programs are not concurrent with degree programs. The state-mandated TExES test is required for persons who complete certification programs. For guidance concerning professional certification, the student should consult with a certification advisor. Students wishing to pursue post-baccalaureate certification must also apply to the Texas Tech University Graduate School. Upon acceptance to the Graduate School, students will contact a graduate certification advisor in the College of Education and file a certification plan. The provisions in previous sections pertaining to admission to student teaching, TExES and TOPT exams, electronic professional portfolio, and recommendation for teacher certification also apply to post-baccalaureate candidates. Students should expect to complete field experiences as part of their program requirements. Information about all certification matters may be found at www.educ.ttu.edu.

Students who become certified on the graduate level sometimes complete an internship of one year rather than complete a semester of student teaching. To be eligible for an internship, a post-baccalaureate student must meet eligibility requirements for student teaching, become employed as a classroom teacher by a school district in Texas, and enroll in 6 credit hours in the fall (including a capstone class) and 3 credit hours in the spring semester. For more information, contact the college coordinator of field experiences or view www.educ.ttu.edu/clinicalexperiences.

Programs Offering Advanced Certification

Supplemental Certificates. Supplemental certificates are available for teachers holding an initial teaching certificate. Students may seek advanced certification in bilingual education, English as a second language, gifted and talented, generic special education, and visual impairment. Details are available on the college Web site under the appropriate program area. The bilingual and English-as-a-second-language certificates are available through the bilingual program area (www.educ.ttu.edu/edbl). Supplemental certificates in generic special education, visual impairment, and gifted and talented are available through the special education program area (www.educ.ttu.edu/edsp).

Professional Certification Programs. The college offers professional certifications programs in the following areas: principal, superintendent, counselor, educational diagnostician, master reading teacher, and professional reading specialist. Some certificates may be combined with graduate programs leading to master's degrees or doctoral degrees in the related program areas. Admission criteria for these certification programs are set by the program area faculty in which they are housed. For admission information and details about the programs, see the college Web site for the appropriate program area. The educational leadership program offers the principal and superintendent certificates, the counselor education program oversees counselor certification, the special education program offers the educational diagnostician certificate, and the language literacy program supervises the master reading teacher certificate and the professional reading specialist certificate.

Recommendation for Supplemental and Professional Certificates. Students seeking supplemental and professional certificates must pass the appropriate TExES exam. The registration process is explained online at www.educ.ttu.edu. After completing all requirements, students may apply for their certificate online from the State Board for Educator Certification (www.sbec.state.tx.us).

Graduate Programs

Interdisciplinary Science Program in Multidisciplinary Science

This interdisciplinary program leading to a Master of Science degree with a major in multidisciplinary science is administered by the associate dean of the College of Education with faculty and courses drawn from participating units throughout the university. The program is designed to meet the professional needs of K-12 teachers in science. The program requires the completion of 36 semester hours of graduate courses in the sciences, mathematics, and science education culminating with the completion of a special project.

Program Coordinator: Dr. Joe Claudet, associate professor of educational leadership and associate dean of the College of Education.

Program Courses

ATMO 5302	Weather, Climate, and Applications (3:3:0)
BIOL 5311	Ecology for Teachers (3:3:0)
BIOL 5312	Cellular, Molecular Biology for Teachers (3:3:0)
CHEM 5360	Conceptual Chemistry for Teachers I (3:3:0)
CHEM 5361	Conceptual Chemistry for Teachers II (3:3:0)
EDSE 5377	Science Curriculum and Instruction (3:3:0)
GEOL 5340	Advances in Historical Geology (3:3:0)
I S 5301	The Nature of Science for Teachers (3:3:0)
MATH 5360	Advanced Mathematics for Teachers I (3:3:0)
MATH 5364	Computer Literacy and Programming I (3:3:0)
PHYS 5371	Conceptual Physics for Teachers (3:3:0)
PHYS 5372	Astronomy for Teachers (3:3:0)

Residency Requirements for Doctorate

The College of Education offers the Doctor of Education and Doctor of Philosophy degrees in various program areas. The specific requirements for the major, foundations core, and research core for each doctoral degree are specified by program and vary between programs. However, all doctoral programs in the College of Education require a period of residency for doctoral candidates to ensure that each has a time of concentrated study as a full-time student with minimal outside obligations. Such a period of coursework, reading, reflection, study, research, and interaction with peers and faculty without the distraction of major outside responsibilities is necessary and no one should contemplate doctoral candidacy who is unable or unwilling to spend a substantial portion of time as a full-time student. During the residency, the student should be free of other employment responsibilities, except as specified below.

A candidate may satisfy the residency requirement in one of the following patterns:

- Two consecutive semesters of at least 12 semester hours each.
- Three consecutive full summer sessions of at least 9 weeks each while earning at least 9 hours of graduate credit during the summer session.
- A full summer session of 12 weeks, earning 12 hours of graduate credit plus the completion of at least 12 hours of graduate credit during the adjacent spring or fall semester.
- A combination of 21 hours of graduate credit completed during a 12-month period plus at least 3 additional hours of graduate credit completed in an immediately preceding or subsequent full semester or summer session.
- Nine semester hours in each of the regular semesters and at least 6 hours in the preceding or subsequent summer (for students holding half-time graduate assistantships or students involved for no more than half-time in other work closely related to doctoral study).

The proposal for doctoral study (degree plan), including the plan for meeting the residency requirements, should be submitted to the Graduate School well in advance of the proposed residency period.

Department of Curriculum and Instruction

Faculty

Margaret Johnson, Chairperson

Professors: Benavides, Santos, Simpson, Smith

Associate Professors: Agnello, Aguirre-Muñoz, Button, Cooper, Farley, Geer, Gonida, Hovey, Janisch, Johnson, McMillan, Midobuche, Morgan-Fleming, Muñoz, Price, Sheets, Thomas

Assistant Professors: Akrofi, Anderson, Furgerson, Halsey, Hamman, Lesley, Myers, Narayan, Salazar, Saldana, Todd, Watson, Wilhelm

Instructors: Craig, Dennis, Duke, Fehr, Lupton, McLaren, Mitchell, Pratt, Sowder, Stocks, Talkmitt

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Multidisciplinary Studies
- Bachelor of Science in Multidisciplinary Science
- Master of Education in Bilingual Education
- Master of Education in Curriculum and Instruction
- Master of Education in Elementary Education
- Master of Education in Language Literacy Education
- Master of Education in Secondary Education
- Doctor of Philosophy in Curriculum and Instruction

Undergraduate Program

Multidisciplinary Studies

Middle-Level Education. This degree is designed primarily for individuals seeking teacher certification in grades four to eight. Students may choose certification in English language arts, English language arts/social studies, and math/science. Students should consult with an advisor in the college to determine which degree plan best suits their career aspirations. Degree plans leading to the different certificates will include subject area coursework and a sequence of four semesters of professional education courses (including the student teaching semester). Courses in middle-level education include field experiences scheduled outside of class time.

Bilingual Education. This degree is designed to prepare those who wish to be certified as an early childhood generalist and as a bilingual generalist teacher of children from early childhood to grade four. The degree includes coursework in Spanish and certification requires passing the Texas Oral Proficiency Test in Spanish as well as TExES exams. Students complete four semesters of professional education work that includes field experiences in elementary and in bilingual settings in area schools.

Special Education. Students wishing to become certified as an early childhood generalist (early childhood to grade four) and as an all-level special education teacher for children from early childhood to grade twelve will seek a degree with a specialization in special education. Students complete four semesters of professional education work with field experiences in elementary and in special education settings.

English as a Second Language. Students wishing to become certified as an early childhood generalist (EC-4) with additional certification in English as a second language (ESL), will seek a degree with a specialization in ESL. Students complete four semesters of professional education work with field experience in elementary and ESL classrooms.

Multidisciplinary Science

Secondary Science Education. The multidisciplinary science major is administered in this department. Individuals completing this major—both the baccalaureate requirements and the certification requirements—are eligible for certification to teach all sciences grades eight to twelve in Texas. This major requires 57 to 61 semester hours in science. All individuals in this major are required to complete CHEM 1107, 1108, 1307, 1308, PHYS 1103, 1104, 1306, 1307, GEOL 1101, 1102, 1303, 1304, BIOL 1403, 1404, ATMO 1300, ASTR 1300, and 1100. Students will choose an area of emphasis from among the sciences (biology, chemistry, geosciences, physics or life and earth sciences) and complete additional coursework. Students seeking certification must minor in secondary education. Students not seeking certification must have a minor in an area other than education. The minimum number of hours required for a major in multidisciplinary science is a total of 129. Students should consult advisors so that prerequisites and other requirements may be met in a timely manner. Two semesters of foreign language are considered leveling work for this program, unless waived because of two years of high school foreign language.

Program Requirements

Core Curriculum Requirements. The university has established Core Curriculum requirements for all students. These requirements will ensure breadth in each academic program. Students should consult their academic advisor regarding specific course requirements. Students are urged to seek advisement prior to their first enrollment to avoid losing credit. Students may find a listing of Core Curriculum requirements in the Undergraduate Academics section of the catalog.

Advisory Program. The advisory program is designed to provide aid to each student in planning and completing the appropriate degree and teacher certification program.

The academic advisor is responsible for (1) assisting the student in planning a program and in updating degree plans, (2) helping the student in selecting the proper areas of certification and/or teaching fields, and (3) advising the student in meeting admission and retention standards of teacher education and student teaching.

Admission to the Bachelor of Science Degree Program and Admission to the Teacher Certification (Education) Program.

The college seeks to maintain rigorous academic programs to produce outstanding educators for Texas and the nation. Admission to college degree and certification programs is open to all individuals on the basis of academic preparation, ability, and availability of space in the program selected. When there are more qualified applicants than can be adequately instructed by available faculty or accommodated in available facilities, the college will control enrollment in specific programs by limiting the admission of new students. The number of students accepted into the undergraduate programs is limited. Therefore, admission into a teacher education program is competitive and based on GPA and other criteria. A complete description of eligibility requirements is available in the Certification Office in the College of Education. (Entrance criteria may be subject to change.) Admission to a college degree program does not ensure admission to an upper-division teacher certification program. Please see “Educator Certification” on the previous pages to read about admission requirements for the teacher certification program, information on the Texas Examinations for Educators Standards (TExES), recommendations for teacher certification, admission to student teaching, and transferability.

Academic Foundations. During their freshman and sophomore years, students normally complete their general degree requirements for both the Bachelor of Science degree and a teaching

certificate. Coursework in professional education and advanced courses, particularly in academic specializations or teaching fields, are usually taken in the junior and senior years.

Professional Education. Teacher education programs in the College of Education are field-based. Students will complete observations and activities in public school settings. These field experiences may require time in addition to class time to complete.

Student Load. The maximum load for a student in the College of Education is 19 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 department chair or associate dean. During the student teaching semester, the maximum load is 12 semester hours—9 to 12 hours of student teaching plus any corequisite education course. Requests to take more than 12 hours must be approved by the certification officer.

Length of Degree Program. The Bachelor of Science degree can be completed in approximately eight semesters. The multidisciplinary studies major requires 126-139 hours, and the multidisciplinary science major requires 129 hours. A student may be required to attend either one summer term or a ninth semester to complete all requirements. Assistance in completing the degree and certification plan is provided by advisors in the College of Education. An Intent to Graduate form should be filed with an advisor one year prior to graduation.

Pass-Fail Option. Courses used to meet stated degree plan requirements may not be taken pass-fail. Up to 13 hours of courses that are taken as free electives to total 133 hours and are not used to meet any other degree requirement may be taken pass-fail. Courses that are designated pass-fail by departmental policy rather than student choice do not count in the 13-hour limit on elective courses that may be taken pass-fail. A student on probation is not allowed the pass-fail option.

Education Minor. Students seeking secondary certification may minor in secondary education. The following courses may be used by students who complete student teaching as undergraduates: EDSE 4000 (9 to 12 hours), 4310, 4311, 4322; EDSE 4320, 4351, 4360, or 4376; and EDLL 4382. The following sequence of courses may be used by students not completing student teaching on the undergraduate level: EDSE 2300, 4310, 4311, 4322; EDSE 4320, 4351, 4360, or 4376; and EDLL 4382. The minimum number of hours for a minor in secondary education is 18. Other education courses may be used in the minor with the permission of an academic advisor.

The College of Education also offers a minor in bilingual education. The following sequence of courses will fulfill the requirements for the bilingual minor: EDBL 3332, 3334, 3336, 3337, 3338, and EDSE 2300. Substitutions for any of these courses need to be approved by an academic advisor in the College of Education.

Bilingual Education (EDBL)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 3205. **Bilingual Programs and Language Issues at the Middle Level (2:2:0).** Corequisite: EDSP 3205. Overview of bilingual programs, issues, and second language research related to middle level students. Field experience required.
- 3332. **Foundations of Bilingual Studies (3:3:0).** Overview of history, philosophy, assessment processes, research, and legal aspects related to bilingual education.
- 3334. **Dual Language and Cognitive Development in Bilingual Programs (3:3:0).** Skills, attitudes, psycholinguistic knowledge related to first and second language acquisition. Field experience required.
- 3336. **Instruction and Management in Bilingual and Multilingual Settings (3:3:0).** Developing instruction and management skills in bilingual and multilingual classrooms.
- 3337. **Content Area Development for English as a Second Language Populations (3:3:0).** Adapting the school curriculum for Eng-

lish as a second language (ESL) students with emphasis on developing appropriate teaching materials for content areas.

- 3338. **Methods for Teaching English Language Learners (3:3:0).** Rationale, theories, and goals of a comprehensive curriculum program for English language learners.
- 4321. **Teaching Literacy/Biliteracy in Elementary Dual Language Programs (3:3:0).** Emphasizes the current perspective of the biliteracy process, English literacy, native-language literacy, biliteracy, and the impact of educational policies and programs for English language learners.

Graduate Courses

- 5332. **Foundations of Bilingual Education (3:3:0).** Overview of curriculum, assessment process, teaching strategies, research, and legislation related to bilingual education.
- 5333. **Teaching the Multicultural-Multilingual Student (3:3:0).** Strategies and techniques for teaching and working with the multicultural-multilingual student.
- 5334. **First and Second Language Acquisition (3:3:0).** First and second language acquisition and development as related to bilingual education and the teaching of English as a second language.
- 5336. **Instructional and Management Issues in Bilingual Education/ESL (3:3:0).** A survey of issues relating to classroom instruction and management for language minority students.
- 5337. **Teaching Strategies for ESL and Content-Area Teachers of Limited English Proficient Students (3:3:0).** Provides an instructional framework for material development and teaching approaches to limited English proficient students.
- 5338. **Methods of Teaching English as a Second Language to PreK-12 Students. (3:3:0).** Study of rationale, theories, and goals of a comprehensive ESL curriculum program in compliance with public school needs and standards of the State of Texas.
- 5393. **Internship in Bilingual Education (3).** Experience in various roles in bilingual education.
- 7000. **Research (V1-12).**
- 8000. **Doctor's Dissertation (V1-12).**

Educational Curriculum and Instruction (EDCI)

Undergraduate Courses

- 3320. **Middle Level Curriculum and Philosophy (3:3:0).** An overview of sociological, historical, and philosophical foundations of the middle school movement. Focus is on unique characteristics of a middle school interdisciplinary curriculum and instruction. Field experience required.
- 3325. **Honors Seminar: Trends and Issues in Educational Policy and Practice (3:3:0).** A seminar course that involves the analysis and synthesis of current trends in educational policy and practices.
- 3361. **Teaching Social Studies at the Middle Level (3:3:0).** Social studies curriculum principles and development, organization of materials, instructional techniques, and evaluation process unique to middle level social studies. Field experience required.
- 3370. **Teaching Mathematics at the Middle Level (3:3:0).** This course emphasizes the content, learning and instruction, assessment, and professional development in teaching middle-school mathematics. Field experience required.
- 3375. **Teaching Science at the Middle Level I (3:3:0).** Prerequisite: Junior standing. A field-based course emphasizing teaching methods and techniques, lesson organization, assessment, and classroom management. Field experience required.
- 4325. **Classroom Organization and Management for the Middle Level (3:3:0).** This course emphasizes theories of teaching and learning with a focus on classroom organization and management techniques for grades 4-8. Accompanies student teaching. (Writing Intensive)
- 4362. **Interdisciplinary Language Arts and Social Studies Methods at the Middle Level (3:3:0).** Content, instructional strategies, and technologies for middle school English language arts and social studies with emphasis on integration through interdisciplinary projects. Field experience required.
- 4370. **Middle-Level Mathematics: Knowledge, Practice, and Theory (3:3:0).** This course emphasizes the content, instruc-

Graduate Program / Education

Post-Baccalaureate Initial Teaching Certification. Post-baccalaureate programs designed to meet initial certification requirements for teaching in early childhood (early childhood to grade four), middle level (grades four to eight), and secondary schools (grades eight to twelve) are available. The state-mandated TExES test is required for persons who complete certification programs. For guidance concerning professional certification, students should consult with an advisor or the university certification officer and the coordinators of the various programs. Information on post-baccalaureate programs leading to certification is available online at www.educ.ttu.edu. Although post-baccalaureate certification coursework may be applied to master's degrees in elementary education and secondary education, gaining admission to degree programs requires an additional admissions process. Additional information on post-baccalaureate certification may be found on the college Web site.

Bilingual Education. A master's degree in this program area is available with a concentration in either bilingual education or English as a second language (ESL). Students may choose a 36-semester-hour plan that includes core courses and specialty concentrations and features a choice among offerings in language literacy, linguistics, anthropology, and English. The 30-semester-hour plan includes core and specialty courses, electives from a range of selections, and a 6-hour thesis. Students may seek supplemental certificates in bilingual education or English as a second language within requirements for the master's degree. More information and application forms are available at www.educ.ttu.edu/edbl.

Curriculum and Instruction. The program area of curriculum and instruction offers a master's degree and a doctor of philosophy degree. The master's degree is designed to meet the diverse needs of professional educators in elementary, secondary, and post-secondary education. Thesis and non-thesis options are available. The doctor of philosophy (Ph.D.) degree may be completed with support areas in bilingual education, curriculum and instruction, elementary education, language literacy, and secondary education. Students also may focus on other areas of interest such as curriculum studies, social studies education, and diver-

sity studies. An additional focus on teaching physical education and sport is designed to meet the needs of students who wish to teach, conduct research, and serve as faculty members in kinesiology, exercise science, or physical education departments within institutions of higher education. These faculty members would be engaged in preparing future physical education teachers and coaches. Further information and application forms are available at www.educ.ttu.edu/edci.

Elementary Education. The master's program in elementary education is designed for students interested in concentrating on the fundamentals of reflective practice with an emphasis in social studies, mathematics, and science education. Thesis and non-thesis options are available. Students enrolled in a post-baccalaureate certification program should meet with a faculty advisor to develop a master's degree plan that will include certification coursework. Information about the program and application forms can be found at www.educ.ttu.edu/edel.

Language Literacy Education. The language literacy program area offers a master's degree in language literacy with two options. The first option addresses many of the requirements of the Master Reading Teacher certificate program. The second option focuses on the Professional Reading Specialist Certification and supplies a strong foundation for later doctoral work. The master's degree requires 36 hours of graduate work. See www.educ.ttu.edu/edll for additional information and application materials. Thesis and nonthesis options are available.

Secondary Education. Two basic degree plans are available. The 36-semester-hour plan (without a thesis) includes a 21-semester-hour concentration in educational foundations and secondary education as well as 15 hours in a minor concentration. The minor may be taken in a teaching field. The 30-semester-hour plan (with a thesis) includes a major concentration of 18 semester hours, a 6-hour minor concentration, and a thesis (6 hours). Students enrolled in a post-baccalaureate certification program should meet with a faculty advisor to develop a master's degree plan that will include certification coursework. See www.educ.ttu.edu/edse for more information and application materials.

- tional strategies, and mathematical processes in teaching middle-school mathematics. Field experience required.
4375. **Integrated Mathematics and Science Methods (3:3:0).** Prerequisite: Junior standing. A field-based course emphasizing teaching methods and techniques, lesson organization, assessment, and classroom management. **Field experience required.**
5001. **Advanced Education Workshops in Curriculum and Instruction (V1-6).** Advanced workshop activities in curriculum and instruction. Topics may vary.
5306. **Seminar in Curriculum and Instruction (3:3:0).** Recent research, trends, and issues in curriculum and instruction. May be repeated for credit.
5310. **Instructional Theory and Design (3:3:0).** Applications of contemporary educational theory and design procedures to secondary education, including models of teaching, enhancement of self-concept, and adolescent needs and interests.
5320. **Curriculum Theory: Foundations (3:3:0).** Fundamental bases for curriculum development.
5321. **Curriculum Theory: Design and Development (3:3:0).** Principles of curriculum needs assessment, design, implementation, and evaluation.
5333. **Improving the Teaching of Thinking (3:3:0).** Provides an instructional framework for teaching specific thinking skills and for developing and nurturing the teaching of skillful and reflective thinking in all content areas (K-12).
5335. **Models of Teaching (3:3:0).** Selected models of or approaches to teaching are described, demonstrated, and practiced. Emphasis is placed on expanding the repertoire of teaching skills.
5371. **Curriculum and Instruction in Sciences and Math Education (3:3:0).** This course guides exploration of science and mathematics curricula: what it is, who writes it, who makes decisions about it, who field tests it, what content should be learned, and how teachers can prepare for proper enactment.
5372. **Assessment Issues in Science and Math Education (3:3:0).** This course guides exploration of current issues related to assessment, multiple dimensions of assessment, and the processes of assessment in mathematics and science education.
5373. **Designing Project-Enhanced Environments for Science and Mathematics (3:3:0).** Introduces interdisciplinary pedagogies, technological tools, instructional strategies, and appropriate assessments for designing and developing project-enhanced environments in science and mathematics classrooms.
5380. **Action Research I (3:3:0).** Fundamentals of quantitative and qualitative design. Students write a literature review and design an original action research project.
5381. **Action Research II (3:3:0).** Prerequisite: EDCI 5380 and consent of instructor. Fundamentals of quantitative and qualitative design. Students implement an action research project, collect data, and report results.
6000. **Master's Thesis (V1-12).**
6306. **Advanced Seminar in Curriculum and Instruction (3:3:0).** Critical analysis and design of research in selected curriculum areas. May be repeated for credit.
6320. **Curriculum Theory: Inquiry (3:3:0).** Antecedents of contemporary curriculum paradigms; relationships among curriculum, instruction, and society; tactics and models of curriculum analysis and criticism.

6333. **Diversity Ideologies: Implications for Schooling (3:3:0).** Examines the origin, purpose, disciplinary orientation, and ideological positions of diversity theoretical perspectives.
6393. **Advanced Practicum in Curriculum and Instruction (3:3:0).** A supervised laboratory or field experience in a curricular area; includes assessment, planning, instruction, and evaluation. May be repeated for credit.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Elementary Education (EDEL)

Undergraduate Courses

2191. **Projects in Elementary Education (1:0:2).** Exploratory experiences in educational programs through the elementary school level. May be repeated for credit. Must be taken pass-fail.
2300. **Schools, Society, and Diversity (3:3:0).** Historical, philosophical, sociological, and ideologic foundations of education: Purposes and roles of schools in a pluralistic society. Contemporary issues and reform trends in American public schools.
3099. **Independent Study (V1-3).** Prerequisite: Junior standing and consent of instructor. Independent study of special aspects or topics of elementary education. May be repeated for up to 3 hours credit.
4000. **Student Teaching in the Elementary School (V1-12).** Prerequisite: Attainment of admission standards to student teaching. Supervised teaching involving a period of major responsibility for instruction and learning in an elementary classroom of an accredited school. Course graded credit (CR) or no credit (NC).
4330. **Capstone Course (3:3:0).** This course emphasizes diagnostic teaching and learning, philosophies of education, current issues, classroom organization, professional portfolios, and teacher assessment. (Writing Intensive)
4360. **Teaching Social Studies (3:3:0).** The design and organization of content, materials, and instructional strategies for social studies programs in elementary schools. Field-based course.
4370. **Teaching Mathematics (3:3:0).** Application of content, materials, and instructional strategies in teaching elementary school mathematics. Field-based course.
4375. **Teaching Science (3:3:0).** The methodology of teaching appropriate science learning experiences to elementary school children. Field-based course.
4393. **Internship in Elementary Education (3:1:3).** Prerequisite: Admission to teacher education. Directed experiences in various roles at the elementary level.
4394. **Internship in Elementary Education (3:1:3).** Prerequisite: EDEL 4393 and admission to teacher education. Directed experiences in various roles at the elementary school level.

Graduate Courses

5002. **Advanced Education Workshops in Elementary Education (V1-6).** A maximum total of 6 hours of credit may be earned either simultaneously or in different semesters.
5360. **Developing Social Studies Programs in Elementary Education (3:3:0).** Objectives, patterns, and principles of organization of social studies in the elementary schools.
5370. **Developing Mathematics Programs in Elementary Education (3:3:0).** The development of arithmetic and its educative function in the elementary school curriculum.
5375. **Developing Science Programs in the Elementary School (3:3:0).** Methods and materials for helping children develop an understanding of their natural and physical environments.
6306. **Studies in Elementary Education (3:3:0).** Trends in modern elementary education.
6360. **Studies in Social Studies Education (3:3:0).** Prerequisite: EDEL 3360 or 5360. In-depth studies of research and instructional practices pertaining to social studies education. May be repeated for credit.
6370. **Studies in Mathematics Education (3:3:0).** Prerequisite: EDEL 4370 or 5370. In-depth studies of research and instructional practices pertaining to mathematics education. May be repeated for credit.
6375. **Studies in Science Education (3:3:0).** Prerequisite: EDEL 4375 or 5375. In-depth studies of research and instructional practices pertaining to science education. May be repeated for credit.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Language Literacy (EDLL)

Undergraduate Courses

3350. **Children's Literature (3:3:0).** Texts appropriate for children under 15, including standards of evaluation and criteria for selection. Includes field experiences.
3351. **Foundations of Reading Instruction (3:3:0).** Prerequisite: Junior standing. Overview of reading development, methods of reading instruction, scope and sequence of programs. Field-based course. (Writing Intensive)
3352. **Language Literacy Acquisition (3:3:0).** Study of the acquisition and development of language learning; study of curriculum, instruction, and exemplary classroom practices that foster literacy development. Field-based course. (Writing Intensive)
3353. **Reading at the Middle Level (3:3:0).** Selection of materials and methods for understanding and developing reading requirements, skills, and strategies for middle level students in grades 4-8. Field experiences required.
3354. **Reading Processes and Practices at the Middle Level (3:3:0).** Overview of reading development, methods of reading instruction, and sequence of instruction for the middle-level classroom.
4349. **Adolescent Literature (3:3:0).** Study of classic and current adolescent literature, selection of materials, and methods for use in middle and secondary level classrooms. Field experiences required.
4350. **Linguistics for the Classroom (3:3:0).** Students in this course will explore language development from a linguistic perspective that recognizes implications for professional teaching practice.
4351. **Foundations in Reading for English Language Learners (3:3:0).** Evaluation and reflections of second-language literacy by examining its philosophy, theory, and examples of classroom-based practices.
4380. **Literacy in the Content Areas (3:3:0).** Understanding literacy in the content areas and planning instruction to promote content learning. Field experiences required. (Writing Intensive)
4381. **Literacy in the Content Areas for Middle Level (3:3:0).** Understanding literacy in the content areas and planning instruction to promote learning of students in grades 4-8. (Writing Intensive)
4382. **Reading and Writing in the Secondary Classroom (3:3:0).** Developing literacy practices to learn in content area disciplines aimed at grades 8-12. (Writing Intensive)

Graduate Courses

5340. **Foundations of Reading Instruction (3:3:0).** Prerequisite: EDLL 5351 or concurrent enrollment. Psychological and research bases of reading instruction. A foundations course.
5341. **Literacy in Secondary Content Area Classrooms (3:3:0).** Reading and writing to learn in content area disciplines intended for secondary students in grades 8-12.
5342. **Assessment in Reading (3:3:0).** Prerequisite: EDLL 5340, 5344, 5351, or consent of instructor. Examines the use of both formal and informal assessment measures as a means to provide information useful for evaluating student performance and planning instruction.
5343. **Practicum in Language Literacy (3:3:0).** Prerequisite: EDLL 5340, 5344 and 5351 or consent of instructor. Must be taken concurrently with EDLL 5342. Provides an opportunity to work in instructional settings to assist children in their reading development. Student achievement is considered through instructional strategies and assessment procedures.
5344. **Content Area Literacy (3:3:0).** Prerequisite: EDLL 5340, undergraduate equivalent, or consent of instructor. Theoretical and research bases, issues, strategies, and methods related to learning from print in all content fields.
5345. **Early Literacy (3:3:0).** Theoretical bases, procedures, techniques, and materials for early literacy instruction.
5346. **Understanding, Valuing, and Assessing Language Learners (3:3:0).** Examines a constructivist framework as a foundation for understanding language and literacy development in elementary classrooms.
5348. **Applied Linguistics and the Teaching of Literacy (3:3:0).** Prerequisite: Previous reading courses or consent of instructor. A study of reading as communication with applications of linguistics to the reading classroom.

5350. **Developing Language Arts Programs in Elementary Education (3:3:0).** Applications of research findings and modern theory to teaching and organizing the language arts in the elementary school.
5351. **Children's Literature for Teachers and Librarians (3:3:0).** Literature for children in elementary and middle school; selection, use and organization. Includes nonprint media. Appropriate for English or language arts majors.
5352. **Portfolio Assessment in Reflective Teaching (3:3:0).** Theory and technique for student portfolio assessment (observation, anecdotes, tests, reading and writing samples). Must have access to classroom students K-12.
5353. **Reading and the Middle-Level Student (3:3:0).** Selection of materials and methods for understanding and developing reading requirements/strategies/skills of middle school/level students in grades 4-8.
5355. **Developing Writing Programs in K-12 Classrooms (3:3:0).** Application of in-depth studies of research and instructional practices in the teaching of writing to guide development of effective writing programs.
5356. **Problems, Trends, and Issues in Teaching Adolescent Reading (3:3:0).** Investigation of current problems, trends, and issues in the teaching adolescent readers in middle and secondary schools. May be repeated for credit.
5357. **Early Detection in Reading (3:3:0).** Assessment of and intervention with children during daily literacy lessons. (First of two courses).
5358. **Early Literacy Intervention (3:3:0).** Assessment of young children and initial intervention based on ongoing reading and writing assessment.
5393. **Internship in Language Literacy Education (3).** Prerequisite: Advanced graduate classification in education. Experiences in the various roles of language literacy education.
6000. **Master's Thesis (V1-6).**
6341. **Problems, Trends, and Issues in Literacy Teaching and Learning (3:3:0).** Study of selected problems, trends, and issues related to literacy teaching and learning. Topics will vary. May be repeated for credit as topic varies.
6344. **Trends and Issues in Content Area Literacy (3:3:0).** An in-depth study of trends and issues in content area literacy instruction in elementary and secondary schools. Designed especially for in-service teachers.
6347. **Research Seminar in Literacy (3:3:0).** In-depth analysis and synthesis of contemporary research in literacy development and instruction.
6349. **Adolescent Literature (3:3:0).** Study of current literature for middle and secondary level students (grades 7-12); selection of material and strategies appropriate for adolescents.
6350. **Studies in Language Arts (3:3:0).** Prerequisite: EDLL 3352 or 5350. In-depth studies of research and instructional practices pertaining to elementary language arts. May be repeated for credit.
6351. **Studies in Literature for Children or Adolescents (3:3:0).** Prerequisite: EDLL 3350 or 5351. In-depth studies of research and instructional practices pertaining to children's literature. May be repeated for credit.
6353. **Investigations in Literacy (3:3:0).** Theoretical bases and research perspectives on literacy learning and instruction. An in-depth analysis of historically important research.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Secondary Education (EDSE)

Undergraduate Courses

2192. **Projects in Secondary Education (1).** Arranged experiences as a tutor and/or teacher's aide in a secondary school. May be repeated for credit. Must be taken pass-fail.
2300. **Schools, Society, and Diversity (3:3:0).** Historical, philosophical, sociological, and ideologic foundations of education; purposes and roles of schools in a pluralistic society. Contemporary issues and reform trends in American public schools.
4000. **Student Teaching in the Secondary School (V1-12).** Prerequisite: Meet admission standards to student teaching. Supervised teaching involving a period of major responsibility for instruction in an accredited secondary school. Course graded credit (CR) or no credit (NC).

4310. **Learning, Cognition, and Instructional Design (3:3:0).** Environmental, social, developmental, and cognitive factors influencing learning in adolescence; application of learning theory to classroom environment and instructional design for adolescent learners. Field experiences required.
4311. **Curriculum Planning, Development, and Evaluation (3:3:0).** Foundations and principles of curriculum planning, development, implementation, and evaluation in secondary schools; issues in curriculum development. Field-based course.
4320. **Instructional Methods (3:3:0).** Strategies for teaching evaluation and classroom management. Field-based course.
4322. **Diversity and the Classroom Learning Environment (3:3:0).** Organization of social and academic systems in the classroom that are responsive to student learning styles, students' ethnic and cultural backgrounds, and students with special needs. Field-based course.
4330. **Capstone for Secondary Students (3:3:0).** This course is taught with student teaching and focuses on instructional management, organization for teaching, student assessment, and political and ethical dimensions. (Writing Intensive)
4351. **Teaching Grammar, Composition, Spelling, and Listening (3:3:0).** Preparation for teaching grammar, usage, punctuation, composition, spelling, critical thinking, and listening in secondary schools. Field-based course.
4360. **Teaching the Social Studies in the Secondary School (3:3:0).** Methods, techniques, and evaluation procedures appropriate to teach various subjects in the area of social studies. Includes supervised practice in the selection of materials, visuals, and microteaching. Field-based course.
4376. **Methods in Science Teaching (3:3:0).** Focus on the curriculum, methods, and materials related to science instruction in the secondary schools. Field-based course.
4393. **Internship in Secondary Education (3:1:3).** Prerequisite: Admission to teacher education. Directed experiences in various roles at the secondary level.
4394. **Internship in Secondary Education (3:1:3).** Prerequisite: EDSE 4393 and admission to teacher education. Directed experiences in various roles at the secondary school level.
4399. **Individual Study (3).** Prerequisite: 9 hours of education and consent of instructor. Independent study focusing on curriculum development and teaching strategies.

Graduate Courses

5305. **Issues and Reform in American Secondary Schooling (3:3:0).** Purpose, role, contemporary issues, and reform trends in American secondary schooling. Historical, philosophical, sociological, and ideological foundations of education. Examination of multiple contexts that influence schooling and roles of teaching.
5307. **Seminar in Secondary Education (3:3:0).** Trends and issues in modern secondary education.
5320. **Developing Curricula in Secondary Schools (3:3:0).** Foundations, principles, and issues of curriculum in secondary level schools.
5322. **Managing Secondary School Learning Environments (3:3:0).** Planning, organization, and implementation of social and academic systems in the classroom. The course is designed to examine critically research-based perspectives on conditions that must be created in order to develop a culturally responsive classroom learning environment.
5331. **Improvement of Instruction in the Secondary School (3:3:0).** A study of teaching behaviors, styles, and strategies. Instructional theories and various models of teaching are examined.
5377. **Science Curriculum and Instruction (3:3:0).** A study of evolving science curriculum with emphasis on innovative practices, methodology, organization for instruction, and evaluation.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Department of Educational Psychology and Leadership

Faculty

Fred Hartmeister, Chairperson

Horn Professor: Bradley

Professors: Hartmeister, Lan, Murray, Olivarez, Parr, Rodriguez, Runnels

Associate Professors: Burley, Claudet, Crooks, Davidson, Duemer, Griffin-Shirley, Kelley, Layton, Lock, Marbley, Maushak, Mendez-Morse, Pogrund, Shonrock

Assistant Professors: Banda, Hendricks, Klinker, Lechtenberger, Reutebuch, Rudd, Shen, Siwatu, Stevens

About the Program

The Department of Educational Psychology and Leadership offers coursework at the undergraduate level in educational psychology and special education. The department offers study in the following graduate degree programs:

- Master of Education in Counselor Education
- Master of Education in Educational Leadership
- Master of Education in Educational Psychology
- Master of Education in Higher Education
- Master of Education in Instructional Technology
- Master of Education in Special Education
- Doctor of Education in Educational Leadership
- Doctor of Education in Higher Education
- Doctor of Education in Instructional Technology
- Doctor of Education in Special Education
- Doctor of Philosophy in Counselor Education
- Doctor of Philosophy in Educational Psychology
- Doctor of Philosophy in Higher Education

Graduate Program

The department offers programs leading to professional certificates and associated supplemental certificates. Information on admission standards, program requirements, and other matters concerning graduate programs in the department may be obtained from the department office, the Office of Graduate Education in the College of Education, and online at www.educ.ttu.edu.

Counselor Education. The college offers both a master's and a doctoral program in counselor education. The master's program consists of 48 semester hours and offers two tracks or majors: school counseling and agency counseling. The doctoral program offers one major in counselor education. The master's and doctoral programs are approved by the Council for Accreditation of Counseling and Related Educational Programs. Applicants must complete the Counselor Education Application Packet available at www.edu.ttu.edu.

Students desiring to obtain only the professional certificate in school counseling must have a master's degree in education from an accredited university and be admitted to the Graduate School and the counselor education program. A maximum of 18 graduate semester hours may be accepted for transfer credit toward certification provided the courses are no more than six years old and are equivalent to courses taught at Texas Tech. No transfer hours will be allowed for practica (EPCE 5360), internship (EPCE 5094), or techniques (EPCE 5357). In addition to completing the program successfully, the applicant must have two years teaching experience, have a valid teaching certificate, and pass a TExES examination administered by the State Board for Educator Certification. Additional information is available at www.educ.ttu.edu/epce and in the department office.

Educational Leadership. The Educational Leadership Program offers a Master of Education (M.Ed.) and a Doctor of Education (Ed.D.) degree in educational leadership. Graduate programs are also offered for principal and superintendent professional certificates. Degree programs and certification programs have differ-

ent requirements, but many courses will apply to both and are explained online at www.educ.ttu.edu/edld.

Educational Psychology. Students enrolled in the educational psychology program earn a master's and/or doctoral degree with a variety of areas of emphasis (i.e., history and/or philosophy of education; learning and motivation; human development;) multicultural education; and research, measurement, and statistics). A minimum of 36 semester credit hours is required for the Master of Education degree. Students pursuing a master's degree can do so with or without a thesis. A minimum of 93 semester credit hours is required for the Doctor of Philosophy degree. Applicants to either program must first apply to and be cleared by the Graduate School before being reviewed and approved by the educational psychology faculty. Admission to a master's program does not constitute later admission to a doctoral program. Applicants without a strong background in psychology may be required to complete leveling courses before unconditional admission to the program. For more information, see the program Web site at www.educ.ttu.edu/epsy.

Higher Education. Higher education students come from a variety of fields and types of higher education institutions. To prepare leaders for the higher education enterprise, the program delivers teaching, research, and professional development services to students, institutions of higher education, and other academic disciplines.

Students working on a master's degree may pursue either nonthesis or thesis options. The master's program consists of two tracks or majors: higher education administration (36 semester hours) and student affairs (39 semester hours).

The Higher Education Program offers two doctoral degrees. The Doctor of Education (Ed.D.) is designed for the advanced student who wishes to achieve a superior level of competency in his or her professional field with emphasis on practice and leadership. Under the direction of their advisor, students may select a focus in community college leadership, university administration, or student affairs. The Doctor of Philosophy (Ph.D.) is designed for the advanced student who wants to acquire the ability to contribute to the knowledge base of teaching, education, and leadership through a thorough grounding in the conduct of research. The Ph.D. will prepare students for professional careers as institutional researchers and planners; administrators with an orientation towards research, sponsored programs, or grant proposal writing; program assessment-evaluation specialists; research associates; and faculty members.

Both doctoral degrees require the completion of 93 credit hours beyond the baccalaureate. As part of the credit hour requirements, candidates for both the Ed.D. and the Ph.D. are required to demonstrate proficiency in independent research in higher education, culminating in the completion of a dissertation. For further information, see the program Web site at www.educ.ttu.edu/edhe.

Instructional Technology. The instructional technology program offers both master's and doctoral degrees. The goal of the program is to prepare specialists in the field of instructional design and technology. Instructional technology students come from a variety of backgrounds, including public school education, higher education, and the private sector. Graduate programs include a foundation of educational research and educational psychology as well as an in-depth study of instructional design and educational technology applications. Several online courses are offered and an online master's degree is available.

The doctoral program requires 83 credit hours plus a dissertation beyond a bachelor's degree. Doctoral program graduates often enter the field of higher education as professors, instructional designers, and technology specialists.

The master's program requires 39 credit hours beyond a bachelor's degree. Two areas of emphasis are available: educational computing and distance education. Graduates often accept posi-

tions as technology specialists in public education, as consultants or developers of instructional materials in the private sector, or as community college instructors or technology specialists. For more information, see www.educ.ttu.edu/edit.

Special Education. In conjunction with the state of Texas, the special education program provides for coursework in the certification areas of generic special education, educational diagnostician, visual impairment, and deaf education. An additional certification in orientation and mobility is also available. Students in the graduate special education program are prepared to work with individuals with disabilities in a variety of settings, including the public schools, higher education, and the private sector. A post-baccalaureate degree to obtain generic special education certification is also available. To be certified in the state of Texas, students must pass the TExEs examination for their area.

A minimum of 36 hours is required for the master's degree. Additional hours are required for certain certificates, including educational diagnostician. Students may select to write a thesis or complete the non-thesis route. The Doctor of Education degree requires a minimum of 93 graduate hours.

Specific areas of interest within the Special Education Program include autism, emotional disturbance, learning disabilities, mental retardation, orientation and mobility, visual impairment, and deaf education.

A majority of the courses in the master's program in special education are available online. A few of the educational diagnostician courses are offered through two-way interactive television (ITV) and require the student to make arrangements through the College of Education and the university's digital video network to secure end-point site approval. When locations do not have adequate technological capability, students will not be able to obtain permission to enroll in those courses. Students living within a one-hour commute of the Texas Tech Lubbock campus will be required to attend these courses on campus and no ITV connection will be provided.

Courses in the doctoral core are generally available in the summer sessions to accommodate those employed in the public school system. These 15 hours are traditional on-campus classes. The remainder of the program can be completed through distance education with a residency requirement.

Special Education Program applicants for the post-baccalaureate, certification, or master's program must complete an application found in the *Special Education Program Handbook*. Acceptance to the master's program does not guarantee later acceptance to the doctoral program. Doctoral applicants must complete a separate application that also appears in the handbook. For additional information, see www.educ.ttu.edu. For information about the undergraduate Bachelor of Science degree in multidisciplinary studies leading to a special education certificate, refer to the Department of Curriculum and Instruction section.

Counselor Education (EPCE)

(To interpret course descriptions, see page 8.)

Graduate Courses

5001. **Advanced Workshop in Counseling (V1-6).** Prerequisite: Consent of instructor. Workshop and field experience assignments in counseling-related activities. A maximum of 6 hours of credit may be earned.
5094. **Internship in Counseling (V1-3).** Prerequisite: Admission to the EPCE program and completion of EPCE 5360. Students cannot enroll in more than 3 semester hours of EPCE 5094.
5352. **Child Counseling (3:3:0).** Prerequisite: EPCE 5364, admission to the counselor education program, or consent of instructor. Philosophy, principles, and practices of counseling children and young adolescents in school and community settings.
5353. **Introduction to Community Counseling (3:3:0).** Overview of the activities of community counseling, nature of specific populations, program development and evaluation, planning for client services, and public policy issues.
5354. **Group Counseling (3:3:0).** An overview of the principles, practices, and approaches to group counseling in school and community settings.
5355. **Introduction to Career Counseling (3:3:0).** Overview of career theories, assessment procedures, techniques, and counseling processes used with adolescents and adults in school and community settings.
5357. **Techniques of Counseling (3:3:0).** Prerequisite: Admission to the EPCE program and completion of EPCE 5364 and 5353 or 5358. Theory, simulation, and practice of counseling techniques used in school and community agency settings.
5358. **Introduction to School Counseling (3:3:0).** Prerequisite: Admission to the counselor education program or consent of instructor. This course is designed to equip participants with skills and knowledge to develop, implement, manage, and assess components of a comprehensive developmental school counseling program.
5360. **Practicum in Counseling (3).** Prerequisite: Admission to Graduate School, admission to the EPCE program, and completion of EPCE 5353 or 5358, 5352 or 5366, 5354, 5357, 5364, 5367, 5370, 5371, and EPSY 5356. Assignment in a school or community agency setting. Dual majors must enroll in 6 hours of EPCE 5360.
5364. **Theories of Counseling (3:3:0).** Overview of theories and paradigms of counseling.
5366. **Dysfunctional Behavior (3:3:0).** Prerequisite: EPCE 5364 and 5353 or 5358, or consent of instructor. Overview of dysfunctional behavior, analysis of dysfunctional behavior in educational and counseling settings.
5367. **Family Counseling Applied to School Settings (3:3:0).** Prerequisite: EPCE 5364 and 5353 or 5358, or consent of instructor. Family counseling applied to school settings. Theory, simulation, and practice of techniques used in family counseling applied to school and community agencies.
5369. **Seminar in Counseling (3:3:0).** Prerequisite: Departmental approval required. A critical investigation of counseling topics related to school and community agencies. May be repeated as topic varies.
5370. **Ethical and Legal Issues in Counseling (3:3:0).** Prerequisite: EPCE 5364 and 5353 or 5358. An investigation of legal and ethical issues in the counseling profession. Focus on schools and community agencies.
5371. **Counseling Diverse Populations for Licensed Professional Counselor (3:3:0).** Prerequisite: EPCE 5364 and 5353 or 5358. The course provides an overview of counseling theory as it applies to diverse groups including gender, geriatric, racial, ethnic, and exceptionality issues.
5372. **Addictions: An Overview for School and Community Counselors (3:3:0).** This basic course provides an overview of addictions theory, issues, and practice. The course's focus is on community and school counseling.
5373. **Advanced Addictions Counseling (3:3:0).** Prerequisite: EPCE 5366 and 5372. Screening, assessment, diagnosis, and counseling techniques used in treatment of co-occurring mental health and substance use disorders for counselors in school and community agencies.
5374. **Applied Principles and Practices of Play Therapy-Counseling I (3:3:0).** Prerequisite: EPCE 5357, 5364, EPSY 5331 strongly recommended. This course includes an overview of essential elements and principles of play therapy including theories, techniques, modalities, and environments. The course features a practicum element during which students conduct play therapy sessions under supervision of the instructor.
5375. **Applied Principles and Practices of Play Therapy-Counseling II (3:3:0).** Prerequisite: EPCE 5374 or consent of instructor. Advanced theories, techniques, modalities, and environments of play therapy amplified by supervised experience with children in playrooms.
6001. **Advanced Study of Special Topics in Counselor Education (V1-6).** Prerequisite: Consent of instructor and admission to doctoral program in counselor education. An organized course to foster in-depth study of a current topic in counselor education. Coursework will focus on one major current topic. May be repeated for credit.
6094. **Doctoral Internship in Counseling (V1-3).** Prerequisite: Admission to Ed.D. program in counseling, completion of all coursework including practica and supervision, and consent of instructor. Supervised employment or field experience in a school or community agency setting. May be repeated for credit.
6335. **Advanced Counseling Theory and Techniques (3:3:0).** Prerequisite: EPCE 5357, 5364, and admission to doctoral

- program in counseling. Analysis of major approaches to counseling with integration of the techniques in clinical practice.
6350. **Doctoral Seminar in Counseling (3:3:0)**. Prerequisite: Admission to doctoral counseling, consent of instructor, EPSY 5381 or equivalent. Special topics in counseling covering both research and practice. May be repeated for credit.
6354. **Advanced Theory and Practice of Group Leadership (3:3:0)**. Prerequisite: EPCE 5354, 5364, and consent of instructor. Survey of major theoretical paradigms and their application in leading small groups. Supervised practice to integrate theory and application.
6360. **Advanced Practicum in Counseling (3)**. Prerequisite: Admission to Graduate School, admission to the counseling program, completion of all EPCE 5000 level practica, and consent of instructor. Supervised laboratory and field experience in schools and community agencies. Emphasis on integration of theory and practice. May be repeated for credit with the instructor's consent.
6366. **Advanced Practicum in Counselor Education and Supervision (3)**. Prerequisite: Admission to the Graduate School, full status admission to the counseling program, completion of all EPCE 5000 level practica, EPCE 6360 and 6335, and consent of instructor. Emphasis on supervision theory, training, and experience in the supervision of counselors.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Educational Leadership (EDLD)

Graduate Courses

5001. **Advanced Education Workshops in Teaching and Administration (V1-6)**. Prerequisite: Consent of instructor. Advanced workshop activities and experiences in administration. A maximum total of 6 hours of credit may be earned either simultaneously or in different semesters.
5306. **School-Based Leadership (3:3:0)**. This course examines the major theories, concepts, and empirical findings related to school-based leadership.
5310. **Instructional Supervision (3:3:0)**. Principles, planning, organizations, and processes of supervision in both elementary and secondary schools.
5330. **Staff Development (3:3:0)**. Principles and procedures of organizing programs of school improvement through comprehensive and ongoing staff development.
5340. **Educational Law (3:3:0)**. Introduction to the legal aspects of educational organizations, focusing on the school building level and emphasizing the rights and responsibilities of students, teachers, and administrators. (AGED 5340)
5350. **School Personnel and Fiscal Management (3:3:0)**. Introduction to the concepts of fiscal and human resource management with an emphasis on site-based decision making.
5351. **Communication for School Leaders (3:3:0)**. The study and application of interpersonal communication theory and research as related to organizational, social, and environmental contexts. Individual conferencing, informational and employment interviewing, and group dynamics, are included.
5361. **Process of Educational Change (3:3:0)**. A study of the knowledge base of change management in education. Application of the cognitive understandings to national change models and local settings.
5380. **The School Superintendent and Educational Governance (3:3:0)**. Prerequisite: Admission to superintendent certification program. Prepare educational leaders for the national, state, and local aspects of school district governance in the 21st century.
5381. **School District Resource Management (3:3:0)**. Prerequisite: Admission to superintendent certification program. Critical analysis of the business services of school districts, emphasizing planning, budgeting, resource management, fiscal operations, and accountability.
5382. **The Superintendency, Organizational Politics, and Legal Issues (3:3:0)**. Prerequisite: Admission to superintendent certification program. Emphasis on political and legal knowledge, skill and competencies; also board and superintendent relationships, conflict resolution, communications, and community relations.
5391. **School and Community (3:3:0)**. Explores the development of collaborative culture at school, enlist community support, and form partnerships with businesses, universities, and parents. Addresses improved communication among increasingly diverse members of the school staff, parents, students, community members, and media. (AGED 5391)
5392. **Principal Internship in Education (V3-6)**. Prerequisite: The internship can only be taken as the final course in the principal certification program. Guided experiences in principalship. May be repeated for credit with a maximum of 6 credit hours.
5394. **Superintendent Internship in Education (3)**. Prerequisite: Admission to superintendent certification program. Guided experiences in central office administration under the supervision and direction of a central office administrator and a university professor. The internship can only be taken as the final course in the superintendent's certification program.
6001. **Advanced Study of Special Topics in Educational Administration (V1-6)**. Prerequisite: Consent of instructor and admission to doctoral program. An organized course to foster in-depth study of a current topic in Educational Leadership. Coursework will focus on one major current topic. May be repeated for credit.
6300. **Organizational Theory in Education (3:3:0)**. Prerequisite: Admission to doctoral program. Theories and paradigms to determine implications for theory development, for research activities, and for practical applications.
6310. **Educational Leadership Ethics (3:3:0)**. Exploration of philosophical platforms, ethical/intuitive decision-making processes, secular ethics, and the interplay between cultural and personal value shifts that impact educational leadership.
6321. **Educational Finance (3:3:0)**. Prerequisite: Admission to doctoral program. The development and content of public school finance policy in the United States focusing on the fiscal, political, legal, and economic and normative dimensions.
6330. **Educational Leadership, Democracy, and Schools (3:3:0)**. Exploration of democratic principles, philosophy, and past and present cultural influences on our democracy and schools.
6340. **Educational Policy and the Law (3:3:0)**. Prerequisite: Admission to doctoral program. The interplay of the law and public policy emphasizing the relationship between legal decisions and educational practices from the perspectives of the governing board and central administration.
6341. **Legal Issues With Special Populations (3:3:0)**. Prerequisite: EDLD 5340 or consent of instructor. Prepare educational leaders for legislative and litigating aspects of working with special populations.
6351. **Organizational Communication in Education (3:3:0)**. Prerequisite: Admission to doctoral program. The study of organizational communication theory and research as related to theoretical issues, environments, and patterns in education. Organizational communication methodology and process are included.
6361. **Doctoral Seminar in Educational Administration (3:3:0)**. Prerequisite: Admission to doctoral program. Advanced analysis and synthesis of research and practice concerning problems and issues in educational leadership. May be repeated for credit.
6380. **Contemporary Perspectives on Educational Leadership (3:3:0)**. Post-modern theories and perspectives on educational leadership.
6385. **Research in Educational Administration (3:3:0)**. Prerequisite: Admission to doctoral program. Survey of educational leadership research focusing on contemporary issues, techniques in research design and methodology (qualitative and quantitative), and grantsmanship.
6392. **Doctoral Internship in Educational Leadership (3:3:0)**. Prerequisite: Admission to doctoral program and consent of instructor. The application of reflective practice to problems of leadership in a school setting. Expert practitioners and University professors coach students through a process of thinking about the definition and solution of problems as they develop and test plans for action.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Early Childhood Education (EDEC)

Undergraduate Course

4000. **Student Teaching EC-4 Certification (V1-12)**. Prerequisite: Attainment of admission standards to student teaching. Supervised teaching involving a period of major responsibility for instruction and learning in an early childhood classroom of an accredited school. Course graded credit (CR) or no credit (NC).

Graduate Courses

5310. **Application of Studies in Maturation and Learning to Early Childhood Education (3:3:0).** Study of the influence of environmental factors on the physical, emotional, social, and intellectual growth of young children.
5311. **Analysis and Design of Programs in Early Childhood Education (3:3:0).** Research study and laboratory observations to determine nature and need of school experiences for young children.

Educational Psychology (EPSY)

Undergraduate Courses

3190. **Special Topics in Educational Psychology (1).** Study of specialized topics in educational psychology and foundations of education.
3331. **Adolescent Development: Applications for Middle-Level Classrooms (3:3:0).** Study of physical, intellectual, social, and emotional development of and environmental influences on the development of young adolescents.
4399. **Individual Study (3).** Prerequisite: Consent of instructor. Independent study of selected topics in educational psychology and the foundations of education.

Graduate Courses

5310. **Philosophy of Education (3:3:0).** Major western social philosophies and their application to the field of education in the United States.
5314. **History of Education (3:3:0).** A study of the development of Western education with emphasis on pedagogical leaders and reformers.
5323. **Cultural Foundations of Education (3:3:0).** Analysis of linkages between school and community with special reference to the impact of the selection and allocation functions of schooling on minority groups.
5330. **Motivation in Educational Settings (3:3:0).** This course reviews various theories in motivation and their applications in education with an emphasis on the cognitive perspective of motivational processes.
5331. **Human Development in Education (3:3:0).** Interrelationships of social and psychological development through the lifecycle and implications for teaching and learning.
5332. **Educational Psychology (3:3:0).** Emphasis on the application of educational psychological principles to teaching at all levels.
5333. **Adolescent Learners (3:3:0).** Environmental, social, developmental, and cognitive factors influencing learning in adolescence; application of learning theory to classroom environment and instructional design for adolescent learners.
5349. **Seminar in Educational Psychology (3:3:0).** Research analysis and synthesis in the field of educational psychology. May be repeated for credit.
5356. **Principles of Educational and Psychological Measurement (3:3:0).** Analysis and techniques of tests and measurements in educational settings achievement tests, tests used in counseling and assessment of students.
5379. **Introduction to Educational Research (3:3:0).** Introduction to the nature of research and its relationship to educational thought and practice. Focus on preparing research consumer.
5380. **Introduction to Educational Statistics (3:3:0).** An introductory course in statistics with major emphasis on univariate measures for analyzing educational data.
5381. **Intermediate Educational Statistics (3:3:0).** Prerequisite: EPSY 5380 or STAT 5302. Topics include multiple regression, analysis of variance and covariance, multiple comparison tests, and additional non-parametric tests.
5382. **Qualitative Research in Education (3:3:0).** Study in theoretical perspectives informing qualitative research in education including relevant issues and methodological criteria.
5383. **Data Analysis With Statistical Software (3:3:0).** Hands-on analysis of quantitative educational data using statistical software.
5385. **Foundations of Educational Research (3:3:0).** Methods of educational research; methods of obtaining, processing, interpreting, and using significant educational data.
5389. **Individual Intelligence Testing (3:3:0).** Use of individual appraisal instruments and techniques (WISCIII, Stanford-Binet, K-ABC) in educational evaluation of children, youth, and adults.
5393. **Internship in Education (3).** Prerequisite: For counseling students, admission to counseling program and completion of

practicum requirements. Supervised employment or field experience in an educational setting. May be repeated for credit.

6000. **Master's Thesis (V1-6).**
6301. **Advanced Data Analysis (3:3:0).** Prerequisite: EPSY 5381 or STAT 5303 or consent of instructor. Study of multivariate techniques for analyzing educational data, including such topics as multivariate regression, manova, discriminate analysis, and factor analysis.
6302. **Survey Research in Education (3:3:0).** Prerequisite: EPSY 5381, 5385, or consent of instructor. The design and implementation of survey methodology in educational settings. Coverage of sampling techniques. Questionnaire design, analysis of data, and strategies for dissemination of findings to specific audiences.
6303. **Educational Measurement (3:3:0).** Prerequisite: 3 hours of statistics. Study of psychometric theory, test and instrument development, and use of standardized instruments in educational research.
6304. **Qualitative Research Methods (3:3:0).** Prerequisite: EPSY 5382. Study of qualitative methods used in educational research. Includes application and problems.
6305. **Qualitative Data Analysis in Education (3:3:0).** Prerequisite: EPSY 6304. Study of methods used in the analysis of data gathered through qualitative research methods and of ways of reporting these research findings.
6332. **Advanced Educational Psychology (3:3:0).** Emphasis on the research and theories of educational psychology and the evaluation and synthesis of psychology theories.
6349. **Doctoral Seminar in Educational Psychology (3:3:0).** Prerequisite: Admission to doctoral program. Several topics in research and analysis in educational psychology. May be repeated for credit.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Higher Education (EDHE)

Graduate Courses

5001. **Seminar in Higher Education (V1-6).** A special topics course designed to acquaint students with current research, theory, policies, and/or practices in higher education. May be repeated for credit.
5300. **The History of Higher Education in the United States (3:3:0).** An examination of the development of the American system of higher education, its origin, major characteristics, trends, and distinctive features.
5301. **American Higher Education (3:3:0).** A comprehensive introduction to the basics of American higher education including facts and fundamental theoretical concepts on which to build future understandings and research.
5302. **Comparative Higher Education (3:3:0).** A comparative study of systems of higher education throughout the world and their counterparts in the United States.
5303. **Critical Issues in Higher Education (3:3:0).** An examination of perspectives on equity and access, excellence, and efficiency concerns in higher education.
5305. **Leadership in Higher Education (3:3:0).** An examination of organization theory, models, and policies; governance and management processes; and leadership perspectives and theory. A review of research and new conceptual perspectives.
5313. **The Community Junior College (3:3:0).** An introductory course to acquaint students with the purposes, programs, people, organization, control, and resources of these colleges.
5315. **Community College Leadership (3:3:0).** A study of different leadership styles, strategies, and theories applicable to the community college sector.
5321. **The Administration of Higher Education (3:3:0).** Examines administration of higher education at institution and unit level. Addresses organizational culture and behavior, as well as management and leadership studies.
5322. **Institutional Planning in Higher Education (3:3:0).** An examination of the current models and theories used to develop strategies for organizational planning, including an analysis of internal assumptions and the external environment.
5323. **Development and Finance in Higher Education (3:3:0).** A study of the requirements for a sound institutional development program, including mission and objectives, budgeting, organization and planning. Relationships with constituencies and proposal preparation is analyzed.

5324. **Higher Education and the Law (3:3:0)**. A study of constitutional, statutory, and case law concerning public and private college and university boards, administrators, faculty, and students.
5332. **Student Services in Higher Education (3:3:0)**. Focuses on the theoretical bases of the profession, roles and models for practice and competencies, and techniques of student services.
5333. **Issues in Student Affairs (3:3:0)**. Prerequisite: EDHE 5332 or consent of instructor. Current issues in the administration of student affairs programs and activities on college and university campuses in the United States.
5334. **College Student Development (3:3:0)**. This course will provide an in-depth study of developmental theories that are unique to college-aged students. Implications for practice will also be included.
5335. **The American College Student (3:3:0)**. This course will examine the changing demographics and characteristics of college students. Research on college students will be reviewed to determine the impact of college on students.
5341. **Assessment of Student Outcomes in Higher Education (3:3:0)**. An examination of the philosophy and practice of assessment and evaluation in higher education.
5342. **College Teaching (3:3:0)**. An exploration of the nature of college teaching and the teaching-learning process, including a review of major issues and problems.
5343. **College and University Curriculum (3:3:0)**. Issues, problems, and basic considerations in curriculum development. The structure of knowledge. Developments and trends in liberal education, the disciplines, and professional education.
- 5393, 5394. **Internship in Higher Education (3 each)**.
6000. **Master's Thesis (V1-6)**.
6310. **Higher Education Research Seminar (3:3:0)**. A series of seminars dedicated to the development of student research proposals, Manuscripts, and grant applications. The seminars bridge the gap between theory and practice. May be repeated for credit.
6311. **Higher Education Ph.D. Research Seminar (3:3:0)**. A seminar dedicated to the development of conceptual and theory-based research of Ph.D. students. May be repeated for credit.
6325. **Policy Analysis and Issues in Higher Education (3:3:0)**. Examines the relationship between colleges and universities and policies developed by boards and governments. Explores prevalent issues facing higher education from a policy prospective.
6370. **Capstone Seminar (3:3:0)**. Integrates the Ph.D. experience and prepares graduates for entry into the profession. Students will develop a portfolio, conference research paper, and a reflection paper.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Educational Instructional Technology (EDIT)

Undergraduate Courses

2318. **Computing and Information Technology (3:3:0)**. Use of computers as productivity tools, societal and ethical implications, and applications and related technology in society.
3318. **Applications of Technology in Elementary Education (3:3:0)**.

Graduate Courses

5000. **Special Topics in Instructional Technology (V1-3)**. Covers special designated topics in instructional technology. May be repeated for credit.
5316. **Foundations of Instructional Technology (3:3:0)**. Overview of the field of instructional technology including the design, development, utilization, management, and evaluation of instructional systems.
5317. **Instructional Design Foundations (3:3:0)**. Technological advances in instruction with emphasis in instructional systems design; and a broad overview of the field of instructional technology.
5318. **Introduction to Small Computers in Education (3:3:0)**. Introduction to computers for educators. Includes computer terminology, operations, overview of applications, hardware, and software. Hands-on experience with small computers included.
5320. **Educational Network Applications (3)**. Computer applications for school-based networks. Issues of instructional support, design, and administration will be discussed.
5321. **Computer Programming for Educators (3:3:0)**. Prerequisite: EDIT 5318 or consent of instructor. Overview of instructional programming using a high level object oriented language to develop educational software. Best practice and design will be modeled.
5322. **Authoring Systems for Educational Software (3:3:0)**. Explores computer authoring languages and systems, includ-

ing hypermedia systems, and their application to the design of instructional programs.

5325. **Planning and Developing Instructional Media (3:3:0)**. Production and use of visual instructional media. Includes visual design, photographic techniques, video production, and computer graphic presentations.
5326. **Instructional Software Design (3:3:0)**. Prerequisite: EDIT 5318 or consent of instructor. An in-depth study of instructional software design and development. Principles and procedures for creating sound instructional software will be investigated. Evaluation and usability methodologies will be explored.
5330. **Computers, Critical Thinking, and Problem Solving in the Content Areas (3:3:0)**. Prerequisite: EDIT 5317 or 5318 or consent of instructor. Surveys research and strategies for using computers to promote higher order thinking and problem solving in all content areas. Includes software identification, use, and evaluation.
5341. **Curriculum Applications of the Internet (3:3:0)**. Prerequisite: EDIT 5340 or consent of instructor. Integration of the Internet and World Wide Web into the K-12 curriculum, focusing on the use of the resource for communication, information access, and instructional delivery.
5342. **Authoring Tools for Internet Instruction (3:3:0)**. Explores authoring tools with an emphasis on proper instructional design to deliver effective and appropriate Internet based instructions.
5370. **Foundations of Distance Education (3:3:0)**. Overview of the field of distance education including history, research, technologies, and related design models.
5380. **Principles and Practice for Video Based Distance Learning (3:3:0)**. Prerequisite: EDIT 5318 or consent of instructor. Evaluation, selection, and administration of video based distance learning systems, emphasizing legal, ethical, and access issues. Strategies for creating effective distance learning environments.
5390. **Online Distance Learning (3:3:0)**. Web-based teaching in K-12, adult, and higher education. Includes instructional design, instructional management, and related issues.
5395. **Administration of the Educational Technology Program (3:3:0)**. Prerequisite: EDIT 5318 and 5319 or consent of instructor. Covers organization and management of computer resources; selection and acquisition of computer hardware and software.
5397. **Practicum in Educational Technology (3:3:0)**. Prerequisite: EDIT 5318, 5319, or consent of instructor. Supervised experience in an educational setting which requires the application of competencies such as teaching, management, supervision, and administration.
6000. **Master's Thesis (V1-6)**.
6317. **Advanced Instructional Design: Theory and Practice (3:3:0)**. Prerequisite: EDIT 5317 or EDCI 5310. This seminar explores the theory and practice of instructional design in-depth. Product development, research, and evaluation of instructional design models are included.
6322. **Research in Instructional Technology (3:3:0)**. Prerequisite: EDIT 5318 and EPSY 5380 or consent of instructor. Review of research on instructional technology, use of computers for research data analysis, and designing research on instructional technology.
6325. **Multimedia Production for Instruction (3:3:0)**. Explores design and delivery of individualized instruction and information retrieval via modern multimedia systems.
6380. **Distance Education: Trends, Issues, Research (3:3:0)**. Prerequisite: EDIT 5370, 5380, or consent of instructor. Students will identify and evaluate relevant literature to synthesize theories, trends, issues, and concerns related to the field of distance education.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Special Education (EDSP)

Undergraduate Courses

3205. **Learning and Special Populations (2:2:0)**. Examines the psychological, sociological, and educational implications of both high and low incidence populations of exceptionality for middle level classrooms. Field-based experience required.
3300. **Exceptional Children and Youth (3:3:0)**. Major categories of exceptionalities; psychological, sociological, and educational implications of exceptionality. Field-based experience required.
3302. **Assessment and Program Planning for Exceptional Children (3:3:0)**. Appraisal instruments and techniques used by relevant

- disciplines in determining educational placement and programming for exceptional children. Field-based experience required.
3303. **Methods for Teaching Students With Mild Disabilities (3:3:0).** This course gives preservice teachers a foundation in best practice in methodology for teaching basic academic skills, social skills, and content area subjects to students with mild disabilities including modifications to regular education curricula. Field-based experience required.
4304. **Methods for Teaching Students With Severe Disabilities (3:3:0).** Curricular adaptations and additions for students with severe and profound disabilities. Emphasis on functional communication, physical management, and training for independent living and employment, stressing community integration. Field-based experience required.
4305. **Behavior Management for Students With Disabilities (3:3:0).** Behavioral management strategies for addressing the conduct at school, at home, and in the community of infants, toddlers, children, and youth who have disabilities and the conduct of their families. Field-based experience required.

Graduate Courses

5093. **Internship in Special Education (V1-3).** Prerequisite: Consent of instructor.
5094. **Advanced Internship in Special Education (V1-3).** The arranged internship gives students practical experience in an area of specialization.
5095. **Internship for Diagnosticians (V1-3).** This arranged internship provides experiences in educational diagnostics.
5300. **Exceptional Children and Youth (3:3:0).** Major categories of exceptional children and youth; psychological, sociological, and educational implications of exceptionality.
5301. **Educational Appraisal of Exceptional Children (3:3:0).** Appraisal instruments and techniques employed by relevant disciplines in determining appropriate educational placement and programming for exceptional children.
5303. **Applied Behavior Analysis in Special Education (3:3:0).** Use of applied behavior analysis in special education programs. Included are techniques for observing and recording behavior testing intervention, effects, and use in learning environment.
5304. **Instructional Strategies for Teaching Students With High Incidence Disabilities (3:3:0).** Provision of knowledge of various models of instruction and strategies related to education of learners with varying disabilities, including materials development and evaluation.
5306. **Instructional Strategies for Teaching Students With Low Incidence Disabilities (3:3:0).** Strategies for teaching students with severe disabilities utilizing a critical skills model curriculum aimed at teaching appropriate functional skills across the domains.
5307. **Problems and Trends in Special Education (3:3:0).** Current problems and future trends in the field of special education.
5308. **Authentic Assessment for Students with Exceptionalities (3:3:0).** Authentic appraisal strategies and techniques to document the strengths and needs of students with exceptionalities in a naturalistic setting.
5310. **Gifted and Talented Children and Youth (3:3:0).** Psychological, sociological, and educational implications of higher level intelligence and intellectual ability as well as various talents.
5312. **Creativity and the Gifted and Talented (3:3:0).** Psychological foundations of creativity especially as they apply to gifted children, how to assess and nurture creativity, and establish an environment conducive to creativity.
5320. **Children and Youth With Low Incidence Disabilities (3:3:0).** The characteristics and psychological, sociological, and educational implications of severe disabilities including mental retardation, autism, serious emotional disturbance, dual sensory impairment, and multiple disabilities.
5330. **Children and Youth With High Incidence Disabilities (3:3:0).** The characteristics and psychological, sociological, and educational implications of mild disabilities including learning disabilities, behavior disorders, and mild mental retardation.
5350. **Foundations and Psychosocial Aspects of Students Who Are Deaf or Hard of Hearing (3:3:0).** Overview of historical and contemporary issues, individual assessment, academic placement, achievement, deaf culture, and educational controversies for students who are deaf or hard of hearing.
5351. **Emergent Language and Literacy for Students Who Are Deaf or Hard of Hearing (3:3:0).** Development of communication, language, and emergent literacy in students who are deaf or hard of hearing. Addresses all modes of communication, including speech, ASL, and MCE.
5352. **Oral Communication for Students Who Are Deaf or Hard of Hearing (3:3:0).** Theories and developmental stages of speech acquisition in students who are deaf or hard of hearing with emphasis on effects of audition and cochlear implants.
5353. **Educational Strategies for Advanced Language and Literacy for Students Who Are Deaf or Hard of Hearing (3:3:0).** Focus on strategies and methods of promoting literacy for deaf or hard of hearing students, including assessment, systematic instruction, and all modes of communication.
5354. **Assessing the General Education Curriculum for Students Who Are Deaf or Hard of Hearing (3:3:0).** Focuses on the use of materials, technology, and visual strategies to help students who are deaf or hard of hearing succeed in general curriculum courses.
5380. **Programs and Services for Individuals With Visual Impairments (3:3:0).** Introduction to educational programs and services for students with visual impairments, including history, developmental characteristics, psychological needs, and legislation.
5381. **Instructional Strategies for Individuals With Visual Impairments (3:3:0).** Strategies for teaching and adapting instruction in content areas, independent living, career-vocational, PE., and leisure. Includes a theoretical framework, assessment strategies, and research applications.
5382. **Communication Skills for Individuals With Visual Impairments (3:3:0).** Knowledge and skills in reading and writing the literary Braille code, Nemeth mathematics code, and format. Overview of other codes and basic signing skills for nonverbal communication.
5383. **Anatomy and Functions of the Visual System (3:3:0).** Structure and function of the eye, causes and implications of eye conditions, clinical and functional vision assessments, relationship to other disabilities, and neurological aspects of visual impairment.
5384. **Basic Orientation and Mobility Skills (3:3:0).** Prerequisite: EDSP 5300. Exploration of space in the home and school environment and the wider community according to individual needs; appreciation and understanding of professional mobility instruction programs.
5386. **Intermediate Orientation and Mobility Training for Multihandicapped and Blind (3:3:0).** Prerequisite: EDSP 5384. Development of teaching skills in orientation and mobility in semi-independent settings with multihandicapped and blind students.
5387. **Advanced Orientation and Mobility Training for Multihandicapped and Blind (3:3:0).** Prerequisite: EDSP 5386. Advanced orientation and mobility teaching techniques for travel in independent settings for multihandicapped and blind students.
5388. **Programs and Services for Students With Dual Sensory Impairments (3:3:0).** Psychological, sociological, and educational implications of dual sensory impairments in children and youth, including appropriate community, educational, and social services.
5389. **Methods and Materials for Teaching Students With Dual Sensory Impairments (3:3:0).** Curricular adaptation and additions for students with dual sensory impairments. Emphasis on functional communication, behavior management, and training for independent living and employment.
5390. **Seminar in Special Education (3:3:0).** Recent research practices and problem areas in special education. May be repeated for credit.
6000. **Master's Thesis (V1-6).**
6301. **Leadership Issues With Special Populations (3:3:0).** Prerequisite: Admission to doctoral program. Preparation of leaders in Special Education through analysis of research and critical issues, professional writing and speaking, and grant preparation. May be repeated for credit.
6303. **Physical and Psychological Aspects of Special Populations (3:3:0).** Preparation of graduate students to understand physical and psychological backgrounds of people with disabilities.
6304. **Preparing Leadership Personnel for Special Populations (3:3:0).** Course will prepare doctoral level students to develop a leadership and managerial style and to effectively develop, implement, and evaluate preservice and in-service programs for adults.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

College of Engineering

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About the College

Engineering involves applying scientific and mathematical principles and knowledge to solve the technical problems that confront society. Students studying in the College of Engineering must develop an understanding of the forces at work within nature in order to learn to control and direct them. Engineering knowledge assists in achieving human goals, and humanity's advancement is the common objective of each program within the college. Students learn to become professionals and are expected to act responsibly and professionally.

Each academic program includes education in the basic sciences, mathematics, humanities, social sciences, and the technical knowledge needed to solve some of society's problems.

The college's primary goal is to educate students to fill leadership roles as professionals aware of technology and its economical and political role in the world. Therefore, we strive to produce technically competent graduates who solve problems, are able to communicate and work well with others, are sensitive to the needs of society, and are well-educated in the humanities as well as in the engineering disciplines.

Undergraduate Program

The college historically produces quality graduates. One quality component is the requirement of a grade of C or better in all courses used in the degree plan. The college also monitors student retention on a regular basis and has developed various programs and tools to help students learn how to learn and to improve student retention.

The college provides an educational system that uses outcomes assessment. Examples of long-term outcomes are job placement and on-the-job success. The college has excellent job placement. Students will also experience other assessment and advisement based on outcomes as they complete their education. The capstone senior design course or sequence of courses offered by each depart-

ment also is a measure of the integrated knowledge and ability of students. At this point, not only have students developed technical knowledge, but they have also learned to work as a professional team, valuing commitment and ethics and even advancing to a pattern of lifelong learning.

The Bachelor of Science degree programs in chemical engineering, civil engineering, computer engineering, electrical engineering, engineering physics, industrial engineering, mechanical engineering, and petroleum engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, 410.347.7700. The three engineering technology programs—construction, electrical-electronics, and mechanical—lead to a Bachelor of Science in Engineering Technology degree and are accredited by the Technology Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, 410.347.7700.

The Master of Environmental Engineering, a five-year degree program that starts with the freshman year, is also accredited by ABET and is administered in the Department of Civil and Environmental Engineering. The option of a nonABET accredited Bachelor of Science in Environmental Engineering is available to Master of Environmental Engineering students.

A degree in computer science is offered by the Department of Computer Science and supports teaching and learning in the areas of languages, systems, hardware, software, and related studies. Graduates are prepared to continue their formal study or work in a variety of industries.

The program leading to the degree of Bachelor of Science in Engineering Technology is designed for students whose basic aptitude and interests are in the application of established procedures to the solution of technical problems. An engineering technology program leads to a degree preparing students for technical careers in such fields as applied design, construction, operations, maintenance, quality control, or sales. Curriculum outlines and course descriptions are given in this catalog under the Department of Engineering Technology.

Degree Programs

Undergraduate Degrees. The College of Engineering offers the following professional engineering curriculum, each leading to the degree of Bachelor of Science in the respective engineering fields: chemical, civil, computer, electrical, industrial, mechanical, petroleum, and engineering physics. The computer science curriculum leads to the Bachelor of Science degree with a major in computer science. Engineering technology curriculum with specializations in construction, electrical-electronics, and mechanical technology leads to the degree of Bachelor of Science in Engineering Technology. A cooperative program between the Colleges of Engineering and Architecture leads to a degree from both entities. The Civil and Environmental Engineering Department coordinates the program for the College of Engineering.

The College of Engineering is divided into instructional departments that offer coursework and supervise the degree programs. These departments 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 curriculum tables are prescribed for the various degrees. The course arrangement for the 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 to include courses that are prerequisite to the ones for the following semester.

150-Hour Dual Degree. The College of Engineering provides a 150-hour dual degree that allows students eligible for graduate school to earn both a B.S. and a M.S. degree with approximately 150 hours. Students are allowed to use graduate work that closely matches the subject requirements of the undergraduate degree to substitute for undergraduate courses. Students should contact their department for details about the curriculum. Students interested in this program must apply to the Graduate School prior to taking graduate courses. Early planning and contact with the department advisors is essential because in some cases students may be able to connect undergraduate research experience to their thesis work in graduate school.

Interdepartment Degree Plans. The college offers a coordinated curriculum that leads to the awarding of two baccalaureate degrees from the college. At the present time, formal dual-degree plans are available between electrical engineering and computer science, and computer science and chemical engineering. Because of sequencing of courses and prerequisites, the student should enter the program during the freshman year and follow the plan rigorously. Because of the increased number of hours required, a minimum of five years is needed to complete the program. For information on the dual degrees, please contact the departments of interest.

Second Degree. A student who has completed the requirements for a first bachelor's degree from the College of Engineering may acquire a second by completing the degree program for the second degree with the following restriction: at least 30 hours of the second degree requirements must be from courses not counted in attaining the first degree. The student must regain admission to enter the new degree program.

Cooperative Education. A Cooperative Education Program for engineering students is available within the dean's office. To participate in this program, students should contact the Director of Cooperative Education. Three parties are involved in the program: the college, the student, and the employer. These parties work together so that the student can learn and perform real-world engineering functions under the supervision of engineering professionals. This program consists of three work tours in industry alternated with semesters of coursework at the university. Work assignments are related to academic and career goals with progressively responsible duties on the second and third tours. Students typically begin their first work tour after completion of their sophomore year and complete the third tour before the beginning of their senior year. Industry supervisors are expected to evaluate each student's work performance and education and share this evaluation information directly with the student. Information from this evaluation will be used confidentially to evaluate the effectiveness of the Texas Tech engineering program and the cooperative education program. Students must be registered for and meet the requirements of a qualifying cooperative education course during the semesters they are on tour in industry.

Departmental Minors. Students from other colleges or students outside their major department may elect to minor in an academic program of the College of Engineering. Each department will specify the required courses and number of hours that constitute a minor from their programs. Information on approved minors, if offered, is available from each department chair.

Engineering Minor. The College of Engineering offers an engineering minor for students enrolled in academic programs outside of the college. This minor consists of a minimum of 18 hours of engineering coursework with at least 6 hours completed at the junior level or above (3000- or 4000-level courses). The academic dean of the College of Engineering must approve all programs of study for this minor.

Bioengineering Minor. A minor in bioengineering is available to students enrolled in any College of Engineering degree program. This minor consists of four required preparatory courses (in biology, chemistry, and statistics), one course in a bioengineering core area (biomechanics, biochemical engineering, or bioinstrumentation), and two approved bioengineering elective courses. Students who wish to pursue this minor should see their advisor or the academic dean.

Joint Business/Engineering Certificate in Technology Entrepreneurship. The purpose of the Certificate in Technology Entrepreneurship (CTE) is to prepare students majoring in either engineering or business careers in technology-driven industries. The certificate program is designed for those students who would like to develop a cross-disciplinary perspective of technology using both engineering and business skills.

Undergraduate Certificate in Technology Entrepreneurship (coupled with a B.S. in Engineering or a Bachelor of Business Administration) — 9 total hours required

- Required Business Foundation Course for
Engineering Students: B A 3302, Financial and Managerial Accounting 3 hrs.
- Required Engineering Foundation Course for
Business Students: I E 4320, Fundamentals of Systems .. 3 hrs.
- Required Courses for **All Certificate Program Students:**
MGT 4376, Entrepreneurship II: Discovering Entrepreneurial Opportunity 3 hrs.
I E 4331, Individual Studies in Industrial Engineering:
Engineering Entrepreneurship 3 hrs.

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 computer science and chemical, civil, electrical, industrial, mechanical, and petroleum engineering. In addition to these programs, the College of Engineering offers a Master of Engineering degree designed especially for practicing engineers desiring to continue their professional education.

Admission to the Graduate School is based upon an above average undergraduate record and satisfactory standing on the Graduate Record Examinations.

Dynamic Enrollment Management Plan (DEMP). The college uses a dynamic enrollment management plan to control quality and enrollments in upper-level classes. The set points of GPA and details of implementation vary by department. Some departments, for example, require a GPA of 2.5 or higher to continue into upper-level classes or to transfer into the department. Students should see their department advisor and understand the requirements for their major.

Community College Articulation Agreements. Students from community colleges generally transfer courses in English, history, political science, mathematics, and science to Texas Tech. Community colleges that adequately prepare students to study engineering have designated faculty who function as liaisons between their schools and the College of Engineering. Such cooperative arrangements provide students an opportunity to choose courses at the community college that are required by a specific major in the College of Engineering. Problems in transferring to Texas Tech are minimized by the student's early commitment to transfer to the College of Engineering.

General Standards and Requirements

The requirements for a degree from the College of Engineering include many courses that are common to all degree programs. Most of these courses are taught at the freshman and sophomore level. A specific curriculum has been established for each degree program and is given in detail on the following pages.

Admission Requirements. Students meeting the admissions requirements of the university will be admitted to any major within the college with the exception of mechanical engineering and petroleum engineering. These majors may have more stringent admissions requirements than the rest of the college. Students interested in these majors should refer to the departmental sections of the catalog under the sections describing freshman admission and transfer admission. Students admitted to the College of Engineering, but not into the department of their choice, may choose engineering undecided as a major while they attempt to fulfill the additional admissions requirements.

Core Curriculum Requirements. The university has established a set of core courses required for all students. These requirements ensure breadth in each academic program. Students should consult their faculty advisors or chairperson regarding specific requirements. Please note that these requirements are incorporated in the curriculum of each major or specialization in the college. Students are urged to seek advisement prior to their first enrollment to avoid losing credit. A listing of Core Curriculum requirements is in the Undergraduate Academics section of this catalog.

Computer. All students in the college are expected to have access to a personal computer. Many instructors require students to transfer homework with email. Some instructors transfer information to students using the Internet. While computer facilities are available on campus, students do best when they have their own personal computer. Students should check with their respective department for hardware and software recommendations.

Maximum Course Load. A normal course load is 15-19 credit hours. A student must get approval from the dean's office to take more than 19 hours during a fall or spring semester or more than 8 hours during a summer term. Students on academic probation are not allowed to take more than 16 hours during a fall or spring semester. Students who work should adjust their course load accordingly. Check with the dean's office for recommendations.

Credit by Examination. Credit for some engineering courses above the freshman level is available through departmentally prepared examinations. The student must present to the dean a written request to take the examination. The petition must state the extent and manner in which the student obtained competence in the subject. Upon approval by the dean, the petition should be presented to the chair of the department concerned for arrangements to take the examination.

Graduate Program

The College of Engineering offers programs of instruction and research leading to the Master of Science and the Doctor of Philosophy degrees with majors in chemical, civil, computer science, electrical, industrial, mechanical, and petroleum engineering. A Master of Science in Environmental Technology Management degree and a Master of Environmental Engineering degree are offered in the Department of Civil and Environmental Engineering. The Department of Industrial Engineering offers a Master of Science in Systems and Engineering Management. The general regulations governing the graduate programs at Texas Tech University apply to these degrees.

In addition to the above degree programs, work leading to the Master of Engineering degree is offered with the entire graduate faculty of the college participating.

The program leading to the Master of Engineering degree does not specify an area of specialization and does not require a thesis. The program is designed primarily for practicing engineers. For such practicing engineers credit for graduate coursework completed in residence at another accredited graduate school may be accepted for as much as 15 hours of the 36 semester hour requirement for the Master of Engineering degree. All work credited toward the degree must be completed within nine calendar years. Under certain circumstances, regular on-campus students may be admitted to the undifferentiated Master of Engineering degree program. (In such cases, the regular six-year time limit will apply.) In addition to the regulations governing admission to the Graduate School, a baccalaureate degree in engineering, or its equivalent, is required for entrance to the Master of Engineering program. The student may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the college.

Correspondence Courses. All correspondence work taken for a degree program requires written approval from the dean of the College of Engineering prior to registration. Correspondence courses taken from institutions other than Texas Tech must be certified by the Division of Outreach and Distance Education as being equivalent to correspondence courses offered at Texas Tech.

Transfer Course Evaluation. Courses transferred from another institution will be evaluated for use in a given degree program. Each department evaluates transfer courses associated with courses taught in their department.

Grades for Transfer Courses. The highest grade for a repeated course, either at Texas Tech or another institution, will be the grade used to determine acceptance of the course for a degree program. Only courses with a grade of C or better will be accepted for use on an engineering degree plan.

Prerequisites. In scheduling courses, prerequisites and corequisites are mandatory.

Engineering Science Courses. All designated engineering science courses in a degree program should be taken as early as possible. The designated engineering science courses are C E 2101, 2301, 3302, 3303, 3305, CH E 3321, 3330, E E 3302, I E 3301, M E 3311, 2322, 3331, and 3370. The designated engineering technology science courses are GTEC 1312, 2351, and 2311.

Basic Science and Mathematics Requirements. If a student receives advanced placement in a mathematics course (on the basis of high school mathematics classes, MAT, or SATM test scores) higher than the first required course in the particular degree program, the department may specify the replacement course. If not specified, the student has the option to take an additional higher level mathematics course or substitute up to 4 hours of basic science for 4 hours of mathematics (some programs may specify the substitute course). The student must take a minimum of 12 hours of mathematics and 12 hours of basic science as required by the degree program. To meet the Engineering Accreditation Commission of ABET requirements, a minimum of 32 hours of approved basic sciences and mathematics must be completed. The Technology Accreditation Commission of ABET requires a minimum of 24 hours of approved basic science and mathematics for students in the Department of Engineering Technology. The basic science and mathematics courses used for the substitution may or may not be required by the degree program. In any case, the student must meet the minimum number of hours required for graduation.

ROTC. Subject to the policies of the department and with the approval of the department chair, 3 hours of advanced ROTC credit may be counted for the general elective courses in engineering, computer science, and engineering technology degree programs.

Substitution of Courses. Any substitution of courses specified in a degree program requires the written approval of the chair of the student's major department and the dean of the College of Engineering. Degree credit for electives requires written approval by the chair of the department involved. A list of acceptable technical electives for a degree program can be obtained from the department. Courses considered remedial, duplicative, or inferior will not be accepted.

Grades of C. A grade of C or better is required for all courses included in the degree plan. If a student earns a D or F grade in a prerequisite to a required course, the student must retake the prerequisite course and complete a grade of C or better before enrolling in the required course.

Pass-Fail. All courses used to satisfy the degree program requirements must be taken for a grade. (The pass-fail option is not allowed.)

Scholarships. A student on departmental or college scholarship must be a full-time student to maintain his or her scholarship.

Engineering Undecided. A student registering as engineering undecided (ENUD) must select a major after completing 45 hours of academic credit. Exceptions to this rule will be reviewed on a case by case basis by the dean's office. Engineering undecided is not a major.

Application for Degree. A student must file an "Application for Degree" with the office of the dean of the College of Engineering at least one year before the anticipated date of graduation. Subse-

quently, the student will receive a list of courses and the number of credit hours that remain to be taken. Because they must meet all the requirements of a specific year's catalog, students must indicate the year's catalog under which they plan to graduate. This must be a year during which the student is registered 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.

Engineering (ENGR)

Undergraduate Courses

1105. **Strategies for Success in Engineering (1:0:3).** Laboratory course to provide engineering majors with practice in skills to improve academic performance. Topics include study skills and habits, note taking, collaborative learning and teamwork, test-taking skills, and time management.
1315. **Introduction to Engineering (3:3:0).** Introduction to the engineering profession, including the distinction between different majors, engineering problem solving, professionalism and ethics, and experiences in team design projects.
3000. **Engineering Cooperative Education (V1-6).** Prerequisite: Approval by the Engineering Cooperative Education Director. Field course for supervised preprofessional educational employment experiences in industry and government involving assignments in the student's major.
4101. **Fundamentals of Engineering Exam Review (1:0:3).** Review of engineering topics in preparation for taking the NCEES Fundamentals of Engineering Exam.
4392. **Engineering Ethics and Its Impact on Society (3).** Prerequisite: Junior or senior standing. Development of ethical reasoning and enhancing critical thinking skills using theory and case studies with applications to engineering practice; includes international issues. Offered only online.

Graduate Courses

5000. **Special Topics in Engineering (V1-12).** Prerequisite: Graduate standing in engineering. Individual study of advanced interdisciplinary topics in engineering under the guidance of one or more members of the engineering faculty.
5340. **Turbomachinery (3:3:0).** Working of a typical power plant. Components making up steam and gas turbines. Cycle performance and internal flow in turbines and forces generated.
5354. **Creativity in Problem Solving (3:3:0).** The basic concept of creativity and means by which individuals and groups can develop more effective creative skills. Exercises to increase creative thinking and problem solving in individual and group settings.
5360. **Fundamentals of Engineering Science (3:3:0).** An overview of physical, mathematical, and engineering concepts; including electronics, materials, statistics, C programming, digital logic, microprocessors, and project management.
5361. **Device Characterization and Failure Analysis (3:2:3).** Characterization techniques for materials and devices. Failure analysis of analog and digital devices and systems. Reliability analysis and testing. Diagnostic instrumentation and data analysis techniques.
5362. **Advanced Semiconductor Processing and Process Characterization (3:2:3).** Prerequisite: E E 5381. This course stresses process flow, yield management, specific device processing steps, and process control. Packaging and back-end processing.
5363. **Advanced Topics in Semiconductor Product Engineering I (3:1:6).** Prerequisite: Consent of instructor. Advanced industry-related project in the area of semiconductor product engineering.
5364. **Advanced Topics in Semiconductor Product Engineering II (3:1:6).** Prerequisite: Consent of instructor. Advanced industry-related project in the area of semiconductor product engineering. A continuation of Advanced Topics I.
5365. **Parametric and Functional Device Testing (3:2:3).** Prerequisite: E E 5384 and 5393. Fundamentals of semiconductor device chip and wafer testing. Parametric and functional tests, test philosophy, C programming for testing, and commercial wafer level testers.
6330. **Master's Report (3).** Prerequisite: Graduate standing. Formal technical report on an interdisciplinary topic under guidance of faculty from one or more departments.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Department of Chemical Engineering

Faculty

M. Nazmul Karim, Ph.D., Chairperson

Horn Professor: McKenna

Professors: Hoo, Karim, Mann, Riggs, Simon

Associate Professors: Dai, Leggoe, Vaughn, Wiesner

Assistant Professors: Khare, Weeks

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Chemical Engineering
- Master of Science in Chemical Engineering
- Doctor of Philosophy in Chemical Engineering

Program Educational Objectives. Major objectives of the department during the next decade will be: (1) to provide students with a high quality education at both the undergraduate and graduate levels to enable them to adapt to a rapidly changing technical environment, (2) to produce graduates who will be productive throughout their careers in a wide range of industrial, professional, and academic environments, and (3) to develop graduates with a strong sense of ethics and professionalism and the ability to succeed as both individual and team contributors.

The profession of chemical engineering combines the principles of physical and chemical sciences with the discipline of engineering to solve modern technological problems and be of effective service to society. The chemical engineer is largely responsible for the continual development of new processes and new products that have a direct impact on improving the quality of life and the environment. To this end, the department provides a broad-based program with individual, academic, and professional counseling.

The importance of professionalism in engineering cannot be over-emphasized. Chemical engineering students are presented with a code of professional behavior and ethics at each academic level and are required to adhere to it. Copies of these codes are available on request.

The senior-year courses, as indicated in the list of courses in chemical engineering, are taught as a year of professional practice. Professional behavior constitutes a significant portion of grade evaluation in these courses.

The chemical engineering curriculum is sufficiently general that upon completion the student is prepared for a career in any of the process industries that involve chemical transformations. Employment opportunities cover a wide spectrum that includes, among others, petroleum, plastics production, basic chemicals, petrochemicals, pharmaceuticals, metals, textiles, semiconductors, and various biomedical and biological specialties. Many chemical engineers also are directly involved in the design of systems to minimize pollution of our environment or are active with governmental regulatory agencies that set environmental standards.

Continuing advances in the practice of chemical engineering include extensive use of computer simulation and computer control of chemical processes. The Department of Chemical Engineering at Texas Tech has well-established programs in both of these areas. All chemical engineering students must have access to a personal computer running the Windows operating system, including Microsoft Word, Microsoft Excel, and MatLab software. Many on-campus classes have their own Internet sites, and some classes are available only on the Internet. For this reason, access to an Internet provider is strongly recommended.

To be prepared for professional training as well as to practice chemical engineering professionally, it is essential that the prospective engineer have a good background in the physical sciences, namely mathematics, physics, and chemistry, in addition to the engineering sciences. Summer experience in a chemical processing industry is strongly recommended as part of the preparation for professional practice. To illustrate the application of engineering principles, visits to processing installations may be required as part of academic coursework.

Undergraduate Program

In accord with the Dynamic Enrollment Management Plan of the College of Engineering, the progress of each chemical engineering student is carefully monitored to ensure that all prerequisites for upper-level courses are satisfied and that degree requirements will be met in a timely manner. A grade of C or better is required in any course applied toward the B.S.Ch.E. degree.

If a student earns a D or F grade in a prerequisite to a required course, the student must retake the prerequisite course and complete it with a grade of C or better before enrolling in the required course.

Students earning a grade lower than a C in any course will be required to meet with their advisor before the start of the next semester. Students who have not achieved a grade of C or better after two attempts (including withdrawals) in a required chemical engineering course must apply for readmission to the program.

Assessment. The department uses outcome assessment to monitor quality. Students should expect periodic assessment of technical competence in addition to those activities contributing to course grades.

Transfer Admissions. Students transferring into this department from other institutions or from another department at Texas Tech must have an overall 2.0 GPA or better, as well as a 2.0 GPA or better in all science, mathematics, and engineering courses. All grades assigned in the matriculation of these courses will be included in the computation of GPA.

Scholarships. In addition to scholarships offered through the university's Financial Aid Office and the College of Engineering, the Chemical Engineering Department also offers scholarships to qualified students.

Curriculum. The first curriculum table in this section gives an eight-semester sequence of required courses that must be taken in the order shown as partial requirements for the B.S.Ch.E. degree. The remaining requirements can be taken as the student's load permits, provided all prerequisites are met. Specification of prerequisites implies all prior prerequisites must have been met. Oral communication is included in CH E 2306 and 4555. Writing intensive courses include CH E 1121, 2306, 3232, 4232, and 4555.

The second curriculum table gives a 10-semester sequence for the joint chemical engineering and computer science B.S. degrees. The courses in the table are required and must be taken in the order shown. The remaining Core Curriculum requirements and chemistry electives can be taken as the student's load permits. Several substitutions are made in the B.S.Ch.E. curriculum: C S 1411 is substituted for CH E 1305, seven of the C S hours at the junior level or higher are substituted for CH E 3330 and for four hours of chemistry electives, and I E 3301 is counted toward the Core Curriculum Group and Individual Behavior requirement.

Several substitutions are also made in the B.S.C.S. curriculum: CH E 2306 is substituted for ENGL 2311 and COMS 3358, CH E 3343 is substituted for the Mathematical Probability and Statistics elective, CH E 3353/4153 are substituted for a computer science elective, CH E 4381 is substituted for a computer science elective, and two required CH E courses at the junior level or higher are substituted for the technical or professional development electives.

The department also offers a combined Bachelor of Science and Master of Science curriculum in which completion of degree requirements leads to the award of two degrees (see curriculum table).

Minors. Along with the B.S.Ch.E. degree, a student may declare a minor in a field of his or her choice. Any required or elective courses in the chemical engineering curriculum may be applied toward the minor, with the approval of the minor department. While declaration of a minor is not required, it is strongly recommended. A minor in polymers and materials is offered by the department. The department participates in the college-wide minor in bioengineering (see page 239). A minor in chemistry or mathematics can also be earned with very few additional hours.

A minor in chemical engineering consists of 18 or more hours in chemical engineering courses, including CH E 2410, 2421, 3315, 3322, and 3326. Prerequisites for all of these courses will be enforced.

The minor in polymers and materials consists of 18 hours, six of which must be taken outside of the student's major. Two courses are required: CH E 4344 Polymers and Materials Laboratory and a course in materials science and engineering (either CH E 3330, M E 3311, or MTEC 3441). The remaining four courses should be selected from the following list:

CHEM 3306	Organic Chemistry II
CHEM 4310	Polymer Chemistry
CH E 4340	Polymer Processing
CH E 4341	Polymerization Engineering
CH E 4342	Polymer Physics and Engineering
CH E 4345	Dynamics of Polymeric and Nonlinear Fluids
CH E 4346	Polymer Viscoelasticity
E E 4381	VLSI Processing
M E 3328	Materials and Mechanics Laboratory
M E 4341	Materials in Design
M E 4344	Manufacturing Processes for Engineering Materials

Chemical Engineering (CH E)

(To interpret course descriptions, see page 8)

Undergraduate Courses

- 1121. Chemical Engineering Seminar (1:1:0).** Readings and discussion of the chemical engineering profession; history, ethics, career paths, and research opportunities. (Writing Intensive)
- 1305. Engineering Analysis I (3:2:3).** Synthesis and analysis of typical engineering problems emphasizing the use of computing tools, spreadsheet and compiler programming.
- 2306. Exposition of Technical Information (3:1:6).** Prerequisite: ENGL 1302. Organization and presentation of experimental data, and research interpretation and conclusions. Computer-aided preparation of engineering reports. (Writing Intensive)
- 2410. Introduction to Chemical Process (4:4:0).** Prerequisite: CHEM 1307, PHYS 1408, MATH 1351, ENGL 1301. Units and conversions, process variables, material and energy balances, process flow sheet analysis, phase equilibrium, elementary transient balances.
- 2421. Chemical Engineering Thermodynamics I (4:4:0).** Prerequisite: CH E 2410; corequisite: MATH 2350. Properties of pure substances, ideal gas behavior, heat effects in industrial reactions, first and second law analyses, energy conversion and power cycles.
- 3232. Chemical Engineering Transport Laboratory (2:0:6).** Prerequisite: CH E 2306, 3315 and 3326; corequisite: CH E 3341. Experiments in mass, momentum, and heat transport; statistical analysis of data. (Writing Intensive)
- 3315. Fluid Mechanics (3:3:0).** Prerequisite: CH E 2410, MATH 3350. Principles of momentum transport. Application to laminar and turbulent flow, metering, porous media, and settling.
- 3322. Chemical Engineering Thermodynamics II (3:3:0).** Prerequisite: CH E 2421. Solution thermodynamics, phase and chemical equilibria, analysis of processes.
- 3325. Intermediate Transport Phenomena (3:3:0).** Prerequisite: CH E 3315, CH E 3326. Study of advanced topics in transport phenomena including momentum transport in non-Newtonian coupling of momentum transport with heat and mass transport.
- 3326. Heat Transfer (3:3:0).** Prerequisite: CH E 2421 and MATH 3350. Principles of energy transport. Application to heat con-

Curriculum for Bachelor of Science in Chemical Engineering

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calculus I*	3	MATH 1352, Calculus II	3
CHEM 1307 & 1107, Prin. of Chem. I**	4	CHEM 1308 & 1108, Prin. Chem. II	4
CH E 1121, Chem. Engr. Seminar	1	CH E 1305, Engr. Anal.	3
TOTAL	11	PHYS 1408 Prin. of Phys. I***	4
		TOTAL	17
SECOND YEAR			
Fall		Spring	
MATH 2350, Calc. III	3	MATH 3350, Adv. Math. for Engr. I	3
CHEM 3305 & 3105, Org. Chem. I	4	CH E 2306, Expos. Tech. Info.	3
CH E 2410, Intro. to Chem. Proc.	4	CH E 2421, Chem. Eng. Thermo. I	4
PHYS 2401, Prin. of Phys. II	4	TOTAL	10
TOTAL	15		
THIRD YEAR			
Fall		Spring	
CH E 3315, Fluid Mechanics	3	CHEM 3308, 3108, Phys. Chem. II	4
CH E 3326, Heat Transfer	3	CH E 3232, Transport Lab.	2
CH E 3322, Chem. Eng. Thermo. II	3	CH E 3330, Engr. Mat. Sci.	3
TOTAL	9	CH E 3341, Mass-Trans. Oper.	3
		CH E 3353, Process Control	3
		TOTAL	15
FOURTH YEAR			
Fall		Spring	
CH E 4232, Unit Oper. Lab.	2	CH E 4153, Process Control Lab.	1
CH E 4323, Chem. Reaction Eng.	3	CH E 4555, Chem. Proc. Des. Sim.	5
Chemical Engineering Elective	3	Chemical Engineering Elective	3
I E 3301, Engr. Econ. Anal.	3	TOTAL	9
TOTAL	11		
Critical-Path Hours—97			
Additional Requirements:			
American Government	6	Humanities/Multicultural††	3
U.S. History	6	Chemistry Electives#	8
Visual and Performing Arts†	3	Group or Individual Behavior†	3

Minimum hours required for graduation—126

* Students who are not adequately prepared for calculus must take appropriate courses (MATH 0301, 0302, 1320, 1321, 1350) before enrolling in MATH 1351.

** Students who are not adequately prepared for chemistry must take CHEM 1301 before enrolling in CHEM 1307.

*** Students who are not adequately prepared for physics must take PHYS 1304 before enrolling in PHYS 1408. A high school physics course and a year of calculus are recommended as adequate preparation.

† Choose from Core Curriculum requirements.

†† Select a course that is simultaneously listed in the humanities section of the Core Curriculum requirements and the section specifying courses that satisfy the multicultural requirement.

Must include two laboratory courses from approved sophomore or higher courses.

- duction, convection, and radiation. Design and performance of heat exchangers and furnaces.
- 3330. Engineering Materials Science (3:3:0).** Prerequisite: CH E 3322 or CHEM 3307 and 3305. Engineering properties of metals, ceramics, and polymers; molecular, crystal, and microstructure configurations; selection of materials for applications.
- 3341. Mass-Transfer Operations (3:3:0).** Prerequisite: CH E 3322. Theory and practice of mass transfer. Particular emphasis on the operations of distillation, absorption, and extraction.
- 3353. Process Control (3:3:0).** Prerequisite: CH E 3315 and 3326 and MATH 3350 or 3354. Study of the principles of process dynamics and control and their applications to feedback control.
- 4000. Special Problems in Chemical Engineering (V1-6).** Prerequisite: Departmental approval. Individual studies in chemical engineering areas of special interest. May be repeated for credit.
- 4121. Chemical Engineering Research Seminar (1:1:0).** Prerequisite: Senior standing in chemical engineering. External speakers focus on their current research in chemical engineering and related fields.

Curriculum for Joint Bachelor of Science in Chemical Engineering and Computer Science

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	MATH 1352, Calculus II	3
MATH 1351, Calculus I*	3	CHEM 1308 & 1108, Chem. II	4
CHEM 1307 & 1107, Chem. I**	4	PHYS 1408, Prin. of Phys. I***	4
CH E 1121, Chem. Engr. Seminar	1	C S 1412, Programming Princ. II	4
C S 1411, Programming Princ. I	4	TOTAL	15
TOTAL	15		
SECOND YEAR			
Fall		Spring	
MATH 2350, Calc. III	3	MATH 2360, Linear Algebra	3
PHYS 2401, Prin. of Phys. II	4	CHEM 3305 & 3105, Org. Chem. I	4
CH E 2410, Intro. to Chem. Proc.	4	CH E 2421, Chem. Engr. Thermo. I	4
C S 2413, Data Structures	4	C S 2382, Discrete Comp. Struct.	3
TOTAL	15	ENGL 1302, Adv. Coll. Rhetoric	3
		TOTAL	17
THIRD YEAR			
Fall		Spring	
MATH 3350, Adv. Math. for Engr. I	3	CHEM 3308 & 3108, Phys. Chem. II	4
CH E 3315, Fluid Mechanics	3	CH E 2306, Expos. Tech. Info.	3
CH E 3322, Chem. Engr. Thermo. II	3	CH E 3341, Mass-Trans. Oper.	3
C S 2371, Intro. Digital Design	3	C S 2350, Com. Org. Assem. Lang.	3
TOTAL	12	TOTAL	13
FOURTH YEAR			
Fall		Spring	
CH E 3326, Heat Transfer	3	CH E 3232, Transport Lab.	2
C S 3361, Concepts Prog. Lang.	3	CH E 4372, Engr. Exp.	3
C S 3383, Theory Automata	3	CH E 3353, Process Control	3
Chemistry Elective#	4	C S 3352, Intro. Systems Program.	3
TOTAL	13	I E 3301, Eng. Economics	3
		TOTAL	14
FIFTH YEAR			
Fall		Spring	
CH E 4232, Unit Oper. Lab.	2	CH E 4153, Process Control Lab.	1
CH E 4323, Reactor Design	3	CH E 4381, Num. Methods	3
C S 3364, Design & Anal. Algor.	3	CH E 4555, Chem. Proc. Des. Sim.	5
C S 3365, Software Eng.	3	C S 3375, Comp. Architecture	3
TOTAL	11	TOTAL	12
Critical-Path Hours—137			
Additional Requirements:			
American Government	6	Visual and Performing Arts†	3
U.S. History	6	Humanities/Multicultural††	3

Minimum hours required for graduation—155

* Students who are not adequately prepared for calculus must take appropriate courses (MATH 0301, 0302, 1320, 1321, 1350) before enrolling in MATH 1351.

** Students who are not adequately prepared for chemistry must take CHEM 1301 before enrolling in CHEM 1307.

*** Students who are not adequately prepared for physics must take PHYS 1304 before enrolling in PHYS 1408. A high school physics course and a year of calculus are recommended as adequate preparation.

† Choose from Core Curriculum requirements.

†† Select a course that is simultaneously listed in the humanities section of the Core Curriculum requirements and the section specifying courses that satisfy the multicultural requirement.

Must include one laboratory course from approved sophomore or higher courses.

- 4153. Process Control Laboratory (1:0:3).** Prerequisite: CH E 3353. Experiments with control equipment and the minicomputer. Professional practice course.
- 4232. Unit Operations Laboratory (2:0:6).** Prerequisite: CH E 3232 and senior standing or consent of instructor. Laboratory experiments illustrating the basic principles of unit operations. Includes instruction on experimental methods, equipment scale up, and technical communication. Professional practice course. (Writing Intensive)
- 4323. Chemical Reaction Engineering (3:3:0).** Prerequisite: CH E 3322 and 3326. An introduction to the kinetics of chemical conversion processes and the design of chemical reactors.
- 4331. Corrosion Science and Engineering (3:3:0).** Prerequisite: Senior standing in engineering or consent of instructor. Study of corrosion management technologies.
- 4340. Polymer Processing (3:3:0).** Prerequisite: CH E 3315, MATH 2350. Polymer processing and fabrication technology for thermoplastic and thermoset polymers: The science and art of manufacturing with plastic materials.

Curriculum for Combined Bachelor of Science and Master of Science in Chemical Engineering

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calculus I*	3	MATH 1352, Calculus II	3
CHEM 1307 & 1107, Chem. I**	4	CHEM 1308 & 1108, Chem. II	4
CH E 1121, Chem. Eng. Seminar	1	CH E 1305, Engr. Anal.	3
TOTAL	11	PHYS 1408, Prin. of Phys. I***	4
		TOTAL	17

SECOND YEAR			
Fall		Spring	
MATH 2350, Calc. III	3	MATH 3350, Adv. Math. for Engr. I	3
CHEM 3305 & 3105, Org. Chem. I	4	CH E 2306, Expos. Tech. Info.	3
CH E 2410, Intro. to Chem. Proc.	4	CH E 2421, Chem. Eng. Thermo. I	4
PHYS 2401, Prin. of Phys. II	4	TOTAL	10
TOTAL	15		

THIRD YEAR			
Fall		Spring	
CH E 3315, Fluid Mechanics	3	CHEM 3308 & 3108, Chem. II	4
CH E 3326, Heat Transfer	3	CH E 3232, Transport Lab.	2
CH E 3322, Chem. Eng. Thermo. II	3	CH E 3330, Engr. Mat. Sci.	3
TOTAL	9	CH E 3341, Mass-Trans. Oper.	3
		CH E 3353, Process Control	3
		TOTAL	15

FOURTH YEAR			
Fall		Spring	
CH E 4232, Unit Oper. Lab.	2	CH E 4153, Process Control Lab.	1
CH E 4323, Chem. Reaction Eng.	3	CH E 4555, Chem. Proc.	5
Graduate Core Course+	3	Graduate Core Course+	3
I E 3301, Engr. Econ. Anal.	3	Graduate Core Course+	3
TOTAL	11	TOTAL	12

FIFTH YEAR			
Fall		Spring	
CH E 5721, Graduate Seminar	1	CH E 5721, Graduate Seminar	1
Graduate Core Course+	3	Graduate Elective Course++	3
Graduate Core Course+	3	Graduate Elective Course++	3
Graduate Elective Course++	3	CH E 6000, Master's Thesis	3
CH E 6000, Master's Thesis	3	TOTAL	10
TOTAL	13		

Critical-Path Hours—118

Additional Requirements:

American Government	6	Humanities/Multicultural††	3
U.S. History	6	Chemistry Electives#	8
Visual and Performing Arts†	3	Group or Individual Behavior†	3

Minimum hours required for graduation—152

* Students who are not adequately prepared for calculus must take appropriate courses (MATH 0301, 0302, 1320, 1321, 1350) before enrolling in MATH 1351.

** Students who are not adequately prepared for chemistry must take CHEM 1301 before enrolling in CHEM 1307.

*** Students who are not adequately prepared for physics must take PHYS 1304 before enrolling in PHYS 1408. A high school physics course and a year of calculus are recommended as adequate preparation.

† Choose from Core Curriculum requirements.

†† Select a course that is simultaneously listed in the humanities section of the Core Curriculum requirements and the section specifying courses that satisfy the multicultural requirement.

Must include two laboratory courses from approved sophomore or higher courses.

+ Choose from the five graduate core courses: CH E 5310, 5312, 5321, 5323, or 5343.

++ One graduate level elective must be a CH E course, the other two may be in any area of engineering, science, or mathematics.

Graduate Program

The master's program is a structured program requiring five core courses: C E 5310, 5312, 5321, 5323, and 5343. The graduate student will be required to take one additional chemical engineering course and at least two other courses as specified by his or her advisory committee. A written thesis and a minimum of 24 hours of graduate-level coursework, exclusive of thesis and seminar, are required for the master's degree. In addition, a final oral exam in defense of the completed thesis will be administered by the candidate's thesis committee.

The master's program may also be completed without a thesis. Entry into the nonthesis option must be approved by the departmental graduate committee. This program is intended for graduate students in the college-sponsored International Exchange Program and for new students with more than five years industrial experience. Graduate students in this nonthesis option are required to take 36 credit hours of graduate coursework, exclusive of seminars. The coursework for each student must meet approval of the department's graduate committee. Students must obtain approval from the department before registering for required graduate courses.

In addition to regulations established by the Graduate School, applicants for candidacy for the doctor's degree are required to demonstrate high proficiency in a single research area. Certification of the research proficiency will be based on a record of accomplished research that demonstrates the required level of competence in the research area. The record must be substantiated by published articles, final research reports, or papers presented at meetings of learned societies.

All master's students and doctoral candidates are required to register for CH E 7121, 7122, 7123, or 7124 each long semester unless exempted by the chairperson. Seminar courses do not count toward fulfilling credit hour requirements.

- 4341 Polymerization Engineering (3:3:0).** Prerequisite: CHEM 3305 and MATH 2350. Polymerization reactions, mechanisms and kinetics, control of properties through reaction and processing, polymerization reactor and process design, degradation reactions.
- 4342. Polymer Physics and Engineering (3:3:0).** Prerequisite: CH E 3330. Fundamentals of polymer science and engineering. Solution properties, chain conformation and molecular mass characterization. Rubber elasticity and viscoelastic behavior. Crystalline polymers and morphology.
- 4344. Polymers and Materials Laboratory (3:1:6).** Corequisite: CH E 3330, ME 3311, or MTEC 3441. Synthesis and properties of materials including polymers, polymerization, transitions, phase separation, mechanical properties, and processing.
- 4345. Dynamics of Polymeric and Nonlinear Fluids (3:3:0).** Prerequisite: CH E 3315. Observed phenomena in polymeric and multicomponent flow systems; viscometry and viscoelastic measurements for nonlinear fluids; rheological models; analytical solutions to flow problems; dimensional analysis.
- 4346. Polymer Viscoelasticity (3:3:0).** Prerequisite: MATH 3350 and CH E 3330 or consent of instructor. Linear viscoelasticity, Boltzmann superposition, experimental methods, molecular theory, and mechanical properties of solid polymers.
- 4360. Advanced Industrial Waste Treatment (3:3:0).** Prerequisite: Senior standing in chemical engineering or consent of instructor. Advanced methods for treating industrial wastes and remediating contaminated sites of increasing importance to industry and society.
- 4363. Biochemical Engineering (3:3:0).** Prerequisite: CH E 4323. Introduction to biochemical reaction engineering and separations. Kinetics of biomass and product information, and substrate utilization. Biotransport phenomena, bioenergetics, downstream separation and purification processes.
- 4364. Chemical Engineering Applications in Biological Systems (3:3:0).** Prerequisite: MATH 3350 or 3354. Transport phe-

- nomena and chemical reactions at the molecular and cellular level in biological systems.
4371. **Energy Resources, Processing, and Utilization (3:3:0)**. Prerequisite: Senior standing in science or engineering or consent of instructor. The cost, availability, and processing requirements of energy resources used by individuals and society.
4372. **Engineering Experimentation (3:0:3)**. Prerequisite: Senior standing in science or engineering. Strategy in experimentation; planning efficient experiments; analysis of data and interpretation and presentation of results; and Six Sigma methodology.
4375. **Chemical Process Safety (3:3:0)**. Prerequisite: CH E 2321 and 3226. Case studies in emergency response, hazard evaluation, accident investigation, toxic releases, atmospheric dispersion, fires and explosion types.
4376. **Catalytic Processes (3:3:0)**. Prerequisite: CH E 4323. Physical and chemical mechanisms involved in industrial catalytic processes. Kinetic modeling and determination of their parameters. Effects of pore diffusion and mass-transfer.
4381. **Numerical Techniques for Chemical Engineering Problems (3:3:0)**. Prerequisite: MATH 3350. Numerical methods for integration, solution of systems of algebraic equations, initial- and boundary-value problems, and optimization.
4384. **Process Dynamics and Automatic Control (3:3:0)**. Prerequisite: CH E 3353. Study of the transient behavior of process systems; analysis methods; synthesis and simulation of digital control systems; process model-based control, optimization, and statistical process control.
4385. **Bioprocess Control (3:3:0)**. Prerequisite: MATH 3350 or 3354 and CH E 3353 or consent of instructor. Problems and solutions associated with optimization and control of bioprocesses.
4555. **Chemical Process Design and Simulation (5:3:6)**. Prerequisite: CH E 3341, 3353, 4323, I E 3301. Design of chemical processes and equipment using computer simulation, flow sheeting, optimization, and process synthesis techniques. (Writing Intensive)
4615. **Topics in Process Engineering and Intelligent Control (6:3:9)**. Prerequisite: Senior standing in chemical engineering. Newly developed concepts in the design, analysis, and control of chemical and biochemical processes, including advanced methods in chemical kinetics and catalysis, modeling, and intelligent control concepts.
4635. **Topics in Transport Phenomena (6:3:9)**. Prerequisite: Senior standing in chemical engineering. Current research topics in transport phenomena, including turbulent flow characterization atmospheric chemistry and transport, and rheology, emphasizing computational modeling.
4640. **Topics in Polymer and Materials (6:3:9)**. Prerequisite: Senior standing in chemical engineering. Current research topics and laboratory experience in the area of polymers, composites, rheology, and material science.
4660. **Topics in Bioengineering (6:3:9)**. Prerequisite: Senior standing in chemical engineering. In-depth investigation of current topics of importance in bioengineering, including theoretical, experimental, and computational methods for studying biological membranes and advanced bioprocess engineering.
5316. **Linear Chemical Process Control Theory (3:3:0)**. Prerequisite: CH E 4353, 5310, or equivalent. Linear systems theory is employed to analyze models of chemical and chemical-related processes and to design stable controllers.
5317. **Chemical Process Model-Based Control (3:3:0)**. Prerequisite: CH E 5316 or equivalent. Different model descriptions of chemical and related processes are identified and analyzed for the synthesis of predictive, stable, and optimal control systems.
- 5321.* **Advanced Chemical Engineering Thermodynamics (3:3:0)**. In-depth study of fundamental laws of thermodynamics, property relations for pure material and mixtures, and phase and chemical equilibrium principles.
- 5323.* **Digital Computation for Chemical Engineers (3:3:0)**. The development of current numerical methods for application to modeling of chemical engineering systems. Primary emphasis is placed upon steady state and unsteady state chemical reaction systems.
5335. **Advanced Transport Phenomena (3:3:0)**. Prerequisite: CH E 5312 and 5310 or consent of instructor. Tensor analysis; partial differential equations for multicomponent fluid mixtures; two phase flow problems; and interfacial transport.
5340. **Polymer Processing (3:3:0)**. Polymer processing and fabrication technology for thermoplastic and thermoset polymers: The science and art of manufacturing with plastic materials.
5341. **Polymer Chemistry and Processing (3:3:0)**. Polymerization reactions, mechanisms, and kinetics, large-scale synthesis, scope of polymer processing, and fabrication technology.
5342. **Polymer Physics and Engineering (3:3:0)**. Fundamentals of polymer science and engineering. Solution properties, chain conformation and molecular mass characterization. Rubber elasticity and viscoelastic behavior. Crystalline polymers and morphology.
- 5343.* **Reaction Kinetics (3:3:0)**. Analysis and design of chemical reactor operations with multiple reactions; semibatch operations and other complex reactor configurations. Determination of kinetic parameters from operating data. Economic-based optimization, characterization and modeling of non-ideal reactors.
5344. **Polymers and Materials Laboratory (3:2:3)**. Synthesis and properties of materials, including polymers, polymerization, transitions, phase separation, mechanical properties, and processing.
5345. **Dynamics of Polymeric and Nonlinear Fluids (3:3:0)**. Observed phenomena in polymeric and multicomponent flow systems; viscometry and viscoelastic measurements for nonlinear fluids; rheological models; analytical solutions to flow problems; and dimensional analysis.
5346. **Polymer Viscoelasticity (3:3:0)**. Linear viscoelasticity, Boltzmann superposition, experimental methods, molecular theory, and mechanical properties of solid polymers.
5348. **Materials Applications for Scanning Probe Microscopy (3:3:0)**. The science and technology of scanning probe techniques, including scanning tunneling microscopy, near field scanning optical microscopy, and atomic force microscopy, applied to materials characterization.
5354. **Bioprocess Control (3:3:0)**. Problems and solutions associated with optimization and control of bioprocesses.
5360. **Advanced Industrial Waste Treatment (3:3:0)**. Advanced methods for treating industrial wastes and remediating previously contaminated sites are of increasing importance to industry and to society. This course will detail the ways to evaluate the many proposed treatment methods. They will be evaluated in terms of science, engineering science, operability, costs, and credentials of the developer. Actual proposed processes will be used as examples.
5363. **Biochemical Engineering (3:3:0)**. Introduction to biochemical reaction engineering and separations. Kinetics of biomass and product information and substrate utilization. Biotransport phenomena, bioenergetics, downstream separation, and purification process.
5364. **Chemical Engineering Applications in Biological Systems (3:3:0)**. Prerequisite: MATH 3350 or 3354. Transport phenomena and chemical reactions at the molecular and cellular level in biological systems.
5372. **Engineering Experimentation (3:3:0)**. Course emphasizes strategy in experimentation, planning efficient experiments, analyzing and interpreting data, presenting results, and Six Sigma methodology.
5376. **Catalytic Processes (3:3:0)**. Prerequisite: CH E 4323. Physical and chemical mechanisms involved in industrial catalytic processes. Kinetic modeling and determination of their parameters. Effects of pore diffusion and mass-transfer.

Graduate Courses

5000. **Advanced Topics in Chemical Engineering (V1-6)**. Prerequisite: Approval of department chairperson. Individual study of topics of current interest under the guidance of a member of the staff. May be repeated for credit on different topics.
5121. **Graduate Seminar (1:1:0)**. Discussions of chemical engineering research and its relationship to the philosophy and art of chemical engineering. Required of all chemical engineering graduate students. May be repeated for credit.
- 5310.* **Advanced Chemical Engineering Techniques (3:3:0)**. Application of ordinary and partial differential equations for solution of mass, momentum, and/or energy transfer and transport problems. Primary emphasis is on the mathematical analysis of unsteady state systems and chemical-reaction systems: models, solutions, and model validation.
- 5312.* **Fluid Transport Principles and Analysis (3:3:0)**. Fundamental relations governing mass, momentum, and energy transfer within fluids, with special emphasis on simultaneous transport, process applications, and numerical methods of analysis.
5314. **Process Dynamics and Automatic Control (3:3:0)**. Study of the transient behavior of process systems: methods of analysis; synthesis and simulation of digital control systems; introduction to process model-based control, optimization, and statistical process control.

* The master's program is a structured program requiring the five core courses denoted by asterisks.

5381. **Statistical Mechanics for Chemical Engineers (3:3:0).** Prerequisite: CH E 5321. Molecular theories for properties of gases and condensed phase systems. Emphasis will be on free energy changes, phase equilibria, and transport properties.
5382. **Methods of Molecular Simulations (3:3:0).** Theory and applications of computational methods for simulating the statistical mechanics of complex molecular systems. Discusses thermodynamic, transport, and dynamic properties.
5615. **Topics in Process Engineering and Intelligent Control (6:3:9).** Newly developed concepts in the design, analysis, and control of chemical and biochemical processes, including advanced methods in chemical kinetics and catalysis, modeling, and intelligent control concepts.
5635. **Advanced Topics in Transport Phenomena (6:3:9).** Current research topics in transport phenomena, including turbulent flow characterization, atmospheric chemistry and transport, and rheology, with an emphasis on computational modeling.
5640. **Topics in Polymer and Materials Science (6:3:9).** Current research topics and laboratory experience in the area of polymers, composites, rheology, and materials science.
5660. **Advanced Bioengineering (6:3:9).** In-depth investigation of current topics of importance in bioengineering, including theoretical, experimental and computational methods for studying biological membranes and advanced bioprocess engineering.
6000. **Master's Thesis (V1-12).**
7000. **Research (V1-12).**
7121. **Doctoral Seminar (1).** Open discussions of recent advanced findings in any field of endeavor, with special attention to their relationship to the philosophy of chemical engineering. May be repeated for credit.
7122. **Polymer and Materials Seminar (1:1:0).** Discussion and presentation of current research.
7123. **Bioengineering Seminar (1:1:0).** Discussion and presentation of current research in bioengineering.
7124. **Process Control and Engineering Seminar (1:1:0).** Discussion and presentation of current research in process control and engineering.
8000. **Doctor's Dissertation (V1-12).**

Department of Civil and Environmental Engineering

Faculty

H. Scott Norville, Ph.D., Chairperson

Horn Professor: Mehta

Professors: Borrelli, Fedler, Kiesling, Letchford, Norville, Rainwater, J. Smith, Swift, Sweazy

Associate Professors: Jackson, Jayawickrama, Ramsey, Senadheera, D. Smith

Assistant Professors: Budek, Chen, Lawson, Liu, McEnery, Morse, Newhouse, Zuo

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Civil Engineering
- Bachelor of Science in Environmental Engineering
- Master of Science in Civil Engineering
- Master of Environmental Engineering
- Master of Science in Environmental Technology Management
- Doctor of Philosophy in Civil Engineering

Mission. The mission of the department has three elements:

- To provide excellent instruction and design experiences essential for graduates to enter the practice of civil engineering and pursue lifelong professional development.
- To provide research opportunities for students that generate, communicate, and apply new knowledge for the betterment of society.
- To foster a spirit of service and leadership among students and faculty and assist the public in addressing issues concerning using our resources, protecting our environment, and developing our infrastructure.

Program Educational Objectives. The faculty members strive to achieve the following objectives for their graduates:

- Graduates will progress to professional registration.
- Graduates will develop professionally through participation and leadership in professional organizations.
- Graduates will pursue lifelong learning through continuing education or postgraduate education.
- Graduates will be capable of diverse career paths in industry, consulting, and government.

Undergraduate Program

The Civil and Environmental Engineering Department supports the concept of the Dynamic Enrollment Management Plan and has adopted the following version of it. Prior to the third year of the curriculum shown below and before enrolling in subsequent civil engineering courses, each student must file an application for

admission to the civil engineering degree program by submitting a degree plan. To obtain approval of the degree plan, students must acquire a C or better in all courses. To graduate, the student must maintain the above standards in subsequent courses, complete the specified minimum number of hours in each of these subject areas, and have a C or better in all degree program courses. Changes in the degree plan or exceptions to the above conditions require written approval of the chairperson of the Department of Civil and Environmental Engineering. Forms and information pertaining to departmental regulations are available in the Department of Civil and Environmental Engineering office. Professors and instructors reserve the right to restrict the use and type of calculators used during class hours and tests.

Students interested in obtaining both the Bachelor of Science in Civil Engineering and the Master of Architecture degrees should refer to the dual-degree curriculum listed in the College of Architecture section of this catalog.

Civil Engineering (C E)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1130. **Civil Engineering Seminar I (1:0:2).** Introduction to the practice of civil engineering.
1305. **Engineering Analysis I (3:3:0).** Corequisite: MATH 1351. Formulation development and presentation of solutions to typical engineering problems. An introduction to numerical analysis and various computer techniques.
2101. **Construction Materials Laboratory (1:0:3).** Corequisite: C E 1305. Laboratory determination and interpretation of engineering properties of construction materials including steel, concrete, aluminum, wood, and masonry.
2301. **[ENGR 2301] Statics (3:3:0).** Corequisite: MATH 1352, PHYS 1308, 1105. Equilibrium of particles and rigid bodies, friction, centroids, and moments of inertia.
3103. **Mechanics of Solids Laboratory (1:0:3).** Prerequisite: C E 3303. Laboratory measurements and observation of behavior of solid materials.
3105. **Mechanics of Fluids Laboratory (1:0:3).** Prerequisite: C E 3305. Experimental studies of fluid behavior.
3121. **Geotechnical Engineering Laboratory (1:0:3).** Corequisite: C E 3321. Laboratory determination and engineering evaluation of the physical properties of soils.
3171. **Environmental Engineering Laboratory I (1:0:3).** Corequisite: C E 3309. Performance of standard analytical methods used to measure water and wastewater quality. Evaluation of limits to data produced by standard methods.
3302. **Dynamics (3:3:0).** Prerequisite: C E 2301; corequisite: MATH 2350. A study of motions of particles and rigid bodies.

Bachelor of Science in Civil Engineering Curriculum

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
HIST 2300, U.S. Hist. to 1877	3	C E 1305, Engr. Anal. I	3
C E 1130, Civil Engr. Seminar I	1	PHYS 1408, Prin. of Phys. I	4
E GR 1207, Engr. Graphics	2	CHEM 1308, Prin. of Chem. II	3
CHEM 1307, Prin. of Chem. I	3	CHEM 1108, Prin. Chem. II (Lab.)	1
CHEM 1107, Prin. of Chem. I (Lab.)	1	TOTAL	17
TOTAL	16		
SECOND YEAR			
Fall		Spring	
MATH 2350, Calc. III	3	MATH 3350, Math. for Engrs. I	3
PHYS 2401 or E E 3301	3-4	M E 2322 or I E 3301	3
C E 2301, Statics	3	C E 3303, Mech. of Solids	3
CTEC 2301, Surveying	3	C E 3305, Mech. of Fluids	3
POLS 1301, Amer. Govt., Org.	3	Statistics*	3
C E 2101, Construction Matls.	1	TOTAL	15
TOTAL	16-17		
THIRD YEAR			
Fall		Spring	
C E 3440, Struc. Anal. I	4	C E 3372, Water Sys. Des.	3
C E 3354, Intro. to Hydrology	3	C E 3341, Prin. of Struc. Des.	3
C E 3309, Envir. Engr. I	3	C E 3302, Dynamics	3
C E 3171, Envir. Engr. Lab.	1	C E 3321, Intro. to Geotech. Engr.	3
C E 3105, Mech. of Fluids Lab.	1	C E 3121, Geotech. Engr. Lab.	1
C E 3103, Mech. of Solids Lab.	1	POLS 2302, Amer. Pub. Pol.	3
HIST 2301, U.S. Hist. Since 1877	3	TOTAL	16
TOTAL	16		
FOURTH YEAR			
Fall		Spring	
C E 4343, Des. Concr. Struct.	3	C E 4330, Des. Engr. Sys.	3
C E 4292, Engr. Ethics & Prof.	2	ENGR 4101, F.E. Exam Review	1
Tech. Writing/Oral Comm.**	3	Elective (Humanities)^	3
C E 4361, Transport. Engr.	3	Elective (Humanities)^	3
Elective (Design)+	3	Elective (Design)+	3
TOTAL	14	Sr. Elective++	3
		TOTAL	16

Minimum hours required for graduation—126

* Select from I E 3341 or MATH 3342.

^ Humanities electives should satisfy multicultural and visual and performing arts requirements of the Core Curriculum. Obtain departmental approval before enrolling in courses to satisfy humanities electives.

** Technical Writing/Oral Communication: Choose PETR 3308 or I E 2331.

+ Electives shall be selected as follows (f=fall, s=spring, r=rotating):

Design—choose from C E 4321 (s), 4331 (f, s), 4333 (f, s), 4342 (f), 4353 (f), 4371 (s); ENVE 4307 (f), 4391 (s), 4399 (s).

++ Technical Elective—See Design electives above, senior level C E elective [C E 4340 (s), 4363 (s)] or advanced technical elective with advisor approval [e.g., GEOG 3300 (f, s), GEOL 3428 (f)].

Master of Environmental Engineering Curriculum

FIRST YEAR			
Fall		Spring	
MATH 1351, Calc. I	3	MATH 1352, Calc. II	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Ess. of Coll. Rhet.	3
E GR 1207, Engr. Graphics	2	C E 1305, Engr. Anal. I	3
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. I (Lab.)	1	CHEM 1108, Prin. Chem. II (Lab.)	1
POLS 1301, Amer. Govt. Org.	3	HIST 2300, History of U.S. to 1877	3
ENVE 1100, Env. Eng. Seminar	1	TOTAL	16
TOTAL	16		
SECOND YEAR			
Fall		Spring	
MATH 2350, Calc. III	3	POLS 2302, Amer. Pub. Policy	3
PHYS 1408, Prin. of Phys. I	4	Environmental Science Elective**	3
CHEM 3305, Org. Chemistry I	3	C E 3305, Mech. of Fluids	3
C E 2301, Statics	3	BIOL 1404, Biology II	4
BIOL 1403, Biology I	4	HIST 2301, History of U.S. Since 1877	3
TOTAL	17	TOTAL	16
THIRD YEAR			
Fall		Spring	
Statistics*	3	MATH 3350, Differential Equations.	3
C E 3309, Envir. Engr.	3	Indiv.-Group Behavior Elective†	3
C E 3303, Mech. of Solids	3	C E 3372, Water Systems Design	3
C E 3354, Engr. Hydrology	3	Vis./Performing Arts Elective††	3
Engr. Communication***	3	C E 3321, Intro. to Geotech. Engr.	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
C E 4353, Design of Hydraulic Systems	3	ENVE 4399, Bio. Mun. WW Trt.	3
C E 3105, Mech. of Fluids Lab.	1	Humanities Elective#	3
ENVE 4390, Water-Wastewater	3	ENVE 4391, Adv. Water Treat.	3
ENVE 4307 Phys./Chem. Mun. WW Trt.	3	ENVE 5303 Des. Air Pol. Ctr. Syst.	3
ENVE 4385, Micro Appl. in Env. Engr.	3	C E 5363, Groundwater Hydro.	3
C E 4292, Engr. Ethics and Prof.	2	TOTAL	15
TOTAL	15		
FIFTH YEAR			
Fall		Spring	
C E 5364, Groundwater Transp.	3	ENVE 5306, Env. Sys. Des. II	3
ENVE 5305, Env. Sys. Design I	3	ENGR 4101, F.E. Exam Review	1
I E 5306, Safety Engineering	3	C E 5395, Solid and Haz. Waste	3
C E 5360, Open Channel Hydr.	3	Technical Electives##	9
C E 5393, Unit Processes Lab.	3	TOTAL	16
TOTAL	15		

Minimum hours required for graduation—156

* Select I E 3341 or MATH 3342.

** Select environmental science elective such as GEOG 1401, 3301, 3310, GEOL 3323, 3428, ATMO 3301, CHEM 3311, 4303, or others with advisor approval.

***Either PETR 3308 or I E 2331.

† I E 3301 strongly recommended, other courses from Core Curriculum with advisor approval.

†† Core Curriculum F could be used to meet the multicultural requirement.

Core Curriculum E should be used to meet multicultural requirement if F was not.

Choose graduate technical electives from: C E 5327, 5361, 5362, 5365, 5366, 5368, 5383, 5394, 5398, or others with advisor approval.

3303. Mechanics of Solids (3:3:0). Prerequisite: C E 2301. Theory of stress and strain in elastic and inelastic bodies subject to various conditions of loading.

3305. Mechanics of Fluids (3:3:0). Prerequisite: C E 2301. Hydrostatics; dynamics of viscous and nonviscous fluids; resistance to flow; flow in pipes and open channels.

3309. Environmental Engineering (3:3:0). Prerequisite: CHEM 1308 and C E 3305. Corequisite: C E 3171. Water and wastewater characteristics and system design for water and wastewater treatment. Introduction of techniques of solid hazardous waste management and air pollution control.

3321. Introduction to Geotechnical Engineering (3:3:0). Prerequisite: C E 3303. Physical properties of soils; theories of soil strength, consolidation, and settlement; soil stabilization; slope stability analysis; selected design topics.

3341. Principles of Structural Design (3:3:0). Prerequisite: C E 3440. Fundamental principles of structural design with con-

sideration for the selection of materials and systems. Team approach to design; oral and written presentations.

3354. Engineering Hydrology (3:3:0). Prerequisite: C E 3305. Analysis and design methods related to the occurrence and distribution of surface and groundwater; precipitation, infiltration, runoff, and frequency analysis. (Writing Intensive)

3372. Water Systems Design (3:3:0). Prerequisite: C E 3305, 3354. Hydraulic analysis and design of municipal water distribution, stormwater collection, and wastewater collection systems. Oral and written presentations. (Writing Intensive)

3440. Structural Analysis I (4:3:3). Prerequisite: C E 3303. Introduction to the analysis of statically determinate and indeterminate structures.

4000. Special Studies in Civil Engineering (V1-6). Individual studies in civil engineering areas of special interest. May be repeated for credit.

4101. Application of Engineering Fundamentals (1:1:0). Prerequisite: Students must be within two long semesters of

- graduation. Review of engineering courses in preparation for NCEES Fundamentals of Engineering Exam.
4292. **Engineering Ethics and Professionalism (2:2:0)**. Prerequisite: Senior standing or consent of department chairperson. Principles and practice of engineering ethics and professionalism. (ENGR 4092)
4321. **Geotechnical Engineering Design (3:3:0)**. Prerequisite: C E 3321. Design and construction of foundation systems, geotechnical site investigation, bearing capacity and settlement analysis for shallow foundations, types of deep foundations, axial load capacity of driven piles, drilled shafts, and auger-cast piles, group behavior of piles.
4329. **Design of Bridge Structures (3:3:0)**. Corequisite: C E 4343. A course in the structural design of highway bridges using the AASHTO LRFD Bridge Design Specifications.
4330. **Design of Engineering Systems (3:2:3)**. Prerequisite: Senior standing, and either C E 4342 or C E 4343 or corequisite C E 4353 or ENVE 4399 and consent of instructor. Interdisciplinary team approach to the design of complex engineering systems; should be taken during last semester of undergraduate program. Oral and written presentations. (Writing Intensive)
4331. **Special Problems in Civil Engineering (3)**. Individual studies in civil engineering. May be repeated for credit.
4333. **Special Problems in Water Resources (3)**. Individual studies in water resources. May be repeated for credit.
4340. **Structural Analysis II (3:3:0)**. Prerequisite: C E 3440 or consent of instructor. Analysis of structures by matrix methods.
4342. **Design of Steel Structures (3:3:0)**. Prerequisite: C E 2101 and 3341. A course in design of structural steel systems by the LRFD method.
4343. **Design of Concrete Structures (3:3:0)**. Prerequisite: C E 2101 and 3341. A course in design of reinforced concrete systems by strength design methods.
4353. **Design of Hydraulic Systems (3:3:0)**. Prerequisite: C E 3305 and 3354. Design of open channel and closed conduit conveyance systems for water; includes introduction to HEC-RAS.
4361. **Transportation Engineering (3:3:0)**. Prerequisite: CTEC 2301; corequisite: C E 3321, I E 3341 or MATH 3342, and senior standing or approval of instructor. Transportation modes; railway and airport runway design; basic design and analysis concepts of highway systems' transportation planning; traffic engineering; intersection control' geometrics; pavement engineering.
4363. **Groundwater Hydrology (3:3:0)**. Prerequisite: C E 3354 or consent of instructor. Groundwater flow; well hydraulics, development, and management of groundwater resources; water quality; mathematical modeling with available software. Introduction to design of wells and well fields.
4371. **Geometric Design of Highways (3:3:0)**. Prerequisite: 4361 or consent of instructor. Study of geometric design of highways and streets, sign and marking of roadways, and application of computer software in highway design.
- stress or strain for axisymmetric problems; application to plates and shells, torsion, heat transfer and seepage problems.
5319. **Nonlinear Finite Element Analysis (3:3:0)**. Nonlinear behavior of solids, geometric and material nonlinearities, Lagrangian and updated Lagrangian methods, Prandtl Reuss equations, and incremental elastic plastic analysis.
5321. **Advanced Soil Engineering I (3:3:0)**. Prerequisite: C E 3321 or equivalent, or consent of instructor. Introduction to physio-chemical properties of soils; soil structure; soil classification; permeability; principle of effective stress; stress-deformation; stress paths and strength characteristics; partly saturated soils; advanced consolidation theory; secondary consolidation; field instrumentation.
5323. **Advanced Foundation Engineering (3:3:0)**. Prerequisite: Computer programming skills and consent of instructor. Advanced foundation engineering theory and practice, bearing capacity, settlement analysis, piles and pile groups, drilled piers, wave equation analysis.
5325. **Soil-Structure Interaction (3:3:0)**. Prerequisite: C E 5310 and 5311 or consent of instructor. Numerical methods for beam on elastic foundation; piles and pile groups; laterally-loaded piers; slab on elastic foundation.
5326. **Analysis and Design of Earth Structures (3:3:0)**. Prerequisite: C E 5321 or consent of instructor. Principles of stability analysis and design as applied to earth dams, embankments, fills, cuts, and natural slopes; pore pressure considerations; initial and long-term stability.
5327. **Geotechnical Practice for Waste Disposal (3:3:0)**. Review of government regulations; risk assessment; site investigation techniques; design and installation of land fills; land treatment; toxic waste handling.
5329. **Advanced Design of Bridge Structures (3:3:0)**. Prerequisite: C E 4329 or consent of instructor. Advanced structural design of highway/railway/guideway bridges using the LRFD design method.
5331. **Advanced Work in Specific Fields (3)**. Nature of course depends on the student's interest and needs. May be repeated for credit.
5333. **Advanced Work in Water Resources (3)**. Individual studies in advanced water resources. May be repeated for credit.
5340. **Advanced Structural Analysis I (3:3:0)**. Prerequisite: Proficiency in basic structural analysis techniques and computer programming. Fundamentals and applications of modern methods of structural analyses using computers.
5341. **Wind Engineering Laboratory (3:2:3)**. Prerequisite: C E 5348. Introduction to instrumentation, design of experiments, data analysis, and interpretation for full and model scale wind engineering applications.
5342. **Advanced Design of Steel Structures (3:3:0)**. Prerequisite: C E 4342 or consent of instructor. Advanced design of structures, utilizing LRFD design concepts.
5343. **Advanced Reinforced Concrete Design (3:3:0)**. Prerequisite: C E 4343 or consent of instructor. Understanding advanced concrete design concepts and discussion of new concrete material technology.
5346. **Structural Dynamics I (3:3:0)**. Dynamic response of single and multidegree of freedom systems; modal analysis of lumped and continuous mass systems.
5347. **Structural Dynamics II (3:3:0)**. Prerequisite: C E 5346 or consent of instructor. Design consideration for structures subjected to time-varying forces including earthquake, wind, and blast loads.
5348. **Wind Engineering (3:3:0)**. Prerequisite: Consent of instructor. Understanding the nature of wind related to wind-structure interaction, and wind loads on structures. Design loads for extreme winds, tornadoes, and hurricanes.
5351. **Advanced Pavement Materials (3:3:0)**. Materials science, characterization, test methods, mix design, specifications and performance of pavement materials including aggregates, bituminous materials, and portland cement concrete.
5352. **Advanced Pavement Design (3:3:0)**. Analysis and design of flexible and rigid pavements; pavement type selection; loading; failure criteria and reliability; mechanistic pavement design; design exercises using existing methods.
5353. **Pavement Management Systems (3:3:0)**. Pavement distresses and evaluation, nondestructive testing, back-calculation of layer moduli, pavement performance models, pavement maintenance, rehabilitation, pavement management concepts, existing pavement management systems.
5360. **Open Channel Hydraulics (3:3:0)**. Channel geometry and parameters. Uniform and varied flow.

Graduate Courses

5101. **Civil Engineering Seminar (1:1:0)**. Individual study of engineering problems of special interest and value to the student.
5310. **Numerical Methods in Engineering (3:3:0)**. Prerequisite: MATH 3350 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; experimental and energy methods.
5313. **Theory of Elastic Stability (3:3:0)**. Theory of the conditions governing the stability of structural members and determination of critical loads for various types of members and structural systems.
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 analysis of shells; general theory of shells.
5316. **Theory of Elasticity (3:3:0)**. Analysis of stress and strain; equilibrium and compatibility equations; plane stress, plane strain, and axisymmetric problems; torsion of noncircular shafts; finite difference and finite element models; energy principles.
5318. **Finite Element Methods in Continuum Mechanics (3:3:0)**. Prerequisite: C E 5310 and 5311 or consent of instructor. Theory of the finite element method-constant strain elements; plane

- 5361. Surface Water Hydrology (3:3:0).** Advanced study of hydrologic cycle: hydrologic abstractions, surface-runoff mechanics, hydrographs, baseflow separation, data analysis, reservoir and channel routing, and an introduction to rainfall-runoff modeling.
- 5362. Surface Water Modeling (3:3:0).** Prerequisite: C E 5360 and consent of instructor. Theory and application of one-dimensional hydrodynamics models. Theory and application of watershed models.
- 5363. Groundwater Hydrology (3:3:0).** Prerequisite: Consent of instructor. Groundwater flow; well hydraulics, development, and management of groundwater resources; water quality; mathematical modeling with available software. Design of wells and well fields.
- 5364. Groundwater Transport Phenomena (3:3:0).** Prerequisite: Consent of instructor. Study of sources and fates of contamination in groundwater. Mathematical modeling of reactive and non-reactive pollutant movement. Aquifer restoration strategies.
- 5365. Storm Water Management and Erosion Control Theory (3:3:0).** Theory and concepts of soil erosion are studied to develop predictive models related to storm runoff, including development of plans to reduce damage from storm events.
- 5366. Water Resources Management (3:3:0).** Prerequisite: Consent of instructor. Models and other technical elements of water resources systems in context of the political, social, and other environments in which they exist.
- 5368. Surface Water Quality Modeling (3:3:0).** Contaminant transport and fate in surface water. Engineering methods assessing surface water and transport for water and sediment quality. Modeling dissolved oxygen, chemicals, water-borne substances.
- 5371. Advanced Geometric Design of Highways (3:3:0).** Prerequisite: Consent of instructor. Advanced study of geometric design of highways and streets, signage and marking of roadways. Advanced instruction in the application of computer software in highway design.
- 5372. Advanced Traffic Engineering I: Highway Capacity Analysis (3:3:0).** Prerequisite: C E 4361 or consent of instructor. Study of the concepts and methodologies for assessing the capacity and level of service of various surface transportation facilities.
- 5373. Advanced Traffic Engineering II: Traffic Flow Theory and Control (3:3:0).** Prerequisite: C E 5372. Fundamentals of macro and microscopic traffic flow characteristics, continuum flow models, control of signalized intersections, and traffic simulation.
- 5383. Bioremediation of Wastes in Soil Systems (3:3:0).** Factors impacting microbiological treatment of organic wastes in surface and subsurface soil environments will be examined for implications in system design and operation.

Graduate Program / Civil and Environmental Engineering

For master's and doctoral degrees in civil engineering, students may choose one or more of several areas of specialization including environmental engineering, water resources engineering, structural engineering, wind engineering, engineering mechanics, geoenvironmental engineering, geotechnical engineering, and highway engineering.

Students with a baccalaureate degree in engineering may enter the graduate program by having their entrance credentials evaluated by both the Graduate School and the department. For applicants with a baccalaureate degree in science or mathematics, certain leveling courses in engineering normally are required. Persons entering the graduate program in civil engineering should consult with a graduate advisor.

Two general plans of study are available for the Master of Science degree: a 30-hour plan that includes 6 hours credit for the master's thesis and a 36-hour plan that includes 3 hours credit for the master's report. The decision regarding which plan to follow is made jointly by the student and faculty advisor.

The master's degree in environmental engineering is an ABET accredited freshman-to-master's degree program specializing in environmental engineering. It is a design-oriented program that culminates in a comprehensive design problem rather than a research-oriented thesis.

Students in the master's program in environmental technology management may choose one or more of six areas of specialization: environmental technology management, land quality, water quality, hazardous and toxic waste, solid waste, and air quality. Course selection will be from several engineering and science disciplines. Certain leveling courses may be required for students entering the environmental technology and management program with a baccalaureate degree in science, mathematics, or technology. For acceptance into the degree program, students must have their entrance credentials evaluated by both the Graduate School and the department. The required undergraduate course prerequisites are MATH 1351, 2350, BIOL 1403, CHEM 1307 and 1107, 1308 and 1108, and ECO 2301 or their equivalents. In addition, students should have the computer skills necessary to do the analytical work required in the program.

Professors and instructors reserve the right to restrict the use and type of calculators used during class hours and tests.

Master of Environmental Engineering. The traditional path to becoming an environmental engineer involves completing the B.S.C.E. and M.S.C.E. (with environmental engineering specialization) degrees or B.S.Ch.E. and M.S.Ch.E. degrees. Although the traditional path produces graduates in high demand by employers, certain parts of the environmental engineering spectrum demand graduates with a more specialized degree program. The M.Env.E. program is a five-year "freshman-to-master's degree" program. The M.Env.E. program provides graduates with strong preparation in biology, chemistry, and environmental engineering. Students choosing the M.Env.E. degree are B.S.C.E. majors until formally admitted to the M.Env.E. program at the end of the second curriculum year. Students must pass the Graduate Record Examination and meet the university's graduate school admission requirements before enrolling in graduate level courses.

The original intentions of the curriculum and program standards may be stated as follows:

- The graduates of the M.Env.E. program will be prepared for environmental engineering practice through a curriculum that stresses design and application of engineering principles, rather than research.
- The inclusion of a broad background in biology, chemistry, and geology will make M.Env.E. graduates able to interact directly with environmental scientists in regulatory agencies, consulting firms, and industrial organizations.
- The M.Env.E. graduates will be attractive employees for petrochemical industries, as well as more traditional consulting and regulatory positions, through combining basic engineering principles with a strong environmental engineering foundation.

The Engineering Criteria 2000 established requirements for major focus areas and proficiencies to be included in an accredited program in environmental engineering. The major focus areas of water supply and resources, environmental systems modeling, environmental chemistry, wastewater management, solid waste management, hazardous waste management, air pollution control, and environmental health are included in specific advanced and graduate level courses within the curriculum. Further information about the curriculum and assessment procedures can be found at www.ce.ttu.edu.

5385. **Micro Applications in Environmental Engineering (3:3:0).** The course presents information regarding bacterial cell structure and microbial genetics: metabolism and the role of microbes in the design of treatment process; and water/wastewater reuse issues.
5390. **Water and Wastewater Analysis (3:1:6).** Prerequisite: Consent of instructor. Laboratory procedures for the physical, chemical, and biological examination of water, wastewater, and hazardous wastes. Interpretation of water quality data.
5391. **Advanced Water Treatment (3:3:0).** Water chemistry and microbiology; design procedures for municipal water treatment; advanced methods for quality control, renovation, and reuse.
5392. **Conventional Wastewater Treatment Systems (3:3:0).** Prerequisite: Consent of instructor. Municipal wastewater treatment methods, including suspended and attached growth biological systems, nitrification and denitrification, sludge stabilization, treated effluent, and sludge disposal.
5393. **Unit Processes Laboratory (3:0:9).** This course demonstrates fundamental equilibrium, kinetic and transport processes to describe basic environmental systems and processes, including design of an experiment relating to these concepts and analysis of data using appropriate models.
5394. **Natural Systems for Wastewater Treatment (3:3:0).** Examination of tertiary systems for municipal wastewater; natural systems (land application, wetlands, and aquaculture) and modular facilities incorporating unit operations, biological, and chemical processes.
5395. **Solid and Hazardous Waste Treatment (3:3:0).** Prerequisite: Consent of instructor. Treatment and disposal of municipal and industrial solid and hazardous wastes.
5396. **Environmental Impact Analysis (3:3:0).** Interdisciplinary approach to environmental analysis stemming from the National Environmental Policy Act; elements of impact-analysis and assessment methodologies.
5397. **Limnological Aspects of Environmental Engineering (3:2:3).** Study of the biological phenomena and physical, chemical interactions that occur in fresh and marine surface waters with emphasis on water pollution control including water quality hazard assessment techniques.



5398. **Risk Management and Public Policy (3:3:0).** Methods and principles of risk assessment will be examined. Incorporation of these findings into practical risk management programs meeting current policy requirements will be discussed.
6000. **Master's Thesis (V1-6).**
6330. **Master's Report (3).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Environmental Engineering (ENVE)

Undergraduate Courses

1100. **Environmental Engineering Seminar (1:0:2).** Introduction of first year and transfer students to the practice of environmental engineering.
4307. **Physical and Chemical Municipal Wastewater Treatment (3:3:0).** Prerequisite: C E 3309 and consent of instructor. Characterization of municipal wastewaters and the application of physical and chemical design procedures to remove and dispose of criteria pollutants in wastewater.
4311. **Environmental Systems Models (3:2:3).** Prerequisite: MATH 3350. Application of various computer models used in the analysis and solution of environmental engineering problems involving air, water, and solid and hazardous wastes.
4385. **Microbial Applications in Environmental Engineering (3:3:0).** Presents information regarding bacterial cell structure and microbial genetics, metabolism and the role of microbes in the design of treatment processes and water/wastewater reuse issues.
4390. **Water and Wastewater Analysis (3:1:6).** Prerequisite: Junior or senior standing; consent of instructor. Laboratory procedures for the physical, chemical, and biological examination of water, wastewater, and hazardous wastes. Interpretation of water quality data.
4391. **Advanced Water Treatment (3:3:0).** Prerequisite: Consent of instructor. Water chemistry and microbiology; design procedures for municipal water treatment; advanced methods of quality control, renovation, and reuse.
4399. **Biological Municipal Wastewater Treatment (3:3:0).** Prerequisite: ENVE 4307, C E 3309 or consent of instructor. Municipal wastewater treatment methods, including suspended and attached growth biological systems, nitrification, denitrification, phosphorous removal, sludge stabilization, and treated effluent and sludge disposal.

Graduate Courses

5303. **Design of Air Pollution Control Systems (3:3:0).** Engineering analysis procedures techniques for the selection, application, and operation of air pollution control methods in various operational situations.
- 5305, 5306. **Environmental Systems Design I, II (3:2:3 each).** Student teams evaluate a waste problem, select and develop a treatment alternative in a feasibility study, and then finalize their design selections in technical memorandums.
5307. **Advanced Physical and Chemical Municipal Wastewater Treatment (3:3:0).** Characterization of municipal wastewaters and the application of physical and chemical design procedures to remove and dispose of criteria pollutants in wastewater.
5310. **Principles of Environmental Technology and Management (3:3:0).** The magnitude and impacts of the different waste streams produced by man and his activities on the various components of the environment will be examined.
5311. **Environmental Systems Models and Information Reporting (3:3:0).** Research report will be prepared on the modeling of an environmental system of process. Course stresses the research report as well as modeling techniques.
5399. **Biological Municipal Wastewater Treatment (3:3:0).** Municipal wastewater treatment methods, including suspended and attached growth biological systems, nitrification, denitrification, phosphorous removal, sludge stabilization, and treated effluent and sludge disposal.

Department of Computer Science

Faculty

Noe Lopez-Benitez, Ph.D., Interim Chairperson

Professors: Cooke, Gelfond, Hewett, Marcy, Sobolewski
Associate Professors: Desrosiers, Lakhani, Lopez-Benitez, Mengel, Pyeatt, Sinzinger, Temkin, Richard Watson, Yu Zhuang
Assistant Professors: Andersen, Rushton, Shin, Youn, Yuan-Li Zhang
Instructors: Balduccini, Watson
Lecturer: Paniagua

About the Program

The Computer Science department offers the following degree programs:

- Bachelor of Science in Computer Science
- Master of Science in Computer Science
- Master of Science in Software Engineering
- Doctor of Philosophy in Computer Science

The computer science curriculum places a strong emphasis on writing, communications, professional skills, and ethical concerns. The objectives of our programs are to give students a broad-based understanding of the computing discipline and to prepare them for a productive professional career and/or for pursuing advanced degrees in the field. Students are expected to be involved in an exciting learning experience involving both course and lab work to develop problem-solving skills and logical reasoning that can be successfully applied to areas of computer science that involve computational theory, intelligent systems design, and applications.

At the completion of an undergraduate degree, computer science graduates should be familiar with the mathematical foundations of computation, have the ability to apply design techniques and programming practices in the solution of challenging problems, have an understanding of how computer science theory relates to the fundamental workings of contemporary computing, and have a breadth of knowledge in the theory and practice of computer science.

At the completion of a graduate degree, computer science graduates also should have the ability to work in multidisciplinary environments with cross-functional teams, perform modeling and experimental analysis on challenging research problems, and investigate current advances in computing research for the purpose of making innovative contributions that are particularly expected at the Ph.D. level.

Undergraduate Program

All students entering the computer science degree program are expected to follow the sequence of courses shown in the curriculum table in this section and must satisfy the requirements of the Dynamic Enrollment Management Plan (DEMP) for computer science and the College of Engineering. DEMP details are available from the department. Students demonstrating satisfactory performance may deviate from the specified sequence of courses only with the express approval of a computer science undergraduate advisor and only when such deviation is required to obtain a normal load of coursework for the student. Students may take a course no more than three times unless they have written permission from the computer science chairperson.

Computer science majors are not required to have a minor field. However, many students choose to pursue a minor. Minors can be pursued in virtually any field of study offered at Texas Tech. The minor must consist of a minimum of 18 hours, with at least six of those hours at the 3000 or 4000 level. A minor may require additional hours of study, depending on the particular minor field.

Minors in Computer Science. A minor in computer science consists of C S 1411, 1412, 2413 and three of the following courses: C S 1382, 3361, 3364, 3383.

Dual Degrees. Computer science is part of three dual-degree programs in which Bachelor of Science degrees can be earned in both computer science and another field. The electrical engineering and computer science (EECS) and chemical engineering and computer science (CHCS) dual-degree curriculum tables can be found under the listings for electrical engineering and chemical engineering, respectively. The mathematics and computer science (MACS) dual-degree curriculum table is listed on the following pages; this degree is administered through the College of Arts and Sciences and follows all requirements mandated for the Bachelor of Science degrees for both the College of Engineering and the College of Arts and Sciences. EECS and CHCS students are advised through the Departments of Electrical Engineering and Chemical Engineering, respectively; MACS students can choose to be advised in either Mathematics or Computer Science.

Combined Bachelor's and Master's Programs. The department offers two combined Bachelor of Science and Master of Science curricula. In both cases, completion of the degree requirements leads to the awarding of two degrees. In one curriculum, the degrees awarded are the Bachelor of Science in Computer Science and the Master of Science in Computer Science; in the other, the degrees are the Bachelor of Science in Computer Science and the Master of Science in Software Engineering. Students choosing the combined degree program would be initially admitted as pursuing a Bachelor of Science in Computer Science. The graduate component of the program would be added upon admission to the Master's degree by the Graduate School during the student's third year of study. Students must meet the university requirement to take the Graduate Record Examination as well as other graduate admission requirements of the department before enrolling in graduate-level courses.

Computer Science (C S)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1300. [COSC 1300] **Computers and Modern Society (3:2:2).** Survey of computers, their uses, and their impact on society. Brief introduction to computer programming and the use of word processor, spreadsheet, and data base application software. Credit may not be applied toward a computer science major or minor.
1303. **Programming Language Proficiency in C/C++ (3:2:2).** Prerequisite: MATH 1320 and computer literacy. The course will focus on basic programming skills in the C/C++ language. This course cannot be used for a C S major or minor.
1305. [COSC 1301, 1401] **Introduction to Computer Science (3:3:0).** An introduction to the field of computer science for majors. Computer ethics issues facing computer science professionals are addressed. Students will also learn concepts of computer programming with an emphasis on problem solving, critical thinking, logical reasoning, design and implementation techniques.
1382. **Discrete Computational Structures (3:3:0).** Prerequisite: C S 1411. Sets, functions, counting principles, basic probability, logic, proof methods, and graphs.
1411. [COSC 1436] **Programming Principles I (4:3:3).** Prerequisite: Department approval. Procedural programming. Discipline of computer science; analysis, design, implementation, debugging, and testing of software. Introduction to field for majors.
1412. [COSC 1437] **Programming Principles II (4:3:3).** Prerequisite: C S 1411. Object-oriented programming with emphasis on evaluation of alternative program design strategies. Class design, recursion, linked, and dynamically allocated structures.
2350. [COSC 1319, 2319, 2325, 2419, 2425] **Computer Organization and Assembly Language Programming (3:3:0).** Prerequisite: C S 1412, E E 2372. Introduction to the organization of single-processor computer systems via Assembly Language. Topics addressed include basic concepts of computer architecture and organization, assembly programming, interfacing

- assembly with High Level Languages, sub-procedures and macros, I/O devices, interrupts, and multitasking issues.
- 2371. Introduction to Digital Design (3:3:0).** Prerequisite: PHYS 2301. Logic and computer design fundamentals, including design of combinational and sequential logic circuits, memory systems, I/O devices, and register transfer logic.
- 2413. [COSC 2315, 2436] Data Structures (4:3:3).** Prerequisite: C S 1412. Comparative study of the interaction of data and procedural abstractions. Data structures, lists, stacks, queues, trees, graphs. Algorithms: searching, sorting, parsing, hashing, graph traversals.
- 3352. Introduction to Systems Programming (3:3:0).** Prerequisite: C S 2350, C S 2413. Introduction to system software including assemblers, linkers, loaders, and compilers. Other topics addressed include design of utility and networking software, shell programming, and script languages.
- 3361. Concepts of Programming Languages (3:3:0).** Prerequisite: C S 2413. Study of programming language design. The investigation and comparison of different programming language paradigms.
- 3364. Design and Analysis of Algorithms (3:3:0).** Prerequisite: C S 1382, 2413, and MATH 2360. A theoretical course focusing on the design and analysis of computer algorithms.
- 3365. Software Engineering (3:3:0).** Prerequisite: C S 2413, MATH 3342, or equivalent. Introduces theory and practice for software engineering. Topics include software life cycle, requirements, specification and analysis, software architecture and detailed design, implementation, and testing.

Curriculum for Computer Science

FIRST YEAR			
Fall		Spring	
C S 1411, Programming Princ. I	4	C S 1412, Programming Princ. II	4
ENGL 1301, Ess. Coll. Rhetoric	3	C S 1382, Discrete Structures	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, Amer. Gov., Org.	3	ENGL 1302, Adv. Coll. Rhetoric	3
Elective (Core Curr.)*	3	Elective (Core Curr.)*	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
C S 2413, Data Structures	4	C S 2350, Comp. Org. & Assy. L.	3
PHYS 1408, Princ. of Physics I	4	PHYS 2401, Princ. Phys. II	4
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
E E 2372, Modern Dig. Sys. Design	3	ENGL 2311, Technical Writing	3
Elective (Core Curr.)*	3	CHEM 1307 & 1107, Princ. Chem. I	4
TOTAL	17	or BIOL 1403, Biology I	4
		TOTAL	17
THIRD YEAR			
Fall		Spring	
MATH 3342, Stat. Eng. & Sci.	3	C S 3352, Intro. Sys. Prog.	3
C S 3361, Concepts. Prog. Lang.	3	Elective (C S 3000-level)	3
C S 3364, Des. & Anal. Alg.	3	C S 3375, Comp. Arch.	3
C S 3383, Theory of Automata	3	C S 3365, Software Engineering	3
COMS 3358, Bus. & Prof. Comm.	3	Elective (Core Curr.)*	3
or PETR 3308, Engr. Comm.		TOTAL	15
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Elective (Core Curr.)*	3	C S 4311, Sr. Proj. Des.	3
Elective (C S)**	3	Elective (C S)**	3
Elective (C S)**	3	C S 4352, Oper. Sys.	3
Elective (C S)**	3	Elective (Core Curr.)*	3
C S 4354, Con. Database Sys.	3	TOTAL	12
TOTAL	15	TOTAL	12

Minimum hours for graduation—123

* Courses needed to fulfill the university Core Curriculum requirements, including 3 additional hours of political science, 6 hours of U.S. History, 3 hours of humanities, 3 hours of visual and performing arts, and 3 hours of individual or group behavior electives. The 3-hour multicultural requirement must also be satisfied. For details, consult the Core Curriculum requirements.

** Computer Science electives: choose from any 3000- or 4000-level computer science courses that are not required for the C S major.

- 3368. Introduction to Artificial Intelligence (3:3:0).** Prerequisite: C S 1382. This course provides introduction to theory, design, and implementation of intelligent systems.
- 3371. Embedded Systems Design (3:3:0).** Prerequisite: C S 2350. Design of special purpose embedded processor-based systems. Evaluation of software and hardware trade-offs for cost effective solutions.
- 3375. Computer Architecture (3:3:0).** Prerequisite: C S 2350. Introduction to the functional components of computer systems; their hardware implementation and management at different levels; their interaction, characteristics, and performance as well as their practical implications for computer programming.
- 3383. Theory of Automata (3:3:0).** Prerequisite: C S 1382. The relationship between language, grammars, and automata.

Curriculum for Combined B.S. in Computer Science and M.S. in Software Engineering

FIRST YEAR			
Fall		Spring	
C S 1411, Programming Princ. I	4	C S 1412, Programming Princ. II	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, Amer. Gov. Org.	3	C S 1382, Discrete Structures	3
Elective (Core Curr.)*	3	Elective (Core Curr.)*	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
C S 2413, Data Structures	4	C S 2350, Comp. Org. & Assy. L.	3
PHYS 1408, Princ. of Physics I	4	PHYS 2401, Princ. Phys. II	4
E E 2372, Modern Dig. Sys. Design	3	ENGL 2311, Technical Writing	3
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
Elective (Core Curr.)*	3	CHEM 1307 & 1107, Princ. Chem. I	4
TOTAL	17	or BIOL 1403, Biology I	4
		TOTAL	17
THIRD YEAR			
Fall		Spring	
MATH 3342, Stat. Eng. & Sci.	3	C S 3352, Intro. Sys. Prog.	3
C S 3361, Concepts. Prog. Lang.	3	Elective (C S 3000-level)	3
C S 3364, Des. & Anal. Alg.	3	C S 3375, Comp. Arch.	3
C S 3383, Theory of Automata	3	C S 3365, Software Engineering	3
COMS 3358, Bus. & Prof. Comm.	3	Elective (Core Curr.)*	3
or PETR 3308, Engr. Comm.		TOTAL	15
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
C S 5373, Soft. Mod. and Arch.	3	C S 5374, Soft. Ver. and Val.	3
Elective (C S)**	6	C S 4311, Sr. Proj. Design	3
C S 4354, Con. Database Sys.	3	C S 4352, Oper. Sys.	3
EElective (Core Curr.)*	3	Elective (Core Curr.)*	3
TOTAL	15	Elective (C S)**	3
		TOTAL	15
FIFTH YEAR			
Fall		Spring	
Elective (S E)†	3	C S 5363, Soft. Proj. Mgt.	3
Elective (S E)†	3	Elective (S E)†	6
Elective (S E)†	3	C S 6000, Master's Thesis^	3
C S 6000, Master's Thesis^	3	TOTAL	12
TOTAL	12	TOTAL	12

Minimum hours for graduation—150

* Courses needed to fulfill the university Core Curriculum requirements, including 3 additional hours of political science, 6 hours of U.S. History, 3 hours of humanities, 3 hours of visual and performing arts, and 3 hours of individual or group behavior electives. The 3-hour multicultural requirement must also be satisfied. For details consult the Core Curriculum requirements.

** Computer Science electives: Choose from any 3000 or 4000 level computer science courses that are not required for the C S major.

† Software Engineering Graduate Elective Courses: To be determined in consultation with a thesis or departmental graduate advisor.

^ Master's Thesis: The 6 hours for C S 6000 shown here are only a minimum number; some thesis projects due to their nature may require an earlier start and/or take longer to complete. Also, if pursuing a nonthesis option, substitute 12 additional hours of graduate elective courses to be determined in consultation with a computer science graduate advisor for the 6 hours of C S 6000. Nonthesis students must also pass the departmental Master's Comprehensive Examination.

Deterministic and nondeterministic machines. Pushdown automata and Turing machines. Limits of computability.

- 4000. Special Topics in Computer Science (V1-6).** Prerequisite: Advanced standing and departmental approval. Individual studies in computer science areas of special areas. May be repeated for credit.
- 4311. Senior Project Design (3:3:0).** Prerequisite: C S 3365, 3364, COMS 3358 or PETR 3308, and 12 additional hours of upper-division computer science coursework and senior standing. For majors only. This is a project-oriented course intended not only to consolidate most theoretical aspects of software engineering, but also to emphasize team work and foster communication

skills. Projects are formulated, formally proposed, designed, implemented, tested, documented, and demonstrated.

- 4312. Senior Project Implementation Laboratory (3:0:9).** Prerequisite: C S 4311. Students will complete the projects begun in C S 4311. Acceptance testing of projects will be performed by the customer. Formal project presentations will be made upon completion. (Writing Intensive)
- 4328. Scientific Computing (3:3:0).** Prerequisite: C S 3375 and MATH 2350. Numerical techniques for interpolation, integration, and the solution of systems of algebraic and differential equations with special emphasis on hardware limitations.
- 4352. Operating Systems (3:3:0).** Prerequisite: C S 3352, C S 3364. Concepts and design of different components of operating systems.

Dual-Degree Curriculum: Math-Computer Science

FIRST YEAR			
Fall		Spring	
C S 1411, Programming Princ. I	4	C S 1412, Programming Princ. II	4
ENGL 1301, Ess. Coll. Rhetoric	3	C S 1382, Disc. Struct.	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, Amer. Govt., Org.	3	ENGL 1302, Adv. Coll. Rhetoric	3
Elective (Core Curr.)**	3	Personal Fitness and Wellness*	2
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
C S 2413, Data Structures	3	C S 2350, Comp. Org. Assy. L.	3
E E 2372, Modern Dig. Sys.	3	PHYS 2401, Princ. of Phys. II	4
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
PHYS 1408, Princ. Physics I	4	CHEM 1307, 1107, Princ. Chem. I	4
Elective (Core Curr.)**	3	or BIOL 1403, Biology I	
TOTAL	16	ENGL 2311, Technical Writing	3
		TOTAL	17
THIRD YEAR			
Fall		Spring	
C S 3383, Theory of Automata	3	C S 3375, Computer Architecture.	3
C S 3361, Concepts. Prog. Lang.	3	MATH 3360, Found. of Algebra I	3
MATH 3354, Diff. Equations I	3	Foreign Language Elective***	5
Foreign Language Elective***	5	Elective (Core Curriculum)**	3
C S 3364, Des. & Anal. Alg.	3	COMS 3358, Bus. & Prof. Com.	3
TOTAL	17	or PETR 3308, Engr. Comm.	
		TOTAL	17
FOURTH YEAR			
Fall		Spring	
C S 4354, Con. Database Sys.	3	C S 3352, Intro. Sys. Prog.	3
MATH 3430, Comp. Tech. Sci.	4	C S 3365, Software Engineering	3
MATH 4342, Math. Stat.	3	MATH 4310, Intro. Num. Anal I	3
Foreign Language Elective***	3	MATH 4343, Math. Stat.†	3
Elective (Core Curr.)**	3	Foreign Language Elective***	3
TOTAL	16	TOTAL	15
FIFTH YEAR			
Fall		Spring	
Elective (C S)††	3	C S 4311, Sr. Proj. Design	3
Elective (C S)††	3	C S 4352, Operating Systems	3
MATH 4350, Adv. Calculus	3	MATH 4312, Intro. Num. Anal. II†	3
MATH 4354, Diff. Equations II	3	Elective (Core Curr.)**	6
Elective (Core Curr.)**	3	TOTAL	15
TOTAL	15		

Minimum hours for graduation—159

- * Choose from Personal Fitness and Wellness requirements for the College of Arts and Sciences.
- ** Courses needed to fulfill the College of Arts and Sciences and the university Core Curriculum requirements, including 3 additional hours of political science, 6 hours of U.S. History, 3 hours of English literature, 3 hours of visual and performing arts, and 3 hours of individual or group behavior electives. The 3-hour multicultural requirement must also be satisfied. For details consult the Core Curriculum requirements and the College of Arts and Sciences General Degree requirements for a Bachelor of Science.
- *** Refer to the General Degree requirements for the College of Arts and Sciences.
- † MATH 4312 and 4343 are both recommended but a mathematics elective course can be substituted with approval of an advisor in the Department of Mathematics.
- †† Computer Science electives: choose from any 3000 or 4000 level computer science courses that are not required for the MACS major.

Curriculum for Combined Bachelor of Science and Master of Science in Computer Science

FIRST YEAR			
Fall		Spring	
C S 1411, Programming Princ. I	4	C S 1412, Programming Princ. II	4
ENGL 1301, Ess. Coll. Rhetoric	3	C S 1382, Disc. Struct.	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, Amer. Gov., Org.	3	ENGL 1302, Adv. Coll. Rhetoric	3
Elective (Core Curr.)**	3	Elective (Core Curr.)**	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
C S 2413, Data Structures	4	C S 2350, Comp. Org. & Assy. L.	3
PHYS 1408, Princ. of Physics I	4	PHYS 2401, Princ. Phys. II	4
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
E E 2372, Modern Dig. Sys. Design	3	ENGL 2311, Technical Writing	3
Elective (Core Curr.)**	3	CHEM 1307 & 1107, Princ. Chem. I	4
TOTAL	17	or BIOL 1403, Biology I	
		TOTAL	17
THIRD YEAR			
Fall		Spring	
MATH 3342, Stat. Eng. & Sci.	3	C S 3352, Intro. Sys. Prog.	3
C S 3361, Concepts. Prog. Lang.	3	Elective (C S 3000-level)	3
C S 3364, Des. & Anal. Alg.	3	C S 3375, Comp. Arch.	3
C S 3383, Theory of Automata	3	C S 3365, Software Engineering	3
COMS 3358, Bus. & Prof. Comm.	3	Elective (Core Curr.)*	3
or PETR 3308, Engr. Comm.		TOTAL	15
TOTAL	15		
FOURTH YEAR			
Fall		Spring	
Elective (Core Curr.)*	3	C S 4311, Sr. Proj. Design	3
Elective (C S)**	3	Elective (C S)**	3
Elective (C S)**	3	C S 4352, Oper. Sys.	3
C S 4354, Conc. Database Sys.	3	Elective (Core Curr.)*	3
Graduate Core Course†	3	Graduate Core Course†	3
TOTAL	15	TOTAL	15
FIFTH YEAR			
Fall		Spring	
Graduate Core Course†	3	Graduate Core Course†	3
Graduate Elective Course††	6	Graduate Elective Course††	6
C S 6000, Master's Thesis^	3	C S 6000, Master's Thesis^	3
TOTAL	12	TOTAL	12

Minimum hours for graduation—150

- * Courses needed to fulfill the university Core Curriculum requirements, including 3 additional hours of political science, 6 hours of U.S. History, 3 hours of humanities, 3 hours of visual and performing arts, and 3 hours of individual or group behavior electives. The 3-hour multicultural requirement must also be satisfied. For details consult the Core Curriculum requirements.
- ** Computer Science electives: Choose from any 3000- or 4000-level computer science courses that are not required for the C S major.
- † Graduate Core Courses: Select two from C S 5381, 5383, 5384, and two from C S 5352, 5375, 5368.
- †† Graduate Elective Courses: To be determined in consultation with a thesis or departmental graduate advisor.
- ^ Master's Thesis: The 6 hours for C S 6000 shown here are only a minimum number; some thesis projects due to their nature may require an earlier start and/or take longer to complete. Also, if pursuing a nonthesis option, substitute 12 additional hours of graduate elective courses to be determined in consultation with a computer science graduate advisor for the 6 hours of C S 6000. Nonthesis students must also pass the departmental Master's Comprehensive Examination.

Graduate Program / Computer Science

The Department of Computer Sciences offers a number of graduate programs ranging from a Certificate in Software Engineering to a Doctorate of Philosophy. The department has an excellent graduate faculty with research specialities in a variety of areas, including programming language design, logic programming, artificial intelligence, distributed computing, software engineering, computer graphics, data mining, robotics, bioinformatics, and image compression. Further information is provided below and students also should refer to the Graduate School section of the catalog and general rules/regulations for graduate degrees.

Students who do not have a background in computer science are required to take a short series of courses to provide the necessary background knowledge for graduate study in computer science. These courses are required for leveling only; they cannot be counted in satisfying the required hours for graduation. Students in other departments at Texas Tech who wish to transfer to computer science must first complete all leveling courses or show that they have taken the equivalent courses at another university before their application will be considered.

Certificate in Software Engineering

The Certificate in Software Engineering is intended for those who do not need or wish to have a full graduate degree in software engineering or computer science. In particular, the certificate is directed towards working professionals and graduate students in non-computer science majors who are interested in systematic software development. In addition to any leveling requirements, coursework for the certificate requires 12 hours consisting of C S 5373 and 5374 plus two courses from the following list: C S 5332, 5355, 5363, 5377, 5379, 5380, and I E 5320.

Master's Degree

Two general plans are available for the Master of Science degree: a 30-hour plan that includes 6 hours credit for the master's thesis and a 36-hour plan that is based solely on coursework and a comprehensive exam. Students who wish to use the 36-hour

plan must obtain approval from the departmental graduate advisor within their first semester of study.

The degree plan for students pursuing a Master of Science in Computer Science must include two theory courses (C S 5381, 5383, 5384) and two systems courses (C S 5352, 5375, 5368). Students choosing the 30-hour thesis plan must apply 6 hours of C S 6000 and may apply 3 hours of C S 7000 credit toward their degree. Students choosing the 36-hour nonthesis option may not use C S 6000 or 7000 for credit towards their degree. Aside from these requirements and limitations, master's students may use any graduate-level computer science course for credit towards their degree except C S 5301, 5302, and 5303.

The degree plan for students pursuing a Master of Science in Software Engineering (M.S.S.E.) must include C S 5363, 5373, and 5374 as well as elective courses (chosen from C S 5332, 5355, 5377, 5379, 5380, I E 5320, and S E electives) and C S electives (C S graduate courses). Students choosing the 30-hour thesis option must take 6 hours of C S 6000 as well as three elective courses from the S E electives (one course may be substituted with C S 7000) and two courses from C S electives. Students choosing the 36-hour nonthesis option may not use C S 6000 or 7000 towards their degree and must take five elective courses from the S E electives and four courses from the C S electives. The M.S.S.E. thesis option is not available for distance education students.

Doctoral Program

For the Ph.D. degree, students are required to demonstrate general knowledge in several areas of computer science and proficiency in a single research area. Certification of research proficiency will be based on a record of accomplished research. The record must be substantiated by published articles, technical reports, and papers presented at meetings, workshops, and conferences. The Ph.D. degree requires a minimum of 60 hours of graduate work, not counting dissertation and candidacy exam. If a student has a prior master's degree in computer science from another institution, up to 30 hours of coursework may be transferred towards the degree requirements.

Topics addressed include process management, scheduling and resource management, file systems, I/O, and security issues.

4354. **Concepts of Database Systems (3:3:0)**. Prerequisite: C S 3364. Overview of a database system and its components; physical organization of data; data models; relational databases; and query processing.
4379. **Parallel and Concurrent Programming (3:3:0)**. Prerequisite: C S 3352, C S 3364. Introduction to multi-threaded programming, data parallelisms, and message passing techniques. Topics include concurrent and parallel execution environments, user-programmed parallelism, and compiler-based parallelism. Applications addressed involve numerical algorithms familiar to senior-level students.
4391. **Special Topics in AI (3:3:0)**. Prerequisite: Senior standing. In-depth treatment of one or more topics in artificial intelligence. Such topics include robotics, knowledge representation, or automated reasoning.
4392. **Computer Networks (3:3:0)**. Prerequisite: C S 3352. Digital transmission fundamentals, local area networks, network protocols, and common Internet applications.
4395. **Introduction to Computer Graphics (3:3:0)**. Prerequisite: C S 3364. Focus on basic principles and methods for designing, implementing, and applying graphics packages. Methods for manipulating and displaying two- and three-dimensional objects.
4397. **Computer Game Design and Development (3:3:0)**. Prerequisite: C S 3364. Underlying science, technology, and art or computer games. Specific topics include design planning, interactive graphics, autonomous agents, multi-user interaction, and game engine construction.

Graduate Courses

5000. **Practicum of Computing (VI-3)**. Industrial training in an approved field of graduate studies. Can be used only as an additional requirement on degree program.
- 5301, 5302. **Foundations of Computer Science I, II (3:3:0 each)**. Prerequisite: Programming proficiency. An accelerated survey of computer science. Computer organization, high level and assembler languages, job control, software design, data structures, file organization, machines, and formal languages. These courses are for leveling purposes and cannot be applied towards course requirements of any C S graduate degree.
5303. **Foundations of Computer Engineering (3:3:0)**. An accelerated introduction to the fundamentals of computer engineering for students without a computer hardware background. Boolean algebra, digital logic, digital devices and functions, digital system design, computer architecture. These courses are for leveling purposes and cannot be applied towards course requirements of any C S graduate degree.
5320. **Principles of Computer Graphics (3:3:0)**. Techniques and methods for creating realistic images using graphic programming languages. Topics include visible surface determination rendering, surface modeling, and particle systems.
5321. **Virtual Reality Fundamentals (3:3:0)**. The course will cover fundamental principles of virtual reality and development of future virtual reality applications.
5323. **Computer Haptics (3:3:0)**. This course will provide a unified and complete background for the novel force-tactile feedback technology and its use in virtual reality simulations.

- 5328. Scientific Computing (3:3:0).** This course provides an overview of numerical methods that are essential to computing. Topics include matrix computations, statistical methods, numerical integration, and multiresolution methods.
- 5331. Special Problems in Computer Science (3).** Individual studies in advanced computer science and technology.
- 5332. Special Topics in Software Engineering (3:3:0).** Prerequisite: Consent of instructor. Studies in advanced software engineering.
- 5341. Pattern Recognition (3:3:0).** Traditional and current approaches to the general problem of recognizing patterns in images, signals, and other domains. Includes Bayes decision theory, supervised learning, and nonparametric techniques.
- 5352. Advanced Operating Systems Design (3:3:0).** Prerequisite: C S 3352 and 3364, equivalent, or consent of instructor. Topics on distributed operating systems, such as synchronization, communication, file systems, and memory sharing are discussed. Several programming projects are implemented.
- 5353. Compiler Construction (3:3:0).** Prerequisite: C S 3364, equivalent, or instructor consent. Implementation aspects of compiler construction, automata for formal grammar, semantics of procedural languages, automatic generation of parser, and assembly code generation. A prototype of a compiler is developed.
- 5355. Real Time and Time Sharing Systems (3:3:0).** Prerequisite: C S 3365, 3352, equivalent, or consent of instructor. Study of the functional needs in real time and time sharing systems. Basic techniques and display concepts, random-access fields, computer networks, simultaneous operations, multiprogramming, and multiprocessing.
- 5356. Advanced Database Management Systems (3:3:0).** Prerequisite: C S 3364, equivalent, or consent of instructor. Systems aspects of relational databases are emphasized. Topics include relational database design, index and access structures implementation and performance evaluation, query processing and optimization, transaction management, and concurrency control.
- 5357. Multimedia Systems (3:3:0).** Prerequisite: C S 3364, equivalent or consent of instructor. Multimedia digital audio processing; image and video data compression; and processing for multimedia presentations. Time-based media representation and synchronization; multimedia communication systems; and hypertext and programming.
- 5358. Software Studio I (3:3:0).** Prerequisite: C S 3365, equivalent, or consent of instructor. Capstone design and implementation experience of a major software project applying comprehensive software engineering techniques.
- 5359. Software Studio II (3:3:0).** Prerequisite: C S 5358. A continuation of software engineering projects begun in C S 5358.
- 5361. Theory of Computing Languages (3:3:0).** General language theory with emphasis on computing languages. Chomsky typology, syntactical and semantic specifications. Current research on translation of natural language instructions to machine instructions.
- 5363. Software Project Management (3:3:0).** Prerequisite: C S 3365, equivalent, or consent of instructor. Explores the principles of software project management and their effective application. Topics include project, risk, process, and resource management and improvement techniques.
- 5365. Principles of Multiple-Processor Systems (3:3:0).** Prerequisite: C S 3375, equivalent, or consent of instructor. Comprehensive introduction to the field of parallel and distributed computing systems. Algorithms, architectures, networks, systems. Theory and applications.
- 5368. Intelligent Systems (3:3:0).** Prerequisite: C S 3364 or consent of instructor. Comprehensive introduction to the field of artificially intelligent computer based systems. Theory and applications in artificial intelligence.
- 5369. Web-Based Software Systems (3:3:0).** Prerequisite: C S 3365, equivalent, or consent of instructor. In-depth study of how to engineer Web-based software systems. Topics include process, development, testing, and performance issues.
- 5373. Software Modeling and Architecture (3:3:0).** This course introduces the theory and practice for software development and covers software requirements, analysis, software architecture and detailed design.
- 5374. Software Verification and Validation (3:3:0).** This course introduces how to implement effective test and measurement programs as well as how to apply this knowledge to the production of low-defect software.
- 5375. Computer Systems Organization and Architecture (3:3:0).** Prerequisite: C S 3375 or consent of instructor. Introduction to the architecture, organization, and design of computer systems. Topics include processor, control and memory design, computer arithmetic, I/O, and a brief introduction to multiprocessors.
- 5376. Communication Networks (3:3:0).** Networks in the context of parallel and distributed systems. Information theory applied to networks. Network topology. Problems and approaches in design, development, and management of communications networks.
- 5377. Distributed Computing (3:3:0).** Prerequisite: C S 4352, equivalent, or consent of instructor. Introduction to distributed systems. Topics include communications, distributed operating systems, fault-tolerance, and performance issues. Case studies and term projects supplement this course.
- 5379. Parallel Processing (3:3:0).** Prerequisite: C S 3364 and 3375 or consent of instructor. Introduction to parallel processing in theory, performance evaluation of parallel machine-algorithm ensemble, parallelization techniques of sequential codes, parallel algorithm design, and parallel API.
- 5380. Fault-Tolerant Computer Systems (3:3:0).** Prerequisite: C S 3375 and I E 3341, equivalent, or consent of instructor. Introductory course to methodologies for specifying, designing, and modeling fault-tolerant computer systems. Includes fault classification, design techniques for fault detection and recovery, and reliability modeling techniques.
- 5381. Analysis of Algorithms (3:3:0).** Prerequisite: C S 3364 or equivalent. Theoretical analysis of algorithms for sorting, searching, sets, matrices, etc.; designing efficient algorithms for data structures, recursion, divide-and-conquer, dynamic programming; nondeterminism, NP-completeness and approximation algorithms.
- 5383. Theory of Automata (3:3:0).** Prerequisite: C S 3383, equivalent, or consent of instructor. Structured grammars, relation between grammars and automata, deterministic, and nondeterministic finite automata, push-down store, and linear-bounded automata, and Turing machines.
- 5384. Logic for Computer Scientists (3:3:0).** An introduction to mathematical logic. The course includes proofs of several basic theorems and discusses the application of logic to different areas of computer science.
- 5388. Neural Networks (3:3:0).** Neural network theory, models, and implementation. Applications to real-time systems, robotics, pattern recognition, computer vision, and event driven systems.
- 5391. A I Robotics (3:3:0).** Programming of artificially intelligent robots. Topics include sensing, navigation, path planning, and navigating with uncertainty.
- 5392. Reinforcement Learning (3:3:0).** Introduction to reinforcement learning and Markov decision processes and their applications for making optimal decisions.
- 6000. Master's Thesis (V1-6).**
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**



Department of Electrical and Computer Engineering

Faculty

Jon G. Bredeson, Ph.D., Chairperson

Horn Professors: Kristiansen, Mitra, and Temkin

Professors: Bredeson, Chao, Gale, Giesselmann, Krompholz, Parten, Trost

Associate Professors: Baker, Dallas, Dickens, Karp, Mankowski, Neuber, Nikishin, Nutter, Saed, Sari-Sarraf, Zieher

Assistant Professors: Bernussi

Research Professor: Cox

Adjunct Faculty: Ishihara, Lu, Storrs, Woolverton

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Electrical Engineering
- Bachelor of Science in Computer Engineering
- Master of Science in Electrical Engineering
- Doctor of Philosophy in Electrical Engineering

Mission. The mission of Texas Tech University is to provide the highest standard of excellence in higher education while pursuing continuous quality improvement, stimulating the greatest degree of meaningful research, and supporting faculty and staff in satisfying those we serve. The Department of Electrical and Computer Engineering supports the mission of the university through its undergraduate programs by providing students with appropriate curricula and educational experiences. The curricula remain current through continuing assessment by employers, alumni, faculty, and students. Students obtain a broad education necessary to understand the impact of electrical and computer engineering solutions in a global, societal, and environmental context. To accomplish the mission, the electrical and computer engineering faculty, with advice from students, alumni, and employers, endorse the following objectives:

Electrical Engineering Educational Objectives. In their first few years on the job, graduates of the electrical engineering program at Texas Tech should be able to utilize the knowledge gained from their academic program to:

- Solve important problems in a modern technological society as valuable, productive engineers.
- Enter and succeed in a graduate program.
- Function and communicate effectively, both individually and within multidisciplinary teams.
- Continue the process of lifelong learning.
- Be sensitive to the consequences of their work, both ethically and professionally, for productive professional careers.

Electrical Engineering Program Outcomes. To enable Texas Tech electrical engineering students to accomplish these objectives, the curriculum is designed to assure that students, at the time of graduation, are able to:

- Identify, analyze and solve electrical engineering problems by applying knowledge of mathematics, science, and engineering with modern engineering tools in the specific areas of circuits and systems, electronics, communications, digital systems, microcontrollers, programming, control systems, electromagnetics, and a technical specialty chosen by the student.
- Design a system, component, or process to meet desired needs within realistic constraints.
- Design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data.
- Recognize the need for, and have the ability to engage in, perpetual learning by working on projects for which they have no prior experience.
- Have a fundamental capability in oral and written communication.
- Function effectively within multidisciplinary teams.

- Understand ethical and professional engineering practice in the context of global, economic, environmental, and societal realities as well as other contemporary issues.

Computer Engineering Educational Objectives. In their first few years on the job, graduates of the computer engineering program at Texas Tech should be able to utilize the knowledge gained from their academic program to:

- Solve important problems in a modern technological society as valuable, productive engineers.
- Enter and succeed in a graduate program.
- Function and communicate effectively, both individually and within multidisciplinary teams.
- Continue the process of lifelong learning.
- Be sensitive to the consequences of their work, both ethically and professionally, for productive professional careers.

Computer Engineering Program Outcomes. To enable Texas Tech computer engineering students to accomplish these objectives, the curriculum is designed to assure that students, at the time of graduation, are able to:

- Identify, analyze and solve computer engineering problems by applying knowledge of mathematics, science, and engineering with modern engineering tools in the specific areas of circuits and systems, electronics, communications, digital systems, microcontrollers, programming, software engineering, design and analysis of algorithms, computer architecture, operating systems, a technical specialty chosen by the student, and electromagnetics.
- Design a system, component, or process to meet desired needs within realistic constraints.
- Design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data.
- Recognize the need for, and have the ability to engage in, perpetual learning by working on projects for which they have no prior experience.
- Have a fundamental capability in oral and written communication.
- Function effectively within multidisciplinary teams.
- Understand ethical and professional engineering practice in the context of global, economic, environmental, and societal realities as well as other contemporary issues.

The department continues to strive to provide the best educational environment for all students, regardless of ethnicity or gender, and to succeed in accomplishing these objectives in an appropriate time period.

Program Overview. The fields of electrical and computer engineering are very broad and include a number of specialty areas. To allow students to become more familiar with these areas, the programs will offer a wide range of technical specialties consistent with the breadth of electrical and computer engineering and inclusive of recent developments in the field. An important contribution to accomplish these objectives is our five-course sequence of stand-alone project laboratory courses.

In each of the project laboratory courses, students are given a brief description of a complex, open-ended project. The students, usually working in teams, are required to design, develop, construct, and evaluate a system to satisfy the requirements for the project. Faculty advisors evaluate the project on the basis of finished products, required written reports, and oral presentations. By its very structure the project laboratory sequence gives our students considerable experience in dealing with open-ended design problems. They also gain experience in working closely with others and in written and oral communication.

The material presented in the electrical and computer engineering lecture courses is incorporated in the project laboratory course sequence. The projects, however, are real-world problems that require students to go beyond the basic knowledge learned in the classroom. Through these experiences, students gain the technical

Curriculum for Computer Engineering

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
CHEM 1307, Prin. of Chem. I*	3	C S 1412, Programming Princ. II	4
CHEM 1107, Prin. of Chem. I (Lab.)*	1	E E 2372, Mod. Dig. Syst. Des.	3
E E 1304, Intro. Engr.	3	ENGL 1302, Adv. Coll. Rhetoric	3
C S 1411, Programming Prin. I	4	POLS 1301, American Govt., Org.	3
ENGL 1301, Ess. Coll. Rhetoric	3	TOTAL	16
TOTAL	17		

SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math for Engr. I	3
E E 3302, Fund. of Elect. Engr.	3	E E 3311, Electronics I	3
PHYS 1408, Prin. of Phys. I*	4	E E 3331, Proj. Lab. I	3
E E 3362, Dig. Des. Using Micro. Controllers	3	Elective (Prob. & Stat.)**	3
C S 2413, Data Structures	4	Elective (History)	3
TOTAL	17	E E 3303, Linear System Analysis	3
		TOTAL	18

THIRD YEAR			
Fall		Spring	
E E 3334, Comp. Eng. Proj. Lab.	3	E E 3333, Proj. Lab. III	3
E E 3323, Prin. Comm. Sys.	3	E E 3341, Electromag. Theory I	3
E E 3312, Electronics II	3	C S 1382, Disc. Computational Struct.	3
C S 3365, Software Engineering	3	C S 3352, Intr. Sys. Prog.	3
PHYS 2401, Prin. Phys. II	4	Elective (Political Science)	3
TOTAL	16	TOTAL	15

FOURTH YEAR			
Fall		Spring	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
Elective (E E/C S)	3	Elective (E E/C S)	3
Elective (Humanities)	3	Elective (E E/C S)	3
Elective (Oral Comm.)	3	Elective (Ind. Group Behavior)	3
Elective (History)	3	Elective (Vis. Perf. Arts)	3
TOTAL	15	TOTAL	15

Minimum hours required for graduation—129

Electives from the following categories must be selected from approved lists to ensure that ABET, General Education, departmental, and legislative requirements are satisfied: 1 political science, 2 history, 1 humanities, 1 visual and performing arts, 1 individual and group behavior, 1 oral communications, 2 electives (E E/C S) (Choose 2 from E E 4364, 4367, 4375, 4382, C S 3368, 3361, 3364, 3383, 4352, 4354, or 4395).

* Students who do not have high school credit for chemistry or physics must take CHEM 1301 and/or PHYS 1304 before those listed.

** Elective (Prob. & Statistics)—MATH 3342 or I E 3341

Curriculum for 150-Hour Combined Bachelor of Science in Computer Engineering, Master of Science in Electrical Engineering

The combined Bachelor of Science in Computer Engineering and Master of Science in Electrical Engineering degree program differs only in the final years; the first years are the same as the standard B.S. program. Electives must be selected from approved lists to ensure that ABET, General Education, departmental, and legislative requirements are satisfied.

FOURTH YEAR			
Fall		Spring	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
Elective (E E 5000-level)	3	C S 5000-level	3
Elective (Hum. or Fine Arts)	3	Elective (E E 5000-level)	3
Elective (Oral Comm.)	3	Elective (Ind. Group Behavior)	3
Elective (History)	3	Elective (Vis. Perf. Arts)	3
TOTAL	15	TOTAL	15

FIFTH YEAR			
Fall		Spring	
Elective (E E 5000-level)	3	Elective (E E 5000-level)	3
Elective (E E 5000-level)	3	Elective (E E 5000-level)	3
Elective (E E 5000-level)	3	E E 6000, Master's Thesis	5
E E 6000, Master's Thesis	1	TOTAL	11
TOTAL	10		

Curriculum for Electrical Engineering

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
CHEM 1307, Prin. of Chem. I*	3	E E 1305 or C S 1411	3-4
CHEM 1107, Prin. of Chem. I (Lab.)	1	E E 2372, Mod. Dig. Syst. Des.	3
E E 1304, Intro. Engr.	3	ENGL 1302, Adv. Coll. Rhetoric	3
POLS 1301, Amer. Govt., Org.	3	Elective (History)	3
ENGL 1301, Ess. Coll. Rhetoric	3	TOTAL	15-16
TOTAL	16		

SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math for Engr. I	3
E E 3302, Fund. of Elect. Engr.	3	E E 3311, Electronics I	3
*PHYS 1408, Prin. of Phys. I	4	E E 3331, Proj. Lab. I	3
E E 3362, Engr. Appr. to Dig. Des.	3	Elective (Prob. & Stat.)**	3
Elective (History)	3	Elective (Political Science)	3
TOTAL	16	E E 3303, Linear System Analysis	3
		TOTAL	18

THIRD YEAR			
Fall		Spring	
E E 3332, Proj. Lab. II	3	E E 3333, Proj. Lab. III	3
E E 3323, Prin. Comm. Sys.	3	E E 3341, Electromag. Theory I	3
PHYS 2401, Prin. Phys. II	4	E E 3353, Feedback Contr. Sys.	3
E E 3312, Electronics II	3	Elective (Math. or Science)	3
Elective (Hum. or Fine Arts)	3	Elective (O.E. or Vis. Perf. Arts)	6
TOTAL	16	TOTAL	18

FOURTH YEAR			
Fall		Spring	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
E E 3342, Electromag. Theory II	3	Electives (E E)	6
Elective (E E)	6	Elective(O.E.)	3
Elective (Oral Comm.)	3	Elective (Ind. Group Behavior)	3
TOTAL	15	TOTAL	15

Minimum hours required for graduation—129

Electives from the following categories must be selected from approved lists available from the Department of Electrical and Computer Engineering to ensure that ABET, General Education, departmental, and legislative requirements are satisfied: 1 political science, 2 history, 1 humanities, 1 visual and performing arts, 1 individual and group behavior, 1 oral communications, 1 basic science or math elective, 1 Prob. & Statistics, 4 electrical engineering, and 2 other engineering.

Option courses include:

- Analog VLSI—E E 4310, 4314, 4321; MEMS —E E 4381, 4385, 4386;
- Power — E E 4343, 4344, 4391;
- Signal Processing — E E 4364, 4367;
- Communication Systems — E E 4323, 4325, 4361;
- High Frequency Communications — E E 4342, 4344, 4360;
- Control Systems — E E 4324, 4368;
- Digital Systems — E E 4314, 4375, 4382.

* Students who do not have high school credit for chemistry or physics must take CHEM 1301 and/or PHYS 1304 before those listed.

** Elective (Prob. & Statistics)—MATH 3342 or I E 3341

150-Hour Combined Bachelor of Science, Master of Science in Electrical Engineering

The combined Bachelor of Science in Electrical Engineering and Master of Science in Electrical Engineering degree program differs only in the final years; the first years are the same as the standard B.S. program. Electives must be selected from approved lists available from the department to ensure that ABET, Core Curriculum, departmental, and legislative requirements are satisfied.

FOURTH YEAR			
Fall		Spring	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
E E 3342, Electromag. Theory II	3	Elective (E E 5000-level)	3
Elective (E E)	3	Elective (E E 5000-level)	3
Elective (Oral Comm.)	3	Elective (O.E.)	3
Elective (E E 5000-level)	3	Elective (Ind. Group Behavior)	3
TOTAL	15	TOTAL	15

FIFTH YEAR			
Fall		Spring	
Elective (E E 5000-level)	3	Elective (E E 5000-level)	3
Elective (E E 5000-level)	3	Elective (E E 5000-level)	3
Elective (E E 5000-level)	3	E E 6000, Master's Thesis	5
E E 6000, Master's Thesis	1	TOTAL	11
TOTAL	10		

maturity necessary to succeed in their chosen careers. In addition, the project laboratory courses address topics in engineering ethics and professionalism and help students develop the skills needed for lifelong learning.

The result of the overall curriculum is to prepare a graduate who is sensitive to the consequences of his or her work, both ethically and professionally, for a productive professional career. A broad educational background has been incorporated into these curriculums and personalized advising plays an important role in its implementation.

Undergraduate Program

The required undergraduate programs are contained in the curriculum tables shown in this section. The undergraduate curriculum gives students a broad education in electrical and computer engineering and enables them to pursue all career options in a fast-changing technical environment. In addition, students may select from a wide variety of elective courses in electrical and computer engineering and other related disciplines allowing them to specialize at the senior level. If a student wishes, specific specialization options are available, including analog VLSI, MEMS, power; signal processing; communication systems; high frequency communications; control systems and digital systems.

Success in engineering courses is highly dependent on knowledge and skills in mathematics. It is strongly recommended that students have a minimum mathematics SAT score of 500, a minimum score of 23 on the mathematics ACT, or take mathematics courses at a junior or community college to be ready to take calculus classes at Texas Tech. Students will be responsible for arranging a course of study with an advisor's counsel and approval. Students whose high school courses include physics, chemistry, mathematics through analytical geometry, and at least two credits of a single foreign language are expected to follow the sequence of courses shown in the curriculum. However, students who lack credits in any of these areas of study in high school should consult with departmental advisors to determine a suitably adjusted first-year schedule. The exceptionally well-prepared student should consult the section of this catalog on credit by examination.

All students must satisfy the academic performance requirements of the Dynamic Enrollment Management Plan (DEMP) to be permitted to continue as an E E or CMPE major. The ECE DEMP requires students to maintain a 2.25 adjusted cumulative GPA. Students must also meet all degree and prerequisite requirements with grades of C or better. No course can be attempted more than two times (including withdrawals) to achieve a C or better. Students who do not meet these requirements will be dropped from the E E or CMPE program and will not be allowed to register for any E E courses appearing in the university catalog in the "Second Year, Spring" semester or beyond. A faculty committee determined by the department will review individual cases of students requesting readmission to the department. Required courses taken more than twice, under any circumstances, will not apply toward the degree without PRIOR written approval by the department. It is the responsibility of the student to seek written permission. After grades are posted for the current semester, students who have not met prerequisite requirements for any course will be dropped from that course by the department. It will be the responsibility of the student to add additional courses to maintain a full load.

Students interested in a dual degree program or a minor should consult a faculty advisor. A minor in electrical engineering consists of E E 2331, 2372, 3302, 3303, 3311, and 3362. Any student within nine semester hours of graduation may take courses for graduate credit. A joint M.S.-B.S.E.E. 150-hour program is also available. Students interested in pursuing this degree should inform the academic advisor during the first semester of their junior year.

Curriculum for Dual Bachelor of Science in Electrical Engineering and Computer Science Plus Master of Science in Electrical Engineering

The dual Bachelor of Science in Electrical Engineering and Computer Science plus Master of Science in Electrical Engineering degree program differs only in the final years; the first years are the same as the standard B.S. program. Electives must be selected from approved lists available from the Department of Electrical and Computer Engineering or Computer Science to ensure that ABET, General Education, departmental, and legislative requirements are satisfied.

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
E E 3331, Proj. Lab. I	3	E E 3341, Electromag. Theory I	3
E E 3311, Electronics	3	E E 3323, Prin. Comm. Sys.	3
PHYS 2401, Prin. of Phys. II	4	E E 3312, Electronics II	3
C S 3365, Software Eng.	3	C S 3361, Concepts Prog. Lang.	3
MATH 2360, Linear Algebra	3	Elective (Oral Comm.)	3
TOTAL	16	Elective (Vis. & Perf. Arts)	3
		TOTAL	18
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
Elective (History)	3	E E 3353, Feedback Contr. Sys.	3
E E 3342, Electromag. Theory II	3	E E 3333, Proj. Lab. III	3
E E 3332, Proj. Lab. II	3	C S 3364, Des. & Anal. of Alg.	3
C S 5375 or E E 5375, Struc. & Org.	3	Elective (C S 5000-level)	3
Elective (Ind. Group Behavior)	3	Elective (Hum. or Fine Arts)	3
TOTAL	15	TOTAL	15
FIFTH YEAR			
<i>Fall</i>		<i>Spring</i>	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
C S 3352, Intro. Sys. Prog.	3	C S 4352, Operating Systems	3
Elective (E E 5000-level)	3	C S 3383, Theory of Automata	3
Elective (History)	3	Elective (E E 5000-level)	3
TOTAL	12	TOTAL	12
SIXTH YEAR			
<i>Fall</i>		<i>Spring</i>	
Elective (E E 5000-level)	3	Elective (E E 5000-level)	3
Elective (E E 5000-level)	3	Elective (E E 5000-level)	3
E E 6000, Master's Thesis	3	E E 6000, Master's Thesis	3
TOTAL	9	TOTAL	9



Electrical Engineering–Computer Science Dual-Degree Curriculum

FIRST YEAR			
Fall		Spring	
MATH 1351, Cal. I	3	MATH 1352, Cal. II	3
CHEM 1307, Prin. of Chem. I*	3	C S 1412, Programming Princ. II	4
CHEM 1107, Prin. of Chem. I (Lab.)*	1	E E 2372, Mod. Dig. Syst. Des.	3
E E 1304, Intro. Engr.	3	ENGL 1302, Adv. Coll. Rhetoric	3
C S 1411, Programming Princ. I	4	POLS 1301, American Govt. Org.	3
ENGL 1301, Ess. Coll. Rhetoric	3	TOTAL	16
TOTAL	17		
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math for Engr. I	3
C S 2413, Data Structures	4	C S 1382, Disc. Struc.	3
E E 3302, Fund. of Elec. Engr.	3	E E 3303, Linear Syst. Analysis	3
E E 3362, Engr. Appr. to Dig. Des.	3	Elective (Prob. & Stat.)*	3
PHYS 1408, Prin. of Phys. I*	4	Elective (Political Science)	3
TOTAL	17	TOTAL	15
THIRD YEAR			
Fall		Spring	
E E 3331, Proj. Lab. I	3	E E 3341, Electromag. Theory I	3
E E 3311, Electronics	3	E E 3323, Prin. Comm. Sys.	3
PHYS 2401, Prin. of Phys. II	4	E E 3312, Electronics II	3
C S 3365, Software Eng.	3	C S 3361, Concepts Prog. Lang.	3
MATH 2360, Linear Algebra	3	Elective (Oral Comm.)	3
TOTAL	16	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Elective (History)	3	E E 3353, Feedback Contr. Sys.	3
E E 3342, Electromag. Theory II	3	E E 3333, Proj. Lab. III	3
E E 3332, Proj. Lab. II	3	C S 3364, Des. & Anal. of Alg.	3
C S 3375, Machine Struc. & Org.	3	Elective (C S)	3
Elective (Other Engineering)	3	Elective (Vis. Perf. Arts)	3
TOTAL	15	TOTAL	15
FIFTH YEAR			
Fall		Spring	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
C S 3352, Intro. Sys. Prog.	3	C S 4352, Operating Systems	3
Elective (Ind. Group Behavior)	3	C S 3383, Theory of Automata	3
Elective (History)	3	Elective (Humanities)	3
TOTAL	12	TOTAL	12

Minimum hours required for graduation—150

Electives from the following categories must be selected from approved lists available from the Department of Electrical Engineering or Computer Science to ensure that ABET, General Education, departmental, and legislative requirements are satisfied: 1 political science, 2 history, 1 humanities, 1 Visual and Performing Arts, 1 individual and group behavior, 1 computer science, and 1 other engineering.

* Students who do not have high school credit for chemistry or physics must take CHEM 1301 and/or PHYS 1304 before those listed.

** Elective (Prob. & Statistics) - MATH 3342 or I E 3341

Electrical Engineering (E E)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1304. Introduction to Electrical and Computer Engineering (3:3:0).** Prerequisite: Score on Mathematics Placement Examination (MPE) of 7, MATH 1350, 1550, or score on MPE of 5 and MATH 1321. Introduction to the electrical and computer engineering disciplines including familiarization with relevant design tools. Overview of the profession, contemporary issues, and ethics.
- 1305. Introduction to Engineering and Computer Programming (3:3:0).** Prerequisite: Score on Mathematics Placement Examination (MPE) of 7, MATH 1350, 1550, or score on MPE of 5 and MATH 1321. An introduction to the fundamentals of computing and structured programming for electrical engineering.
- 2372. Modern Digital System Design (3:3:0).** Prerequisite: Score on Mathematics Placement Examination (MPE) of 7, MATH 1350, 1550, or score on MPE of 5 and MATH 1321. An introduction to combinational and sequential digital systems.
- 3301. General Electrical Engineering (3:3:0).** Prerequisite: MATH 1352. Analysis of electric circuits. Introduction to electronic instrumentation and electromechanics. For non-majors only.

Graduate Program

The Department of Electrical and Computer Engineering offers students the opportunity of graduate study under the direction of faculty members in an atmosphere of enthusiasm for learning. Master's and doctoral degrees are awarded to students completing a comprehensive program of courses, examinations, and thesis or dissertation. Courses provide breath and depth of knowledge; and thesis and dissertation projects are an important expression of creative research activity.

The master's degree program prepares students for successful professional careers based on a broad foundation, together with specialized technical expertise, in electrical engineering. The doctoral degree program prepares students for engineering-based leadership roles in society involving the solution of important technological problems and the advancement and dissemination of knowledge.

Graduate students can find thesis and dissertation topics in a variety of areas, with research conducted in the following multidisciplinary centers, laboratories, and industry-sponsored programs:

- Center for Pulsed Power and Power Electronics
- Nano Tech Center
- Maddox Laboratory
- Computer Vision and Image Analysis Laboratory
- Applied Vision Laboratory
- Advanced Vehicular Engineering Laboratory
- Neuroimaging, Cognition, and Engineering Laboratory
- Microwave and Antenna Laboratory
- Program for Semiconductor Product Engineering
- Advanced Electronic Systems Engineering Program

The Department of Electrical and Computer Engineering encourages study abroad, and graduate students have studied in Denmark, France, Spain, and Mexico.

Before being recommended for admission to a degree program, students may be required to take (without graduate credit) undergraduate leveling courses designated by the department.

- 3302. Fundamentals of Electrical Engineering (3:3:0).** Prerequisite: MATH 1352. Principles of electric circuits. DC, transient, and sinusoidal steady-state analysis.
- 3303. Linear System Analysis (3:3:0).** Prerequisite: E E 1304, 3302; corequisite: MATH 3350 and 2.25 adjusted cumulative GPA. Concepts of signal and system analysis in time and frequency domains as applied to electric circuits. Laplace transform, Fourier series, and Fourier transform techniques are stressed.
- 3311. Electronics I (3:3:0).** Prerequisite: E E 3302 and 2.25 adjusted cumulative GPA. Introduction to electronic devices, amplifiers, and electronic systems. Principles of electronic circuit design and analysis.
- 3312. Electronics II (3:3:0).** Prerequisite: E E 3311, 3303, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Analysis and design of special-purpose amplifiers and oscillators.
- 3323. Principles of Communication Systems (3:3:0).** Prerequisite: E E 3303, 3311, MATH 3342 or I E 3341, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Random processes and spectral densities. Fourier Transforms and linear systems concepts. Amplitude, phase angle, and pulse modulation communication systems.
- 3331. Project Laboratory I (3:0:9).** Prerequisite: ENGL 1302, E E 3362, 3302 and 2.25 adjusted cumulative GPA. A laboratory course to accompany second-year basic courses in electrical or computer engineering. (Writing Intensive)
- 3332. Project Laboratory II (3:0:9).** Prerequisite: E E 3303, 3311, 3331 CHEM 1307, PHYS 1408 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. A laboratory course to accompany third-year basic courses in electrical engineering. (Writing Intensive)
- 3333. Project Laboratory III (3:0:9).** Prerequisite: E E 3312, 3332, PHYS 2401 and 2.25 adjusted cumulative GPA. A laboratory

- course to accompany third-year basic courses in electrical or computer engineering. (Writing Intensive)
- 3334. Computer Engineering Project Laboratory (3:0:9).** Prerequisite: E E 3303, 3311, 3323, 3331, PHYS 1408, CHEM 1307, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. A laboratory course to accompany third-year basic courses in computer engineering. (Writing Intensive)
- 3341. Electromagnetic Theory I (3:3:0).** Prerequisite: E E 3303 and PHYS 2401, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Vector analysis. Partial differential equations. General treatment of static, electric, and magnetic fields from the vector viewpoint.
- 3342. Electromagnetic Theory II (3:3:0).** Prerequisite: E E 3341 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. General solutions for Maxwell's equations. Traveling waves in scalar media. Boundary conditions and constraints imposed by bounding surfaces.
- 3353. Feedback Control Systems (3:3:0).** Prerequisite: E E 3312 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. An introduction to the analysis and design of automatic control systems. Control system concepts. Controller design and digital control.
- 3360. Engineering Technical Communications (3:3:0).** Prerequisite: ENGL 1302, junior standing, and consent of instructor. For majors only or departmental consent. Written and oral communication techniques for professional engineers. Presentation of engineering projects, experimental data, and interpretation of results.
- 3362. Digital Design Using Microcontrollers (3:3:0).** Prerequisite: E E 1305, 2372. Advanced digital systems design. Assembly language programming, interfacing, and applications of microcontrollers.
- 4310. Introduction to VLSI Design (3:3:0).** Prerequisite: E E 3312 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. A basic introduction to very large-scale integrated design of circuits and devices. Geometrical patterns of semiconductor devices on a chip, Mos circuits, masking and patterning, and automation tools.
- 4314. Solid State Devices (3:3:0).** Prerequisite: E E 3312, E E 3341, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Principles and properties of semiconductor devices and optical devices. Thyristors and other switches. Integrated circuit devices. Device modeling.
- 4316. Power Electronics (3:3:0).** Prerequisite: E E 3312, 3323, 3353, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Switch-mode power conversion, power supplies, inverters, motor drives, power semiconductor devices, and magnetics. System analysis, design, and modeling.
- 4321. Applications of Analog Integrated Circuits (3:3:0).** Prerequisite: E E 3312, 3323, 3353, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Principles involved in designing analog integrated circuits. Device physics, small-signal and large-signal models. Biasing and basic circuit building blocks. Applications.
- 4323. Modern Communication Circuits (3:3:0).** Prerequisite: E E 3312, 3323, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Analysis and design techniques for modern communication circuits.
- 4324. Computer-Aided Circuit Analysis (3:3:0).** Prerequisite: E E 3312 and 3323, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Introduction to the concepts, use, and limitations of computer-aided circuit and system analysis techniques and tools. Discussion of numerical analysis techniques and their application to circuit and system analysis.
- 4325. Telecommunication Networks (3:3:0).** Prerequisite: E E 3323 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Networking and standards. Data and voice network architectures, cellular, satellite and telephone networks. Protocols. Network modeling and optimization. Queuing theory.
- 4331. Special Problems in Electrical Engineering (3).** Prerequisite: Approval of department chairperson and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Individual studies in advanced engineering areas of special interest. May be repeated for credit.
- 4333. Project Laboratory IV (3:0:9).** Prerequisite: E E 3333, 3341, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. A laboratory course to accompany fourth-year courses in electrical or computer engineering. (Writing Intensive)
- 4334. Project Laboratory V (3:0:9).** Prerequisite: E E 3333, 3341, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. A laboratory course to accompany fourth-year courses in electrical or computer engineering. (Writing Intensive)
- 4342. Microwave Solid-State Circuits (3:3:0).** Prerequisite: E E 3312 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Review of transmission-line and waveguide theory, scattering matrix, impedance matching, resonators, passive three- and four-port devices, filters, active circuits.
- 4343. Introduction to Power Systems (3:3:0).** Prerequisite: E E 3341 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Electrical power transmission and distribution systems; power generation systems, system modeling, planning, management and protection.
- 4344. Antennas and Radiating Systems (3:3:0).** Prerequisite: E E 3342 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Antenna fundamentals, uniformly spaced arrays, wire antennas of various types, aperture radiation, antennas for special applications.
- 4345. Pulsed Power (3:3:0).** Prerequisite: E E 3342 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Fundamentals of pulsed power circuits, components, and systems. Pulse forming lines, energy storage, voltage multipliers, switching, materials, grounding and shielding, measurements, and applications.
- 4353. Gaseous Electronics (3:3:0).** Prerequisite: E E 3342 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Kinetic theory of gases, collisions, emission processes, self-sustained discharge, Paschen law, glow discharge, arc discharge, streamers, spark discharge, corona discharge, and gas lasers.
- 4360. Fiber Optic Systems (3:3:0).** Prerequisite: E E 3312, 3323, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Optical fibers, couplers, sources, and detectors; applications to communications and sensing.
- 4361. Advanced Communication Systems (3:3:0).** Prerequisite: E E 3323 and 2.25 adjusted cumulative GPA. For majors only or department consent. Information transmission in electronic systems. Random variables and stochastic processes, noise in analog and digital modulation systems, optimal receivers.
- 4362. Modern Optics for Engineers (3:3:0).** Prerequisite: E E 3323, 3342 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Modern concepts in optics related to engineering applications. Geometrical, physical, and quantum optics; Fourier optics, holography, and image processing.
- 4364. Digital Signal Processing (3:3:0).** Prerequisite: E E 3323 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. An introduction to digital signal processing. Sampling, z-transform, discrete and fast Fourier transforms, flowgraphs, design techniques for digital filters, effects of finite word length, and applications.
- 4367. Image Processing (3:3:0).** Prerequisite: E E 3323 and 2.25 adjusted cumulative GPA. For majors or departmental consent. Imaging fundamentals. Linear operations in both spatial and frequency domains. Image enhancement and restoration techniques. Analysis and coding of images.
- 4368. Advanced Control Systems (3:3:0).** Prerequisite: E E 3353 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Analysis and design of advanced control systems including optimal, nonlinear, multiple-input multiple-output, digital, fuzzy logic, and neural network control.
- 4375. Computer Architecture (3:3:0).** Prerequisite: E E 3362 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. An introduction to the architecture, organization, and design of microprocessors. Hardware design related to various microprocessors. Analysis of current microprocessors and applications.
- 4381. VLSI Processing (3:3:0).** Prerequisite: PHYS 2301, MATH 3350, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Introduction to the physical principles, techniques, and technologies involved with the fabrication of very large scale integrated circuits (VLSI).
- 4382. Digital IC Analysis and Design (3:3:0).** Prerequisite: E E 3312, 3362, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Design of VLSI digital integrated circuits including basic device theory and processing technologies.
- 4385. Introduction to Microsystems I (3:3:0).** Prerequisite: E E 3311, 3303, and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces microsystem design, analysis, simulation, and manufacture through several case studies using representative devices.
- 4386. Introduction to Microsystems II (3:3:0).** Prerequisite: E E 4385 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Application of microfabrication to create microsensor systems. Integration of optics, optoelectronics, and microfluids. Includes other MEMS projects.

4391. **Electric Machines and Drives (3:3:0)**. Prerequisite: E E 3341 and 2.25 adjusted cumulative GPA. For majors only or departmental consent. Analysis and control of DC machines and induction machines. Space vector theory. Field oriented control. Modeling of machine and controller dynamics.

Graduate Courses

5120. **Electrical Engineering Graduate Seminar (1:1:0)**. Discussion will concern present research conducted in electrical engineering and other topics of interest to electrical engineers.

5301. **General Electrical Engineering (3:3:0)**. Prerequisite: Consent of instructor. Introduction and application of a wide range of electrical engineering topics; includes such subjects as circuit analysis, electronics, digital systems, communications, and related systems.

5310. **Introduction to VLSI Design (3:2:3)**. A basic introduction to very large-scale integrated (VLSI) design of circuits and devices. Geometrical patterns of semiconductor devices on a chip, MOS circuits, masking and patterning, and automation tools.

5312. **Power Semiconductors (3:3:0)**. Principles and properties of semiconductor devices, thyristors and other switches, integrated circuit devices, and device modeling.

5314. **Solid State Devices (3:2:3)**. Semiconductor materials and band theory of solids. Physics of semiconductor devices, charge transport, pn junctions, diodes, bipolar junction transistors, optoelectronic devices, and MOS devices.

5316. **Power Electronics (3:3:0)**. Switch mode power conversion, converters and inverters, power supplies and regulators, and power semiconductor circuits.

5321. **Design and Analysis of Analog Integrated Circuits (3:3:0)**. Principles involved in designing analog integrated circuits. Device physics, small signal, and large signal models. Biasing and basic circuit building blocks. Applications.

5323. **Modern Communication Circuits (3:3:0)**. Analysis and design techniques for modern communication circuits.

5324. **Computer-Aided Circuit Analysis (3:3:0)**. Development, implementation, and application of advanced circuit models for the design of integrated circuits. Designed to enhance design skills through direct application of computer-aided analysis tools.

5325. **Telecommunication Networks (3:3:0)**. Networking and standards. Data and voice network architectures, cellular, satellite and telephone networks. Protocols. Network modeling and optimization. Queuing theory.

5328. **Statistical Theory of Communications (3:3:0)**. Probability review, functions of random variables, density and distribution functions, random processes, correlations, power spectral density, linear systems with random inputs, mean square estimation, matched filters.

5331. **Individual Studies 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. **Topics in Electrical Engineering (3:3:0)**. The course will elaborate on a special topic of current interest in electrical engineering. May be repeated for credit.

5342. **Microwave Solid State Circuits (3:3:0)**. Review of transmission-line and waveguide theory, scattering matrix, impedance matching, resonators, passive three- and four-port devices, filters, active circuits.

5343. **Power Systems Engineering (3:3:0)**. Electrical power transmission and distribution systems; power generation systems; system modeling, planning, management and protection.

5344. **Antennas and Radiating Systems (3:3:0)**. Antenna fundamentals, uniformly spaced arrays, wire antennas of various types, aperture radiation, antennas for special applications.

5345. **Pulsed Power (3:3:0)**. Fundamentals of pulsed power circuits, components, and systems. Pulse forming lines, energy storage, voltage multipliers, switching, materials, grounding and shielding, measurements, and applications.

5353. **Gaseous Electronics (3:3:0)**. Kinetic theory of gases, collisions, emission processes, self sustained discharge, paschen law, glow discharge, arc discharge, streamers, spark discharge, corona discharge, gas lasers.

5360. **Fiber Optic Systems (3:3:0)**. Optical fibers, couplers, sources, and detectors; applications to communications and sensing. Integrated optics.

5361. **Advanced Communication Systems (3:3:0)**. Information transmission in electronic systems. Random variables and stochastic processes, noise in analog and digital modulation systems, and optimal receivers.

5362. **Modern Optics (3:3:0)**. Modern concepts in optics related to engineering applications. Geometrical, physical, and quantum optics; Fourier optics, holography, and image processing.

5363. **Linear System Analysis and Design (3:3:0)**. Basic properties of systems described by linear dynamical equations. Controllability, observability, stability, equivalence transformations.

5364. **Digital Signal Processing (3:3:0)**. An introduction to digital signal processing. Sampling, z-transform, discrete and fast Fourier transforms, flowgraphs, design techniques for digital filters, effects of finite word length and applications.

5365. **Parametric and Functional Device Testing (3:3:0)**. Fundamentals of semiconductor device chip and wafer testing. Parametric and functional tests, test philosophy, C programming for testing, and commercial wafer level testers.

5367. **Image Processing (3:3:0)**. Imaging fundamentals. Linear operators in spatial and spatial-frequency domains. Image enhancement and restoration techniques. Analysis and coding of images.

5368. **Advanced Control Systems (3:3:0)**. An introduction to advanced control systems. Optimal, adaptive, and robust control of linear and nonlinear systems. Fuzzy logic and neural network applications to control systems.

5371. **Engineering Analysis (3:3:0)**. Prerequisite: MATH 3350 or its equivalent. Application of mathematical methods and algorithms to engineering problems, stochastic linear system models, vector spaces and operators, orthogonality principle and its applications, adaptive filtering, matrix factorizational application of eigendecomposition methods.

5375. **Computer Architecture (3:3:0)**. An introduction to the architecture, organization and design of microprocessors. Hardware design related to various microprocessors. Analysis of current microprocessors and applications.

5376. **System Modeling and Simulation (3:3:0)**. Mixed-signal system specification, behavioral modeling and analysis, functional modeling and analysis, mixed-signal system design, and evaluation.

5381. **Introduction to Semiconductor Processing (3:2:3)**. Introduction to the physical principles, techniques, and technologies involved with the fabrication of very large scale integrated circuits (VLSI).

5382. **Advanced Digital System Design (3:3:0)**. Advanced VLSI design. Computer arithmetic. High speed computation. Digital hardware design. CAD tools for VLSI design.

5385. **Introduction to Microsystems I (3:3:0)**. Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces basic microsystem design, analysis, simulation, and manufacture through several case studies using representative devices.

5386. **Introduction to Microsystems II (3:3:0)**. Prerequisite: E E 5385. Application of microfabrication to create microsensor systems. Integration of optics, optoelectronics and microfluids. Includes other MEMS projects.

5391. **Electric Machines and Drives (3:3:0)**. Analysis and control of DC machines and induction machines. Space vector theory. Field oriented control. Modeling of machine and controller dynamics.

6000. **Master's Thesis (V1-6)**.

6351. **Physical Electronics (3:3:0)**. Prerequisite: E E 5352 or consent of instructor. Fundamentals of solid state physics relevant to device applications. Semiconductors, dielectrics, ferroelectricity, ferromagnetics, and superconductors. Laser devices, applications, and engineering of lasers.

6360. **Computer Vision and Image Reconstruction (3:3:0)**. Theories of image formation and reconstruction. Reconstruction problems in tomography, magnetic resonance imaging, synthetic aperture radar, and other modalities of imaging.

6363. **Adaptive Pattern Recognition (3:3:0)**. Adaptive approaches to the design of discriminant functions for pattern classification and recognition. Statistical, syntactic, neural networks and fuzzy-set based optimization constraints for discriminants.

6365. **Topics in Advanced Communications (3:3:0)**. Applications of detection and estimation theory in the design of optimum communication systems.

7000. **Research (V1-12)**.

8000. **Doctor's Dissertation (V1-12)**.

System Engineering (S E)

Graduate Course

5301. **System Engineering Processes (3:3:0)**. An introduction to the system engineering process and practice required in response to federal government procurements. The topics are applicable to the development and marketing of electro-mechanical products and associated supporting software.

Engineering Physics

Faculty

Jeffrey Woldstad, Coordinator; Charles W. Myles, Director; and Timothy Dallas, Director

Horn Professors: Kristiansen

Professors: Gregory, Hatfield, Holtz, Lichti, Myles, Simon, Trost, Woldstad

Associate Professors: Akchurin, Baker, Dallas, Gibson, Lamp, Thacker

About the Program

The College of Engineering and the Department of Physics supervise the following degree program:

- Bachelor of Science in Engineering Physics

This program emphasizes flexibility and personalized advisement and is directed toward students who are seriously interested in the interplay between basic physics and work at the frontiers of engineering development. This program is ideal for students in the Honors College who have a love for physical science. Each degree program must include a distinct engineering specialty that provides a cohesive set of engineering courses leading through upper-level engineering design. Students should review the mission statement and objectives for the department providing the engineering specialty.

The engineering physics program is a cooperative effort of the College of Engineering and the Department of Physics in the College of Arts and Sciences. Graduates are prepared for advanced study in both engineering and physics.

Mission. The mission of the engineering physics program is to develop students into professionals with in-depth knowledge and skills in mathematics, science, and engineering to understand physical systems; to research, design, and solve problems in the context of societal and community needs; and provide the foundation for graduate study and lifelong learning.

Educational Goal. Engineering physics is a unique program with three educational goals. These goals are:

- Provide an in-depth knowledge of physical laws, principles, and material properties of physical systems to prepare graduates to work in either a research or industrial setting.
- Meet the educational objectives of the engineering program in which the option is selected.
- Provide courses and experiences that develop students who have the professional skills to practice engineering.

Educational Objectives. The constituencies of the engineering physics program have established six specific educational objectives. Graduates of the program should be able to:

- Identify and understand the fundamental physical principles underlying engineering devices and processes necessary for engineering physics graduates to become successful engineers and lifelong learners.
- Evaluate engineering problems and solutions on the basis of fundamental scientific principles.
- Understand and know how to apply basic physical capabilities associated with tools, instruments, and engineering processes.
- Apply a broad, generalist background of fundamental physics common to all engineering disciplines.
- Work in teams to research, design, and solve problems of a physical nature and to communicate effectively both internally and externally.
- Practice engineering with a commitment to professional, scientific, and ethical responsibility.

Short-Term Educational Outcomes. Students at graduation must have:

- An ability to apply knowledge of mathematics, science, and engineering.

- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs.
- An ability to function on multidisciplinary teams.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- A recognition of the need for and an ability to engage in lifelong learning.
- A knowledge of contemporary issues.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- An ability to understand the interface between basic physics and engineering.
- An ability to apply the methods of mathematical physics to engineering problems.

Undergraduate Program

In the first semester of their freshman year, students should consult the advisor in the particular engineering department in which they expect to specialize. No later than the first semester of the junior year, students must file a degree plan approved by the engineering advisor, the physics advisor, and the dean of the college. Students, in consultation with the physics advisor and the engineering advisor, select the courses to be used for the electives shown in the following curriculum tables. This allows considerable flexibility to accommodate the various programs available in the engineering departments.

Assessment. Assessment is made on student and alumni performance before and after graduation. The focus of assessment before or at the time of graduation is on meeting the short-term educational objectives as program outcomes. The focus of assessment of alumni one year and later is the achievement of the educational objectives.

Electrical Engineering Option

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1305, Eng. Phys. Anal. I	3	PHYS 2401, Prin. Phys. II	4
PHYS 1408, Prin. Phys. I	4	E E 2372, Mod. Dig. Sys. Des.	3
ENGL 1301, Ess. Coll. Rhetoric	3	E E 1304, Intro. Elec. Comp. Eng.	3
POLS 1301, Amer. Govt., Org.	3	ENGL 1302, Adv. Coll. Rhetoric	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math. for Engrs. I	3
PHYS 2402, Prin. Phys. III	4	E E 3331, Proj. Lab. I	3
E E 3302, Fund. of Elec. Eng.	3	E E 3303, Linear Sys.	3
E E 3362, Eng. Appr. to Dig. Des.	3	Elective (Prob. & Stat.)	3
CHEM 1307, Prin. Chem. I	3	E E 3311, Electronics I	3
CHEM 1107, Prin. of Chem. I (Lab)	1	TOTAL	15
TOTAL	17	TOTAL	17
THIRD YEAR			
Fall		Spring	
PHYS 3305, Elect & Mag.	3	PHYS 3204, Intermed. Lab.	2
E E 3312, Electronics II	3	PHYS 3306, Elec. and Magnet.	3
E E 3323, Prin. of Comm. Sys.	3	E E 3333, Proj. Lab. III	3
E E 3332, Proj. Lab. II	3	Elective (Vis. Perf. Arts)	3
Elective (Engineering)**	3	POLS 2302, Amer. Pub. Pol.*	3
PETR 3308, Engr. Comm.	3	Elective (History)	3
TOTAL	18	TOTAL	17
FOURTH YEAR			
Fall		Spring	
PHYS 4307, Intro. Quant. Mech.	3	PHYS 4304, Mechanics	3
E E 4333, Proj. Lab IV	3	PHYS 4302, Statist. Therm. Phys.	3
PHYS 4306, Senior Project	3	or PHYS 4309, Solid State Physics	
Elective (Engineering)**	3	E E 4334, Proj. Lab. V	3
Elective (History)	3	E E 4334, Proj. Lab. V	3
TOTAL	15	Elective (Indiv. and Group Behav.)	3
		Elective (Hum. and Fine Arts)	3
		TOTAL	15

* Any approved political science course may be substituted.

** Non-electrical engineering.

Mechanical Engineering Option

FIRST YEAR		Spring	
Fall			
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1305, Eng. Phys. Anal. I	3	PHYS 2401, Prin. Phys. II	4
PHYS 1408, Prin. Phys. I	4	CHEM 1307, Prin. of Chem. I	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1107, Prin. of Chem. I (Lab)	1
POLS 1301, Amer. Govt., Org.	3	ENGL 1302, Adv. College Rhet.	3
TOTAL	16	E GR 1206, Engr. Graphics	2
		TOTAL	16
SECOND YEAR		Spring	
Fall			
MATH 2350, Calculus III	3	PHYS 3204, Intermed. Lab.	2
PHYS 2402, Prin. Phys. III	4	MATH 3350, Math. Engrs. & Scient.	3
CHEM 1308, Prin. of Chem. II	3	M E 2322, Engr. Thermo. I	3
CHEM 1108, Prin. of Chem. II (Lab)	1	or CH E 2421, Engr. Thermo.	
M E 3315, Comp. Aided Anal.	3	I E 3301, Engr. Eco. Anal.	3
Elective (History)	3	M E 2364, Mechanics I	3
TOTAL	17	TOTAL	14
THIRD YEAR		Spring	
Fall			
PHYS 3305, Elec. & Mag.	3	PHYS 3306, Elect. & Mag. II	3
M E 3464, Intro. to Mech. Des.	4	M E 3371, Heat Transfer	3
M E 3164, Eng. Mech. II Lab.	1	M E 2311, Materials Science	3
M E 3370, Fluid Mechanics	3	M E 3322, Engr. Thermo. II	3
E E 3301, Gen. Elec. Engineering	3	COMS 3358, Bus. and Prof. Comm.	3
POLS 2302, Amer. Pub. Pol.	3	M E 3365, Intro. to Design	3
TOTAL	17	M E 3165, Intro. to Design Lab	1
		Total	19
FOURTH YEAR		Spring	
Fall			
PHYS 4307, Intro. Quan. Mech. or PHYS 3401, Optics	3	PHYS 4304, Mechanics	3
PHYS 4306, Senior Project	3	PHYS 4302, Stat. & Them. Phys.	3
M E 4370, Design I	3	M E 4371, Design II	3
M E 3433, Systems & Vibrations	4	Elective (History)	3
E E Elective (2372, 3303, or 3311)	3	Visual/Perf. Arts	3
Elective (Hum. and Fine Arts)	3	TOTAL	15
TOTAL	19		

Civil Engineering Structures Option

FIRST YEAR		Spring	
Fall			
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1305, Eng. Phys. Anal. I	3	PHYS 2401, Prin. Phys. II	4
PHYS 1408, Prin. Phys. I	4	CHEM 1307, Prin. of Chem. I	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1107, Prin. of Chem. I (Lab)	1
POLS 1301, Amer. Govt., Org.	3	ENGL 1302, Adv. Coll. Rhetoric	3
TOTAL	16	POLS 2302, Amer. Pub. Pol.	3
		TOTAL	17
SECOND YEAR		Spring	
Fall			
MATH 2350, Calculus III	3	MATH 3350, Math. Engrs. & Scien.	3
PHYS 2402, Prin. Phys. III	4	C E 3303, Mech. of Solids	3
CHEM 1308, Prin. of Chem. II	3	I E 3301, Engr. Eco. Anal.	3
CHEM 1108, Prin. of Chem. II (Lab)	1	M E 2322 or CH E 2421 Eng. Ther.	3
C E 2301, Statics	3	C E 2101, Const. Materials (Lab)	1
Visual/Perf. Arts	3	Elective (History)	3
TOTAL	17	TOTAL	16
THIRD YEAR		Spring	
Fall			
PHYS 3305, Elect. & Mag.	3	PHYS 3306, Elect. & Mag. II	3
C E 3305, Mech. of Fluids	3	C E 3341, Prin. of Struct. Des.	3
C E 3440, Structural Analysis	4	C E 3321, Intro. Geotech. Eng.	3
C E 3103, Mech. of Solids (Lab)	1	C E 4340, Structural Analysis II	3
PETR 3308, Eng. Comm.	3	PHYS 3204, Intermed. Lab.	2
TOTAL	14	C E 3121, Geotech. Eng. (Lab)	1
		TOTAL	15
FOURTH YEAR		Spring	
Fall			
PHYS 4307, Intro. Quant. Mech. or PHYS 3401, Optics	3	PHYS 4304, Mechanics	3
PHYS 4306, Senior Project	3	PHYS 4302, Stat. & Them. Phys.	3
C E 4343, Des. Concrete Struc.	3	C E 4330, Des. Eng. Systems	3
C E 4321, Geotech. Eng. Des.	3	Elective (Hum. and Fine Arts)	3
C E 4342, Des. of Steel Struc.	3	Elective (History)	3
TOTAL	15	TOTAL	15

Chemical Engineering Option

FIRST YEAR		Spring	
Fall			
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1408, Prin. Phys. I	4	PHYS 1305, Eng. Phys. Anal. I or CH E 1305, Eng. Anal.	3
CHEM 1307, Prin. of Chem. I	3	PHYS 2401, Prin. Phys. II	4
CHEM 1107, Prin. of Chem. I (Lab)	1	CHEM 1308, Prin. of Chem. II	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1108, Prin. of Chem. II (Lab)	1
POLS 1301, Amer. Govt., Org.	2	ENGL 1302, Adv. Coll. Rhetoric	3
TOTAL	17	TOTAL	17
SECOND YEAR		Spring	
Fall			
MATH 2350, Calculus III	3	MATH 3350, Math. Engrs. & Sci.	3
PHYS 2402, Prin. Phys. III	4	PHYS 3204, Intermed. Lab.	2
CH E 2410, Intro. Chem. Proc.	4	CH E 2306, Expos. Tech. Info.	3
CHEM 3305, Organic Chem I	3	CH E 2421, Chem. Eng. Thermo. I	4
POLS 2302, Amer. Pub. Pol.	3	CHEM 3105, Org. Chem I (Lab)	1
TOTAL	17	Elective (History)	3
		TOTAL	16
THIRD YEAR		Spring	
Fall			
PHYS 3305, Elect. & Mag.	3	PHYS 3306, Elect. & Mag. II	3
CH E 3315, Fluid Mechanics	3	PHYS 4302, Stat. & Them. Phys.	3
CHEM 3305, Organic Chem I	3	CH E 3322, Transport Lab	2
CH E 3326, Heat Transfer	3	CH E 3341, Mass-Trans. Oper.	3
Elective (History)	3	CH E 3353, Process Control	3
TOTAL	15	Visual/Perf. Arts	3
		TOTAL	17
FOURTH YEAR		Spring	
Fall			
PHYS 4306, Senior Project	3	PHYS 4304, Mechanics	3
PHYS 4307, Intro. Quant. Mech. or PHYS 3401, Optics	3	CH E 3304, Materials	3
CH E 4232, Unit Oper. Lab. I	2	CH E 4555, Chem. Eng. Plant Des.	5
CH E 4323, Chem. Reaction Eng.	3	Chemical Engineering Elective	3
I E 3301, Eng. Econ. Anal.	3	Elective (Ind. and Group Behav.)	3
Elective (Humanities/Multicultural)	3	TOTAL	17
TOTAL	17		

Civil Engineering Environmental Option

FIRST YEAR		Spring	
Fall			
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1305, Eng. Phys. Anal. I	3	PHYS 2401, Prin. Phys. II	4
PHYS 1408, Prin. Phys. I	4	CHEM 1307, Prin. of Chem. I	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1107, Prin. of Chem. I (Lab)	1
POLS 1301, Amer. Govt., Org.	3	ENGL 1302, Adv. Coll. Rhetoric	3
TOTAL	16	POLS 2302, Amer. Pub. Pol.	3
		TOTAL	17
SECOND YEAR		Spring	
Fall			
MATH 2350, Calculus III	3	MATH 3350, Math. Engrs. & Sci.	3
PHYS 2402, Prin. Phys. III	4	C E 3303, Mech. of Solids	3
CHEM 1308, Prin. of Chem. II	3	I E 3301, Engr. Eco. Anal.	3
CHEM 1108, Prin. of Chem. II (Lab)	1	M E 2322 or CH E 2421 Eng. Ther.	3
C E 2301, Statics	3	Elective (History)	3
Elective (History)	3	TOTAL	15
TOTAL	17		
THIRD YEAR		Spring	
Fall			
PHYS 3305, Elect. & Mag.	3	PHYS 3306, Elect. & Mag. II	3
C E 3305, Mech. of Fluids	3	PHYS 3204, Intermed. Lab.	2
C E 3440, Structural Analysis	4	C E 3309, Environmental Eng.	3
PETR 3308, Eng. Comm.	3	C E 3321, Intro. Geotech. Eng.	3
TOTAL	13	C E 3121, Geotech. Eng. (Lab)	1
		C E 3171, Environ. Eng. (Lab)	1
		C E 3354, Engineering Hydrology	3
		C E 3105 Mech. Fluids (Lab)	1
		TOTAL	17
FOURTH YEAR		Spring	
Fall			
PHYS 4307, Intro. Quant. Mech. or PHYS 3401, Optics	3	PHYS 4304, Mechanics	3
PHYS 4306, Senior Project	3	PHYS 4302, Stat. & Them. Phys.	3
C E 3372, Water Sys. Des.	3	C E 4330, Des. Eng. Systems	3
C E 4353, Des. Hydraulic Sys.	3	Visual/Perf. Arts	3
ENVE 4391 or 4399	3	TOTAL	12
Elective (Hum. and Fine Arts)	3		
TOTAL	18		

Department of Engineering Technology

Faculty

Larry B. Masten, Ph.D., Chairperson

Professors: Burkett, Masten, Pigott

Associate Professors: Akram, Alayyan, Darwish, Ernst, Green, Reynolds

Assistant Professors: Liang

Lecturers: Hubbard

About the Program

This department supervises the following degree program:

- Bachelor of Science in Engineering Technology

Students may select coursework in one of three areas of specialization: construction engineering technology, electrical-electronics engineering technology, or mechanical engineering technology. All three options are accredited by the Technology Accreditation Commission of ABET, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, 410.347.7700. This department also supervises engineering technology options in the Master of Engineering degree program.

Mission. The department's mission is to provide educational opportunities to a greater cross-section of the state's population and includes the following objectives:

- To provide high-quality engineering technology programs with appeal to a broad range of students including traditional students, under-represented populations, and the by-passed learner. (The bypassed learner is one who has two or more of the following characteristics: Was not a great success in high school, was not planning to attend post-secondary education after high school, has been away from school for some time, or is a first-generation collegian. Very often these students have the ability and desire to do very well in engineering technology. The foundational curriculum at the beginning of the programs, the supportive faculty, and the instructional environment make the engineering technology programs more attractive to the by-passed learner than traditional engineering programs.)
- To provide programs that reflect the needs of industry worldwide.
- To provide the support necessary for students to develop their intellectual capacities, technical competencies, and social responsibilities.
- To have faculty who perform independent applied research and or consulting that will add depth, quality, and practical experience to the department.
- To continuously improve the programs in order to correlate with the type and rate of change in the global marketplace.

Program Educational Objectives. During the first several years after graduation, graduates of the engineering technology programs should be able to:

- Acquire an entry-level position in the areas of product development, construction supervision, component design, manufacturing supervision, HVAC design, technical sales, field sales, field service engineering, and work force coordination.
- Apply engineering knowledge to solving practical industrial problems.
- Apply business and project management skills to the management of engineering projects.
- Function effectively on multidisciplinary teams.
- Communicate effectively.
- Continue the process of lifelong learning.

Program Outcomes. To enable engineering technology students to accomplish these objectives, the graduates will have:

- An appropriate mastery of the knowledge, techniques, skills, and modern tools of their disciplines.

- An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology.
- An ability to conduct, analyze, and interpret experiments and apply experimental results to improve processes.
- An ability to apply creativity in the design of systems, components, or processes appropriate to program objectives.
- An ability to function effectively on teams.
- An ability to identify, analyze, and solve technical problems.
- An ability to communicate effectively.
- A recognition of the need for and an ability to engage in lifelong learning.
- An ability to understand professional, ethical, and social responsibilities.
- A respect for diversity and knowledge of contemporary professional, societal, and global issues.
- A commitment to quality, timeliness, and continuous improvement.

Program Overview. The engineering technologist generally works in the applied part of the engineering spectrum and is playing an increasingly important role in our technological society. Rather than preparing students to go into research, the engineering technology program prepares students for those engineering activities that emphasize applying engineering knowledge to solving practical industrial problems. The activities of the engineering technologist usually include product development, construction supervision, technical sales, component design, field service engineering, work force coordination, and supervision.

The construction specialization stresses basic structural design and construction operations to prepare students to enter various phases of the construction industry. Coursework includes basic structural design and analysis, contracts and specifications, construction management, safety and health, surveying, cost estimating, scheduling, and transportation.

The curriculum in electrical-electronics engineering technology is designed to bring the student to a high level of understanding of the body of engineering and scientific knowledge within the broad scope of electrical engineering, but with emphasis upon the application of this knowledge to current industrial practices. The program prepares students to work in all phases of development, design, production, and maintenance in the field of communication, automatic controls, digital systems, computers, instrumentation, and others.

Mechanical engineering technology is concerned with energy, mechanical devices, and manufacturing. The curriculum gives a good base for further learning, via industrial experience, in all of these areas. The curriculum emphasizes environmental control (heating, ventilating, cooling, and humidity control), steam-powered electric generating plants, and mechanical design. Both environmental control and steam power plants offer relatively stable employment, and many engineering technology graduates have obtained jobs in these areas. In the area of mechanical devices, courses in strength of materials, kinematics, dynamics, and design are offered. These courses equip the student to create a mechanical device that will perform the desired function and then design the parts of the mechanical device with sufficient strength to perform that function, including balancing the mechanical device to provide smooth operation. To provide an understanding of manufacturing and of the current industrial practices, the curriculum includes instruction in various types of machine tools and manufacturing processes as well as an introduction to numerical control.

Undergraduate Program

The curriculum in engineering technology consists of a basic core of about 60 semester hours of specified courses. These courses in basic science, humanities, social studies, mathematics, and applied science give a foundation in technology and general education. The remaining 66-67 hours of required coursework vary with the student's choice of an engineering technology area and electives. The program concentrations allow in-depth training in the student's chosen field.

Students are required to plan their program in consultation with faculty advisors. Emphasis on communication skills requires the inclusion of engineering communications (PETR 3308).

All students must have a personal computer and should check with the department to obtain recommended specifications.

Once a student has elected to take the State Board Fundamentals of Engineering Exam, that student is obligated to pass the exam to graduate.

Minors. Engineering technology students may pursue a minor in virtually any field of study at Texas Tech. The minor must consist of a minimum of 18 hours, with at least 6 of those hours being junior or senior level courses.

A minor in engineering technology is available by completing 18 hours of selected engineering technology courses. The appropriate engineering technology advisor should be consulted for a list of approved courses.

Transfer Admissions. To obtain a degree in engineering technology, transfer students must complete at least 30 credit hours of engineering technology courses in their discipline.

Grades. If a student obtains a grade of D or less in a given course twice, or drops a given course twice, or obtains a D or less once and withdraws once, then the student will be required, with the help of the department secretary, to set up a meeting with the student's advisor, the course instructor, and the department chairperson prior to registration for the next semester or summer session. The meeting will focus on how the student can be helped to succeed and the following actions will be considered:

- The student will be counseled on how to improve performance.
- The student will be required to take courses that he or she may have already passed or received transfer credit for in order to correct a deficiency that is identified as hindering the student's progress.
- The student will be required to take a time management course at the PASS center.
- The student will be required to take XL 0201 (Strategies for Learning).

Students failing to set up the meeting will have a transcript and registration hold entered on their record. If a student obtains a grade of D or less in a given course, drops a given course, or some combination of these three times, then the student may be required to transfer to engineering undecided for counseling.

Internship. The department believes that its students benefit greatly from participation in an internship program. One of the major benefits is improved full-time employment opportunities after graduation. Accordingly, all engineering technology students are required to complete at least the equivalent of three months of full-time work of an appropriate nature in order to graduate. However, part-time work of an appropriate nature conducted during the regular semester also will be considered. Students must enroll in GTEC 4300 while pursuing the internship.

Credit by Exam. In addition to standard transfer credits, the department will permit students to receive credit for some courses in the curriculum if they can demonstrate proficiency in that area by examination. It is the responsibility of the students to petition the department chair for such examination(s) well before they would enroll in the course(s).

The examination for credit for E GR 1206 and 1207, Engineering Graphics, is held only in the fall the first Friday after classes begin. Students must register for the exam in Room 224 of the Mechanical Engineering Building by 5 p.m. the first Wednesday after classes begin for the fall term. Students should have a background in beginning drawing and descriptive geometry.

Construction Engineering Technology (CTEC)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1312. Construction Methods (3:2:3). Introduction to the construction environment and construction methods, materials, processes,

Curriculum for Mechanical Specialization

Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1350, Analytical Geometry	3	MATH 1351, Calculus I	3
CHEM 1305, Chem. and Society	3	PHYS 1403, Gen. Phys. I	4
CHEM 1105, Gen. Chem. I (Lab.)	1	POLS 1301, Amer. Govt., Org.	3
E GR 1206, Engineering Graphics	2	GTEC 1211, Computer Prog.	2
MTEC 1312, Mech. Technology	3	TOTAL	15
TOTAL	15		

Fall		Spring	
MATH 1352, Calculus II	3	GTEC 3311, Strength of Materials	3
PHYS 1404, Gen. Phys. II	4	MTEC 3370, Intro. Proj. Mgt.	3
GTEC 1312, AC/DC Technology	3	GTEC 2351, Thermodynamics	3
GTEC 1112, AC/DC Lab.	1	Humanities Elective	3
POLS 2302, Amer. Public Policy	3	MATH 3322, Math. for Engr. Tech.	3
GTEC 2311, Statics	3	TOTAL	15
TOTAL	17		

Fall		Spring	
MTEC 3441, Materials Tech.	4	GTEC 3412, Fluid Mech. & Lab.	4
GTEC 2151, Intro. to Thermo. Lab	1	MTEC 3412, Vap./Gas Cycl., Lab.	4
HIST 2300, History of U.S. to 1877	3	MTEC 4352, Dynamics of Mach.	3
PETR 3308, Engineering Comm.	3	HIST 2301, History of U.S. Since 1877	3
MTEC 4351, Mechanisms of Mach.	3	MTEC 3206, Adv. Grap. Des Meth	2
GTEC 4231, Project Mgt.	2	TOTAL	16
TOTAL	16		

Fall		Spring	
MTEC 4311, AC System Design I	3	MTEC 4321, Mech. Tech. Lab	3
MTEC 4353, Mech. Design	3	GTEC 4322, Cost and Prof. Anal.	3
MTEC 4170, Capstone Design I	1	MTEC 4270, Capstone Design II	2
MTEC Elective	3	Elective	3
Visual/Perf. Arts	3	MTEC Elective	3
Individual or Group Behavior	3	TOTAL	14
TOTAL	16		

Minimum number of hours required for graduation—127 including internship

Curriculum for Construction Specialization

Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1350, Analytical Geometry	3	MATH 1351, Calculus I	3
CHEM 1305, Chem. and Society	3	PHYS 1403, Gen. Phys. I	4
CHEM 1105, Gen. Chem. I (Lab.)	1	CTEC 2301, Surveying & Surveys	3
CTEC 1312, Const. Mat'l. & Methods	3	GTEC 1211, Computer Prog.	2
E GR 1207, Engineering Graphics	2	TOTAL	15
TOTAL	15		

Fall		Spring	
MATH 1352, Calculus II	3	GTEC 3311, Strength of Materials	3
HIST 2300, History of U.S. to 1877	3	GTEC 3412, Fluid Mechanics	4
PHYS 1404, General Physics II	4	GTEC 1312, AC/DC Technology	3
GTEC 2311, Statics	3	POLS 1301, American Gov't. Org.	3
CTEC 2315, Constr. Equipment	3	MATH 3322, Math for En. Tech.	3
TOTAL	16	TOTAL	16

Fall		Spring	
POLS 2302, Amer. Public Pol.	3	MATH 2300, Statistical Methods	3
PETR 3308, Engineering Comm.	3	CTEC 4343, Constr. Safety Health	3
CTEC 3311, Struct. Analysis	3	CTEC 3302, Transportation Tech.	3
CTEC 3313, Found. & Earthwork	3	GTEC 4351, Thermodynamics	3
CTEC 4342, Cost Estimating	3	CTEC 4341, Const. Management	3
C E 3121, Geotech, Engr. Lab	1	C E 2101, Const. Mat'l. Lab	1
TOTAL	16	TOTAL	16

Fall		Spring	
CTEC 4312, Steel Structures	3	GTEC 4322, Cost & Prof. Anal.	3
CTEC 4313, Masonry Struc.	3	CTEC 4311, Concrete Structures	3
CTEC 4270 Capstone Design	2	CTEC 4321, Contracts & Specs.	3
ECO 2305, Prin. of Economics**	3	HIST 2301, History of U.S. Since 1877	3
Visual/Perf. Arts*	3	Humanities Elective*	3
TOTAL	14	TOTAL	15

Minimum number of hours required for graduation—126 including internship

* One of these courses must also meet the multicultural requirement.

** Suitable substitutions can be made with approval of option coordinator.

Electrical–Electronics Specialization**FIRST YEAR**

Fall		Spring	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1350, Analytical Geometry	3	MATH 1351, Calculus I	3
CHEM 1305, Chem. and Society	3	PHYS 1404, Prin. Physics II	4
CHEM 1105, Gen. Chem. I (Lab.)	1	GTEC 1312, AC/DC Technology	3
PHYS 1403, Prin. Physics I	4	GTEC 1112, AC/DC Lab.	1
POLS 1301, Amer. Govt., Org.	3	E GR 1207, Graphics ACAD	2
TOTAL	17	TOTAL	16

SECOND YEAR

Fall		Spring	
MATH 1352, Calculus II	3	EET 2312, Optoelec. Devices	3
HIST 2300, History of U.S. to 1877	3	EET 2112, Optoelectronics Lab.	1
EET 2311, Linear Elec.	3	GTEC 2351, Thermodynamics	3
EET 2111, Linear Elec. Lab.	1	POLS 2302, American Public Pol.	3
EET 2314, Digital Technology I	3	HIST 2301, History of U.S. Since 1877	3
EET 2114, Digital Technology I Lab.	1	C S 1411, Prog. Lang. in C/C++	4
GTEC 2311, Statics	3	TOTAL	17
TOTAL	17		

THIRD YEAR

Fall		Spring	
MATH 3322, Math. for En. Tech. or 3350, Math for Eng. and Sci. I	3	EET 3312, Digital Communications	3
EET 3311, Telecomm. Tech.	3	EET 3112, Digital Comm. Lab.	1
EET 3111, Telecomm. Tech. Lab.	1	EET 3314, Digital Technology II	3
EET 3316, Power Distribution	3	EET 3114, Digital Tech. II Lab	1
EET 3116, Power Distribution Lab.	1	EET 3324, Linear Des. Appls.	3
EET 3321, Prog. Logic Controller	3	EET 3124, Linear Des. Lab	1
EET 3321, Prog. Logic Cont. Lab.	1	PETR 3308, Bus. & Prof. Comm.	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
EET 4317, Adv. Micro-Electronics	3	EET 4353, Control Systems	3
EET 4331, System Des. Lab. I	3	EET 4370, Capstone Design	3
GTEC 4322, Cost and Profit Analy.	1	EET 4352, Digital Signal Process	3
Humanities Elective*	3	GTEC 4231, Intro. to Project Mgt.	2
Ind. Group Behavior Elective*	3	Visual/Perf. Arts*	3
TOTAL	13	TOTAL	14

Minimum number or hours required for graduation—127 including internship

* One of these courses must also meet the multicultural requirement.

- working drawings, and specifications. Field trips to local construction sites and laboratory construction projects are required.
- 2301. [ENGR 1307] Surveying and Surveys (3:2:3).** Prerequisite: MATH 1321 or equivalent. Care and use of modern surveying equipment; differential leveling, area calculations; horizontal and vertical curves; effects of observation errors.
- 2315. Construction Equipment (3:3:0).** Prerequisite: CTEC 1312, 2301. An introduction to construction equipment, including types of equipment, ownership and operational costs, estimating equipment costs, equipment scheduling and selection, and fleet management.
- 3103. Materials Measurements Laboratory (1:0:3).** Prerequisite: GTEC 3311. The study and testing of construction materials; including nondestructive methods. (Writing Intensive)
- 3104. Soil Properties Laboratory (1:0:3).** Prerequisite: GTEC 3311. The study and testing of the engineering properties of soils, including field-testing simulations. (Writing Intensive)
- 3302. Transportation Technology (3:3:0).** Prerequisite: CTEC 2301 and GTEC 3412. Design of components of the transportation system needed for modern society with practical examples.
- 3311. Structural Analysis (3:3:0).** Prerequisite: GTEC 3311. Analysis of determinate and indeterminate structural systems.
- 3313. Foundations and Earthwork (3:3:0).** Prerequisite: GTEC 3311. Soil properties, elements of soil mechanics, and the design of foundations for structures.
- 4270. Capstone Design Course (2:1:3).** Prerequisite: CTEC 4341, 4342, and 4343. Design and development of construction projects. Projects vary from semester to semester. However, the ASC-Region V Competition is one of the projects. Generally will include cost estimate, scheduling, safety, design, final report and presentation, and working in teams.
- 4311. Reinforced Concrete Structures (3:3:0).** Prerequisite: CTEC 3311. Common practices of design and construction of reinforced concrete structures (ACI-318). Includes wood form work design.

- 4312. Steel Structures (3:3:0).** Prerequisite: CTEC 3311. Common practices of design and construction of steel structures (AISC-LFRD).
- 4313. Masonry Structures (3:3:0).** Prerequisite: GTEC 3311. A study of material properties and common practices of design and construction of masonry structures.
- 4321. Construction Contracts and Specifications (3:3:0).** Prerequisite: Junior or senior CTEC standing. Principles and analysis of construction contracts and project specifications. Other aspects of construction management such as contract laws, negotiations, and professional ethics will be examined. (Writing Intensive)
- 4341. Construction Management (3:2:2).** Prerequisite: Junior or senior CTEC standing or consent of the option coordinator. Capstone course for the construction engineering technology student. Modern methods for managing construction projects, including critical path scheduling, resource allocation, and funds flow. Practical applications are made through simulated projects.
- 4342. Cost Estimating (3:2:2).** Prerequisite: Junior or senior CTEC standing or consent of the option coordinator. Analysis of construction working drawings and specifications to quantify material, labor, overhead, and equipment requirements relative to project bid preparation. Computer software programs are utilized to develop construction bids for simulated projects and case studies are used to develop both technical and professional ethics.
- 4343. Construction: Safety and Health (3:3:0).** Prerequisite: Senior CTEC standing or consent of instructor. Management of safety and health in the construction environment. Examines basic elements of a safety and health program for the construction general contractor, including OSHA regulatory requirements are examined. (Writing Intensive)

Engineering Graphics (E GR)**Undergraduate Courses**

- 1206. [ENGR 1204] Engineering Graphics: Software A (2:0:4).** For students majoring in mechanical and industrial engineering and mechanical and electrical/electronics engineering technology. This course provides a background in orthographic projection, selected topics of descriptive geometry, engineering drawing techniques, and computer-aided design and drafting software.
- 1207. Engineering Graphics: Software B (2:0:4).** For students majoring in civil engineering and construction engineering technology. This course provides a background in orthographic electrical/electronics engineering technology projection, selected topics of descriptive geometry, engineering drawing techniques, and computer-aided design and drafting software.

Electrical-Electronics Engineering Technology (EET)**Undergraduate Courses**

- 2111. Linear Electronics Lab (1:0:3).** Corequisite: EET 2311 concurrent enrollment. Designed to supplement the lecture course with laboratory experimental techniques.
- 2112. Optoelectronics Lab (1:0:3).** Corequisite: EET 2312 concurrent enrollment. A laboratory course to introduce students to experimental techniques and to complement the lecture material in EET 2312.
- 2114. [ENGT 1407] Digital Technology I Lab (1:0:3).** Corequisite: EET 2314 concurrent enrollment. Designed to supplement the lecture material of EET 2314 with laboratory experiments. (Writing Intensive)
- 2311. Linear Electronics (3:3:0).** Prerequisite: PHYS 1403; corequisite: GTEC 1312. Fundamentals of electronic circuit theory and characteristics of active devices networks.
- 2312. Optoelectronic Devices (3:3:0).** Prerequisite: EET 2311, 2111; corequisite: PHYS 1404. A study of optoelectronic devices, fiber optics, and basic communication systems.
- 2314. [ENGR 1407] Digital Technology I (3:3:0).** Corequisite: GTEC 1312, EET 2311, 2111. Fundamentals of Boolean theorems, logic circuits, and applications.
- 3111. Telecommunications Lab (1:0:3).** Corequisite: EET 3311 concurrent enrollment. Implementation of the theorem and applications of EET 3311 in the laboratory.

3112. **Digital Communications Lab (1:0:3)**. Corequisite: EET 3312 concurrent enrollment. Designed to introduce students to experimental techniques and to complement the lecture course EET 3312.
3114. **Digital Technology II Lab (1:0:3)**. Corequisite: EET 3314 concurrent enrollment. Laboratory experiments to complement the lecture material of EET 3314. (Writing Intensive)
3116. **Power Transmission Lab (1:0:3)**. Corequisite: EET 3316. Designed to introduce students to experimental techniques in areas of using dc and ac motors and 3-phase systems. (Writing Intensive)
3121. **Program Logic Controller Lab (1:0:3)**. Corequisite: EET 3321 concurrent enrollment. Laboratory experiments include EEPROM's, GALs, and PALs IC's.
3124. **Linear Design Lab (1:0:3)**. Corequisite: EET 3324 concurrent enrollment. Laboratory experiments include design and applications to complement the lecture material in EET 3324. (Writing Intensive)
3311. **Telecommunications Technology (3:3:0)**. Prerequisite: EET 2112, 2312, MATH 1351; Corequisite: MATH 1352. A study of voice and data communications with fiber optic applications.
3312. **Digital Communications (3:3:0)**. Prerequisite: EET 3111, 3311; corequisite: EET 3114, 3314. A study of modulate and demodulate digital signals and digital satellite systems.
3314. **Digital Technology II (3:3:0)**. Prerequisite: EET 2114, 2314. A study of advanced MSI and LSI digital IC's with emphasis on applications.
3316. **Power Transmission and Distribution (3:3:0)**. Prerequisite: EET 2311, 2111, and GTEC 1312. Emphasis on the principles of power transmission and the electrical motors in steady-state system applications.
3321. **Programmable Logic Controller (3:3:0)**. Prerequisite: EET 3114, 3314; Corequisite: MATH 1352. A comprehensive study of relay logic, ladder logic, and programming controllers.
3324. **Linear Design and Applications (3:3:0)**. Prerequisite: EET 3121, 3321. An advanced study of operational amplifiers, phase locked loops, and RLC oscillators.
4317. **Advanced Micro-Electronic Technology (3:3:0)**. Prerequisite: EET 3324 and 3124. The study of microprocessor circuits and their incorporation into functional systems.
4331. **System Design Laboratory I (3:0:9)**. Corequisite: EET 4317. A laboratory course to accompany first-semester senior courses in electrical-electronics engineering technology. (Writing Intensive)
4352. **Digital Signal Processing (3:3:0)**. Prerequisite: MATH 3350 or 3322, EET 3312, 3112, 3314, and 3114. An introduction to digital transmission systems, binary line codes, and optical fiber systems.
4353. **Control Systems (3:3:0)**. Prerequisite: EET 3324, 4317, MATH 3322 or 3350. An introduction to automatic control systems and the electro-mechanical components used in control systems.
4370. **Capstone Design Course (3:1:6)**. Prerequisite: EET 4331. Corequisite: MATH 3322 or 3350 and EET 4353. Design and analysis of electrical-electronics engineering projects. Projects vary from semester to semester. Participation in a suitable competition can satisfy this course requirement. Generally will include presentation of proposal, scheduling, design, final report, presentation, and teamwork. (Writing Intensive)
- Analysis of trusses, frames, machines, and beams. Friction, centroids, moments of inertia.
2351. **Introduction to Thermodynamics (3:3:0)**. Prerequisite: PHYS 1403, GTEC 1211 and MATH 1351. A study of the fundamental laws of thermodynamics and their application to analysis of gas, steam, and refrigeration cycles.
3311. **Applied Mechanics II-Strength of Material (3:3:0)**. Prerequisite: GTEC 2311 and MATH 1351. A study of the elastic and plastic behavior of materials and structural elements.
3412. **Applied Mechanics III-Fluids (4:3:3)**. Prerequisite: GTEC 2311. Fluid statics and dynamics, flow of fluids in pipe and open channel. Laboratory: Study of fluid flow systems, pumps, and measurement. (Writing Intensive)
4121. **Technology Seminar (1)**. Prerequisite: Advanced standing. Review of engineering technology fundamentals. Final is a mini-fundamentals of engineering type examination.
4131. **Special Topics in Technology (1:1:0)**. Prerequisite: Approval of chairperson. Individual studies in special areas of technology.
4231. **Introduction to Project Management (2:2:0)**. Introduces MTEC and ETEC majors in engineering technology to the basic principles of project management. Curriculum content includes student's use of project management scheduling software. (Writing Intensive)
4300. **Cooperative Education (3)**. Prerequisite: Junior standing and approval of department chairperson. Practice in industry and written reports. Maximum of six semester credit hours may be earned and applied to degree requirements.
4322. **Cost and Profit Analysis for Engineering Technologists (3:3:0)**. Prerequisite: Senior standing or approval of option coordinator. Application of engineering economics to engineering technology disciplines. Factors of time, cost, profit, and risk are evaluated and when applicable integrated into the decision process. Ethical issues are examined.
4331. **Special Topics in Technology (3)**. Prerequisite: Advanced standing and approval of chairperson. Individual studies in special areas in technology. May be repeated for credit.

Mechanical Engineering Technology (MTEC)

Undergraduate Courses

General Engineering Technology (GTEC)

Undergraduate Courses

1112. [ENGT 1409] **AC/DC Lab (1:0:3)**. Course to be taken concurrently with GTEC 1312 for ETEC and MTEC students.
1211. **Computer Programming (2:1:2)**. Theory and practice in logical solutions of numerical problems. Introduction to computer languages. Computer programming using an appropriate level language.
1312. [ENGT 1409] **Alternating and Direct Current Technology (3:2:3)**. Prerequisite: MATH 1350; corequisite: PHYS 1404 and GTEC 1211. Principles of electrical and magnetic circuits and their application in the operation of electrical power equipment. (Writing Intensive)
2151. **Introduction to Thermodynamics Lab (1:0:3)**. Prerequisite: PHYS 1403 and MATH 1351; corequisite: GTEC 2351. Provides a laboratory experience to compliment the lecture course GTEC 2351. (Writing Intensive)
2311. **Applied Mechanics Statics (3:3:0)**. Prerequisite: PHYS 1403 and MATH 1351. Equilibrium of particles and rigid bodies.
1312. [ENGT 2310] **Mechanical Technology (3:2:3)**. Introduction to manufacturing processes and plant operations; plant visits and field trips; familiarization with equipment and instruments; metal fabrication, machine tools, weld, heat treating, and associated safety practices.
3206. **Advanced Graphical Design Methods in Engineering (2:1:2)**. Prerequisite: E GR 1306. Advanced graphical design methods to include 3-D assembly drawings and finite element analysis using appropriate software.
3342. **Process Automation (3:2:3)**. Prerequisite: MTEC 1312 and junior standing. Selected topics in automated manufacturing systems including: numerical controlled machinery, programmed controllers, robotics, inspection, and material handling devices. F
3370. **Introduction to Quality Control (3:3:0)**. Introduction to statistical process control methodology. Control charts and total quality management tools and techniques are examined.
3412. **Analysis of Vapor and Gas Cycles with Laboratory (4:3:3)**. Prerequisite: GTEC 2151, 2351. Evaluation of power and refrigeration cycles. Laboratory study of the component equipment of refrigeration and power cycles.
3441. **Materials Technology (4:3:3)**. Prerequisite: Junior or senior standing. Introduction to the fundamental nature of the structure and properties of engineering materials, their mechanical properties, and behavior based upon their composition.
4170. **Capstone Design Course I (1:1:0)**. Prerequisite: Senior standing and consent of the instructor. The design and analysis of mechanical engineering projects. Topics included will be the design process, design for manufacturability, concept evaluation, codes and standards, reliability, tolerances, quality, scheduling, and working in teams. Projects will be chosen and worked upon in preparation for MTEC 4270. F (Writing Intensive)
4270. **Capstone Design Course II (2:0:6)**. Prerequisite: MTEC 4170. A continuation of MTEC 4170 with emphasis on the application of the material previously learned to complete respective design projects. Projects will vary from semester to semester. S.

4311. **Air Conditioning System Design I (3:3:0)**. Prerequisite: GTEC 2351. The design and arrangement of air conditioning systems. Calculation of heating and cooling loads, piping design, and duct design. Psychrometric system analysis.
4312. **Applied Energy Conversion (3:3:0)**. Prerequisite: MTEC 3412. Overview of modern power plants and the thermodynamics of steam power stations. Analysis and design of turbines. Introduction to alternative energy conservation. F, even years.
4313. **Air Conditioning System Design II (3:3:0)**. Prerequisite: MTEC 4311. Continuation of MTEC 4311 with energy use estimations, energy conservation, automatic controls, selection of fans and pumps, and a design project. S, odd years.
4321. **Mechanical Technology Laboratory (3:0:6)**. Prerequisite: Senior standing and consent of the instructor. Senior projects laboratory. Testing and analysis of components of heat power, refrigeration, and mechanical systems. S. (Writing Intensive)
4332. **Specialized Topics in Mechanical Technology (3)**. Prerequisite: Senior standing and consent of instructor. In-depth study of specialized topics of particular interest to the mechanical technologist. May be repeated for credit.
4351. **Mechanisms of Machinery (3:3:0)**. Prerequisite: MATH 1351 and GTEC 2311. Kinematic analysis and synthesis of cams, gears, and linkages. Applications to machine elements and assemblies. F.
4352. **Dynamics of Machinery (3:3:0)**. Prerequisite: GTEC 2311, MTEC 4351. Study of dynamic forces generated in machinery. Balancing of rotating machines. Analysis of gyroscopes and vibration of mechanical systems. S.
4353. **Mechanical Design (3:3:0)**. Prerequisite: GTEC 3311, MTEC 3441, MTEC 4351. Analysis of stresses and deformations in machine elements. Analysis of strength of machine elements including theories of failure. Design of mechanical elements such as shafts, screws, columns, springs, journal bearings, roller and ball bearings, spur gears, and flexible mechanical elements. F.



Department of Industrial Engineering

Faculty

Patrick E. Patterson, Ph.D., Chairperson

Professors: Beruvides, Kobza, Patterson, J. Smith, M. Smith, Woldstad, Zhang

Associate Professors: Liman

Assistant Professors: Matis, Rivero, Simonton

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Industrial Engineering
- Master of Science in Industrial Engineering
- Master of Science in Systems and Engineering Management
- Master of Science in Manufacturing Systems and Engineering
- Doctor of Philosophy in Industrial Engineering
- Doctor of Philosophy in Systems and Engineering Management

Mission. The mission of the department is to provide the highest quality of industrial engineering education by stimulating discovery, integration, application, and communication of knowledge.

Program Educational Objectives. The objectives of the industrial engineering program are as follows: To graduate well-rounded industrial engineers who are employed in industrial engineering related jobs or study in graduate programs; to graduate industrial engineers who have a strong sense of professionalism, with respect for fellow workers and their profession; and to provide graduates with a set of skills that allows them to grow professionally and provide service and leadership in their careers.

Program Overview. Modern industrial engineering is a combination of basic engineering knowledge and quantitative analysis techniques to support managerial decision making. Industrial engineers use the information and techniques from physical, mathematical, biological, behavioral, and engineering sciences to plan, control, design, and manage complex organizations and systems. Just as the other branches of engineering use the laws of physical sciences in designing and operating a product, industrial engineering applies these same laws to designing and operating systems in which these products are produced or in which services are provided. The major distinction between industrial engineering and other branches of engineering is that the industrial engineer must consider not only the behavior of inanimate objects, as they are governed by physical laws, but also the behavior of people as they interface with inanimate objects and as they operate together in organizations, whether these organizations be simple or complex.

The curriculum provides students with an opportunity to apply their engineering, mathematical, and science knowledge to design systems (production or processes) and solve engineering problems. Students learn to function on teams, communicate effectively, design and conduct experiments, and utilize current engineering tools. Students gain an understanding of their professional and ethical responsibilities as they examine contemporary issues and the impact of engineering solutions in the global workplace. Perhaps most importantly, students learn to learn so that they can continue to update their industrial engineering skills throughout their careers.

The curriculum is continually evaluated by faculty, students, alumni, and industry to provide a contemporary industrial engineering program that meets the needs of our customers. A variety of assessment tools are utilized in the evaluation process. Program changes are implemented on an ongoing basis.

Undergraduate Program

Students entering the industrial engineering program are assigned a faculty advisor and are responsible for arranging a course of study with the advisor's counsel and approval. Programs leading to joint B.S.–M.S. degrees requiring 150 credit hours are available. Students interested in these programs should inform their academic advisor during the first semester of the junior year. Both thesis and nonthesis M.S. degree programs are included in this joint degree program with the nonthesis M.S. requiring 6 additional credit hours.

The curriculum is designed to provide a comprehensive education in industrial engineering and to balance the breadth and depth of instruction to develop effective engineers. The minimum hours required for graduation is 127. The courses are offered so that progress through the program is efficient and flexible to accommodate the needs of individual students. A faculty advisor assists each student with his or her individual program on a semester by semester basis.

The department follows the general standards and requirements of the College of Engineering. Any student requesting an exception must submit a written request and any supporting documentation to the Industrial Engineering Undergraduate Curriculum Committee for its approval.

Industrial Engineering (I E)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1101. Introduction to Industrial Engineering (1:1:0).** The profession of industrial engineering, history of production systems, the profession and its relation to resources utilization and control.
- 1305. Engineering Analysis (3:3:0).** Use of microcomputers in engineering analysis and design. Structured programming languages.
- 2301. Engineering Design in Production Operations (3:3:0).** The engineering design process applied to development management objectives, resource planning, product design, production operations, and engineering design team operations. (Writing Intensive)
- 2331. Professional Communication for Engineers (3:3:0).** Prerequisite: ENGL 1302. Rhetorical theory and conventions applied to communication strategies for engineering practice in the global workplace, addressing collaboration, ethical situations, community service, and electronic communication.
- 2351. Principles of Industrial Automation (3:2:3).** Prerequisite: I E 1305. Principles of design of industrial automation and real-time systems using structured languages. Hardware and software interfacing.
- 3301. Engineering Economic Analysis (3:3:0).** Prerequisite: MATH 1351. Evaluation of engineering proposals using time value of money. Selections between alternatives, break even and minimum cost studies, depreciation, taxes, replacement studies, life cycle costing, and inflation.
- 3311. Operations Research I (3:3:0).** Corequisite: MATH 2350. Introduction to operations research, linear programming, dynamic programming, integer programming, traveling salesman problem, transportation, and assignment problems.
- 3341. Engineering Statistics (3:3:0).** Corequisite: MATH 2350. Descriptive statistics, probability theory, discrete and continuous distributions, point and interval estimates, sampling distributions, one- and two-parameter hypothesis testing, simple linear regression, and linear correlation.
- 3343. Quality Assurance and Engineering Statistics (3:3:0).** Prerequisite: I E 3341. Quality assurance systems, quality control and statistical quality control (including control charting, acceptance sampling, quality costs, and loss functions), multiple linear regression, goodness of fit testing, and introduction to experimental design.
- 3351. Manufacturing Engineering I (3:2:3).** Prerequisite: M E 2311, PHYS 1408, or consent of instructor. Properties of materials as related to manufacturing. Processing methods for metals, plastics, ceramics, semiconductors, and composites. Process selection, planning, and economics.
- 3361. Work Analysis and Design (3:2:3).** Corequisite: I E 3341. Principles and techniques of work measurement, methods

Curriculum for Industrial Engineering

		FIRST YEAR		
		Fall	Spring	
I E 2301, Engr. Design Prod.	3	I E 1101, Intro. to I E	1	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3	
CHEM 1307, Prin. of Chem. I	3	E GR 1206, Engr. Graphics	2	
CHEM 1107, Prin. Chem. I (Lab.)	1	CHEM 1308, Prin. of Chem II	3	
Social Science—Humanities*	3	CHEM 1108, Prin. of Chem II Lab.	1	
TOTAL	16	I E 1305, Engr. Anal.	3	
		TOTAL	16	
		SECOND YEAR		
		Fall	Spring	
I E 2331, Pro. Comm. for Engr.††	3	I E 3301, Engr. Eco.	3	
MATH 2350, Calculus III	3	M E 2311, Materials	3	
PHYS 1408, Prin. of Phys. I	4	MATH 3350, Higher Math Engr. I	3	
C E 2301, Statics	3	Social Science—Humanities*	3	
Social Science Elective*	3	PHYS 2401, Prin. of Phys. II	4	
TOTAL	16	TOTAL	16	
		THIRD YEAR		
		Fall	Spring	
I E 3351, Manuf. Engr.	3	I E 3311, Operations Research I	3	
I E 3341, Engr. Stat.	3	I E 3343, Q. C. & Engr. Stat.	3	
I E 3361, Work Anal. & Des.	3	I E 3371, Production Contr.	3	
M E 2322, Engr. Thermo. I	3	I E 3372, Mgt. Syst. Contr.	3	
Soc. Sci.—Humanities*	3	E E 3301, General Elec. Engr.	3	
TOTAL	15	Soc. Sci.—Humanities*	3	
		TOTAL	18	
		FOURTH YEAR		
		Fall	Spring	
I E 4311, Operations Res. II	3	I E 4333, Senior Design Proj.	3	
I E 4361, Engr. Des. for People	3	I E Electives†	6	
I E Elective†	3	C E 3302, Dynamics,	3	
I E 4351, Facilities Planning	3	or C E 3303, or M E 3331		
Engineering Elective^	3	Soc. Sci.—Humanities*	3	
TOTAL	15	TOTAL	15	

Minimum hours required for graduation—127

* Choose from Core Curriculum requirements.

† I E electives from the following courses: I E 2351, 4320, 4331, 4352, 4362, 4363.

^ Engineering elective from the following courses: C E 3302, 3303, 3305, M E 3331, 3370.

- engineering, workplace design, work sampling, and predetermined time systems. Basic ergonomic principles applied to workplace design and physiological work measurement.
- 3371. Production Control (3:3:0).** Prerequisite: I E 3341. Production control systems, production planning, forecasting, scheduling, materials and inventory control systems and models, learning curves, critical path methods of PERT and CPM.
- 3372. Management Systems Control (3:3:0).** Prerequisite: Junior standing. Cost control techniques for management, methods of financial statement analysis, capital and expense budgets, cost ratios, cost behavior, pricing methods, and overhead allocation methods.
- 4311. Operations Research II (3:3:0).** Prerequisite: I E 3311 or equivalent and a working knowledge of microcomputer operation. Fundamentals of Monte Carlo methods. Systematic development, programming, and analysis of computer simulation models using a high-level simulation language such as GPSS or Arena.
- 4320. Fundamentals of Systems (3:3:0).** Basic foundations and applications of general systems theory applied to engineering and organizational enterprises addressing systems efficiency, effectiveness, productivity, economics, innovation, quality, and QWL.
- 4331. Individual Studies in Industrial Engineering (3).** Prerequisite: Advanced standing and departmental approval. May be repeated.
- 4333. Senior Design Project (3:3:0).** Prerequisite: Industrial engineering senior and have completed all 3000-level I E courses. Individual industrial engineering design project. Applications of systems thinking, oral and written communications, professionalism, and ethics. (Writing Intensive)
- 4351. Facilities Planning and Design (3:3:0).** Prerequisite: I E 3311, 3361, 3371. Modern plant layout and materials handling practices, stressing the importance of interrelationships with

Graduate Program

The Master of Science in Industrial Engineering (M.S.I.E.), Master of Science in Systems and Engineering Management (M.S.S.E.M.), Master of Science in Manufacturing Systems and Engineering (M.S.M.S.E.), the Doctor of Philosophy in Industrial Engineering, and the Doctor of Philosophy in Systems and Engineering Management programs prepare competent industrial engineers and engineering managers for industry, consulting, university teaching and research.

With the counsel of a graduate advisor, students are expected to design individualized academic programs. The master's level programs consist of two options: (1) a 30-hour thesis option, including 6 credit hours of thesis research, and (2) a 36-hour nonthesis option. The course selection may include a minor in an area outside industrial engineering.

Master's and Ph.D. programs incorporate courses taken in each of the three specialty areas below.

- **Ergonomics and Human Factors Engineering:** Occupational biomechanics, work physiology, industrial ergonomics, environmental hygiene, cognitive engineering, human performance, human computer interaction, and occupational safety.
- **Manufacturing and Quality Assurance:** Manufacturing engineering and design, computer integrated manufacturing/CAD/CAM, process analysis and economics, automated manufacturing and process planning, programmable control systems, reliability and maintainability, on-line and off-line quality assurance, and total quality assurance.
- **Operations Research and Systems and Engineering Management:** Simulation modeling, scheduling and sequencing, just-in-time production systems, inventory and production control, linear and nonlinear programming, network analysis, artificial intelligence and expert systems, systems theory, decision theory, industrial cost analysis, advance engineering economics, performance improvement in organizations, project management, and productivity management.

The Master of Science in Systems and Engineering Management (M.S.S.E.M.) program is offered both on campus and by distance education and is designed to prepare its graduates for positions in technical management. The M.S. in Manufacturing Systems and Engineering and the M.S. and Ph.D. in Systems and Engineering Management are offered at the Texas Tech University at Amarillo off-campus site. Details regarding admission and degree requirements are available from the department.

management planning, product and process engineering, methods engineering, and production control.

4352. **Manufacturing Engineering II (3:3:0).** Prerequisite: I E 3351 or consent of instructor. Introduction to computer-aided manufacturing. Computer-aided process planning; control and monitoring of processes. Numerical control and industrial robots.
4361. **Engineering Design for People (3:2:3).** Prerequisite: I E 3361. Design of systems for human use, including human sensory and information processing abilities, human-machine system design processes and principles, and reduction of human error in systems design.
4362. **Industrial Ergonomics (3:2:3).** Prerequisite: I E 3361. Advanced ergonomics principles. Emphasis on physiological, biomechanical, and psychological assessment of work. Establishing human capabilities and limitations.
4363. **Work and Product Safety Engineering (3:3:0).** Prerequisite: Junior or senior standing. Principles of design for work and product safety, accident theory, loss prevention, accident cost analysis, standards and regulations, system safety, hazards recognition, evaluation and control, product safety, and liability.

Graduate Courses

5301. **Ergonomics and Design (3:2:3).** Prerequisite: Consent of instructor. Functional anatomy and physiology of the musculoskeletal system and their applications in work design. Intro-

duction to work physiology, kinesiology, and anthropometry and their applications.

5302. **Environmental Ergonomics (3:2:3).** Prerequisite: Consent of instructor. Evaluation, measurement, and control of the physical environment. Environments considered include: heat, cold, noise, vibration, light, radiation, and air contaminants.
5303. **Work Physiology (3:2:3).** Prerequisite: Consent of instructor. Study of cardiovascular, pulmonary, and muscular responses to work, including energy costs of work endurance, fatigue, physical work capacity, and physiological modeling.
5304. **Occupational Biomechanics (3:2:3).** Prerequisite: Consent of instructor. Historical development and theoretical fundamentals of body mechanics. The body link system and kinematic and kinetic aspects of body movement. Applications to work systems.
5305. **Cognitive Engineering (3:3:0).** Prerequisite: Consent of instructor. Implications of human perceptual, cognitive, and psycho-motor capabilities for the design of systems for effective human use and control.
5306. **Safety Engineering (3:3:0).** Prerequisite: Consent of instructor. Loss prevention principles, practice, and regulations; accident factors, models, costs, and analysis; systems safety; product safety; safety and health related workplace hazards.
5307. **Loss Assessment and Control (3:3:0).** Prerequisite: I E 4363 or I E 5306 or consent of instructor. Advanced topics in worker safety and health; hazard recognition and analysis; system safety techniques and applications; loss assessment and control.
5309. **Human Factors in Engineering and Design (3:3:0).** Introduction to human factors issues in the design of human-machine systems. Design of workstations, controls, and displays, human-computer interfaces, and the environment in industrial systems.
5311. **Principles of Optimization (3:3:0).** Prerequisite: Consent of instructor. Linear optimization models: theory and application. Includes simplex, revised simplex, dual, and primal-dual algorithms, sensitivity and parametric analysis, duality theory, decomposition, linear complementarity problem, assignment and transportation problems, and Karmarkar's algorithm.
5312. **Queueing Theory (3:3:0).** Prerequisite: Consent of instructor. Modeling and analysis of simple and complex service systems. Includes single and multiple server Markov queues, queues with general arrival processes and service times, bulk and batch queues, priority queues, and queueing networks.
5314. **Multistage Decision Processes (3:3:0).** Prerequisite: I E 3311 or 5311 or consent of instructor. Discrete dynamic programming: Knapsack problem, path problems, equipment replacement, capacity expansion, inventory, partitioning problems, sequencing problems; introduction to continuous dynamic programming; Markov decision processes.
5316. **Simulation Models for Operations Analysis (3:3:0).** Prerequisite: Any scientific programming language. Application of simulation techniques to analysis of large scale operations. Production-distribution models; model construction; validation of simulation models; limitations of simulation techniques; programming with simulation languages.
5317. **Statistical Analysis for Digital Simulation (3:3:0).** Prerequisite: I E 5366 or proficiency in a current discrete event simulation language. Generation of random variates. Statistical tests for randomness in random number streams. Collection and analysis of data for input parameters and distributions. Detection and removal of transients in simulation model data. Computation of variance of simulation model output; variance reduction techniques.
5318. **Operations Research Modeling with Spreadsheets (3:3:0).** Development of models for linear, integer, and nonlinear programming; problem formulation, solution, and analysis. Monte Carlo models; sampling methods; and accuracy. Software for current spreadsheet packages.
5319. **Risk Modeling and Assessment (3:3:0).** Probabilistic risk models; probability distributions for risk modeling; input data for risk modeling; low probability events; risk modeling software; and analysis of risk modeling results.
5320. **Systems Theory (3:3:0).** Examines theoretical foundations of general systems theory applied to engineering and organizational enterprises addressing issues of systems efficiency, effectiveness, productivity, economics, innovation, quality, and QWL.
5321. **Decision Theory (3:3:0).** Prerequisite: Consent of instructor. Philosophy, theory, and practice of management; decision theory and social responsibility.
5322. **Industrial Cost Analysis (3:3:0).** Cost analysis and/or control of industrial enterprises. Economic budgeting, planning,

- decision making, and financial analysis for engineering and engineering management.
5323. **The Engineering Management Environment (3:3:0).** Management of research and development; the legal, financial, and professional interrelationships of engineers and their environment in relation to the modern production organization.
5324. **Advanced Economics of Systems (3:3:0).** Prerequisite: I E 3301, equivalent, or consent of instructor. Design analysis and sensitivity of complex economic systems with evaluation of economic system performance measures and modeling.
5325. **Productivity and Performance Improvement in Organizations (3:3:0).** Productivity and performance improvement (including efficiency, effectiveness, quality, QWL, innovation, profitability, and budget ability theories, techniques, analysis, and applications for industrial systems.
5327. **Inventory Systems (3:3:0).** Prerequisite: I E 3341 or consent of instructor. Deterministic and stochastic systems with static and dynamic models; just-in-time systems. Forecasting techniques, MRP and case studies in inventory systems management.
5328. **Activity Scheduling (3:3:0).** Prerequisite: I E 3371 or consent of instructor. Deterministic sequencing of single machine, parallel machines, flow shops, and job shops. Theory of complexity. Optimization and heuristic algorithms for combinatorial sequence generation.
5329. **Project Management (3:3:0).** Technical, organizational, and personnel project management examination including planning, estimating, budgeting, scheduling, resources management, control. Risk analysis and management using software for project performance evaluation.
5331. **Theoretical Studies in Advanced Industrial Engineering Topics (3).** Prerequisite: Consent of instructor and departmental approval. Individual theoretical study of advanced topic selected on the basis of departmental recommendation. May be repeated.
5332. **Experimental Investigation in Advanced Industrial Engineering Topics (3).** Prerequisite: Consent of instructor and departmental approval. Individual experimental study of an advanced topic selected on the basis of departmental recommendation. May be repeated.
5340. **Robust Design and Optimization for Systems (3:3:0).** Prerequisite: Consent of instructor. Experimental, analytical, and optimization approaches for the design and operation of integrated systems emphasizing quality and resource allocation concepts, strategies, and tools.
5342. **Design of Experiments (3:3:0).** Prerequisite: I E 3341 or equivalent. Single factor, factorial, blocked, split plot designs. Means comparisons, contrasts, estimates of variation. Confounding and fractional factorials.
5344. **Statistical Data Analysis (3:3:0).** Prerequisite: I E 3341 or equivalent. Exploratory data analysis, graphical displays and analysis. Linear and nonlinear regression, response surfaces. Selected mainframe and microcomputer packages.
5345. **Reliability Theory (3:3:0).** Prerequisite: I E 3341 or equivalent. System level reliability, redundancy, maintainability, and availability analysis and modeling. Life testing, acceleration, parametric, and nonparametric models.
5346. **Total Quality Systems (3:3:0).** Prerequisite: Consent of instructor. Total quality philosophy, customer definition and demands, quality strategies, planning and integration, benchmarking, team structures and interaction, supplier qualification, and quality audits.
5351. **Advanced Manufacturing Processes (3:3:0).** Prerequisite: Consent of instructor. Advanced topics in manufacturing materials and processes, including metallurgical considerations, nonmetallic materials, deformation processes, metal removal theory, and process economics.
5352. **Advanced Manufacturing Engineering (3:3:0).** Prerequisite: Consent of instructor. Advanced topics in manufacturing engineering, including manufacturing systems, production integration, cellular manufacturing, group technology, intelligent manufacturing, concurrent engineering, and life-cycle product design engineering.
5353. **Lean Tools for Manufacturing (3:3:0).** Lean philosophy principles; tools for identification of "waste" time (time and/or resources); value stream mapping, Kanban, Kaizen, and Six Sigma concepts applied to an industrial project.
5354. **Computer Control in Manufacturing (3:3:0).** Prerequisite: Consent of instructor. Theory and application of computer control of machines and processes used in manufacturing systems. Relevant issues on the analysis, design, and implementation of computer controlled systems.
5355. **Computer-Aided Manufacturing (3:3:0).** Prerequisite: Consent of instructor. Computer usage in manufacturing systems, CAD/CAM, numerical control, CNC, DNC, computer-aided process planning, manufacturing engineering database systems, industrial robot applications, flexible manufacturing systems, and integration of CAD and CAM.
6000. **Master's Thesis (V1-6).**
6323. **Systems Management Global Environment (3:3:0).** Prerequisite: Admission to the doctoral program. This course explores the critical quantitative as well as qualitative issues shaping the practice and research of systems-technical management.
6329. **Systems Management Seminar (3:3:0).** Prerequisite: Admission to the doctoral program. Doctoral research seminar exploring the latest trends in systems engineering and technical management research.
6331. **Advanced Industrial Engineering Topics (3).** Prerequisite: Doctoral degree status and departmental approval. Advanced theoretical and/or empirical studies in industrial engineering, ergonomics-human factors, quality or manufacturing engineering, or OR-engineering systems management.
6399. **Research Methods in Science and Technology (3:3:0).** Prerequisite: Doctoral degree status and design of experiments or equivalent. Examines the research process and differing methodological approaches to research in laboratory, industrial, field work, and case study settings.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Manufacturing Systems and Engineering (MSE)

(To interpret course descriptions, see page 8.)

Graduate Courses

5101. **Graduate Seminar of Advanced Manufacturing Systems and Engineering (1:1:0).** Prerequisite: Advancement to enrollment status of the M.S. in Manufacturing Systems and Engineering program. Discussion of advanced manufacturing systems and engineering.
5333. **Manufacturing Systems and Engineering Internship (3).** Prerequisite: Consent of instructor and program advisor. Internship carried out under the supervision of the program graduate advisor, the student's major advisor, and/or project manager of the internship provided by industrial companies. The internship must take place at the approved major industrial companies within the state of Texas with careful planning in advance.
6000. **Master's Thesis (V1-6).** Prerequisite: Advancement to candidacy status. Thesis research carried out under the supervision of the student's major advisor.



Department of Mechanical Engineering

Faculty

Jharna Chaudhuri, Ph.D., Chairperson

Professors: Anderson, Barhorst, J. Berg, Chaudhuri, Chyu, Eibeck, Ertas, Hashemi, Jankowski, Levitas, Maxwell, Parameswaran

Associate Professors: Ekwaro-Osire, James, Oler, Pantoya, Rasty

Assistant Professors: Bhattacharya, Han, He, Idesman, Ma, Smirnov, Tate

Lecturers: C. Berg, Fanning, Mosedale

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Mechanical Engineering
- Master of Science in Mechanical Engineering
- Doctor of Philosophy in Mechanical Engineering

Vision. The vision of the department is to be recognized for exceptional undergraduate and graduate education in the art, science, and practice of mechanical engineering.

Mission. The mission of the department is to offer students nationally recognized educational opportunities grounded in the fundamentals of mechanical engineering and involving state-of-the-art technology. The department programs support technological development and innovation to meet many goals, including the needs of society. Faculty and student participation in design projects, research, or other similar activities is considered essential to their professional development. The education opportunities are to take place in a collegial environment of effective instruction and counsel.

Program Educational Objectives. The program educational objectives embody the expected accomplishments of graduates in the first few years after graduation. The program educational objectives of the department of mechanical engineering as adopted by its constituents are as follows. As engineers, graduates will:

- Apply their knowledge and skills to solve (engineering) problems both well posed and ill defined.
- Be recognized for their professional contributions in industry, academia, and government.
- Provide effective technical, strategic, and administrative leadership of teams and organizations.
- Continue a process of independent lifelong learning and (as applicable) are successful in graduate schools.
- Know and fulfill ethical and professional responsibilities as embodied in the Engineering Code of Ethics.

These objectives are published in the university's catalog, mechanical engineering's Web page, and in information sent to potential students.

Program Overview. Mechanical engineering is the broadest of the engineering disciplines with a curriculum providing a strong foundation in mathematics and the physical sciences of chemistry and physics followed by an in-depth education in five of the principal engineering sciences—thermal science, fluids engineering, mechanics and materials, dynamics and controls, and mechanical design. The program in mechanical engineering provides students the ability to apply their engineering, mathematics, and science knowledge to design mechanical systems and to solve engineering problems. Students learn to design and conduct experiments, to communicate effectively, to function in teams, and to utilize modern engineering tools. Students gain an understanding of their professional and ethical responsibilities as engineers. Perhaps most important, students are prepared for the lifelong learning necessary to function effectively as the practice of engineering evolves.

Graduates with a degree in mechanical engineering will find employment opportunities covering a wide spectrum, including the aerospace, automotive, petroleum production and refining indus-

tries, petrochemicals, electrical power, electronics, semiconductors and computers, manufacturing, and production, as well as research positions in industry and government laboratories. Problem-solving techniques learned in the mechanical engineering curriculum are also applied to continued educational pursuits or graduate study in engineering, as well as in areas such as law, medicine, business administration, and other professions.

The department requires students to have computational devices for use in the classroom and at home. Each student is required to have a scientific calculator for use in the classroom. Students are also expected to have a personal computer for use at home. At a minimum, this computer should support high-level programming languages such as C and application packages such as word processing, spreadsheets, and mathematical analysis software.

Undergraduate Program

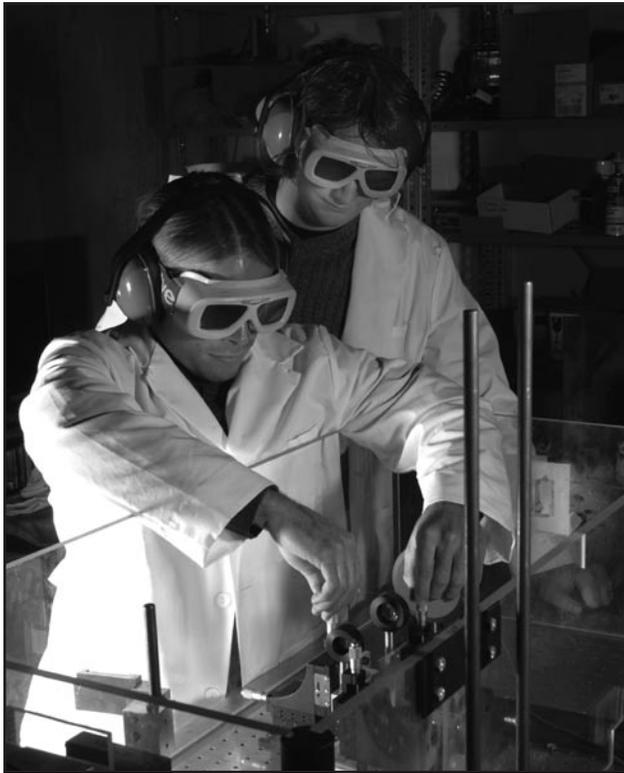
Freshman Admission. To gain admission into mechanical engineering, entering freshmen or transfer students with less than 12 hours of transferable college work must meet the university's published assured admission standards. Students who are interested in declaring mechanical engineering as their major but do not meet the assured admission requirements will enter with the major of engineering undecided. Note that while not eligible for admission to mechanical engineering, these students may be eligible for admission to other engineering programs at Texas Tech.

Transfer Admission. Transfer students to Texas Tech or students who wish to change their major to mechanical engineering from engineering undecided or another major at Texas Tech must have completed a minimum of 12 hours of transferable college work that includes Calculus (MATH 1351) and Chemistry I (CHEM 1307/1107) with an adjusted GPA of 2.5. This GPA criteria is subject to change based on the current enrollment and enrollment trends in the Department of Mechanical Engineering.

Enrollment in Mechanical Engineering Courses. Enrollment in Introduction to Mechanical Engineering (M E 1315) is open to all students accepted for admission to Texas Tech University. Enrollment in any mechanical engineering course beyond M E 1315 requires official admission to the Department of Mechanical Engineering or another engineering program at Texas Tech University. Students in the engineering undecided program are not eligible for enrollment in mechanical engineering courses beyond M E 1315.

150-Hour Combined Bachelor's–Master's Degree Program. The department has recently implemented a combined B.S.–M.S. program that will allow qualified students to obtain a Master of Science in Mechanical Engineering (M.S.M.E.) degree through an additional 12-15 months of study beyond the bachelor's degree. Students enrolled in the program will follow the standard undergraduate mechanical engineering curriculum for coursework through the first seven semesters shown in the mechanical engineering curriculum below. In the final undergraduate semester, two graduate courses will be substituted for the mechanical engineering and design electives, which will be waived. At this time the student receives the Bachelor of Science in Mechanical Engineering degree. The two graduate courses taken in the final undergraduate semester are applied to the student's master's program. In addition, during the final undergraduate semester, the student will be expected to contact faculty in the department in order to identify possible research areas for the master's thesis. The completion of the M.S.M.E. program would then typically require an additional 12-15 months of study. Applications for admission to this program may be obtained from the department and must be submitted prior to completion of the junior year. Further information on this combined program is available from the department.

Co-Op Program. Mechanical engineering students are encouraged to consider the College of Engineering Co-op program. This normally involves three work assignments in industry for a cumu-



Graduate Program

Students seeking master's or doctor's degrees should consult the graduate advisor for the department about their plans of study before enrolling for any courses. The student may wish to emphasize coursework and research activities in any one of the following areas: thermal sciences, fluid mechanics, dynamics and controls, design, solid mechanics and materials, or multidisciplinary studies.

Before being recommended for admission to a master's degree program with a major in this department, the student may be requested to take a preliminary examination to determine proficiency in background for graduate work or may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the department.

Three general plans of study are available for the Master of Science degree: (1) the thesis option consisting of 30 hours (six hours of thesis credit and 24 hours of graduate coursework); (2) the nonthesis report option consisting of 36 hours (33 hours of graduate coursework and three hours of credit for the master's report); and (3) the nonthesis coursework only option (36 hours of graduate coursework). The decision on which plan to follow is made jointly by the student and the advisor. Each option has a set of required core courses and a set of elective courses that are selected in consultation with the student's advisor. Each of the three options requires a final comprehensive evaluation during the semester of intended graduation. Departmental guidelines for coursework, advisory committees, and the final evaluation can be obtained from the department's graduate advisor.

The department has no specific foreign language requirement. Research tools are included as an integral part of the degree program in the leveling, minor, or major courses of each student. All courses are determined by the student's advisory committee. Additional information may be obtained from the department.

relative duration of one year. These work assignments are normally completed prior to the start of the senior year. Co-op students gain valuable real-world engineering experience that enhances the academic experience on campus and provides excellent preparation for a career in industry.

General Academic Requirements. Students are expected to follow the course sequence presented in the mechanical engineering curriculum table. Students whose high school courses do not include chemistry, physics, mathematics through analytical geometry, and at least two credits of a foreign language will be required to take additional coursework during an adjusted first year of study. All students must earn a grade of C or better in all courses. The department rigorously enforces prerequisite requirements for all courses.

Mechanical Engineering (M E)

To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1315. Introduction to Mechanical Engineering (3:2:2).** Corequisite: MATH 1351. Introduction to the mechanical engineering discipline including familiarization with the thermal and mechanical sciences, engineering problem solving, discussion of professionalism and ethics, and experiences in team design projects.
- 2311. Materials Science (3:3:0).** Prerequisite: CHEM 1307 and MATH 1352. Fundamental thermodynamic and chemical nature of the structure and properties of materials.
- 2322. Engineering Thermodynamics I (3:3:0).** Prerequisite: MATH 2350 and PHYS 1408. Properties of pure substances, ideal gas behavior, first and second law analysis, and applications to energy conversion and power cycles.

Curriculum for Mechanical Engineering

FIRST YEAR

Fall	Spring
MATH 1351, Calculus I	MATH 1352, Calculus II
CHEM 1307, Prin. of Chem. I	PHYS 1408, Prin. of Phys. I
CHEM 1107, Prin. Chem. I (Lab.)	ENGL 1302, Adv. Coll. Rhetoric
ENGL 1301, Ess. Coll. Rhetoric	E GR 1206, Engr. Graphics
M E 1315, Intro to Mech. Eng.	Elective (History)*
HIST 2300, History of U.S. to 1877	TOTAL
TOTAL	15

SECOND YEAR

Fall	Spring
MATH 2350, Calculus III	MATH 3350, Higher Math. Engr. I
PHYS 2401, Prin. of Phys. II	M E 2322, Engr. Thermo. I
E E 3301, General E E	M E 2364, Engr. Mechanics I
M E 2311, Materials Science	*Elective (Political Science)
POLS 1301, Amer. Govt., Org.	*Elective (Oral Communication)
TOTAL	TOTAL
16	15

THIRD YEAR

Fall	Spring
M E 3464, Engr. Mechanics II	M E 3322, Engr. Thermo. II
M E 3164, Engr. Mech. II Lab.	M E 3328, Materials & Mech. Lab.
M E 3315, Computer-Aided Analysis	M E 3433, Systems & Vibrations
M E 3331, Dynamics	M E 3365, Intro. to Design
M E 3370, Fluid Mechanics	M E 3165, Intro. to Design (Lab.)
I E 3301, Engr. Econ. Anal.	M E 3371, Heat Transfer
TOTAL	TOTAL
17	17

FOURTH YEAR

Fall	Spring
M E 4334, Cont. Dynamic Sys.	M E 4371, Engr. Design II
M E 4351, Thermal-Fluid Sys. Lab.	Elective (Mech. Engr. Design)**
M E 4370, Engr. Design I	Elective (Math or Science)**
MATH 3342, Math. Stat. Engr. Sci.	Elective (Mech. Engr.)**
ENGR 4101, F.E. Exam	Elective (Visual/Performing Arts)*
Elective (Humanities)*	TOTAL
Elective (Multicultural)†	15
TOTAL	19

Minimum hours required for graduation—127

* Choose from Core Curriculum requirements.

** Select from departmentally approved list.

† Requirement can be met in combination with either humanities or visual and performing arts courses.

2364. **Engineering Mechanics I (3:3:0)**. Prerequisite: MATH 1352, PHYS 1408. Statics of particles and rigid bodies; equilibrium, friction centroids and virtual work.
3164. **Engineering Mechanics II Laboratory (1:0:3)**. Corequisite: M E 3464. Introduces students to the use of finite elements software to perform load and stress analysis on mechanical components.
3165. **Introduction to Design Lab (1:0:3)**. Prerequisite: M E 3464, 3164; corequisite: M E 3365. Computer-based design and analysis exercises in mechanical engineering.
3315. **Computer-Aided Analysis (3:2:2)**. Prerequisite: M E 1315 and PHYS 1408; corequisite: MATH 3350. Introduces numerical methods used in solution of typical engineering problems. Includes design activity.
3322. **Engineering Thermodynamics II (3:3:0)**. Prerequisite: M E 2322. Principles of thermodynamics for general systems, cycle analysis, availability and irreversibility, thermodynamics of state, thermodynamics of nonreacting and reacting mixtures. Includes design activity.
3328. **Materials and Mechanics Laboratory (3:2:3)**. Prerequisite: M E 2364 and 2311. Evaluating and reporting the characteristics of materials and mechanical systems. (Writing Intensive)
3331. **Dynamics (3:3:0)**. Prerequisite: MATH 2350 and M E 2364. Kinematics and kinetics of particles and rigid bodies.
3365. **Introduction to Design (3:3:0)**. Prerequisite: M E 3464 and 3164; corequisite: M E 3165. Analysis, design, and evaluation of mechanical elements.
3370. **Fluid Mechanics (3:3:0)**. Prerequisite: M E 2322 and 2364. Basic principles of fluid statics, fluid dynamics, ideal and viscous flows, and turbo-machinery. Includes design activity.
3371. **Heat Transfer (3:3:0)**. Prerequisite: M E 3370 and 3315. Introduction to heat transfer by the mechanisms of conduction, convection, and radiation. Includes design activity.
3433. **Systems and Vibrations (4:3:3)**. Prerequisite: MATH 3350, M E 3315, and 3331. Modeling and analysis of dynamic systems, equilibrium, stability and linear systems theory, introduction to mechanical vibrations. Companion laboratory.
3464. **Engineering Mechanics II (4:4:0)**. Prerequisite: M E 2364. Corequisite: M E 3164. Analysis of structures to determine stresses, strains, and deformations using classical and finite element methods.
4000. **Special Topics in Mechanical Engineering (V1-6)**. Prerequisite: Departmental approval. Individual studies of special topics in mechanical engineering. May be repeated for credit.
4330. **Advanced Topics in Mechanical Engineering (3:3:0)**. Prerequisite: Departmental approval. Advanced topics in mechanical engineering. May be repeated for credit.
4331. **Individual Study in Mechanical Engineering (3)**. Prerequisite: M E 3464 and departmental approval. Individual study in advanced mechanical engineering areas. Approved M E or design elective. May be repeated for credit.
4334. **Control of Dynamic Systems (3:3:0)**. Prerequisite: M E 3433. Introduction to analysis and design of control systems, including applications to electromechanical systems.
4335. **Robot and Machine Dynamics (3:3:0)**. Corequisite: M E 4334. An overview of planar mechanism (cams and linkages) and set analysis and synthesis. Introduction to spatial mechanisms and robotics kinematic and dynamic analysis and control. Approved M E elective. (M E 5317)
4338. **Polymeric Composite Materials (3:3:0)**. Prerequisite: M E 2311, MATH 3350. Introduction to design of structures made of composite materials, including materials selection, fabrication, materials behavior, and structural analysis. Approved M E elective.
4342. **Failure Analysis/Forensic Engineering (3:3:0)**. Prerequisite: M E 2311. Applies engineering and scientific principles to root-cause failure analysis and to the understanding of how engineering materials and components fail. Discusses failure modes and mechanism, design and manufacturing integrity, materials selection, legal problems, and product liability issues.
4345. **Probabilistic Mechanical Design (3:3:0)**. Prerequisite: M E 3365. Application of probabilistic approaches in mechanical design. Techniques for the quantification of uncertainty and risk inherent in mechanical systems. Mechanical reliability methods. Approved M E or design elective.
4351. **Thermal-Fluid Systems Laboratory (3:2:3)**. Prerequisite: M E 3322; corequisite: M E 3371. Measurements, testing, performance evaluation, and documentation of thermal-fluid systems. (Writing Intensive)
4354. **Automotive Systems (3:3:0)**. Prerequisite: M E 3371. Modeling and analysis of typical automobile and truck powertrains, suspension, and performance. Theory and practice are discussed with emphasis on practical applications. Approved M E elective.
4356. **Aerodynamics (3:3:0)**. Corequisite: M E 3370. An introduction to aerodynamics, including wing and airfoil theory, aircraft performance, and aircraft stability and control. Approved M E or design elective.
4358. **Combustion (3:3:0)**. Prerequisite: M E 3322 and 3371. Introduction to combustion kinetics; the theory of premixed flames and diffusion flames; turbulent combustion; dynamics of detonations and deflagrations. Approved M E or design elective.
4360. **Sustainable Energy (3:3:0)**. Senior standing; M E 2322, MATH 3350. Exploration of the global energy demand and its environmental impact for continued human development. Alternative and petroleum-based fuels will be examined for near-term and long-term solutions. Includes researching, developing presentations, and participating at a high level of activity.
4370. **Engineering Design I (3:2:3)**. Prerequisite: M E 2311, 3331, 3365, corequisite: M E 3371. Design problems characteristic of mechanical engineering, including consideration of cost, design optimization, codes and standards, and ethics. (Writing Intensive)
4371. **Engineering Design II (3:0:9)**. Prerequisite: M E 4370. Design projects characteristic of mechanical engineering, including consideration of cost, design optimization, codes and standards, and ethics. (Writing Intensive)
4373. **Thermal-Fluid Systems (3:3:0)**. Prerequisite: M E 3371. Corequisite: M E 3322. Design and analysis of thermal-fluid systems. Approved M E or design elective.
4375. **HVAC System Design (3:3:0)**. Prerequisite: M E 3322 and 3371. The determination of loads and the design of heating, ventilating, and air conditioning systems. Approved M E or design elective.
4385. **Introduction to Microsystems I (3:3:0)**. For majors only or with departmental consent. Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces microsystem design, analysis, simulation, and manufacturing through several case studies using representative devices. Approved M E elective.
4386. **Introduction to Microsystems II (3:3:0)**. Prerequisite: M E 4385. For majors only or with departmental consent. Application of microfabrication to create microsensor systems. Integration of optics, optoelectronics, and microfluids. Includes other MEMS projects. Approved M E elective or design.
4390. **Foundations of Nuclear Engineering (3:3:0)**. Prerequisite: PHYS 2401, MATH 2350. Survey of nuclear engineering concepts and applications, including nuclear reactions; radioactivity; and radiation interaction with matter and reactor physics with applications in medicine, industry, and research. Approved M E elective.

Graduate Courses

5120. **Graduate Seminar (1:1:0)**. Discusses mechanical engineering research topics. Teaches written and oral communication techniques for professional engineers. Required first semester for all M E graduate students.
5301. **Analysis of Engineering Systems (3:3:0)**. Prerequisite: MATH 3350 or consent of instructor. Analytical techniques for solving ordinary and partial differential equations frequently occurring in advanced mechanical engineering.
5302. **Numerical Analysis of Engineering Systems (3:3:0)**. Prerequisite: M E 3315, MATH 3350, or consent of instructor. Numerical analysis of ordinary and partial differential equations and other advanced topics as applied to mechanical engineering problems.
5311. **Advanced Dynamics (3:3:0)**. Prerequisite: M E 3331, 3433, or consent of instructor. Newtonian dynamics of particles and rigid bodies, rotating coordinate systems, coordinate and inertia property transformations, Lagrangian and Hamiltonian mechanics, Gibbs-Appell equations, and gyroscopic mechanics.
5312. **Control Theory I (3:3:0)**. Prerequisite: MATH 2360, 3354, 4351, or consent of instructor. Linear dynamical systems, stability, frequency response and Laplace transform, feedback, state space description, and geometric theory of linear systems. (MATH 5312)
5313. **Control Theory II (3:3:0)**. Prerequisite: MATH 5312, 5316, 5318, or consent of instructor. Quadratic regulator for linear systems, Kalman filtering, nonlinear systems, stability, local controllability, and geometric theory of nonlinear systems. (MATH 5313)
5314. **Nonlinear Dynamics (3:3:0)**. Prerequisite: M E 5311, or 5316. Nonlinear oscillations and perturbation methods for periodic response; bifurcations and chaotic dynamics in engineering and other systems.
5316. **Advanced Vibrations (3:3:0)**. Prerequisite: M E 3331, 3433, or consent of instructor. Vibration of single and multiple-degree of freedom systems, continuous systems, FE formulation, computer sided modal analysis, random vibrations.

5317. **Robot and Machine Dynamics (3:3:0)**. An overview of planar mechanism (cams and linkages) and set analysis and synthesis. Introduction to spatial mechanisms and robotics kinematic and dynamic analysis and control. An extended and in-depth project is required. (M E 4335)
5321. **Thermodynamics (3:3:0)**. Prerequisite: M E 3322 or consent of instructor. Classical macroscopic theory with an emphasis on availability concepts in nonreacting, reacting, single phase, and multicomponent systems.
5322. **Conduction Heat Transfer (3:3:0)**. Prerequisite: M E 3371 or consent of instructor. Fundamental principles of heat transmission by conduction. Multidimensional steady and transient analysis using various analytical and computational methods.
5323. **Two-Phase Flow and Heat Transfer (3:3:0)**. Prerequisite: M E 3371. Liquid-vapor two-phase flow hydrodynamics, boiling and condensation heat transfer, mechanisms and prediction methods.
5325. **Convection Heat Transfer (3:3:0)**. Prerequisite: M E 3371 or consent of instructor. Fundamental principles of heat transmission by convection; theoretical, numerical, and empirical methods of analysis for internal and external flows.
5326. **Combustion (3:3:0)**. Prerequisite: M E 3322 and 3371. Introduction to combustion kinetics; the theory of premixed flames; turbulent combustion; formation of air pollutants in combustion systems; examples of combustion devices which include internal combustion engines, gas turbines, furnaces and waste incinerators; alternative fuel sources.
5327. **Advanced Heat Transfer (3:3:0)**. Introductory graduate course presenting advanced topics in conduction, convection, and radiation.
5330. **Boundary Layer Theory (3:3:0)**. Prerequisite: M E 3370 or consent of instructor. Fundamental laws of motion for Newtonian viscous fluids in steady laminar and turbulent boundary layers. Utilization of analytical and approximate methods to obtain solutions for viscous flows.
5332. **Potential Flow (3:3:0)**. Prerequisite: M E 3370. The study of inviscid incompressible flows. Topics include stream functions and velocity potential, vorticity dynamics, and applications to aerodynamics.
5334. **Gas Dynamics (3:3:0)**. Prerequisite: M E 3370 or consent of instructor. Development of basic equations for compressible flow, normal and oblique shocks, flow-through nozzles and ducts, external flows.
5335. **Mathematical Models of Turbulence (3:3:0)**. Prerequisite: M E 5330. Nature of turbulence, the Reynold's equations, and the transport equations for Reynold's stresses. Different kinds of closure models and their application to boundary layer flows.
5336. **Computational Fluid Dynamics (3:3:0)**. Prerequisite: M E 5302 or equivalent. Simultaneous solution of momentum, heat, and mass transfer problems by applying various computational techniques.
5338. **Advanced Fluid Mechanics (3:3:0)**. Basic laws, fundamental theories, and engineering applications in fluid mechanics, including Stokesian dynamics, lubrication theory potential flow, vortex dynamics, boundary layers and turbulence.
5340. **Elasticity (3:3:0)**. Prerequisite: Consent of instructor. Stress, deformation, and strain; basic equations; analytical solution; energy principles and principles of virtual displacements; finite element method; and solutions of problems with elements of design.
5341. **Plasticity (3:3:0)**. Prerequisite: Consent of instructor. Stress-strain relations for plasticity and viscoplasticity, variational principles, finite element method, radial return algorithm, elements of limit analysis, and solutions of problems with elements of design.
5342. **Fracture and Failure Analysis (3:3:0)**. Corequisite: M E 5340. Engineering aspects of failure. Failure mechanisms and related environmental factors. Principles of fracture mechanics and fractography. Techniques for failure analysis and prevention.
5343. **Continuum Mechanics (3:3:0)**. Prerequisite: Consent of instructor. Basic balance equation in tensor form, as well as constitutive equations for elastic, viscous, plastic solids and liquids.
5344. **Introduction to High Pressure Science and Technology (3:3:0)**. Prerequisite: M E 2311. Behavior of materials under high pressure. Material synthesis, equation of state, phase diagram, phase transformations. Design and application of high pressure apparatus.
5345. **Computational Mechanics I (3:3:0)**. Prerequisite: One or more of the following courses M E 5311, 5340, 5341, 5343. Finite element method for elastic problems, Galerkin weighted residual and variational approaches to numerical solutions of mechanical problems, error estimates and adaptive FE refinement, iterative algorithms for nonlinear problems, static elastoplastic and elastoviscoplastic problems, general purpose finite element codes.
5346. **Computational Mechanics II (3:3:0)**. Prerequisite: One or more of the following courses M E 5311, 5340, 5341, 5343. Finite element method for dynamic elastic problems, time integration schemes for dynamic problems, iterative algorithms for nonlinear dynamic problems, heat transfer analysis, coupled thermomechanical problems, accuracy analysis, general purpose finite element codes.
5347. **Phase Transformation I (3:3:0)**. Prerequisite: M E 2311 and 5340. Shape memory effect, psuedoelasticity, psuedoplasticity. Crystallography, continuum thermodynamics, and kinetics of phase transformations. Constitutive equations for phase transformations in elastic materials.
5348. **Phase Transformation II (3:3:0)**. Prerequisite: M E 5341 and 5347. Strain-induced phase transformations, transformation-induced plasticity. Continuum thermodynamics and kinetics of interaction between phase transformation and plasticity.
5349. **Nonlinear Mechanics of Materials (3:3:0)**. Prerequisite: M E 5347 and/or consent of instructor. Large strains and rotations, stress and strain measures, large strain elasticity, plasticity, twinning, crystallography, and phase transformations. Non-linear continuum thermodynamics, constitutive equations. Experimental regularities.
5350. **Mechanics of Composite Material (3:3:0)**. Prerequisite: M E 5340. Introduction and analysis of the governing principles of the strength and stiffness of uni- and multi-directional composite materials as well as failure analysis and design applications of those materials.
5351. **Advanced Engineering Design (3:2:3)**. Prerequisite: Consent of instructor. Design analysis and synthesis of multicomponent systems. Application of fatigue, fracture mechanics, random vibration, acoustic and anisotropic materials to component design.
5352. **Probabilistic Design (3:3:0)**. Application of probabilistic approaches in engineering design. Techniques for the quantification of uncertainty and risk inherent in mechanical systems.
5353. **Fundamental of Transdisciplinary Design and Process (3:3:0)**. The fundamental aspects of design and process which cut across the boundaries of all disciplines and provide a means for solving complex problems.
5354. **Systems Engineering Principles (3:3:0)**. An overview of the systems engineering design process focusing on defining both the business and the technical needs and required functionality early in the development cycle, documenting requirements with design synthesis and system validation is presented.
5355. **Complexity Theory for Design and Process (3:3:0)**. Prerequisites: M E 5353. Fundamentals of complexity theory to apply to engineering designs, processes, and systems to improve control and reliability.
5360. **Bio-Fluid Mechanics (3:3:0)**. Prerequisite: Knowledge of basic fluid mechanics. Teaches fundamentals of blood flow mechanics, blood rheology, blood vessel issue mechanics, blood flow measurements, cardiovascular disease and therapeutic techniques related to blood flow, hemodynamics in main organs, and airflow in the airway.
5362. **Orthopedic Biomechanics (3:3:0)**. The study of kinematics and kinetics of the human musculoskeletal system with emphasis on injuries (sports and trauma), orthopedic fixation, fixation, fixation device design.
5385. **Introduction to Microsystems (MEMS) I (3:3:0)**. Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces basic microsystem design, analysis, simulation, and manufacture through several case studies using representative devices.
5386. **Introduction to Microsystems (MEMS) II (3:3:0)**. Prerequisite: M E 5385. Application of microfabrication to create microsensor systems. Integration of optics, optoelectronics and microfluids. Includes other MEMS projects.
5387. **Introduction to Microsystems (MEMS) III (3:3:0)**. Prerequisite: M E 5386 or consent of instructor. Leadership of a design team in an interdisciplinary environment. Simulation and computer-aided MEMS design and analysis.
6000. **Master's Thesis (V1-6)**.
6301. **Master's Report (3)**.
6330. **Advanced Topics in Mechanical Engineering (3:3:0)**. Expose students to new and advanced technology pertaining to topics in the mechanical engineering field with the most current research information available.
6331. **Theoretical Studies (3:3:0)**. Prerequisite: Consent of instructor. Theoretical study of advanced topics selected on the basis of the departmental advisor's recommendation. May be repeated for credit in different areas.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Petroleum Engineering

Faculty

Lloyd R. Heinze, Ph.D., Chairperson

Roy S. Butler Professor: Heinze

Associate Professor: House, Ziaja

Assistant Professors: Adisoemarta, Siddiqui

Instructor: Fasesan

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Petroleum Engineering
- Master of Science in Petroleum Engineering
- Doctor of Philosophy in Petroleum Engineering

Mission. The mission of the Petroleum Engineering Department has three elements:

- To provide excellent instruction and design experiences essential for graduates to enter the practice of petroleum engineering and pursue lifelong professional development.
- To provide research opportunities for students that generate, communicate, and apply new knowledge for the betterment of society.
- To foster a spirit of service and leadership among students and faculty and assist the public in addressing issues concerning using our resources, protecting our environment, and developing our infrastructure.

Program Educational Objectives. The department supports the mission of the university through its undergraduate program by providing students with an appropriate curriculum and educational experience. The course selection and content remain current through continuous assessment by faculty, students, alumni, petroleum industry advisory board (PIAB) members, and industry employers. To accomplish the mission, the petroleum engineering faculty, with advice from students, alumni, PIAB members, and industry employers, endorse program educational objectives to generate petroleum engineering graduates who will accomplish the following during the first few years after graduation:

- Be successful in diverse career paths in the petroleum industry.
- Continue professional development through participation and leadership in professional organizations (SPE, ASEE, API, AADE, SPWLA).
- Pursue lifelong learning through continuing education or post-graduate education (professional meetings, short courses, graduate courses).
- Progress to professional registration so that some individuals graduate from an ABET-accredited degree plan, pass the Fundamentals of Engineering Exam, work in increasingly responsible engineering positions, and pass the Professional Exam.

The department, by fulfilling these objectives, will remain faithful to the mission of the College of Engineering and Texas Tech University, and in so doing, will satisfy the needs of the people of the state of Texas.

Program Outcomes. Graduates of the Bachelor of Science in Petroleum Engineering program as well as the Master of Science in Petroleum Engineering and the Ph.D. in Petroleum Engineering programs are educated to develop the following:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs.
- An ability to function on multi-disciplinary teams
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- A broad education necessary to understand the impact of engineering solutions in a global and societal context.
- A recognition of the need for and an ability to engage in lifelong learning.
- A knowledge of contemporary issues.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Overview. The department is uniquely located in the Permian Basin, where approximately 22 percent of the nation's petroleum resources and 68 percent of Texas' petroleum resources lie within a 175-mile radius. The department fulfills an obligation to the people of the State of Texas and the nation in making available the technical expertise for the safe and efficient development, production, and management of petroleum resources.

Petroleum engineering is the practical application of the basic and physical sciences of mathematics, geology, physics, and chemistry and all of the engineering sciences to the discovery, development, production, and transportation of petroleum. Petroleum is the most widely used form of mobile energy and now supplies approximately three-fourths of the total energy used in the United States. It is also a major raw material from which a wide variety of products are manufactured.

The department strongly encourages students to experience at least one summer internship for professional growth. Intern students will be assessed externally. The department has conferred over 1,700 B.S. degrees since the program's inception in 1948. A high-priority goal is to produce quality B.S. graduates measured by:

- Nearly 100 percent placement of graduates each year.
- Student average starting salaries near the top of the national average in accredited U.S. petroleum engineering departments.
- Provide summer intern opportunities and experiences within the industry for 100 percent of students desiring positions.
- Ninety percent Fundamentals of Engineering Examination pass rate of graduating seniors.
- Recruiting quality undergraduates.
- ABET accreditation.
- Petroleum Industry Advisory Board recommendations on curriculum and graduates.
- An independent assessment of capstone senior course.

The department is heavily involved in assisting our students to find employment—both summer internships and full-time positions—upon graduation. Approximately 50 companies have recruited our students and nearly 100 percent of them have been placed upon graduation for the previous 14 years. Approximately 60 percent of our undergraduate body is on scholarship. An interview and resume workshop for the fall and spring semesters is conducted to assist students with interviewing and resume writing skills as an additional effort to maintain our outstanding placement rate. The curriculum is under continuous review, and revisions are made as needed to maintain accreditation and ensure employability of students. Faculty participation with ABET and the SPE Education and Accreditation Committee ensure the department is current on engineering education. In addition, faculty have attended and been principal planners in all six of the Colloquiums on Petroleum Engineering Education. Changes in the petroleum engineering curriculum since 1991 have been implemented by the Petroleum Engineering Curriculum Committee after due consideration of input from the Petroleum Industry Advisory Board, ABET recommendations, and the department's planning and assessment tools.

The department assists students to obtain summer internships. This provides invaluable and highly recommended industry experience to students. The increasing department involvement in industrial research provides an opportunity for undergraduate students to participate actively in the research experience on campus.

The Petroleum Engineering curriculum is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Undergraduate Program

Success in engineering courses is highly dependent on knowledge and skills in mathematics. It is strongly recommended that students have a minimum mathematics SAT score of 550, a minimum score of 25 on the mathematics ACT, or take mathematics courses at a junior or community college to be prepared to take calculus classes at Texas Tech.

The department recommends that students consider acquiring a personal computer to facilitate coursework.

Curriculum. Petroleum engineering applies the curriculum management of the College of Engineering. To graduate, the student must complete the specified minimum number of hours of the curriculum, have a minimum overall GPA of 2.0, and earn a grade of C or better in all courses.

Transfer Admissions. Students applying for transfer into petroleum engineering from another institution or from another department at Texas Tech must have completed a minimum of 30 hours of transferable college work that includes Calculus I and II (MATH 1351 and 1352), Chemistry I (CHEM 1307 and 1107), and English I and II (ENGL 1301 and 1302) with a GPA of 2.50 or higher. This GPA criteria is subject to change based on the current enrollment trends in the Department of Petroleum Engineering.

Petroleum Engineering (PETR)

(To interpret course descriptions, see - 8.)

Undergraduate Courses

- 1101. **Introduction to Petroleum Engineering (1:1:0).** Introduction to the petroleum engineering profession. Group discussions and selected readings on requirements, responsibilities, ethics, opportunities, and history of petroleum engineering.
- 1305. **Engineering Analysis I (3:3:0).** Corequisite: MATH 1351. Introduction to engineering fundamentals, dimensions, units, and conversions. Synthesis and analysis of typical engineering problems. Introduction to the use of computers, computing, and structured programming.
- 2301. **Petroleum Development Methods (3:3:0).** Prerequisite: MATH 1352, PETR 1305, and PHYS 1408. Introduction to petroleum engineering, rotary drilling, and well completion practices, including casing, cementing, perforating, and workovers. Discussion of equipment design and use.
- 2302. **Reservoir Fluid Properties (3:3:0).** Prerequisite: MATH 1351 and CHEM 1307. Study of reservoir fluid properties including PVT behavior of hydrocarbon systems. Investigation of the nature, methods of estimation, and use of reservoir fluid properties. Laboratory PVT demonstrations.
- 3304. **Formation Evaluation (3:3:0).** Prerequisite: PHYS 2401, MATH 2350, and PETR 3402. Use of open-hole well logs including logging suites for the electric survey to the induction and laterlog suites to determine volume and relative producibility of hydrocarbon reserves. Analysis and design techniques of actual well logging packages are emphasized.
- 3306. **Reservoir Engineering (3:3:0).** Prerequisite: PETR 3402, PHYS 2401, and MATH 2350. Production performance predictions and estimation of hydrocarbons in place for gas, condensate, and oil reservoirs. Applications of material balance calculations for various reservoir types and applications of fluid flow in porous media.
- 3308. **Engineering Communications (3:3:0).** Prerequisite: ENGL 1301, 1302, junior standing, or consent of instructor. Written and oral communication techniques for professional engineers, including writing matrix, fog index, computer analysis, and visual aid production, proposal writing, and other tools. (Writing Intensive)
- 3402. **Reservoir Rock Properties (4:3:3).** Prerequisite: MATH 1352, C E 3305, and PHYS 1408; corequisite: PETR 2302. A study of the physical properties of petroleum reservoir rocks as they relate to the production of oil and gas, including multiphase fluid flow in petroleum reservoirs.
- 4000. **Special Studies in Petroleum Engineering (V1-6).** Prerequisite: Departmental and instructor approval. Individual studies in petroleum engineering areas of special interest. May be repeated for credit.
- 4121. **Petroleum Engineering Seminar (1).** Prerequisite: PHYS 2401, CHEM 1107, 1307, C E 3302, 3303, 3305, MATH 3342, 3350, M E 2322, I E 3301. Study of engineering problems of special interest and value to the student.
- 4300. **Petroleum Property Evaluation and Management (3:2:3).** Prerequisite: PETR 3304, 3306, 3308, I E 3301, GEOL, 3302, 4324, MATH 3342, 3350; corequisite: PETR 4308, 4309. Economic, physical, analytical, and statistical evaluation of hydrocarbon-producing properties, emphasizing relative worth of investments based on engineering judgment, business strategy, and risk analysis using actual oil properties in team projects. Design course. (Writing Intensive)
- 4303. **Petroleum Production Methods (3:3:0).** Prerequisite: PETR 2301, MATH 2350, C E 3302, 3305, PHYS 2401. Artificial lift practices including design of sucker rod pumping systems and gas lift installations. Well stimulation practices includ-

ing acidizing and hydraulic fracturing. Application of inflow performance relationships. (Design Course)

- 4306. **Enhanced Oil Recovery Processes (3:3:0).** Prerequisite: PETR 3306. Introduction to EOR processes mechanisms, frontal advance theory and application, mechanisms of water-flooding and miscible processes and application to reservoir performance prediction.
- 4308. **Advanced Reservoir Engineering (3:3:0).** Prerequisite: PETR 3304, 3306, MATH 3342, 3350; corequisites: PETR 4300, 4308. Fundamental laws, anisotropic, coordinate systems and reservoir geometry, continuity and diffusivity equations, pressure-time-volume relationships. Basic theory of transient flow and testing, type curves, pressure derivative method, buildup, drawdown, interference and reservoir limit tests. Water influx, decline curves analysis, software and reservoir models. Unconventional gas reservoirs.
- 4309. **Well Completion, Production Facilities, and Stimulation (3:3:0).** Prerequisite: PETR 3303, 3308, 3407, C E 3302, 3303, 3305, M E 2322, I E 3301, MATH 3342, 3350 and advanced standing; corequisites: PETR 4300, 4308. Problem course in analysis, design, and application of Completion, Production Facilities and Stimulation. (Design Course)
- 4331. **Special Problems in Petroleum Engineering (3).** Prerequisite: Advanced standing. Individual studies in advanced engineering areas of special interests. May be repeated for credit.
- 4405. **Natural Gas Engineering (4:3:3).** Prerequisite: PETR 3306, M E 2322, PHYS 2401, MATH 3342, 3350. The production of natural gas and condensate reservoirs; processing, transportation, distribution, and measurement of natural gas and its derivatives.
- 4407. **Drilling Engineering (4:3:1).** Prerequisite: PETR 2301, GEOL 3302, PHYS 2401, MATH 3342, 3350, C E 3303, 3305; corequisite: I E 3301. Rotary drilling systems, drilling fluids

Curriculum for Petroleum Engineering

FIRST YEAR			
	Fall		Spring
CHEM 1107, Prin. of Chem. Lab I	1	ENGL 1302, Adv. College Rhetoric	3
CHEM 1307, Prin. of Chem. I	3	MATH 1352, Calculus II	3
ENGL 1301, Ess. of College Rhetoric	3	PETR 1305, Engr. Analysis	3
Elective - Core Curriculum*	3	PHYS 1408, Prin. of Physics I	4
MATH 1351, Calculus I	3	Elective - Core Curriculum*	3
PETR 1101, Intro. to Petr. Engr.	1	TOTAL	16
TOTAL	14		
SECOND YEAR			
	Fall		Spring
C E 2301 / ME 2364, Statics	3	C E 3305 / ME 3370, Fluids	3
Elective - Core Curriculum*	3	GEOL 1303, Physical Geology	3
MATH 2350, Calculus III	3	GEOL 1101, Physical Geology Lab	1
PETR 2302, Reservoir Fluid Properties	3	MATH 3350, Higher Math. for Engr.	3
PHYS 2401, Prin. of Physics II	4	M E 2322 / ChE Thermodynamics	3
TOTAL	16	PETR 2301, Petr. Development Methods	3
		TOTAL	16
THIRD YEAR			
	Fall		Spring
C E 3302 / ME 3331, Dynamics	3	C E 3303 / ME 3464, Solids	3
GEOL 3302, Structural Geology	3	GEOL 4324, Hydrocarbons	3
MATH 3342, Statistics for Engineers	3	I E 3301, Engr. Economics Analysis	3
PETR 3308, Engr. Comm.	4	PETR 3304, Formation Evaluation	3
PETR 3402, Reservoir Rock Properties	3	PETR 3306, Reservoir Engineering	3
TOTAL	16	Elective - Core Curriculum*	3
		TOTAL	18
FOURTH YEAR			
	Fall		Spring
PETR 4303, Petr. Production Methods	3	PETR 4300, Property Eval. Mngmt.	3
PETR 4306, Enhanced Oil Recov. Proc.	3	PETR 4308, Adv. Reservoir Engr.	3
PETR 4407, Drilling Engineering	4	PETR 4309, Well Compl., Prod. Facil. & Stim.	3
PETR 4405, Natural Gas Engineering	4	PETR 4121 / ENGR 4100 PE Seminar	1
Elective - Core Curriculum*	3	PETR Elective - Special Studies	3
TOTAL	17	(4000 or 4331)	
		Elective - Core Curriculum*	3
		TOTAL	16

Minimum hours required for graduation – 129.

One year (two semesters) of a single foreign language required if student did not have two years in high school.

* Courses needed to fulfill the university Core Curriculum requirements include 6 hours of political science, 6 hours of U.S. History, 3 hours of multicultural requirement, 3 hours of humanities (E), and 3 hours of visual and performing arts (F). Students should consult the Core Curriculum requirements prior to registration for courses.

Graduate Program / Petroleum Engineering

The department is staffed with industry-experienced faculty who has an average of more than 15 years of experience per faculty member. This experience is combined with sound engineering and scientific principles in the classroom and made an integral part of the candidate's educational challenge. Also, the department is located in a geographical area that produces 20 percent of the nation's petroleum resources and 68 percent of Texas' petroleum resources lie within a 175-mile radius. This proximity provides the student with unique opportunities for directly interfacing with industry while still a student as well as first hand observations of oil field operations. The department has been consistently ranked in the top ten petroleum engineering departments for both the graduate and undergraduate program.

Graduate studies in petroleum engineering prepare the engineer to assume responsibility in technical and managerial areas within the oil and gas industry. Historically, the graduate can expect to be challenged quickly and in areas of strong potential for personal and professional growth. Candidates with superior skills and the desire to progress within the industry can expect to be successful. The Petroleum Engineering Department at Texas Tech prepares the advanced student with the technical skills required to meet those challenges.

All petroleum-engineering courses can be taken for credit. No more than six hours of PETR 5000 can appear in a master degree plan without approval from the graduate dean. The curriculum is organized into four core areas that denote the teaching and research concentration of the faculty. However, the degree plan of a petroleum engineering student should include at least one course from each of the four core areas:

Drilling Engineering—PETR 5000, 5302, 5303, 5315, 5317.

Production Engineering—PETR 5000, 5306, 5314, 5316, 5318, 5319.

Reservoir Engineering—PETR 5000, 5307, 5309, 5310, 5311, 5312, 5313, 5320, 5321, 5322, 5323, 5325, 5326, 5327.

Formation Evaluation—PETR 5000, 5304, 5305, 5308, 5324, 5328, 5329.

Master's Program

The master's program requires a minimum of 30 graduate credit hours above the baccalaureate degree, including 6 credit hours allowed for the thesis and at least 18 credit hours of graduate petroleum engineering courses (excluding seminar). Additional graduate credit hours of other engineering, mathematics, or science will be allowed when approved by the candidate's advisory committee and graduate advisor. A written thesis is required for the master's degree. In addition, the candidate's thesis committee will administer a final oral exam in defense of the completed thesis.

The department also offers a nonthesis master's program that requires a minimum of 33 graduate credit hours approved by the graduate advisor (excluding seminar). The graduate program for nonthesis master's candidate is specifically tailored for that candidate's educational background, industry experience, and individual interest. For both the thesis and the nonthesis programs, a final comprehensive examination is required. The

policy governing the comprehensive examination is available with the departmental graduate advisor. Comprehensive examinations are given only after the graduate dean has admitted the students to candidacy.

Qualified students with a B.S. degree in an engineering field may enter the M.S. program in petroleum engineering by completing (without graduate credit) leveling work as needed in physics, chemistry, mathematics, geology, basic engineering courses and undergraduate petroleum engineering courses. The details of the leveling program will be worked out on an individual basis by the graduate advisor, and the length of the program will depend on the student's background. The leveling program courses (PETR 5380, 5381, 5382, 5383, and 5384) must be completed with a minimum grade of B.

Joint B.S.—M.S. Degrees. Student entering the petroleum engineering program are assigned a faculty advisor and are responsible for arranging a course of study with the advisor's counsel and approval. Programs leading to a joint B.S.—M.S. degree are available. Students interested in these programs should inform their academic advisor during the first semester of the junior year.

All graduate students are required to register for PETR 5121 or 7121 each long semester unless exempted by the chairperson. The graduate seminar course does not count toward fulfilling degree requirements for the master's or doctor's program.

Doctoral Program

The objectives of the Ph.D. program are to provide students opportunities to reach a critical understanding of the basic scientific and engineering principles underlying their fields of interest and to cultivate their ability to apply these principles creatively through advanced methods of analysis, research, and synthesis. The Ph.D. degree is awarded primarily on the basis of research. Applicants for the doctoral degree must have a degree in engineering disciplines and must meet the approval of the department's graduate committee. Students majoring in this department for doctoral degree must take diagnostic examinations (or preliminary examination) by the end of their second long semester. These examinations are based on the undergraduate curriculum. Each student is required to take the diagnostic examinations in their area of specialization and any three-core areas.

In addition to regulations established by the Graduate School, applicants for candidacy for the doctor's degree are required to demonstrate high proficiency in a single research area. The coursework for each student must meet the approval of the student's doctoral advisory committee. The department has no specific foreign language requirement (but a foreign language for the Ph.D. degree can be specified at the discretion of the student's dissertation advisor). Research tools are included as an integral part of the degree program in the leveling, minor, or major courses of each student. Additional information may be obtained from the departmental program advisor.

All graduate students are required to register for PETR 5121 or 7121 each long semester unless exempted by the chairperson. The graduate seminar course does not count toward fulfilling degree requirements for the master's or doctor's program.

and rheology, drilling mechanism, well planning, blowout and well control, hole deviation, and directional drilling. (Design course) (Writing Intensive)

Graduate Courses

5000. Studies in Advanced Petroleum Engineering Topics (V1-6). An individual study course. Nature of course depends on student's interests and needs. May be repeated for credit on different topics.

- 5121. Graduate Seminar (1:1:0).** Discussions of petroleum engineering research and special industry problems. Required each semester for all graduate students. May be repeated for credit.
- 5301. Teaching Experience in Petroleum Engineering (3:3:0).** Prerequisite: Admission to doctoral program. On-the-job training in teaching petroleum topics. Students prepare and present lectures, grade problem sets, and prepare laboratory experiments. Students and instructor evaluate performance.
- 5302. Petroleum Environmental Engineering (3:3:0).** Prerequisite: Consent of instructor. A unified treatment of all aspects of

- petroleum environmental well planning processes, pollution prevention and safety, management practices and self-assessment process, environmental oil and gas law.
5303. **Advanced Drilling Techniques (3:3:0)**. Prerequisite: PETR 3307 or consent of instructor. A unified treatment of all aspects of well planning and the optimization of oil and gas drilling processes.
5304. **Advanced Well Log Analysis (3:3:0)**. Prerequisite: PETR 3304 or consent of instructor. Methods of analyzing various types of well logs to obtain quantitative hydrocarbon reservoir parameters.
5305. **Advanced Formation Evaluation (3:3:0)**. Prerequisite: Must have graduate standing in petroleum engineering. Application of petrophysical core analysis to formation evaluation. Integration of special core analysis with well logs.
5306. **Advanced Artificial Lift Methods (3:3:0)**. Prerequisite: Consent of instructor. Study of the design and analysis of current mechanisms for lifting oil from the reservoir to surface facilities including optimization theory.
5307. **Enhanced Oil Recovery (3:3:0)**. Prerequisite: Consent of instructor. Fundamental relations governing the displacement of oil in petroleum reservoirs and methods for predicting oil recovery by miscible and immiscible displacement.
5308. **Pressure Transient Analysis (3:3:0)**. Prerequisite: MATH 3350, PETR 4308, or consent of instructor. Theory of transient fluid flow in petroleum reservoirs and applications of methods to interpret transient pressure behavior.
5309. **Hydrocarbon Reservoir Simulation (3:3:0)**. Prerequisite: MATH 3350 or consent of instructor. The development of unsteady state fluid flow equations for hydrocarbon reservoirs and the application of finite difference methods to obtain solutions to the equations.
5310. **Advanced Simulation Techniques (3:3:0)**. Prerequisite: PETR 5309. Treatment of advanced concepts of reservoir simulation for multidimensional, multiphase flow in hydrocarbon reservoirs.
5311. **Thermal Oil Recovery (3:3:0)**. Prerequisite: Consent of instructor. Study of the recovery of oil by thermal methods, including steam injection and in situ combustion.
5312. **Simulation of Enhanced Oil Recovery Applications (3:3:0)**. Prerequisite: Consent of instructor. Study of 1D, 2D, 3D, one-, two-, and three-phase simulation modeling of carbon dioxide and thermal recovery applications.
5313. **Numerical Applications in Petroleum Engineering (3:3:0)**. Prerequisite: Consent of instructor. Least squares, solving first and second order partial differential equations; backward, central, forward difference solutions, matrix, Gaussian, Adams, Rung-Kutta solutions.
5314. **Nodal Analysis and Well Optimization (3:3:0)**. Prerequisite: Consent of instructor. Inflow performance relationships, well design, theory of the reservoir flow, flow restrictions, completion effects, multiphase phase flow, and use of computer programs for complex solutions.
5315. **Horizontal Well Technology (3:3:0)**. Prerequisite: PETR 3303, 3407, or consent of instructor. Topics include why horizontal, incremental cost, historical prospective, drilling change, completion modification, production difference, reservoir aspects, pressure transient, and analysis adjustment.
5316. **Advanced Production Engineering (3:3:0)**. Prerequisite: PETR 3303, 4309, or consent of instructor. Advanced study of production operations, well deliverability, inflow performance, gas lift design, production system analysis and optimization, downhole equipment and surface facilities design.
5317. **Well Completion and Stimulation (3:3:0)**. Prerequisite: Consent of instructor. Completion parameters, well design, fatigue failure, mechanical properties, hydraulic, acid, sandstone fracturing, well bore stability, proppants placement, skin damage, gravel packing, and workovers.
5318. **Gas Production Engineering (3:3:0)**. Prerequisite: Consent of instructor. Design of processing, transportation, distribution, and flow measurement systems; gas storage reservoirs, flow in porous media, tubing, and pipelines; phase behavior of gas condensates; and coal bed methane.
5319. **Multiphase Fluid Flow in Pipes (3:3:0)**. Prerequisite: Consent of instructor. Horizontal, vertical, and inclined flow in pipes and annuli; numerical methods correlations usage and development; empirical correlations correct usage and extrapolations potential; future of multiphase flow.
5320. **Advanced Reservoir Engineering (3:3:0)**. Prerequisite: Consent of instructor. Recovery prediction, tensor permeabilities, multiphase flow, drainage equations, flow potential, streamline-streamtube methods, injectivity, displacements in layered reservoirs, and line source solutions.
5321. **Fluid Flow in Porous Media (3:3:0)**. Prerequisite: Consent of instructor. Physics of petroleum reservoirs, unified mathematics approach to porous media, conservation equations, multiphase flow, transient analysis, wettability, capillary, imbibitions, and saturation paths.
5322. **Computational Phase Behavior (3:3:0)**. Prerequisite: Consent of instructor. Advanced PVT and EOS characterization, tuning EOS by regression, gas condensate reservoirs, use of laboratory experiments and correlation to obtain PVT data, psuedoization and use of PVT programs.
5323. **Advanced Phase Behavior (3:3:0)**. Prerequisite: Consent of instructor. Thermodynamics of equilibria, volumetric phase behavior, Gibbs and Helmholtz energy, chemical potential, phase diagram, modeling paraffins, asphaltenes, hydrates and mineral deposition, use of PVT software.
5324. **Geostatistics for Reservoir Engineers (3:3:0)**. Prerequisite: Consent of instructor. Flow in porous media, reservoir characterization, geostatistics, estimation, simulation, case studies, quantifying uncertainties, geological simulation, data integration, grid block properties, and geostatistics software.
5325. **Water Flooding Techniques (3:3:0)**. Prerequisite: Consent of instructor. Frontal advanced theory for multiphase flow, immiscible flow, capillary cross flow, psuedofunctions, streamlines, measures of heterogeneity, field case studies, pattern flooding, and use of black oil reservoir simulators.
5326. **Miscible Flooding Techniques (3:3:0)**. Prerequisite: Consent of instructor. Physics theories and methods for miscible projects, screening methods, gas injection processes, convection-dispersion equations, fingering and channeling, phase behavior and heterogeneity, characteristic methods.
5327. **Streamline Simulation (3:3:0)**. Prerequisite: Consent of instructor. Multiphase flow equations, displacements in layered reservoirs, streamline models, frontal advanced equation with gravity effects, volumetric linear scaling, streamlines with compositional effects.
5328. **Advanced Property Evaluation (3:3:0)**. Prerequisite: Consent of instructor. Statistical evaluation of hydrocarbon producing properties, risk analysis, economic analysis of production forecasts and reserve estimation, and cash flow analysis.
5329. **Advanced Core Analysis (3:3:0)**. Prerequisite: Consent of instructor. Rock properties relating to production of oil and gas, multiphase fluid flow, micro- and macro-interaction of fluids and reservoir rocks, Archie parameters and well logs, modeling saturations with permeability.
5380. **Drilling Engineering Methods (3:3:0)**. Prerequisite: Consent of instructor. Drilling equipment, components, description, operation; drilling fluids; hydraulic calculations; casing design; hole problem; cost control, penetration rate, well planning; pressure control; directional drilling; bit; cement. (Leveling program course)
5381. **Production Engineering Methods (3:3:0)**. Prerequisite: Consent of instructor. Artificial lift, inflow performance relationships, well design and application of stimulation practices, processing equipment, separator problems, emulsions, treating, and transmission systems. (Leveling program course)
5382. **Well Logging Fundamentals (3:3:0)**. Prerequisite: Consent of instructor. Use of open-hole logs, survey of induction and laterolog suites to determine reserves. (Leveling program course)
5383. **Reservoir Engineering Fundamentals (3:3:0)**. Prerequisite: Consent of instructor. Reservoir performance predictions, computation of in place gas, condensate and oil reservoirs, applications of M E for reservoir mechanisms, decline curves, EOR methods, fluid flow in porous media. (Leveling program course)
5384. **Basic Fluids and Rock Properties (3:3:0)**. Prerequisite: Consent of instructor. Reservoir fluids and rock properties, fluid sampling, phase behavior, reservoir drives mechanisms, concepts of porosity, permeability, saturations, capillary pressure and compressibility for gas-oil production. (Leveling program course)
6000. **Master's Thesis (V1-12)**.
6001. **Master's Report (V1-6)**.
6331. **Proposal/Project Communication (3:3:0)**. Prerequisite: Admission to doctoral program. Guide to research, technical report, project planning, problem definition, grant proposals, thinking, talking, and writing in research, writing technical journal, review articles, and technical presentations.
7000. **Research (V1-12)**.
7121. **Doctoral Seminar (1)**. Open discussion of recent advanced findings in any field of endeavor with special attention to their relationship to the philosophy of petroleum engineering. May be repeated for credit.
8000. **Doctor's Dissertation (V1-12)**.

Honors College

Gary M. Bell, Ph.D., Dean

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Faculty

Although Honors courses are taught by professors in departments and colleges throughout the university, the following faculty have appointments exclusively with the Honors College or have joint appointments that include the Honors College.

Professors: Bell, Elbow, Haragan, Purinton

Associate Professors: Brink, McGinley

Assistant Professors: Ashby-Martin, Bradatan, Caswell, Tomlinson, Wilhelm

About the College

Texas Tech offers a special program for highly motivated and academically talented students who want to maximize their college education. Considered to be one of the best honors programs in the nation, the Honors College provides the personalized feeling and challenging instruction of a small private college. The curriculum is designed to provide students with a distinctive and broadly integrated intellectual experience that will complement all academic majors and career paths. The ultimate goal is to assist students in developing a broad education that will enhance their critical thinking and methodological skills and engender a spirit of intellectual independence.

With the exception of those in the natural history and humanities major and the arts and letters major, students accepted into the Honors College are also enrolled concurrently in the college that houses their major area of study. In addition to providing financial support for eligible students through merit-based and special Honors scholarships, enrollment in the Honors College gives students an opportunity to interact with other similarly motivated students and access to such special benefits as early registration, special-interest housing, extended library privileges, enriching co-curricular activities, and closer contact with faculty members.

Honors students are encouraged to engage in the greatest possible range of educational experiences. Some of these include: (1) the Honors Undergraduate Research program, which enables students to take part in undergraduate research with faculty in many disciplines; (2) international study, which enhances marketability and provides opportunities for personal growth and acquisition of cultural knowledge and language skills; and (3) competition for national and international scholarships, such as Goldwater, Truman, Udall, Marshall, Gates-Cambridge, and Rhodes, which assists in clarifying educational and career goals as well as potentially providing scholarship assistance.

Those who graduate from the Honors College after acquiring at least 24 Honors credit hours (including two Honors seminars) graduate with “Honors,” a distinction that is noted on diplomas and transcripts and receives special recognition at graduation ceremonies. Those who also complete a senior thesis consisting of 6 additional hours graduate with “Highest Honors.”

Applying for Admission

Students must make special application to be considered for admission to the Honors College, either as an entering freshman or as a continuing Texas Tech or transfer student. In general, threshold application requirements for incoming freshmen are a composite SAT score (reading and math only) of 1200 or above, a composite ACT score of 26 or better, or graduation in the top 10 percent of the high school class. However, the Honors College applies a portfolio approach to student admission by considering in the admission process such factors as application and entrance exam essays; student activities; and special skills, abilities, or experiences. Therefore, students whose SAT or ACT and class standing do not meet the threshold requirement may still gain admission, just as students who surpass those requirements may not be admitted.

For continuing Texas Tech or transfer students, eligibility to apply is based on a college cumulative GPA of 3.4 or better. The college also will consider admitting students who do not meet the above criteria but who offer a compelling reason why they should be part of the program. Admission is competitive and contingent upon the pool of applicants for any given year. Admission deadlines and information are posted online at www.honr.ttu.edu.

To continue participation after being accepted into the Honors College, a student must maintain a minimum 3.25 cumulative GPA while at Texas Tech and demonstrate adequate progress toward completion of the Honors degree requirements. For more details, see the *Honors Student Handbook* online at www.honr.ttu.edu.

Academic Program

The Honors College encourages interdisciplinary work and presents a range of courses and programs that offer such opportunities. At the heart of the Honors College experience is a series of departmental classes taught by some of the university’s most talented professors. These courses include those fulfilling both Core Curriculum and specific major or minor requirements. They are generally limited to 25 students and are faster paced, more interactive, more writing intensive, and more personalized than their regular-section counterparts. The Honors program also offers a variety of seminars on special topics that explore specific subject areas in-depth.

Texas Tech School of Medicine Early Acceptance Program

The joint Texas Tech University—Texas Tech University Health Sciences Center Early Acceptance Program offers an exciting opportunity to select Honors College students by allowing them to waive the Medical College Admission Test (MCAT) and apply early (typically the junior year) to the School of Medicine (SOM) at the Health Sciences Center. Successful applicants to the Early Admission Program are notified of their acceptance to the medical school in late January and must complete their baccalaureate degree prior to admission to the SOM.

The primary goal of this special program is to encourage Honors students to broaden their educational experiences before they enroll in their professional studies. The waiver of the MCAT allows students to include coursework or other experiences in areas such as languages, the humanities, mathematics, and business, thus enabling them to become more well-rounded professionals.

General Requirements for Application. Early acceptance is available to Honors students within *any* major, so long as the requirements for entry to the School of Medicine are met and the students are judged to be *exceptional* candidates by the SOM Admissions Committee in the circumstances under which they apply. Students who are eligible to apply must meet the following criteria:

- Enroll officially in the Honors College.
- Enter Texas Tech as freshmen (students classified as transfer students upon entering Texas Tech are ineligible).
- Be legal residents of the state of Texas.
- Have earned a composite score of at least 1300 on the SAT (verbal and math portions only) or at least 29 on the ACT upon matriculation at Texas Tech (the composite score must be earned in one test administration).
- Submit a “checklist” form to the Honors College during their semester of application to the SOM.

For further information about this program, see www.honr.ttu.edu.

Honors College/School of Law Early Decision, Admission Plans

Early Decision Plan. The Honors College and the School of Law cooperate in an Early Decision Plan that allows exceptional Law School applicants who are Honors College students in good standing to receive notification of their acceptance during their third year at Texas Tech. Enrollment in the School of Law would not occur until after the student receives a baccalaureate degree.

To be eligible to apply for Early Decision, applicants must meet the following criteria:

- Have an undergraduate GPA of at least 3.5.
- Have a LSAT score that places them in the top half nationwide.
- Have a SAT score of at least 1300 or an ACT of at least 29.
- Be enrolled in the Honors College and be making satisfactory progress toward a baccalaureate degree with a diploma designation in Honors studies.

Students must apply during the fall semester of their third year and must take the LSAT by December of that year. Students who receive and accept an Early Decision offer must commit to enroll at the Texas Tech School of Law and may not apply to other law schools. The School of Law Admissions Committee applies the same standards and procedures for Early Decision applicants and applicants reviewed under the traditional admission process.

“3+3” Early Admission Program. Honors students in good standing who are working toward the B.A., B.S., B.F.A., B.M., or B.G.S. degree in the College of Visual and Performing Arts, the College of Arts and Sciences, or the Honors College may gain early admission to the Texas Tech University School of Law by completing coursework totaling a minimum of 100 semester hours in their undergraduate college and then completing the first year of coursework at the Texas Tech School of Law. To be eligible to participate in this program, students must meet all of the following criteria:

- Have an undergraduate GPA of at least 3.5.
- Have a LSAT score that places them in the top half nationwide.
- Have a SAT score of at least 1300 or an ACT of at least 29.
- Be enrolled in the Honors College and making satisfactory progress toward a Visual and Performing Arts, Arts and Sciences, or Honors College degree (B.A., B.S., B.F.A., B.M., or B.G.S.) consistent with the regulations established by the colleges.

Students must apply for the “3+3” program during the fall semester of their third year and take the LSAT by December of that year. Students who accept Early Admission must commit to enroll at the Texas Tech School of Law and may not apply to other law schools. The School of Law Admission Committee applies the same stan-

dards and procedures for “3+3” applicants and applicants reviewed under the traditional admission process.

For more information on the Early Decision Plan and the Early Admission Program, see www.honr.ttu.edu.

Honors Program in Management

The Honors Program in Management is an Honors specialization leading to a Bachelor of Business Administration degree and is a joint program of the Honors College and the area of management in the Rawls College of Business. Another degree program—the 150-Hour Honors Program in Management—allows students to pursue an Honors specialization and earn both a B.B.A. and a M.B.A. degree.

Bachelor of Arts Degree in Arts and Letters

The degree program in Honors Arts and Letters (HAL) is designed for capable, curious students who are pursuing a broad and challenging course of study that will prepare them for a variety of careers and a lifetime of active citizenship. Most university graduates change careers several times during their life. Therefore, this degree emphasizes “portable skills” such as critical thinking and problem solving, which equip students with career flexibility. HAL also provides knowledge and skills that qualify students for admission to graduate and professional schools such as Law. Students who seek a career in health professions can complete their science requirements while pursuing the HAL major.

The HAL major emphasizes a broad, humanistic approach to understanding our world. Required courses include History of Western Civilization, Introduction to Humanities, and Honors Experience in Fine Arts. In addition, HAL students are required to complete an undergraduate thesis, and they graduate with Highest Honors. Students in HAL must complete a 15-hour track. Tracks include pre-law, health professions, art and aesthetics, and American studies. There is also an open track in which students may propose a program of study that fits their personal interests (subject to approval from the HAL advisory committee). For additional program details, see the Honors College Web site at www.depts.ttu.edu/honors/HAL/.

HAL majors are urged to include a study abroad experience as part of their education, and they are required to take a foreign language through the first semester of the third year (3000 level) as preparation for study in a foreign country. Study abroad may be at one of the Texas Tech University overseas campuses or anywhere else in the world where it can be arranged. Most students will study abroad during the spring semester of their junior year, but students in the health professions track may opt to study abroad in the summer to avoid interrupting the sequence of required science courses.

Contact information: Dr. Gary S. Elbow, 211 McClellan Hall, gary.elbow@ttu.edu, 806.742.1828.

Bachelor of Arts Degree in Natural History and Humanities

The Honors College emphasis on breadth of education extends to a multidisciplinary Bachelor of Arts in Natural History and Humanities. This degree is founded upon a broadly based, multidisciplinary curriculum designed to enable students to gain a working knowledge of the natural sciences, philosophy, and the humanities. It is unique in that it emphasizes the application of science knowledge to a creative endeavor.

The knowledge and skills obtained through this degree will enable students to pursue a number of post-graduate options, including graduate school, science journalism, nature writing, nature photography, museum science, documentaries, and other careers that require a merging of science and humanities disciplines.

The natural history and humanities curriculum is a true interdisciplinary degree designed ultimately to direct each student toward an individual course of study. In the first two years of the degree plan, all students have common coursework that will allow them to experience a sampling of several different creative paths and to obtain a broad understanding of the sciences (chemistry, physics, biology, geosciences) and how they integrate.

The foundation of the freshman and sophomore years is three semesters of science and three semesters of special natural history and humanities seminars designed to verse students in the philosophy, history, and theories and practices of natural history and the humanities. At the start of the junior year, students will work under the guidance of the program director to customize a course of study that reflects a specific career direction. This ensures that a sound working knowledge of a particular field can be obtained prior to graduation. In addition, students also will be guided toward producing a senior portfolio. This will include spending two semesters working on the portfolio under the guidance of the director and a faculty mentor in the field of the student's choice. Under special circumstances, permission may be granted for student portfolio projects to be supervised by a qualified mentor who is not affiliated with Texas Tech University. Students also will be encouraged to seek out summer internships in the field of their choice beginning in the summer of their junior year.

Contact information: Dr. Susan Tomlinson, 201B McClellan Hall, 806.742.1828, susan.tomlinson@ttu.edu.

Natural History and Humanities Minor

Students may complete an 18-hour minor in natural history and humanities by completing NHH 1301, NHH 1302, NHH 2301, NHH 3300, NHH 3350, and 3 additional NHH-specific hours of their choosing or 3 hours of portfolio work.

Contact information: Dr. Susan Tomlinson, 201B McClellan Hall, 806.742.1828, susan.tomlinson@ttu.edu.

Humanities Minor

The purpose of the humanities minor is to provide the inquiring and curious student a flexible and interdisciplinary program to explore the creative works of human beings—literary, musical, philosophical, religious, theatrical, and artistic. The minor encourages a broad-based and overarching approach to the investigation of human accomplishment that expresses visions of life and values for living which offer both delight and wisdom.

For students majoring in the sciences or professions, the interdisciplinary humanities minor offers an enriching educational experience. For students already majoring in a single discipline among the humanities, this minor provides a broader awareness of the background of ideas and arts that shape our world. The introductory humanities courses also fulfill Core Curriculum requirements or provide elective credit.

In the humanities 19-hour minor, the student takes two 3-hour foundation courses, HUM 2301 and 2302. Under the director's guidance, the student chooses to focus on one of three tracks: Ancient, Medieval/Renaissance, or Modern. The student then selects one course from each of three categories within each track (Art and Architecture, Language and Culture, and History and Philosophy) as well as an additional course from a category of the student's choice. The student's experience culminates with completion of a one-hour capstone course (HUM 4100), which requires an essay that summarizes the ways in which the courses within the selected track relate. The final course of study must be approved by the director.

Contact information: Dr. Gary S. Elbow, 211 McClellan Hall, gary.elbow@ttu.edu, 806.742.1828.

Natural History and Humanities (NHH)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1301. **The Natural History Tradition (3:3:0).** An introduction to the field of nature writing. Field trip required. Fulfills Core Curriculum humanities requirement. Special field trip fee. (Reading and Writing Intensive)
- 1302. **Introductory Fieldcraft: Nature as Text (3:3:0).** Development of field skills and interpretation of landscape. Weekly field trips and outside projects required. Special field trip fee. (Reading and Writing Intensive)
- 2302. **The Literature of Place (3:3:0).** Prerequisite: NHH 1301 and NHH 1302 or consent of instructor. An introduction to the literature of place through a series of writing and reading workshops. (Reading and Writing Intensive)
- 3300. **Research Methods: Writing the Natural World (3).** Prerequisites: NHH 1301, 1302, and 2301 or consent of instructor. Writing for publication. A writing workshop in creative nonfiction focused on the relationship between people and nature. Field trips required. (Reading and Writing Intensive)
- 3305. **Ecology (3:3:0).** Prerequisite: HONS 2305 and 2306 or consent of instructor. An introduction to the ecology of individuals, populations, and ecosystems. Special field trip fee. (Reading and Writing Intensive)
- 3306. **Course Readings in Natural History (3:3:0).** Prerequisite: NHH 1301 and 3201 or consent of instructor. An exploration of contemporary writers whose focus is primarily the relationship of people with nature. (Reading and Writing Intensive)
- 3350. **Advanced Fieldcraft: Nature as Text (3).** Prerequisites: NHH 1301, 1302, and 2301 or consent of instructor. An advanced exploration of place. Research of literature, culture, and ecology of a region in preparation for immersion in a field experience. Field trip required. Special field trip fee. (Reading and Writing Intensive)
- 4300. **NHH Senior Portfolio (3).** Prerequisite: Proposal Approval. Individual project work under the guidance of a faculty member. (Reading and Writing Intensive)
- 4350. **Field Methods: The Capstone Experience (3).** Prerequisite: NHH 3350 or consent of instructor. Academic study centered around an immersion field experience. Field trip required. Students are expected to be in good physical condition. Special field trip fee. (Reading and Writing Intensive)

Humanities (HUM)

Undergraduate Courses

- 2301 [HUMA 1301]. **Introduction to Humanities (3:3:0).** An exploration of human values, primarily significant to western civilization, in great works of literature, philosophy, and the arts from the classical Greek and Roman eras to the Renaissance. (Reading and Writing Intensive)
- 2302 [HUMA 1302]. **Introduction to Humanities (3:3:0).** The exploration of contemporary human values through great works of literature, philosophy, and the arts from the Renaissance to the present. (Reading and Writing Intensive)
- 4100. **Humanities Capstone (1).** Under the guidance of the Humanities Director, independent work by the student to summarize the relationships between the courses in the student's selected Humanities Minor track (Ancient, Medieval / Renaissance, or Modern.)

Honors (HONS)

Undergraduate Courses

- 1101. **Honors Arts and Letters Seminar I (1:1:0).** This course integrates content from English, history, and political science required core courses.
- 1102. **Honors Arts and Letters Seminar II (1:1:0).** This course integrates content from English, history, and political science required core courses.
- 1301. **Honors First-Year Seminar in Humanities (3:3:0).** Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing in particular the development of critical

- thinking and oral and written communications skills through the framework of a humanities discipline. Topics vary. (Writing Intensive)
1302. **Honors First-Year Seminar in Sciences (3:3:0)**. Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing in particular the development of critical thinking and oral and written communications skills through the framework of a technology and applied science discipline. Topics vary. (Writing Intensive)
1303. **Honors First-Year Seminar in Social Sciences (3:3:0)**. Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing in particular the development of critical thinking and oral and written communications skills through the framework of a social and behavioral science discipline. Topics vary. (Writing Intensive)
1304. **Honors First-Year Seminar in Fine Arts (3:3:0)**. Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing in particular the development of critical thinking and oral and written communications skills through the framework of a visual and performing arts discipline. Topics vary. (Writing Intensive)
2301. **Honors Experience in Fine Arts I (3:3:0)**. Corequisite: HIST 1301 and HUM 2301. Course surveys highlights of human experience in the arts from the ancient world to the middle ages. Sculpture, architecture, music, painting, music theatre and dance emphasized through “hands-on” participation experiences. No previous experience required, but an enthusiastic openness for new experiences is essential. (Writing Intensive)
2302. **Honors Experience in Fine Arts II (3:3:0)**. Corequisite: HIST 1302 and HUM 2302. Course surveys highlights of the human experience in the arts from the Renaissance to the 21st century. Sculpture, architecture, music, painting, music theatre and dance are emphasized through “hands-on” participation experiences. (Writing Intensive)
2405. **Honors Integrated Science I (4:3:2)**. Corequisite: HONS 2115. An integrated science course introducing students, in an interdisciplinary way, to physics and chemistry. Satisfies Core Curriculum natural science requirement. Not open to science majors. Part of a two-semester integrated presentation.
2406. **Honors Integrated Science II (4:3:2)**. Corequisite: HONS 2116. An integrated science course introducing students in an interdisciplinary way to biology and geosciences. Satisfies Core Curriculum natural science requirement. Not open to science majors. Part of a two-semester integrated presentation.
3300. **Individual Honors Research (3)**. Prerequisite: Enrollment in the Honors College and approval from the Honors Dean. Contents will vary to meet the needs of students. May be repeated once for credit. Independent work under the individual guidance of a faculty member, who must be either a member of the graduate faculty or approved by the Honors Dean.
3301. **Honors Seminar in Humanities (3:3:0)**. Prerequisite: Enrollment in the Honors College or approval from the Honors Dean. An in-depth study of major literary works emphasizing the interrelationships of literature and philosophy. Satisfies the Core Curriculum humanities requirement. May be repeated as the topic varies with permission of the Honors Dean. (Writing Intensive)
3302. **Honors Seminar in Sciences (3:3:0)**. Prerequisite: Enrollment in the Honors College or approval from the Honors Dean. Considers the developments and applications of modern science as they affect living today, directed toward cultivating sound individual judgments in a technological society. Satisfies the Core Curriculum technology and applied science requirement. May be repeated as the topic varies with permission of the Honors Dean. (Writing Intensive)
3303. **Honors Seminar in Social Sciences (3:3:0)**. Prerequisite: Enrollment in the Honors College or approval from the Honors Dean. Study of techniques, principles, and methodology of the social sciences as applied to a central topic to demonstrate the interrelationships of the various disciplines. Satisfies the Core Curriculum individual or group behavior requirement. May be repeated as the topic varies with permission of the Honors Dean. (Writing Intensive)
3304. **Honors Seminar in Fine Arts (3:3:0)**. Prerequisite: Enrollment in the Honors College or approval from the Honors Dean. Study of the history, development, and terminology of the fine arts, emphasizing functional relationships between disciplines in an effort to provide bases for aesthetic evaluation of specific artistic entities. Satisfies the Core Curriculum visual and performing arts requirement. May be repeated as the topic varies with permission of the Honors Dean. (Writing Intensive)
4300. **Individual Honors Research (3)**. Prerequisite: Enrollment in the Honors College and approval from the Honors Dean. Contents will vary to meet the needs of students. May be repeated once for credit. Independent work under the individual guidance of a faculty member, who must be either a member of the graduate faculty or approved by the Honors Dean.



College of Human Sciences

“Improving and enhancing the human condition”

Linda C. Hoover, Ph.D., Dean

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About the College

Mission Statement. The College of Human Sciences provides multidisciplinary education, research, and service focused on individuals, families, and their environments for the purpose of improving and enhancing the human condition.

Overview. Texas Tech human sciences programs at the baccalaureate, master's, and doctoral levels are innovative in focus, relevant to the needs of a rapidly changing society, and designed to prepare professionals for employment in broad career options.

The College of Human Sciences is a professional college, requiring the highest expectations for its graduates. College programs are accredited by the American Association of Family and Consumer Sciences and seven other national accrediting agencies. Additionally, the college offers courses of significance to the general and professional education of students majoring in other colleges and provides continuing education for professionals in fields related to human sciences.

Degree Programs. Most undergraduate degree programs lead to the Bachelor of Science degree. Majors offered for all programs within the college include the following:

- Apparel Design and Manufacturing
- Community, Family, and Addiction Services
- Early Childhood
- Family and Consumer Sciences
- Human Development and Family Studies
- Interior Design
- Nutritional Sciences
- Personal Financial Planning
- Restaurant, Hotel, and Institutional Management
- Retailing

For additional information about undergraduate degree programs in the various departments, see the following pages and/or contact the office of Academic Advising Services in 159 Human Sciences 806.742.1180.

The college offers a dynamic curriculum, a well-qualified faculty, outstanding facilities, and a commitment to excellence. In addition to undergraduate majors, the college offers the Master of Science and Doctor of Philosophy degrees with majors in all departments. Specific information regarding graduate degrees may be found in the Graduate Program sections.

Undergraduate Program

General Standards and Requirements

Students are expected to assume responsibility for knowing the rules, regulations, and policies of the university; to learn the requirements pertaining to their degree program; and to consult the catalog, registration guidelines, and degree plans for their major.

Financial Aid to Students. Numerous scholarships and assistantships are available to provide financial assistance and valuable experience to capable students. Write to the dean of the College of Human Sciences, Box 41162, Texas Tech University, Lubbock, Texas 79409-1162. The scholarship application deadline is February 1. Emphasis will be on leadership, service, high school and transfer grade point averages, test scores, and need. To receive full-time financial aid, students must be enrolled for a minimum of 12 hours. Some programs allow enrollment in less than full-time hours, but students must check with the Financial Aid Office concerning eligibility for these programs.

Catalog Selection. Students must use the catalog issued for the year in which they were first officially admitted to the college or a more recent catalog if approved. However, if they are not enrolled at Texas Tech for one academic year or have transferred to another college at Texas Tech or another institution, they must be readmitted to the College of Human Sciences and use the catalog in effect at the time of readmission. For graduation purposes, a catalog expires after seven years.

Academic Advising Services. The purpose of Academic Advising Services is to provide quality service to the faculty and students in the college. The advising staff is responsible for assisting students from orientation to graduation. Students should visit online at www.hs.ttu.edu/AAS to obtain information and updates prior to advance registration periods. Schedule of classes, registration, adding and dropping classes, payment of fees, and individual degree plans (click on degree audit under student services) are available by visiting www.techsis.admin.ttu.edu/student. Students needing additional assistance may visit with an advisor. To make an appointment, call the office of Academic Advising Services at 806.742.1180. Office hours are from 8 to 6 p.m. Monday through Thursday.

Graduation. Graduation is attained by fulfilling the requirements for a bachelor's degree using an acceptable catalog edition. The student is responsible for fulfilling all catalog requirements. At least one year prior to the graduation semester, students should file a Statement of Intention to Graduate form with Academic Advising Services. After submission of the form, the coordinator of undergraduate programs will complete a degree audit and email a Progress Report for Graduating Seniors (list of courses lacking toward degree completion) to the student. Thereafter, students will follow the audited list of remaining courses. Substitutions and minor

forms must be filed prior to or at the same time as the Statement of Intention to Graduate. The Progress Report for Graduating Seniors will be reviewed prior to the last semester and students will be notified by email of any discrepancies that may prevent graduation. The last 30 hours are to be taken from Texas Tech (including correspondence and off-campus courses) unless permission has been granted by the dean. Any change in graduation date must be communicated to the office of Academic Advising Services.

Correspondence Courses. All correspondence courses must be approved in writing by the coordinator of undergraduate programs. Graduating seniors are not allowed to take correspondence courses in their last semester.

Credit by Examination. A matriculated student may attempt credit by examination (described in Admissions section of catalog).

Course Load. The normal course load for a semester is 15 hours or above. The maximum load for a semester is 19 hours (7 hours for a summer term).

Course Prerequisites. Prerequisites are governed by the catalog in effect when the course is taken.

Ineligible Registration. The College of Human Sciences reserves the right to drop any ineligibly registered student from a course for reasons such as lower division-upper division rule infractions, lack of prerequisites, GPA requirements, and failure to attend the first week of class in HDFS 3411 and 3413. Courses taken ineligibly are not used in the degree program.

Minor. The student should consult with the academic department of the intended minor and have a Minor Approval form signed. Declared minors can be filed either before or at the same time as the Intention to Graduate form. Grades of C or better are required in each course. Specific minors are listed in the departmental areas.

Pass-Fail. A maximum of 13 hours may be taken pass-fail. The pass-fail option may be used for free elective courses. If an ineligible course is taken pass-fail, it must be replaced by the next higher course. Pass-fail hours are excluded in determining eligibility for the Dean's Honor or President's List. No student on probation is allowed the pass-fail option.

Selection of a Major. Freshman level human sciences courses will be helpful in clarifying career goals. See an academic advisor for additional information.

Human Sciences (HUSC)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1100. Introduction to Human Sciences (1:1:0).** Overview of the College of Human Sciences and instruction on how to study within the college can help prepare a student for academic and personal success. Topics include personal and family relationships, personal finance, nutrition, academic advising, etc. Required first semester.
- 2000. Special Studies (VI-6).** A course for lower-level human sciences majors for individual study or special problems.
- 3214. Human Sciences Seminar (2:2:0).** Prerequisite: Human Sciences majors only, junior or senior standing. Recommended to be taken one year prior to anticipated graduation. Integrative approach and professional orientation to societal issues, including public policy, ethics, cultural diversity, and global interdependence.

Graduate Courses

- 5311. Problems in Human Sciences (3:3:0).** May be repeated for credit.
- 6000. Master's Thesis (V1-12).**

Graduate Program

The College of Human Sciences offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees.

The Master of Science degree has majors in environmental design; nutritional sciences; family and consumer sciences education; human development and family studies; marriage and family therapy; personal financial planning; and restaurant, hotel, and institutional management.

The Doctor of Philosophy degree has majors in environmental design and consumer economics, nutritional sciences, family and consumer sciences education, hospitality administration, human development and family studies, and marriage and family therapy.

The graduate programs in the college are designed to educate scholars and leaders in all areas that affect human development; nutrition; family studies; environmental design; restaurant, hotel, and institutional management; personal financial planning; family and consumer sciences education; and consumer behavior.

Persons successfully completing graduate work in the college have traditionally been prepared to serve as leaders in the business world, private sector organizations, and academic institutions. Anyone interested in graduate programs should consult the Graduate School catalog section for information about university requirements for master's and doctoral degrees. Information about the graduate minor in risk-taking behavior is also provided in the Graduate School section under the heading "Opportunities for Interdisciplinary Study."

Admission to master's degree programs requires the recommendation of the department and approval of the graduate dean. Admission to the doctoral program requires the recommendation of the department as well as approval of the graduate dean. Applicants should contact the program director or the chairperson of the department offering the specialization for college and departmental guidelines.

The College of Human Sciences is a member of the Great Plains Interactive Distance Education Alliance (GPIDEA). The GPIDEA is comprised of many institutions of higher education who share a goal of increasing educational options at the graduate level. Ten of the best state universities in the country have joined together to offer online graduate certificates and master's degrees in human sciences disciplines. Prospective students may apply for admission to a human sciences graduate program at any of the 10 universities. The student is admitted to one university and receives a graduate degree or certificate from that same university.

Two programs are offered through collaboration of the GPIDEA and the College of Human Sciences. Students can specialize in gerontology within the M.S. in Human Development and Family Studies or obtain an M.S. in Family Consumer Sciences Education. For additional information see graduate program listings for the department of Human Development and Family Studies or Applied and Professional Studies.

The courses are taught by several universities, but students enroll and pay for all their courses through the university where they have been admitted. Students therefore have the advantage of receiving coordinated, diverse, high-quality instruction from topic experts at several universities without the hassle and expense of figuring out each institution's admissions, enrollment, payment, and transcript transfer processes.

For more information about the GPIDEA, its programs, and the participating institutions, visit www.hs.ttu.edu/gpidea.

Department of Applied and Professional Studies

Faculty

Karen S. Wampler, Ph.D., Chairperson

Professors: Couch, Felstehausen, V. Hampton, Ivey, K. Wampler, R. Wampler

Associate Professors: Bagwell, Cordell, Finke, Gustafson, K. Harris, S. Harris, Katz, Kimball, Shumway

Assistant Professors: K. Alexander, Gilliam, Morris, Salter, Smock

Instructors: Barnhill, Comiskey, Davis, Morelock

About the Program

The department supervises the following degree programs:

- Bachelor of Science in Family and Consumer Sciences
- Bachelor of Science in Community, Family and Addiction Services
- Bachelor of Science in Personal Financial Planning
- Master of Science in Family and Consumer Sciences Education
- Master of Science in Marriage and Family Therapy
- Master of Science in Personal Financial Planning
- Doctor of Philosophy in Family and Consumer Sciences Education
- Doctor of Philosophy in Environmental Design and Consumer Economics with an emphasis in Personal Financial Planning
- Doctor of Philosophy in Marriage and Family Therapy

Mission. The mission of the Department of Applied and Professional Studies (APS) is to serve students and the community by offering quality education in applied human services delivered by world-class faculty teaching in distinguished programs. To accomplish this mission, the department offers the following program areas: family and consumer sciences, personal financial planning, addictive disorders and recovery studies, and marriage and family therapy.

The department relates to the Center for Financial Responsibility, the Center for the Study of Addiction and Recovery, the Family Therapy Clinic, and the Curriculum Center for Family and Consumer Sciences.

Within the department there are opportunities to collaborate with faculty members in research; to experience different aspects of programs through internships, classroom apprenticeships, and independent studies; and to participate in student organizations and activities. The department is committed to being an active and contributing member of the college, university, and surrounding communities. As a result, faculty, staff, and students are actively engaged with many university groups, community groups, and agencies in an effort to improve the experience for students and improve the quality of life for others.

Addictive Disorders and Recovery Studies

The Center for the Study of Addiction and Recovery (CSAR) at Texas Tech, established in 1986, assists individuals recovering from drug and alcohol addiction and eating disorders with their pursuit of a college education. The CSAR has created a community support and relapse prevention program, the Collegiate Recovery Community, which provides an environment in which recovering students can focus on staying sober without having to delay their educational goals. The CSAR, the only program of its kind in the United States, was selected recently to receive support from the federal government to develop a model to replicate collegiate community support and relapse-prevention programs at other universities.

The CSAR offers a comprehensive curriculum in addictive disorders and recovery studies meeting all educational requirements for a student to become a licensed chemical dependency counselor in the state of Texas. Students enrolled in many majors across the university take classes in this curriculum.

Interdisciplinary Minor in Addictive Disorders and Recovery Studies

The Department of Applied and Professional Studies, Addictive Disorders and Recovery Studies program, and the College of Arts and Sciences jointly offer an interdisciplinary minor in addictive disorders and recovery studies (ADRS). This minor is designed for students with professional, academic, or personal interest in addictive disorders. It will provide students with an understanding of the physiological, psychological, societal, and familial factors contributing to addiction and the recovery from addiction. It is recommended that the 18 hours of coursework be taken in the order listed below:

1. Take this class first: ADRS 2310 Understanding Alcohol, Drugs and Addictive Behavior
2. Take this class second: ADRS 3325 Family Dynamics of Addiction
3. Choose **two** classes in any order from the following:

ADRS 2327	Prevention of Substance Abuse
HLTH 3325	Health and Chemical Dependency
SOC 3383	Alcohol, Drugs, and Society
PSY 4325	Drugs, Alcohol, and Behavior
4. Choose **one** class from the following:

PFP 2325	Family Financial Counseling
FCSE 3325	Educational Programming: Addiction Issues
ADRS 3329	Addiction, Recovery, and Relationships
SOC 4325	Criminology
SOC 4327	Juvenile Delinquency
5. Take this class last: ADRS 4325 Treatment of Addictive Disorders

The Texas Commission on Alcohol and Drug Abuse and the Texas Certification Board of Alcoholism and Drug Abuse Counselors accept completion of this minor as fulfillment of alcohol- and drug-specific education for licensure.

Community, Family, and Addiction Services

The B.S. in Community, Family, and Addiction Services (CFAS) prepares graduates to work in administrative and direct service roles in agencies serving communities and families of diverse needs and populations. This plan of study places emphasis on organizational effectiveness, program development, and service delivery. All coursework is grounded in family systems theory and its applications in human services settings. An understanding of addiction in its various manifestations and the development of multicultural competence are also core elements of the curriculum.

Through this dual focus, CFAS graduates develop a unique combination of skills in leadership, fund raising, financial management, program development, program delivery, and cultural competence. They are also trained to understand addiction, including prevention, assessment, treatment, and relationship dynamics. This degree fulfills all of the coursework (but not the 3000 hours of supervised practicum experience) required to become a Licensed Chemical Dependency Counselor (LCDC) in the State of Texas (as administered by the Texas Commission on Alcohol and Drug Abuse and the Texas Certification Board of Alcoholism and Drug Abuse Counselors). The CFAS degree also prepares students for placements within: Non-Profit Administration or Service Coordination, Community Support Outreach, Social and Community Services Management, Drug Abuse Counseling, Graduate Programs within Mental Health Services, and other human service related career paths.

Enrollment in the CFAS major is based on a cumulative grade point average of 2.5 and all upper-division CFAS courses also have a prerequisite of a 2.5 GPA. The program also requires a 14-week practicum in which students work in an existing human service organization during the summer between the junior and senior years.

Curriculum for B.S. in Community, Family, and Addiction Services

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302 Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	PSY 1300, Intro to Psychology	3
MATH 1300 or 1320, Cont. Math. or College Algebra	3	Visual & Performing Arts*	3
Humanities*	3	ADRS 2310, Under. Addictive Beh.	3
POLS 1301, Amer. Govt. Org.	3	POLS 2302, Amer. Public Policy	15
CFAS 2301, Intro to CFAS	3	TOTAL	16
TOTAL	16		
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
NS 1410 Science of Nutrition	4	ADRS 2327, Sub. Abuse Prevention	3
CFAS 2300, Comm., Civil., & Ethics	3	PPF 2325 (S) Fam. Fin. Counseling	3
CFAS 2360, Multicultural Competence	3	Natural Lab Science*	4
PPF 2310, Tech. App. in PFP	3	Free Elective	3
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
SOC 3391, MATH 2300, or PSY 3400, Statistics	3	HUSC 3214, HS Seminar [^]	2
ENGL 2311, Technical Writing [^]	3	HDFS 3320, Contemporary Family [^]	3
PSY 4305, Abnormal Psychology [^]	3	FCSE 3303, Ed. Proc. Prof. Settings	3
ADRS 3325, Fam. Dyn. of Addiction	3	CFAS 4330, Admin. in CFAS [^]	3
Family Issues Elective (C)	3	ADRS 4325 (S), Treat. Of Addiction [^]	3
TOTAL	15	TOTAL	14
SUMMER			
Practicum, CFAS 4314 [^] (SS)	6		
FOURTH YEAR			
Fall		Spring	
CFAS 4380, Develop. & Evaluation [^]	3	FCSE 4325, Fam. Issues & Soc. Action [^]	3
HDFS 2322 Int. Relationships or PFP 3301 Personal and Family Fin.	3	CFAS 4300, Coaching Leaders [^]	3
Research & Ind. Study Elective (B)	3	CFAS 4390, Senior Seminar [^]	3
Treatment Elective (A)	3	Free Elective	3
TOTAL	12	TOTAL	12
TOTAL – 122 Hours			

* Choose from Core Curriculum requirements.
[^] Prerequisites apply
 (F) Offered fall semester only; (S) offered spring semester only; (SS) offered summer only
 (A) Choose from ADRS 3329, 4329, or CFAS 4331.
 (B) Choose from ADRS 4000, 4320; CFAS 4000, 4320; or S W 3339.
 (C) Choose from HDFS 3317, 3321, or 3331

Family and Consumer Sciences Education

The mission of the family and consumer sciences education program is to prepare individuals for professional positions in secondary schools, colleges and universities, extension education, and related areas through quality education, research, and service. The family and consumer sciences program offers specializations in family and consumer sciences teacher certification and family and consumer sciences. The certification specialization meets Texas standards for the Family and Consumer Sciences Composite Certificate that qualifies individuals to teach all family and consumer sciences courses offered in Texas junior and senior high schools. Texas has a critical shortage of teachers, and the demand for family and consumer sciences teachers remains strong.

Family and Consumer Sciences Teacher Certification. The family and consumer sciences teacher certification program is designed for students planning teaching careers in junior high and high school family and consumer sciences, extension, adult- and community-based education, educational support services such as curriculum development and media, business, government, human services, and other fields. The program includes coursework in all family and consumer sciences content areas and the professional education courses required for teacher certification. See an academic advisor for current information.

Curriculum for B.S. in Family and Consumer Sciences with Teacher Certification

FIRST YEAR			
Fall		Spring	
HUSC 1100 or I S 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	Math. or Logical Reasoning*	3
Mathematics*	3	NS 2310, Prin. of Food Prep.	3
FCSE 2102, Intro. to FCS	1	POLS 2302, Amer. Public Policy	3
POLS 1301, Amer. Govt. Org.	3	ID 1380, Intro. to Interior Design	3
Visual & Performing Arts*	3	TOTAL	15
Oral Communication*	3		
TOTAL	17		
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
English Literature [^]	3	ENGL 2311, Intro. to Tech. Writing [^]	3
Natural Lab. Science*	4	HDFS 3301, Theories of Human Dev.	4
EDSE 2300, Schools, Society, and Div.	3	PPF 2325 (S) or 3301	3
ADM 2311 (F), Textiles [^]	3	NS 1410, Science of Nutrition	3
ADM 1303 (F), Clothing Const.	3	TOTAL	16
TOTAL	19		
THIRD YEAR			
Fall		Spring	
FCSE 3301 (F), Foundation of FCSE [^]	3	HDFS 3413 [^] or 3411 [^]	4
HDFS 3320, Contemporary Family	3	FCSE 3350, Special Topics in FCS	3
HDFS 3331, Parenting	3	or PFP 2325 (S), Fam. Fin. Counseling	3
EDIT 3318, App. of Tech in Elem. Edu.	3	FCSE 4302 (S), Pro. App. in FCS [^] ***	3
HDFS 3312, Dev. During Childhood [^]	3	EDSE 4310, Learn./Cog./Inst. Design [^] ***	3
HDFS 3310, Prenatal and Infant Dev. [^]	3	EDSE 4322, Div./Class. Learn. Env. [^] ***	3
TOTAL	18	EDLL 4382, Read/Write 2nd Class. [^] ***	3
		TOTAL	19
FOURTH YEAR			
Fall		Spring	
FCSE 4308 (F), Res. and Eval. in FCS [^] ***	3	FCSE 4601 (S), Student Teaching [^] ***	6
FCSE 4306 (F), Occupational FCS [^] ***	3	FCSE 4601 (S), Student Teaching [^] ***	6
RHIM 3460, Food Syst. Management I	4	FCSE 4304 (S), Inst. Man. in FC [^] ***	3
ID 4000, Housing & Int. All. Course	3	TOTAL	15
HUSC 3214, Human Sci. Sem.	2		
TOTAL	15		
TOTAL—134 hours			

* Choose from Core Curriculum requirements.
[^] Prerequisites apply
[^] Concurrent enrollment is required
 ** Admission to Teacher Certification (Education) Program and a minimum 2.5 GPA required (apply prior semester).
 (F) Offered fall semester only ; (S) offered spring semester only

Curriculum for B.S. in Family and Consumer Sciences

FIRST YEAR			
Fall		Spring	
HUSC 1100 or I S 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	Math. or Logical Reasoning*	3
Mathematics*	3	Individual/Group Behavior*	3
Visual & Performing Arts*	3	Tech/App. Sciences*	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, American Public Policy [^]	3
Minor Requirement	3	TOTAL	15
TOTAL	16		
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
Humanities*	3	Oral Communication*	3
Natural Lab Science*	4	Minor Requirements	9
Minor Requirements	6	TOTAL	15
TOTAL	16		
THIRD YEAR			
Fall		Spring	
Natural Lab. Science*	4	Human Science Core Elective	3
FCSE 3303, Ed. Proc. Prof. Settings	3	Minor Requirements	9
HUSC 3214, Jr./Sr. Seminar	2	Elective	3
Minor Requirements	6	TOTAL	15
TOTAL	15		
FOURTH YEAR			
Fall		Spring	
Minor Requirements	12	FCSE 4325, Fam. Issues and Soc. Action	3
Research, Internship, Practicum or Individual Study	3	Minor Requirements	9
TOTAL	15	Research, Internship, Practicum or Individual Study	3
		TOTAL	15
TOTAL—122 hours			

* Choose from Core Curriculum requirements.
[^] Prerequisites apply

Students seeking teacher certification must meet all requirements outlined in the College of Education section of this catalog. Admission requirements include completion of a minimum of 60 semester hours (including current enrollment) with a 2.5 or better overall GPA and college-level skills in reading, oral and written communication, critical thinking, and mathematics. To be recommended for certification, graduates must maintain a 2.5 or better overall GPA and also a 2.5 or better GPA in all professional education courses as well as in the teaching field(s). In addition, graduates must achieve a satisfactory level of performance on the appropriate examinations prescribed by the State Board for Educator Certification.

Students also may earn a teaching certificate in family and consumer sciences as part of a major in human development and family studies. A Specialized Family and Consumer Sciences Certificate in Hospitality, Nutrition, and Food Sciences is available as part of a major in nutritional sciences or a major in restaurant, hotel, and institutional management. For more information, see the catalog sections for the Department of Human Development and Family Studies and the Department of Nutrition, Hospitality, and Retailing.

Family and consumer sciences certification students may take online courses through the Texas Family and Consumer Sciences Distance Education Alliance and the Great Plains Interactive Distance Education Alliance. More information on these options can be found at www.fcsalliance.org or www.gpidea.org or by contacting an FCSE advisor.

Family and Consumer Sciences. The family and consumer sciences specialization is designed for students who wish to pursue multiple fields of study within the College of Human Sciences. It provides flexibility for students to explore specific areas of interest, work toward career goals, or prepare for graduate or professional study. Instead of a major, students complete the requirements for a minor in each of three areas of study. Students may select minors in addictive disorders and recovery studies; apparel design and manufacturing; human development and family studies; interior design; nutritional sciences; personal financial planning; restaurant, hotel and institutional management; or retailing. Each minor consists of a minimum of 18 hours for a total of 54 hours. For additional information about minor requirements in each area, see an Academic Advisor in the College of Human Sciences.

Personal Financial Planning. See the catalog section for the Division of Personal Financial Planning.

Addictive Disorders and Recovery Studies (ADRS) (To interpret course descriptions, see page 8.)

Undergraduate Courses

2125. **Collegiate Community Seminar (1:1:3).** Prerequisite: Consent of instructor. Philosophy and process of recovery from addiction. Intensive seminar and laboratory experience. May be repeated for credit.
2310. **Understanding Alcohol, Drugs, and Addictive Behaviors (3:3:0).** This course is designed to provide students with an introduction to addiction, including the nature of addiction, its history, biology, inter/intra personal, and social aspects.
2327. **Substance Abuse Prevention (3:3:0).** Prerequisite: ADRS 2310. Introduction to different perspectives on current research and methodologies in the field of substance abuse.
3325. **Family Dynamics of Addiction and Recovery (3:3:0).** Prerequisite: ADRS 2310. An examination of the family system with specific reference to the causes and effects of chemical abuse, addiction, and the process of recovery.
3329. **Addiction, Recovery, and Relationships (3:3:0).** Prerequisite: ADRS 2310. Addicted persons may have difficulties with intimate relationships. Relationships can also be a specific addiction. This course examines addiction, relationships, and addictive relationships.
4000. **Individual Study (3).** Prerequisite: ADRS 2310 and written consent of supervising faculty member. Teaching assistant-

ships, independent coursework, or student-initiated research experience. May be repeated once for credit.

4320. **Research in Addictive Disorders (3).** Prerequisite: ADRS 2310 and written consent of a supervising faculty member and senior standing. Supervised faculty-initiated research experience in selected areas. May be repeated twice for credit.
4325. **Treatment of Addictive Disorders (3:3:0).** Prerequisite: ADRS 2310 and ADRS 3325. Survey of the current treatment philosophies and programs designed to assist individuals and families affected by addictive disorders.
4329. **Eating Disorders (3:3:0).** Prerequisite: ADRS 2310. Nature of eating disorders and approaches to prevention and intervention.

Graduate Courses

6301. **Couple and Family Dynamics of Addiction (3:3:0).** Study of the theory and research related to addictive behaviors and couple/family relationships. Focuses on systemic etiological factors and relational outcomes.
6315. **Systemic Treatments and Addictions (3:3:0).** Study of systemically relevant treatment approaches and strategies for addictive behaviors. Focus is on treating addictions and compulsive behaviors using systemic-focused (e.g., couple and family) approaches.

Community, Family, and Addiction Services (CFAS)

Undergraduate Courses

2300. **Communication, Civility, and Ethics (3:3:0).** Provides students with a basic understanding of proper communication, civility, and ethics within professional and personal settings.
2301. **Introduction to Community, Family, and Addiction Services (3:3:0).** Introduction to the field of community, family, and addiction services, including an overview of family systems theory and its applications.
2360. **Diversity in Community, Family, and Addiction Services (3:3:0).** Prerequisite: CFAS 2301. Focus on the interrelationships of race, class, and gender and their impact on community, family, and addiction services.
4000. **Individual Study in CFAS (VI-6).** Prerequisite: GPA of 2.5, CFAS 2301, and written consent of supervising faculty member. Teaching assistantship, independent coursework, or student-initiated projects. May be repeated once for credit.
4300. **Coaching Leaders (3:3:0).** Prerequisite: GPA of 2.5, CFAS 2301 and junior or senior standing. Theories of leadership training and personal and professional development are presented with the goal of developing and cultivating effective leadership relationships within teams and other organizational groups.
4314. **Practicum in CFAS (3).** Prerequisite: GPA of 2.5 and CFAS 2301. This practicum provides students with experience in administrative and organizational functioning as well as the policies and procedures of agencies servicing families and the community.
4330. **Administration in Community, Family, and Addiction Services (3:3:0).** Prerequisite: GPA of 2.5 and CFAS 2301. Includes approaches to organizational management and intervention, strategic planning, team building, supervision, and basic financial considerations.
4331. **Introduction to Marriage and Family Therapy (3:3:0).** Prerequisite: GPA of 2.5 and CFAS 2301. An experiential course with emphasis on developing skills that apply to interview situations. A problem-centered approach to family needs.
4380. **Development and Evaluation of CFAS Programs (3:3:0).** Prerequisite: GPA of 2.5 and CFAS 2301. Approaches to program development in community settings, needs assessment, and evaluation.
4390. **Senior Seminar in CFAS (3:3:0).** Prerequisite: GPA of 2.5 and CFAS 2301, 4330, 4380, 4314. Capstone experience in grant-writing and board/community/staff management. Includes final preparation of grant proposal for community agency.

Family and Consumer Sciences Education (FCSE)

Undergraduate Courses

2102. **Introduction to Family and Consumer Sciences (1:1:0).** For human sciences students only. Exploration of family and

Graduate Programs

The Department of Applied and Professional Studies supervises graduate degree programs in marriage and family therapy, family and consumer sciences education, and environmental design and consumer economics with an emphasis in personal financial planning. Students develop their courses of study in consultation with a graduate advisory committee. During the first year of doctoral study, the graduate faculty in the major field will make a formal evaluation of the student's background. The results of this evaluation will be used as the basis for planning the student's program of study and determining any leveling courses that may be needed. Following completion of all coursework, a qualifying examination for admission to candidacy for the Ph.D. degree will be conducted in accordance with the requirements of the Graduate School.

Applicants should contact the graduate advisor in the individual program concerning admission requirements, programs of study, and financial assistance. Admission to a graduate degree program requires both the recommendation of the department and the Graduate School.

Family and Consumer Sciences Education (FCSE)

M.S. in FCSE. The M.S. in FCSE is designed to prepare individuals for advancement in family and consumer sciences careers. A minimum of 32 semester hours is required for the thesis option and 38 semester hours for the nonthesis option. Required coursework includes curriculum development, evaluation, administration and leadership, and research methods. Statistics is required for the thesis option.

Ph.D. in FCSE. The Ph.D. in FCSE prepares individuals for faculty positions in higher education and other professional leadership roles. A minimum of 50 semester hours beyond the master's degree is required, exclusive of dissertation. The program includes a specialization in family and consumer sciences education, a research component, and other coursework designed to meet individual professional goals. Students may complete an 18-hour emphasis that meets the Southern Association of Colleges and Schools standard for coursework in a teaching discipline.

Post-Baccalaureate Certifications. Graduate students also may obtain a teaching certificate in family and consumer sciences by completing coursework that meets the Texas standards for teacher certification. Three post-baccalaureate options are available. The Family and Consumer Sciences Composite Certificate qualifies individuals to teach all family and consumer sciences courses offered in Texas junior and senior high schools. Specialized certificates in human development and family studies and hospitality, nutrition, and food science qualify individuals to teach family and consumer sciences courses in the designated content areas. Post-baccalaureate certification students are eligible to complete a one-year paid teaching internship in lieu of student teaching. Selected graduate credits earned for certification may be applied toward a graduate degree in family and consumer sciences education (M.S. or Ph.D.).

GPIDEA—M.S. in Family and Consumer Sciences Education.

An online option for the M.S. in Family and Consumer Sciences Education is offered in collaboration with the Great Plains Distance Education Alliance (GPIDEA). The nonthesis program is designed for individuals who have a bachelor's degree in a family and consumer sciences content specialization or related area and are interested in obtaining initial certification/licensure for teaching family and consumer sciences at the secondary level. The program consists of 39 semester hours and includes

the pedagogy courses required for certification. Teacher certification standards vary by state, and students may need to meet additional certification requirements mandated by the state in which they wish to be certified. Students admitted to this program register for all courses at Texas Tech, but the courses may be taught by faculty at any of the Great Plains institutions. Additional information may be obtained at www.hs.ttu.edu/gpidea or by contacting an FCSE advisor.

Marriage and Family Therapy

The M.S. and Ph.D. degree programs in marriage and family therapy provide clinical and academic training to students who will function as marriage and family therapists at the highest level of clinical competence and who will make unique contributions to the field of marriage and family therapy through research, teaching, clinical practice, and other professional activities. The M.S. degree is intended to provide the academic requirements leading to licensure as a marriage and family therapist in the state of Texas. Actual licensure requires additional post-master's degree clinical experience. The Ph.D. degree requires a minimum of 48 credit hours beyond the master's degree plus a clinical internship and at least 12 hours of dissertation research. The Ph.D. program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education of the American Association for Marriage and Family Therapy.

Personal Financial Planning (Environmental Design and Consumer Economics)

The Division of Personal Financial Planning, which is administered by the Department of Applied and Professional Studies, supervises degree programs leading to Master of Science in Personal Financial Planning and a Doctor of Philosophy in Environmental Design and Consumer Economics. See information on these programs in the Division of Personal Financial Planning catalog section.

Graduate Certificates

Addictions and the Family. The graduate certificate in addictions and the family was created to provide specialized training to mental health providers who work with families and individuals struggling with substance abuse and addictive behaviors. Coursework requirements include a total of 18 credit hours: 12 credit hours focusing on family systems theories, the impact of addiction on family dynamics, systemic treatment, and issues in professional development; and 6 credit hours chosen from courses in systemic evaluation, developmental issues in therapy, and couple/sex therapy. Additional coursework and clinical experience is required for clinicians seeking state licensure as a Licensed Chemical Dependency Counselor.

Personal Financial Planning. The Graduate Certificate in Personal Financial Planning is designed to meet the educational requirement for the Certified Financial Planner™ Certification designation. A minimum of 18 hours must be completed in the areas of Financial Planning, Asset Management, Insurance and Risk Management, Retirement, Tax, and Estate Planning for the certificate from Texas Tech. For students with no previous coursework in these areas, 24 hours may be required to meet the educational requirements of CFP Board to sit for the CFP® Certification Examination.

- consumer sciences programs in traditional and nontraditional settings, including family and consumer sciences extension, adult education, business and community agencies, and public schools. Includes field experience.
- 3103. Field Experience in Family and Consumer Sciences I (1:1:0).** Supervised observation and teaching in family and consumer sciences.
- 3301. Foundations of Family and Consumer Sciences Education (3:3:0).** Prerequisite: FCSE 2102, 2.5 GPA, and application and/or admission to the Teacher Education Program. Introduction to programs in secondary schools and other settings. Program development and teaching methods.
- 3303. Educational Processes in Family and Consumer Sciences Professions (3:3:0).** Designed for nonmajors. Focus on the teaching-learning process in professional settings outside the traditional classroom.
- 3325. Educational Programming: Addiction Issues (3:3:0).** Addiction issues affecting individuals and families in business, community, and school settings. Emphasis on program development, implementation, and evaluation.
- 3350. Special Topics in Family and Consumer Sciences (3:3:0).** Semester long study of a specific topic pertinent to the family and consumer sciences profession. May be repeated (different topics) for a maximum of 12 credit hours.
- 4000. Individual Study (V1-6).** Prerequisite: Written consent of supervising faculty member. May be repeated for credit for up to 6 hours. F, S, SS.
- 4103. Field Experiences in Family and Consumer Sciences II (1:1:0).** Supervised observation and teaching in occupational family and consumer sciences.
- 4301. Student Teaching in Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 4306, 4308, corequisite: FCSE 4304. Supervised teaching in an approved secondary family and consumer sciences program.
- 4302. Professional Applications in Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 3301. Application of family and consumer sciences knowledge and skills in the secondary classroom.
- 4304. Instructional Management in Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 4306, 4308; corequisite: FCSE 4601. Principles and procedures for managing the family and consumer sciences classroom. Designed to support the student teaching experience.
- 4306. Occupational Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 4302. Application of family and consumer sciences knowledge and skills for use in food service, home furnishings, clothing, child development, services for the elderly, and institutional and hospitality management occupations.
- 4307. Internship in Family and Consumer Sciences (3:3:0).** Prerequisite: Junior standing, FCSE 3301 or 3303, 2.5 GPA. Supervised experiences in family and consumer sciences positions in extension, business, or related areas. May be repeated once for credit.
- 4308. Research and Evaluation in Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 4302. Introduction to methods of research and evaluation in family and consumer sciences. Includes practical applications.
- 4325. U.S. Family Issues and Social Action (3:3:0).** Prerequisite: GPA of 2.5 and junior or senior standing. Designed to help students critically examine private and public family and related community issues and appropriate social action in a democratic culture.
- 4601. Student Teaching in Family and Consumer Sciences (6:6:0).** Prerequisite: FCSE 4306, 4308, corequisite: FCSE 4304. Supervised teaching in an approved secondary family and consumer sciences program.
- colleges, and extension programs. Focus on theories of curriculum and recent trends affecting family and consumer sciences programs.
- 5303. Evaluation in Family and Consumer Sciences Education (3:3:0).** Appraisal of individual achievement in all subject areas in family and consumer sciences. Development of evaluative instruments and interpretation of data in the evaluation of family and consumer sciences programs.
- 5304. Techniques of Research in Family and Consumer Sciences Education (3:3:0).** Methods of research in family and consumer sciences, including interpretation and application of results.
- 5307. Techniques of Supervision in Family and Consumer Sciences Education (3:3:0).** Methods and theories of supervision in family and consumer sciences educational settings.
- 5308. Communication Processes in Family and Consumer Sciences Education (3:3:0).** Exploration of communication theory and processes in family and consumer sciences education programs.
- 5309. Occupational Family and Consumer Sciences Education I (3:3:0).** Emphasis on teaching methods in occupational family and consumer sciences, including cooperative and laboratory programs.
- 5311. Problems in Family and Consumer Sciences Education (3:3:0).** May be repeated for credit.
- 5312. Occupational Family and Consumer Sciences Education II (3:3:0).** Focus on tasks, skills, and equipment for teaching in family and consumer sciences occupational programs.
- 5341. History and Philosophy of Family and Consumer Sciences Education (3:3:0).** Historical, philosophical, and legislative bases of family and consumer sciences education. Consideration of current and future roles of family and consumer sciences education in secondary, post-secondary, higher education, extension education, and other areas.
- 5342. Contemporary Adult and Continuing Education in Family and Consumer Sciences Education (3:3:0).** Development and administration of adult and continuing education programs in family and consumer sciences. Emphasis on professional development, career redirection, and lifelong learning.
- 5344. Internship in Family and Consumer Sciences Education (3:3:0).** Prerequisite: 6 hours in family and consumer sciences education and approval of instructor. Supervised experiences in family and consumer sciences positions in extension, business, secondary schools, or related areas. May be repeated for credit.
- 5350. Special Topics in Family and Consumer Sciences Education (3:3:0).** Semester-long study of a specific topic pertinent to the family and consumer sciences education profession. May be repeated (different topics) for a maximum of 12 hours credit.
- 6000. Master's Thesis (V1-6).**
- 6307. Professional Issues in Family and Consumer Sciences Education (3:3:0).** Social, economic, and environmental issues impacting society and the response of family and consumer sciences professionals in higher education.
- 6343. University Teaching in Human Sciences (3:3:0).** Synthesis and analysis of innovative educational strategies, humanistic evaluation, and faculty role in program governance.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Graduate Courses

- 5118. Seminar (1:1:0).** May be repeated for credit.
- 5301. Administration in Family and Consumer Sciences Education Professions (3:3:0).** Administration of family and consumer sciences programs with emphasis on leadership development in a variety of settings.
- 5302. Curriculum Development in Family and Consumer Sciences Education (3:3:0).** Development of family and consumer sciences programs for secondary schools, junior and senior

Marriage and Family Therapy (MFT)

Graduate Courses

- 5300. Introduction to Marriage and Family Therapy Practice (3:3:0).** Prerequisite: Consent of instructor. Analyses of and solutions for common problems in marriage and family therapy practice.
- 5301. Family Therapy I (3:3:0).** Prerequisite: Consent of instructor. Examination of structural, strategic, and systemic approaches to family therapy including the work of Minuchin, Haley, Mental Research Institute, and Milan Associates.
- 5302. Family Therapy II (3:3:0).** Prerequisite: Consent of instructor. Examination of transgenerational and object relations approaches to family therapy including the work of Bowen, Boszormenyi-Nagy, Whitaker, and Satir.

5304. **Systemic Evaluation in Couple and Family Therapy (3:3:0).** Prerequisite: Consent of instructor. This course provides an in-depth examination of a systemic approach to clinical evaluations. Students receive training in administration and application of systemic assessment methods.
5322. **Family Systems (3:3:0).** Application of general systems theory and cybernetics to family systems. Examination of structural, strategic and systemic approaches to family therapy, including the work of Minuchin, Haley, Mental Research Institute, and key modern and post-modern family therapy theorists.
5351. **Research Methods in Marriage and Family Therapy (3:3:0).** Study of research strategies and methodologies relevant to marriage and family therapy, including experience in conducting research investigations
5370. **Issues in Professional Development (3:3:0).** An examination of the major issues for professionals in marriage and family therapy. Emphasis on ethical standards, professional identity, and private practice issues.
6000. **Master's Thesis (V1-6).**
6303. **Family Therapy III (3:3:0).** Prerequisite: Consent of instructor. Focuses on the theory and practice of couple therapy and sex therapy. Includes approaches to enhance couple relationships through therapeutic intervention.
6305. **Developmental Issues in Therapy (3:3:0).** Prerequisite: Consent of instructor. An examination and integration of human development topics within a systems framework.
6311. **Contemporary Directions in Marriage and Family Therapy (3:3:0).** Prerequisite: Consent of instructor. An examination of postmodern thought on marriage and family therapy with emphasis on the collaborative and narrative approaches.
6322. **Family Systems II (3:3:0).** Prerequisite: Consent of instructor. Advanced topics and issues in systems theory. Special focus on marriage and family therapy research.
6323. **Qualitative Research Methods in Marriage and Family Therapy (3:3:0).** Prerequisite: Consent of instructor. Focuses on qualitative research methodologies specifically related to marriage and family therapy research. Students will gain practical experience applying qualitative methods to their research with clinical populations and family therapy topics.
6342. **Advanced Family Therapy Topics (3:3:0).** Prerequisite: Consent of instructor. Advanced topics in the field of family therapy that may include family therapy with special populations and recent developments in family therapy theory and application. May be repeated for credit.
6370. **Diversity in Marriage and Family Therapy (3:3:0).** Prerequisite: Consent of instructor. An examination of issues of race, ethnicity, and culture as they relate to family therapy. The course is designed to raise awareness and to train multiculturally competent therapists.
6395. **Practicum in Marriage and Family Therapy (3).** Prerequisite: Consent of instructor. Supervised experiences designed to prepare the student for involvement in marriage and family therapy and family life education. May be repeated for credit up to 48 hours.
6396. **Supervision of Marriage and Family Therapy (3:3:0).** Prerequisite: Two years of marriage and family therapy practicum and consent of instructor. Theory, research, and supervised practicum in supervision of family therapy.
6397. **Supervision Practicum in Marriage and Family Therapy (3:3:0).** Prerequisite: Completion of MFT 6396 or equivalent and consent of instructor. Course provides structured experience in supervision of marriage and family therapy students.
7000. **Research (V1-12).**
7395. **Internship in Marriage and Family Therapy (3).** Prerequisite: Permission of Director of Marriage and Family Therapy Program. Full-time supervised internship in an appropriate setting. May be repeated for up to 12 hours credit.
8000. **Doctor's Dissertation (V1-12).**

Division of Personal Financial Planning

Faculty

Vickie Hampton, Ph.D., Director

Professor: Hampton

Associate Professors: Bagwell, Cordell, Finke, Gustafson, Joo, Katz

Assistant Professors: Gilliam, Salter

Instructors: Barnhill

About the Program

The Division of Personal Financial Planning is administered by the Department of Applied and Professional Studies. The program offers classes leading to the following degrees:

- Bachelor of Science in Personal Financial Planning
- Master of Science in Personal Financial Planning
- Doctor of Philosophy in Environmental Design and Consumer Economics with an Emphasis in Personal Financial Planning

Mission and Vision. The mission of the Division of Personal Financial Planning is to educate students to the highest standards of excellence; foster intellectual, ethical, and personal development; and generate the highest quality of meaningful research.

The division will excel as the national leader in higher education in personal financial planning, manifesting excellence, inspiring confidence, and engaging the financial planning profession and society at large.

The Division of Personal Financial Planning will:

- Achieve and maintain national recognition as the premier financial planning program, attracting the highest quality students and faculty.
- Prepare students to be leaders, decision-makers, and scholars who are highly competent, articulate, ethical, principled, innovative, and confident in financial planning.
- Generate quality research thus expanding the boundaries of knowledge in financial planning.
- Promote excellence in scholarly and professional organizations through faculty service in leadership roles.

Undergraduate and graduate degree programs in personal financial planning are registered by the Certified Financial Planner Board of Standards, Inc. (CFP Board). The term CFP® identifies a financial planning professional who has met educational standards, passed the CFP® Certification Examination, satisfied a work experience requirement, and agreed to the CFP Board's Code of Ethics and Professional Responsibility. The terms CFP® and Certified Financial Planner™ represent the most respected professional certification in the financial services industry.

Bachelor of Science in Personal Financial Planning. Students majoring in personal financial planning are prepared for careers in financial planning in private practice, financial institutions, and governmental and social agencies. The multidisciplinary program includes courses in business, accounting, economics, family studies, and communications in addition to personal financial planning. Students will develop a background for graduate study and for certifications as financial planners and counselors.

Students studying personal financial planning must maintain a 2.8 or better GPA to enroll in upper-division classes. A 2.8 or better GPA is needed to transfer into the Division of Personal Financial Planning. The program also requires a paid internship in the financial planning/services industry, typically completed the summer prior to the senior year.

Minor in Personal Financial Planning. A student may minor in personal financial planning by completing a minimum of 27 hours to satisfy the education requirements set by the CFP® Board of Standards.

Minor in Personal Finance Studies. A student may minor in personal finance studies by completing a minimum of 18 hours from selected courses. This minor will not satisfy CFP® Examination requirements but may be appropriate for students wanting to work in affiliated professions.

Curriculum for Personal Financial Planning

FIRST YEAR

Fall		Spring	
HUSC 1100 or I S 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	MATH 1331, Intro. Math. Analysis [^]	3
MATH 1330, Intro. Math. Analysis [^]	3	ACCT 2300, Financial Acct. [^]	3
CFAS 2300, Comm., Civility & Ethics	3	ECO 2301, Princ. of Eco. I	3
POLS 1301, Amer. Govt. Org.	3	PFP 2330 (S), Pers. Fin. Counseling I	3
PFP 1301, Cult. and Gender Issues	3	TOTAL	15
TOTAL	16		

SECOND YEAR

Fall		Spring	
Phil 2320, Introduction to Ethics*	3	POLS 2302, American Public Policy	3
ENGL 2311, Intro. to Tech. Writing [^]	3	ACCT 3307, Income Tax Acct. [^]	3
PFP 2310, Tech. Apps. in PFP	3	ECO 2302, Princ. of Eco. II	3
MATH 2345, Intro. to Statistics [^]	3	Natural Lab. Science*	4
PFP 2315, PFP for Professionals [^]	3	PFP 3375, Risk Man./Emp. Benefits [^]	4
TOTAL	15	TOTAL	16

THIRD YEAR

Fall		Spring	
PFP 3397, Life Insurance Planning [^]	3	HUSC 3214, Human Sci. Sem.	2
BLAW 3391, Business Law I [^]	3	PFP 3350, Ind. Tax Plan. Topics [^]	3
PFP 3330 (F), Per. Fin. Counsel. II [^]	3	PFP 3378 (S), Estate Planning [^]	3
PFP 3374, Retirement Planning [^]	3	PFP 3398 (S), Pro. Pract. in PFP [^]	3
PFP 3376 (F), Asset Mgt I [^]	3	PFP 4376 (S), Asset Mgt II [^]	3
TOTAL	15	TOTAL	14

SUMMER

PFP 4399 Intern. in Pers. Fin. Plan.[^] 3

FOURTH YEAR

Fall		Spring	
Visual & Performing Arts*	3	PFP 4380, Adv. Tech. App. in PFP [^]	3
HIST 2300, History of U.S. to 1877	3	Natural Lab. Science*	4
Human Sciences Core+	3	PFP Elective#	3
PFP Elective*	2	HIST 2301, History of U.S. from 1877	3
PFP 4370, PFP Capstone [^]	3	TOTAL	13
TOTAL	14		

TOTAL—121 hours

[^] Prerequisites apply

* Choose from Core Curriculum requirements

+ HS Core choose 1 course from: ADRS 2310, N S 1325, HDFS 2322

Choose two courses from the following (one must be PFP): PFP 2370, 3210, 4377, 4396; HDFS 3326, 3332; ADRS 3325, CFAS 4331

(F) Offered fall semester only; (S) offered spring semester only

Personal Financial Planning (PFP)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1301. Cultural and Gender Issues in Personal Finance (3:3:0).** Study of financial attitudes and behaviors of cultural and gender groups in the U.S. Financial content includes budgeting, banking and saving, credit and debt management, major purchases, and other basic financial activities. F, S.
- 2310. Technological Applications in Personal Financial Planning (3:1:3).** Introduction to computer software programs used in financial planning, including spreadsheets, word processing, data base management, and presentations. F, S.
- 2315. Personal Financial Planning for Professionals (3:3:0).** Prerequisite: MATH 1330, ACCT 2300, ECO 2301 or 2302, and PFP major or minor. Introduction to personal financial planning, including goal setting, cash management, credit, housing, education planning, and selected professional issues. F, S.
- 2325. Family Financial Counseling (3:3:0).** For nonmajors only. Methods and procedures to assist individuals and families of different socioeconomic environments to resolve dysfunctional financial behaviors including skills essential in counseling clients. S.

Graduate Programs

The Division of Personal Financial Planning supervises degree programs leading to the Master of Science degree in Personal Financial Planning and the Doctor of Philosophy degree in Environmental Design and Consumer Economics with an emphasis in Personal Financial Planning.

The nonthesis master's degree in personal financial planning requires a minimum of 42 hours. Appropriate leveling coursework may be required.

Joint degrees offered in personal financial planning at the master's level include:

- Law/Personal Financial Planning, J.D.–M.S.
- Business Administration/Personal Financial Planning, M.B.A.–M.S.
- Business Administration-Finance/Personal Financial Planning, M.S.B.A.–M.S.

A thesis master's degree is offered by the PFP program. Students are required to complete a minimum of 30 hours (including a minimum of 6 hours of thesis), to defend the thesis based on original research, and to take a final oral examination.

The doctoral degree requires a minimum of 78 semester hours of graduate work beyond the bachelor's degree, exclusive of credit for the dissertation. Students develop their courses of study in consultation with a graduate advisory committee. Following the completion of all coursework, a qualifying examination for admission to candidacy for the Ph.D. degree will be conducted in accordance with the requirements of the Graduate School.

Applicants should contact the division concerning admission requirements, program of study, and financial assistance.

Admission to a graduate degree program is a two-part process requiring the recommendation of both the division and the Graduate School.

- 2330. Personal Financial Counseling I (3:3:0).** Prerequisite: PFP major or minor. Methods and procedures to assist individuals and families of different socioeconomic environments to resolve financial behaviors, including skills essential for financial planning professionals. F, S.
- 2370. [ECON 1301, 1303] Consumers in the Marketplace (3:3:0).** Analysis of current consumer problems and the decision-making process. Overview of consumer policies and programs for consumer protection and education.
- 3210. Professional Field Experience (2:2:0).** Prerequisite: 2.8 GPA, 6 hours of PFP courses. Supervised attendance and participation in professional conferences, tours of professional practices, and seminars focusing on professional issues. May be repeated for up to 4 hours of credit. F.
- 3301. Personal and Family Finance (3:3:0).** Prerequisite: Upper-division standing. For nonmajors only. Introduction to personal financial planning, including goal setting, cash management, credit, insurance, taxes, housing, investment alternatives, and retirement plans. Meets the Core Curriculum requirement for Individual and Group Behavior. F, S.
- 3330. Personal Financial Counseling II (3:3:0).** Prerequisite: 2.8 GPA, PFP 2310, 2330, and ENGL 2311. Counseling techniques and interviewing strategies for use in financial counseling and planning settings. Emphasis on the importance of communication processes in helping individuals and families. F (Writing Intensive)
- 3350. Individual Tax Planning Topics (3:3:0).** Prerequisite: 2.8 GPA, ACCT 3307, 2310, and PFP 2315. Study of the impact of federal and state taxation on personal financial planning decisions.
- 3374. Retirement Planning (3:3:0).** Prerequisite: 2.8 GPA, PFP 2315, 2310, ENGL 2311 and completion or concurrent enrollment in ACCT 3307. A foundation course in retirement planning. F, S.

- 3375. Risk Management and Employee Benefits (3:3:0).** Prerequisite: 2.8 GPA, PFP 2310, 2315, ENGL 2311. A foundation course in personal risk management and employee benefits. F, S.
- 3376. Asset Management I (3:3:0).** Prerequisite: 2.8 GPA, PFP 2315, 2310, and MATH 2345. This course focuses on the theory and practice of personal asset allocation planning with a special emphasis on the basic tools, techniques, and methodologies employed by financial planners. Topics covered include basic security valuation and analysis, capital markets, investment alternatives, fundamentals of portfolio design, money management process, client goals and expectations, regulation of financial advisors, and financial planning issues in asset management. F, S.
- 3378. Estate Planning (3:3:0).** Prerequisite: 2.8 GPA, BLAW 3391, PFP 2310, 2315, and completion or concurrent enrollment in ACCT 3307. Application of estate planning methodologies and policies to personal financial planning. F, S.
- 3397. Life and Health Insurance Planning (3:3:0).** Prerequisite: 2.8 GPA, PFP 2310, 2315, ENGL 2311. This course explores the use of life insurance, health insurance, and annuities in personal financial planning, with an emphasis on advanced planning techniques. F
- 3398. Professional Practices in Personal Financial Planning (3:3:0).** Prerequisite: 2.8 GPA and all PFP 3000-level courses completed or concurrent enrollment, except 3350. Principles of professional practices focusing on ethics, effective managerial strategies, and the student's transition to the professional workplace. S. (Writing Intensive)
- 4000. Individual Study (VI-6).** Prerequisite: Written consent of supervising faculty member. Individual study or research under the guidance of a family financial planning faculty member to enhance the degree program. May be repeated for up to 6 hours credit. F, S.
- 4370. Personal Financial Planning Capstone (3:1:3).** Prerequisite: 2.8 GPA, PFP 3374, 3375, 3376, 3378, 4399, and ACCT 3307. Integrates the financial planning content areas into the development of comprehensive financial plans. Coursework includes case studies and work with clients. F, S.
- 4376. Asset Management II (3:1:3).** Prerequisite: 2.8 GPA, PFP 3376 (or FIN 4324), and ACCT 3307. The evaluation of client risk tolerance, analysis of asset manager's historic performance, and the creation of portfolios using mutual funds and variable annuities. F, S.
- 4377. Practicum in Personal Financial Planning (3:1:6).** Prerequisite: 2.8 GPA and consent of instructor. Supervised experience designed to prepare the student for a career in financial planning/counseling. May be repeated once for credit. F, S.
- 4380. Advanced Technological Applications in Personal Financial Planning (3:1:3).** Prerequisite: 2.8 GPA, PFP 3374, 3375, 3376, 3378, 4370, and 4376, ACCT 3307 or concurrent enrollment. Advance coursework in professional software packages for financial planning and investment portfolio applications. F, S.
- 4396. Asset Management III (3:3:0).** Prerequisite: 2.8 GPA, PFP 3376 and 4376 with grades of B or higher. Students will work with issues regarding the blending of client risk tolerance investment objectives and holding periods into a successfully conceived investment plan. F, S.
- 4399. Internship in Personal Financial Planning (3:1:6).** Prerequisite: 2.8 GPA, all PFP 3000-level courses, and ACCT 3307 completed with a grade of C or higher. Supervised intern experiences in established career-related positions. May be repeated for credit. SS.
- 5301. Seminar in Personal Financial Planning (3:3:0).** Introduction to philosophies, techniques, and processes involved in research and graduate study in personal financial planning.
- 5311. Independent Study in Personal Financial Planning (3:3:0).** Prerequisite: Consent of instructor. Individual study or research under the guidance of a personal financial planning faculty member to enhance the degree program. May be repeated for credit.
- 5322. Personal Finance: Professional and Personal Applications (3:3:0).** Survey course in personal financial planning for those wanting to use this information in their personal and professional lives. F, S, SS, Distance.
- 5350. Individual Tax Planning Topics (3:3:0).** Prerequisite: PFP 5371, ACCT 5311, PFP or CEED major, joint degree student, or consent of instructor. Studies legal research skills and the impact of federal and state tax regulations on personal financial planning decisions.
- 5362. Asset Management I (3:3:0).** Prerequisite: PFP or CEED major, joint degree student, or consent of instructor. Investment management concepts in a personal financial planning context; client goals, expectations, and risk tolerance; capital markets; investment alternatives; security valuation; risk assessment; and portfolio management concepts.
- 5370. Consumers in the Marketplace (3:3:0).** Analysis of current consumer problems and the decision-making process. Overview of consumer policies and programs for consumer protection and education, including decision-making and other relevant theories.
- 5371. Introduction to Personal Financial Planning (3:3:0).** Prerequisite: PFP or CEED major, joint degree student, or consent of instructor. Focus on the financial planning process and the profession, including the study of cash management, time value of money, education funding, and other planning areas.
- 5372. Asset Management II (3:3:0).** Prerequisite: PFP 5362 or FIN 5325. Portfolio management and theory in a personal financial planning context, evaluation of client risk tolerance, market efficiency, fundamental analysis, investment selection, and analysis of portfolio performance.
- 5373. Personal Financial Planning Capstone (3:3:0).** Prerequisite: PFP 5362 (or FIN 5325), 5371; ACCT 5311, PFP or CEED major, joint degree student, or consent of instructor. Prerequisite or corequisite: PFP 5394, 5395, 5397, and 5398. Techniques and methods for utilizing financial planning practice standards in the development of comprehensive financial plans for clients.
- 5377. Personal Financial Counseling (3:3:0).** Prerequisite: PFP or CEED major, joint degree student, or consent of instructor. The study and use of methods to assist families of different socioeconomic groups in correcting financial behavior.
- 5378. Research Methods I (3:3:0).** Positivist, interpretive, and critical modes of research inquiry in personal financial planning and consumer economics.
- 5380. Technological Applications in Personal Financial Planning (3:1:3).** Prerequisite or corequisite: PFP 5373, PFP or CEED major, joint degree student, or consent of instructor. Advanced studies in professional software packages for financial planning and investment portfolio applications.
- 5390. Practicum in Personal Financial Planning (3:1:6).** Prerequisite: Consent of instructor. Supervised experience designed to prepare the student for a career in financial planning/counseling. May be repeated for up to 6 hours credit.
- 5394. Retirement Planning (3:3:0).** Prerequisite or corequisite: PFP 5371 and ACCT 5311, PFP or CEED major, joint degree student, or consent of instructor. The study of retirement planning models, retirement plans, and selected employee benefit plans from the perspective of employees and employers. Current retirement issues will be studied.
- 5395. Risk Management and Employee Benefits (3:3:0).** Prerequisite: PFP or CEED major, joint degree student, or consent of instructor. Application of risk management theory, personal risk analysis, and financial loss prevention with private insurance and employee benefits throughout the family life cycle.
- 5396. Asset Management III (3:3:0).** Prerequisite: 3.0 GPA and completion of PFP 5372 with a grade of B or higher, or consent of instructor. Synthesis of portfolio management and risk tolerance assessment concepts, participation of an actual securities portfolio, and evaluation of portfolio performance.

Graduate Courses

- 5198. Professional Practices in Personal Financial Planning (1:1:0).** Prerequisite: Completion or concurrent enrollment in PFP 5371. Emphasis on the principles of professional practice focusing on ethics, effective managerial strategies, and the student's transition to the professional workplace. Enrollment precedes PFP 5399.
- 5210. Professional Field Experience (2:2:0).** Prerequisite: 6 hours of PFP courses or consent of instructor. Supervised attendance and participation in professional conferences, tours of professional practices, and seminars focusing on professional issues. May be repeated for up to 4 hours credit.

5397. **Life and Health Insurance Planning (3:3:0)**. Prerequisite: PFP or CEED major, joint degree student, or consent of instructor. Explores the use of life insurance, health insurance, and annuities in financial planning with heavy emphasis on advanced planning techniques.
5398. **Estate Planning (3:3:0)**. Prerequisite or corequisite: PFP 5371 and ACCT 5311, PFP or CEED major, joint degree student, or consent of instructor. Application of estate planning methodologies and policies to personal financial planning.
5399. **Internship in Personal Financial Planning (3:1:6)**. Prerequisite: PFP 5198. Supervised internship experiences in established career-related positions in the financial planning field.
6101. **Research Seminar in Personal Financial Planning (1:1:0)**. Seminar in current research topics and methodology in personal financial planning. Should be taken by doctoral student each semester of the program.
6395. **Financial Planning Program Development Seminar (3:3:0)**. Seminar focusing on the development and management of high-quality, university-level programs in personal financial planning.
6397. **Doctoral Seminar in Personal Financial Planning (3:3:0)**. Doctoral seminar on theories and empirical evidence in personal financial planning and its areas of specialization. May be repeated for credit for up to 6 hours when topics vary.
6399. **Residency in Financial Planning Research and Education (3:1:6)**. Prerequisite: Consent of instructor. Supervised residency teaching and conducting research in personal financial planning at cooperating universities. May be repeated for credit up to 6 hours.

Consumer Economics and Environmental Design (CEED)

Graduate Courses

6374. **Family Economics (3:3:0)**. Economic status of families at all income levels; factors influencing their standard of living; interrelationships with the economy.
6375. **Current Consumer Issues (3:3:0)**. Analysis of current consumer problems and decision-making responsibilities. Policies and programs for consumer protection and education.
6376. **Family and Personal Consumption Behavior (3:3:0)**. Emphasis on factors involved in individual and family consumption. Concepts related to levels and standards of living and quality of life will be examined.
6378. **Research Methods II (3:3:0)**. Prerequisite: CEED 5378 or equivalent and 3 credit hours of statistics. Application of statistical packages to analyze data and interpret results. Includes mainframe and micro applications.



Department of Design

Faculty

Lynn Huffman, Ph.D., Interim Chairperson

Professor: Shroyer

Associate Professors: Amor, Curry, Khan, Wilson

Assistant Professors: Collier, Hwang

Instructors: Anderson, Christoffel, Peggram

About the Program

The department supervises the following degree programs:

- Bachelor of Interior Design
- Bachelor of Science in Apparel Design and Manufacturing
- Combined Bachelor of Interior Design and Master of Science in Environmental Design
- Master of Science in Environmental Design
- Doctor of Philosophy in Environmental Design and Consumer Economics

A student may minor in one of these programs by completing a minimum of 18 hours selected in conference with the program director/coordinator.

Undergraduate Program

General Requirements

The Bachelor of Science and Bachelor of Interior Design degree programs are separated into lower division (first and second years) and upper division (third and fourth years). Students remain in the lower division until they have completed courses designated as first and second year requirements; earned at least 64 hours; have at least a 2.0 cumulative GPA in apparel design and manufacturing or interior design. The grade of C is a minimum requirement in all departmental and support courses for majors in the department. Prerequisites for departmental courses are governed by the catalog in effect when the course is taken.

An internship is required of each student specializing in apparel design and manufacturing or interior design. The internship experience is jointly planned by the faculty and the student. A laboratory fee is required.

Bachelor of Science in Apparel Design and Manufacturing

This program offers a comprehensive curriculum that prepares students for entry-level positions in the apparel industry or for continued study in graduate school. The curriculum emphasizes creativity, technical skills, knowledge of textiles, apparel product management, custom design for individual consumers, and design for mass production.

Students participate in extracurricular activities that provide additional learning opportunities, including the Hi-Tech Fashion Group, Fashion Tours of New York or Los Angeles, two yearly design competitions, and a Senior Fashion Exhibit.

Sophomore Progress Review. In the fall semester of the sophomore year, students are evaluated on their subject matter knowledge and skills in the area of designing, patternmaking, and construction. In the event of an "unsatisfactory" evaluation is received by a student, the student must submit improved work within one semester following the review. At this time, the student's work must have met the recommended conditions stated by the reviewers to progress to the next level of coursework.

Senior Portfolio Review. During the spring semester of the senior year, students are required to present a portfolio to be reviewed by a jury of apparel design professionals. If a “conditional evaluation” is received, the recommendations of the jury must be met prior to graduation.

Program Policies. A minimum grade of C is required in all art and apparel design and manufacturing courses. In addition, students must be registered in ADM 4310 to enter design competitions in the spring semesters of the junior or senior years. One design competition must be entered during the junior or senior years to meet program requirements.

Bachelor of Interior Design

Accredited by the Council for Interior Design Accreditation (formerly FIDER), the Bachelor of Interior Design program provides a sound curriculum that prepares individuals as entry-level interior designers. The curriculum also may serve as preparation for continued study in graduate schools offering advanced degrees in interior design or related areas.

Students participate in a wide range of design experiences: lectures, studios, seminars, group presentations and discussions, professional critiques, field trips, and field experiences. The interior design program has limited enrollment and emphasizes practical application of multidisciplinary principles to residential and non-residential interior environments.

Undergraduate interior design students have the option of obtaining a combined Bachelor of Interior Design and Master of Science in Environmental Design degree.

Graduate Programs

Admission into the master’s and the doctoral programs requires submission of GRE scores. Admission of international students requires submission of TOEFL scores.

The department offers an optional internship for students who have not previously had practicing professional experience in interior design or allied areas. To obtain departmental procedures and guidelines, students should contact the director of graduate programs.

Master’s Degree

The master’s degree in environmental design requires a minimum of 42 semester hours including thesis. Students are required to defend the thesis based on original research. Successful completion of the Environmental Design Master’s Degree increases the student’s ability to positively contribute to the advancement of either the interior design profession or academia.

Doctor’s Degree

The doctor’s degree requires a minimum of 75 semester hours of graduate work beyond the bachelor’s degree, exclusive of credit for the dissertation. Students develop their program of study in consultation with a graduate advisory committee. Leveling coursework may be required. A preliminary examination is required of all students before the end of the second semester of work toward the Ph.D. degree. The student’s progress will be evaluated and recommendations will be made concerning continuation of graduate studies and leveling coursework necessary to remove any deficiencies revealed by the examination. Following the completion of all coursework, a qualifying examination for admission to candidacy for the Ph.D. degree will be conducted in accordance with the requirements of the Graduate School.

Sophomore Portfolio Review. In the fall and spring semesters, sophomores submit a portfolio with representative work from specific studio courses (ARCH 1441, 1442, I D 1382, 2380, 2383). In the event a “conditional” evaluation is received by a student, the portfolio is reviewed a second time by the interior design faculty. A consensus of opinion by the faculty is required for determining recommendations for the student. Prior to being admitted to I D 3385, students who received “conditional” evaluations must have met the recommended conditions identified by the reviewers.

Senior Portfolio Review. During the senior year and while enrolled in I D 4104, students are required to present a portfolio to be reviewed by a jury of design professionals. This experience provides the student practice in critically evaluating, organizing, and presenting work. Students receiving “conditional” evaluations must meet the recommended conditions stated by the reviewers.

Student Projects Policy. The Department of Design reserves the right to retain, exhibit, and reproduce design projects submitted by students. Work submitted for a grade is the property of the department and remains such until it is returned to the student.

Curriculum for Bachelor of Interior Design

FIRST YEAR			
Fall		Spring	
HUSC 1100 or I S 1100	1	ENGL 1302, Adv. Coll. Rhetoric^	3
ENGL 1301, Ess. Coll. Rhetoric	3	Math. or Logical Reasoning*	3
MATH*	3	ARCH 1442 (S), Arch. Delineation II^	4
ARCH 1441 (F), Arch. Delineation I	4	POLS 1301, Amer. Govt. Org.	3
I D 1380, Intro. to Interior Design#	3	I D 2380, Interiors II^#	3
I D 1382, Interiors I#	3	TOTAL	16
TOTAL	17		

SECOND YEAR			
Fall		Spring	
ART 1310 or 2311, Art Hist. Survey I or II	3	Natural Lab. Science*	4
HIST 2300, Histoy of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
Natural Lab. Science*	4	ENGL 2311, Intro. to Tech. Writing^	3
I D 2383, Interiors III^	3	I D 3381, Lighting Systems^	3
I D 3387, Comp. Draft. for Int. I^	3	POLS 2302, Amer. Public Policy^	3
TOTAL	16	TOTAL	16

THIRD YEAR			
Fall		Spring	
ECO 2305, Princ. of Economics	3	ARCH 3350 (S), Arch. Construction II^	3
ARCH 2351 (F), Arch. Construction I^	3	I D 3190 (S), Pre-Internship Seminar^	1
I D 3385, Advanced Design Proc.^	3	I D 3311, Interior Materials^	3
I D 3382 (F), Period Furnishing I^	3	I D 3383 (S), Period Furnishings II^	3
I D 4383, (Computer Aided Drafting II^	3	I D 3386 (S), Studio Procedures^	3
TOTAL	15	HUSC 3214, Human Sci.Seminar^	2
		TOTAL	15

SUMMER	
I D 4307, Internship	3

FOURTH YEAR			
Fall		Spring	
B A 3301, Hospitality Mgt. Mkt.^	3	COMS 3358, Bus. and Pro. Comm.	3
or RHIM 4316, Fund. of Mkt.^		I D 4104, Senior Portfolio Seminar^	1
Human Sciences Elective+	3	PHOT 2310 or ID 3325	3
I D 4606 (F), Collaboration Studio^	6	I D 4385 (S), Advanced Interiors^	3
ARCH 2311, Architecture History	3	Guided Elective	
TOTAL	15	TOTAL	13

TOTAL—126 hours

- * Choose from Core Curriculum requirements.
- ^ Prerequisites apply.
- # Concurrent enrollment is required.
- + HS Core; choose 1 course from: ADRS 2310, NS 1325, HDFS 2322 or 3320, PFP 3301
- (F) Offered fall semester only; (S) offered spring semester only; (SS) offered summer only

Apparel Design and Manufacturing (ADM)**Undergraduate Courses**

- 1301. Introduction to Apparel Design (3:3:0).** Overview of apparel design room practices. Emphasis on the business, art, and craft of apparel design. F.
- 1303. [HECO 1328] Clothing Construction (3:1:4).** Application of basic apparel assembly methods, including the fundamentals of fit and use of home sewing machines and sergers. F.
- 1304. [HECO 1329] Intermediate Clothing Construction (3:1:4).** Prerequisite: ADM 1301 and 1303. Intermediate apparel assembly, alteration of commercial patterns, and selection of appropriate fabrics. S.
- 2302. Fashion Illustration (3:1:4).** Prerequisite: ART 1302, 1303. Illustration techniques for the fashion figure and rendering of garment details using various media. Includes color theory applied to fashion drawing and portfolio development. S.
- 2308. Flat Pattern Design (3:1:4).** Prerequisite: ADM 1301, 1303. Application of basic flat pattern techniques to bodices, skirts, sleeves, neckline, and bodice-sleeve combinations. S.
- 2310. Design Through Draping (3:1:4).** Prerequisite: ADM 2308. Introduction of the fundamental principles in developing basic silhouettes of skirts, blouses, bodices, and collars by draping techniques. Understanding of fabric characteristics and drapability and its affect on the development of silhouette and style.
- 2311. [HECO 1320] Textiles (3:3:0).** Prerequisite: ADM 1301 or 1303. Selection, use, and care of textiles in relation to fiber characteristics, yarn, and fabric structure. F.
- 3303. Tailoring (3:1:4).** Prerequisite: Apparel design and manufacturing core. Advanced patternmaking, fit, construction, assembly, and finishing techniques for lined, tailored apparel. Emphasizes jackets and coats. S.
- 3305. Computer Applications in Apparel Design (3:1:4).** Prerequisite: Apparel design and manufacturing core. Computer-aided design methods for product development, including design, illustration, specification, costing, patternmaking, and plotting. Use of CAD in portfolio development. F.
- 3308. Advanced Flat Pattern Design (3:1:4).** Prerequisite: Apparel design and manufacturing core. Application of advanced flat patterning techniques in apparel design.
- 3310. Knitted Textile and Apparel Design (3:1:4).** Prerequisite: Apparel design and manufacturing core. Design and production of textiles on knitting machines. Emphasis on knit structures and methods for cut and sew apparel. F.
- 3312. History and Philosophy of Dress (3:3:0).** Prerequisite: Junior standing. Apparel throughout the ages as reflected in cultures of the past and as an influence on contemporary design. F. (Writing Intensive)
- 4000. Individual Study (V1-6).** Prerequisite: Written consent of supervising faculty member prior to registration. Individual study or research under the guidance of a fashion design faculty member to enhance the degree program. May be repeated for up to 6 hours credit. F, S, SSI, SSII.
- 4307. Apparel Manufacturing (3:1:4).** Prerequisite: Apparel design and manufacturing core. Mass production strategies, including product development, sizing, grading, marking, costing, and manufacturing. Implementation of strategies for developing individual apparel collections. S.
- 4309. Surface Design (3:1:4).** Prerequisite: Apparel design and manufacturing core and ART 2304. Exploration of textile dyeing, printing, and painting with emphasis on composition using varied media and materials. F.
- 4310. Apparel Product Development (3:1:4).** Prerequisite: Apparel design and manufacturing core, and junior standing. Research, planning, and development of an apparel collection for a target market, meeting relative workmanship, cost, and quality standards. May be repeated for up to 6 hours credit. S.
- 4350. Apparel Portfolio Development (3:1:2).** Prerequisite: Apparel Design and Manufacturing core, and junior standing. Preparation of senior portfolio for internship and portfolio review. Emphasizes use of computers for layout and professionalism.
- 4389. Professional Practices for Apparel Design and Manufacturing (3:1:2).** Prerequisite: A grade of C or higher in all apparel design and manufacturing courses and senior standing. Planning and implementing strategies necessary for securing

Curriculum for B.S. in Apparel Design and Manufacturing

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	Mathematics*	3
ART 1302, Design I	3	ART 2304, Drawing II [^]	3
ART 1303, Drawing I	3	ADM 2308 (S), Flat Pattern Design [^] #	3
ADM 1301 (F) Intro. to Apparel Design#	3	ADM 1304 (S), Inter. Clothing Const. [^] #	3
ADM 1303 (F), Clothing Const.#	3	TOTAL	15
TOTAL	16		
SECOND YEAR			
Fall		Spring	
Natural Science Lab.*	4	Natural Science Lab.*	4
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
ART 3323, Drawing III Life Drawing [^]	3	ADM 2302 (S), Fashion Illustration [^]	3
ADM 2311 (F), Textiles [^]	3	Math & Logical Reasoning*	3
ADM 2310 (F), Design Through Draping [^]	3	ART 1310, Art History	3
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
POLS 1301, Amer. Govt. Org.	3	POLS 2302, Amer. Public Policy [^]	3
ADM 3312 (F), Hist. and Phil of Dress [^]	3	HUSC 3214, Human Sci. Sem	2
ADM 3310 (F) or 4309 (F) [^]	3	ART 3312, Art History III [^]	3
ART 2311, Art History II	3	ADM 3308 (S), Adv. Flat Pattern Design [^]	3
TOTAL	12	ADM 4307 (S), Apparel Manufacturing [^]	3
		TOTAL	14
FOURTH YEAR			
Fall		Spring	
Individual or Group Behavior*	3	Human Sciences Elective*	3
COMS 3358, Business and Prof Spech	3	ADM 4350 (S), Apparel Portfolio Dev. [^]	3
ADM 3305 (F), Comp. App. in Appar. Des.	3	ADM 4310 (S), Apparel Product Dev. [^]	3
Guided Elective	6	ADM 4389 (S) Pro. Pract. Fash. Design [^]	3
TOTAL	15	TOTAL	12
SUMMER			
ADM 4390 (SS), Internship [^]	3	ADM 4391 (SS)1, Internship [^]	3

TOTAL—122

* Choose from Core Curriculum requirements.

[^] Prerequisite applies.

Concurrent enrollment is required.

+ HS Core; choose 1 course from: ADRS 2310, NS 1325, HDFS 2322, PPF 3301

(F) Offered fall semester only; (S) offered spring semester only; (SS) offered summer only



Curriculum for Combined Bachelor of Interior Design and M.S. in Environmental Design

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Adv. Coll. Rhetoric	3
ENGL 1301, Ess. Coll. Rhetoric	3	Mathematics or Logic*	3
Mathematics*	3	ARCH 1442, Arch. Delineation II	4
ARCH 1441, Arch. Delineation I	4	POLS 1301, Amer. Govt. Org.	3
I D 1380, Intro. to Interior Design	3	I D 2380, Interiors II	3
I D 1382, Interiors I	3	TOTAL	16
TOTAL	17		
SUMMER			
POLS 2302, Amer. Public Policy	3	HIST 2300, History of U.S. to 1877	3
SECOND YEAR			
Fall		Spring	
Natural Lab Science*	4	Natural Lab Science*	4
I D 3387, Computer Aided Drafting I^	3	ENGL 2311, ^ Tech. Writing	3
I D 2383, Interiors III^	3	I D 3385, Adv. Design Processes	3
I D 3381, Lighting Systems^	3	I D 4383, Computer Aided Drafting II	3
ART 1310 or 2311, Art Hist. Survey I or II	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
COMS 3358, Business and Prof. Comm.	3	I D 3190, Pre-Internship Seminar^	1
I D 3311, Interior Materials^	3	I D 3383, Period Furnishings II^	3
PHOT 2310, Basic Photography	3	I D 3386, Studio Procedures^	3
I D 3382, Period Furnishing I^	3	I D 4385, Adv. Interiors^	3
ARCH 2351, Arch. Construction I^	3	ARCH 3350, Arch. Construction II	3
TOTAL	15	TOTAL	13
SUMMER			
I D 4307, Internship	3	ECO 2305, Prin. of Economics	3
FOURTH YEAR			
Fall		Spring***	
I D 4104, Senior Portfolio Seminar^	1	CEED 5310, Readings	3
HUSC 3214, Human Sciences Seminar^	2	EPSY 5380, Intro. to Edu. Stat.	3
RHIM 4316, Hospitality Mgt. Marketing^	3	Support/Elective	3
OR B A 3301, ^ Intro. to Marketing	3	ARCH Hist (Gr Level)	3
I D 4606, Collaboration Studio^	6	TOTAL	12
TOTAL	12		
SUMMER SESSION			
CEED 5382, Interior Design Systems	3	CEED 5381, Env. Design Analysis	3
CEED 6370, Env. Design Tech. and Dev.	3	CEED 5301, Grad. Res. Seminar	3
TOTAL	6	TOTAL	6
FIFTH YEAR			
Fall		Spring	
CEED 5378, Research Methods I	3	CEED 6000, Master's Thesis	6
CEED 6389, Env. Design Studio	3	TOTAL	6
CEED 5388 (or 5384), Design of Int. Env. Support/Elective	3		
TOTAL	12		
TOTAL 159			

* Choose from Core Curriculum requirements.

^ Prerequisite

Must take concurrent

career positions in fashion design. Senior day planning and fashion show production. S.

4390, 4391. Internship in Apparel Design and Manufacturing (3:1:6 each). Prerequisite: A 2.0 cumulative GPA and a grade of C or higher in ADM 3303, 3305, 4389, 4307, 4309 or 3310, and 4310. Applied problems in apparel design emphasizing student participation in business and industry. SSI, SSII.

Interior Design (I D)

Undergraduate Courses

1380. Introduction to Interior Design (3:3:0). A survey of basic principles and concepts including aesthetics and processes relevant to planning residential and nonresidential environments. F, S.

1382. Interiors I (3:1:4). Prerequisite or corequisite: I D 1380. Introduces principles and concepts relevant to planning residential environments. F, S.

2380. Interiors II (3:1:4). Prerequisite: A grade of C or higher in I D 1380, 1382, and ARCH 1441 (or concurrent enrollment). Introduces skills necessary to design, analyze, and present concept, preliminary, working, and presentation drawings for residential environments. F, S.

2383. Interiors III (3:1:4). Prerequisite: A grade of C or higher in I D 2380 and ARCH 1442 (or concurrent enrollment). Graphic media application in rendering and presentation methods. Perceptual development in volumetric organization relative to 2 and 3 dimensional design. F, S.

3190. Preinternship Seminar (1:1:0). Prerequisite: Junior standing, I D 3385 and 3386 or concurrent enrollment, and a 2.0 cumulative GPA; enrollment required in spring immediately preceding I D 4307. Emphasis on preparation for interior design internship, career opportunities, job search, and interview strategies. S.

3311. Interior Materials (3:2:3). Prerequisite: A grade of C or higher in I D 2383 and successful completion of sophomore portfolio review. Selection of materials used in residential and nonresidential environments based on characteristics, composition, installation methods, and maintenance requirements. F, S. (Writing Intensive)

3325. Study Tour in Interior Design (3:3:0). Examination of the influence of a selected city in shaping interior design and the built environment. Accomplished through research, presentation, and travel to the city. S.

3381. Lighting Systems (3:2:2). Prerequisite: A grade of C or higher in I D 2380 or equivalent. Survey of the human factors relating to the luminous environment that support health, safety, comfort, human performance, and aesthetics. F, S.

3382. Period Furnishings I (3:3:0). Prerequisite: A grade of C or higher in I D 2383. Introduction to furniture and interior elements through the 17th century. Emphasis on the evolution of forms, relationships to previous periods, and implications for current design applications. F.

3383. Period Furnishings II (3:3:0). Prerequisite: A grade of C or higher in I D 3382. Introduction to furniture and interior elements from 18th, 19th, and 20th centuries. The evaluation of forms, relationships to previous periods, and implications for current and future designs are emphasized. S.

3385. Advanced Design Processes (3:1:4). Prerequisite: A grade of C or higher in I D 3387 and 3381 (or concurrent enrollment), and successful completion of sophomore portfolio review. Emphasis on problem formulation, programming, design conceptualization, design development, working drawings, specifications, schedules, furniture selection, layout and design presentation, universal design, life safety, and building codes. F, S. (Writing Intensive)

3386. Studio Procedures and Professional Practices for Interior Designers (3:3:0). Prerequisite: Junior standing, interior design. Preparation of business documents. Study of the ethics, business, and legal aspects of studio procedures. S.

3387. Computer Aided Drafting for Interior Designers I (3:1:4). Prerequisite: A grade of C or higher in I D 2380 or equivalent. Introduction to computer-aided design and two-dimensional drafting for the interior designer and other uses of computers in the practice of interior design. F, S.

4000. Individual Study (V1-6). Prerequisite: Written consent of supervising faculty member. May be repeated for up to 6 hours credit. F, S, SSI.

4104. Senior Portfolio Seminar (1:1:0). Prerequisite: Graduating senior's final semester. Analysis of professional issues with emphasis on portfolio development and review. F, S.

4307. Internship in Interior Design (3:1:6). Prerequisite: Departmental approval and a grade of C or higher in I D 3190, 3385, and 3386. Supervised intern experiences in established career-related positions. May be repeated as I D 4000 Individual Study. SSI.

4383. Computer-Aided Drafting for Interior Designers II (3:1:4). Prerequisite: A grade of C or higher in I D 3387 or consent of instructor. Advanced three-dimensional computer-aided design and two-dimensional drafting for the interior designer and other uses of computers in the practice of interior design. F, S.

4385. Advanced Interiors (3:1:4). Prerequisite: A grade of C or higher in I D 3385 and spring enrollment immediately preceding May,

August, or December graduation. Advanced experiences in residential and nonresidential design that integrate problem solving skills, building systems, techniques of graphic expression, materials and specifications, and aesthetic sensibility. S.

4606. **Collaboration Studio (6:1:8)**. Prerequisite: A grade of C or higher in I D 3385. An interdisciplinary studio for the design profession that addresses the process and skills necessary for collaboration. F.

Consumer Economics and Environmental Design (CEED)

Graduate Courses

5301. **Graduate Research Seminar (3:3:0)**. Introduction to philosophies, technologies, and processes involved in research and graduate study related to the student's major area of specialization.
5307. **Internship (3:1:6)**. Supervised internship experiences in established career-related positions in the student's major area of specialization. May be repeated for credit up to 6 hours.
5310. **Readings (3:3:0)**. A comprehensive and critical review of literature and research data related to current issues in the student's major area of specialization.
5311. **Individual Study in Environmental Design and Consumer Economics (3:3:0)**. May be repeated for credit.
5378. **Research Methods I (3:3:0)**. Positivistic, interpretive, and critical modes of research inquiry in the student's major area of specialization.
5379. **International Issues for Families and Households (3:3:0)**. Analysis of relevant social, economic, and political developments pertinent to individuals and family welfare approached from a global perspective.
5381. **Interior Design Analysis (3:3:0)**. Implications from the social sciences as applied to analyzing causes and arriving at possible solutions to problems related to housing and interiors in contemporary society.
5382. **Environmental Design Systems (3:3:0)**. Study of systems used in the design and research of residential and nonresidential interiors.
5384. **Advanced Lighting Systems (3:3:0)**. Prerequisite: I D 3381 or equivalent. Advanced study and application of lighting systems.
5388. **Design of Interior Environments for Physically and Mentally Challenged Populations (3:3:0)**. Adaptation and evaluation of proximate environments to meet the needs of the physically and mentally challenged.
6000. **Master's Thesis (V1-6)**.
6330. **Research Fund Development (3:3:0)**. Exploration of processes for preparing research ideas for presentation to individuals, groups, and/or organizations. Study of research proposal characteristics, how proposals are reviewed, strategies for success, and public versus private funding sources.
6370. **Environmental Design Technology and Development (3:3:0)**. Examination of environmental design processes and related technologies. Analysis and synthesis of human factors, interior components, information systems, and the environment.
6374. **Family Economics (3:3:0)**. Economic status of families at all income levels; factors influencing their standard of living; interrelationships with the economy.
6375. **Current Consumer Issues (3:3:0)**. Analysis of current consumer problems and decision-making responsibilities. Policies and programs for consumer protection and education.
6376. **Family and Personal Consumption Behavior (3:3:0)**. Emphasis on factors involved in individual and family consumption. Concepts related to levels and standards of living and quality of life will be examined.
6378. **Research Methods II (3:3:0)**. Prerequisite: CEED 5378 or equivalent and 3 credit hours of statistics. Application of statistical packages to analyze data and interpret results. Includes mainframe and micro applications.
6383. **Regulatory Policy (3:3:0)**. A survey of regulatory policies focusing on current issues, alternatives, and dilemmas concerning consumers.
6389. **Environmental Design Studio (3:3:0)**. Development of and/or response to specific environmental design programs. Study of design processes, including visual presentations that exemplify designs solutions for programs. Students will exhibit design projects.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.



Department of Human Development and Family Studies

Faculty

Anisa H. Zvonkovic, Ph.D., Chairperson

Professors: Bell, Caldera, Fischer, Haley, Hart, O'Boyle, Reifman, Scott, Zvonkovic

Associate Professors: Cleveland, Colwell, Crawford, Feng, Fitzpatrick, Lindsey, McCarty, Mulsow, Sorell

Assistant Professors: Behrens, Sharp, Trejos

Instructors: Johnson, Nathan, Powell

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Human Development and Family Studies
- Master of Science in Human Development and Family Studies
- Doctor of Philosophy in Human Development and Family Studies

Undergraduate Program

The Department of Human Development and Family Studies (HDFS) offers a wide range of courses in the areas of early childhood, human development, interpersonal relations, and family studies. Graduates of the department may enter a variety of human services vocations and/or pursue graduate studies. Students interested only in selected aspects may elect to minor in the department curriculum or they may choose electives while pursuing another major course of study. A student may minor in HDFS by completing 18 hours of selected coursework. The specific courses for the HDFS minor are approved by Academic Advising Services in the College of Human Sciences.

Bachelor of Science in Human Development and Family Studies

From a foundation of research and theory, this degree focuses on development across the life span (prenatal to late adulthood) in the context of couple, marriage, family, and peer relationships. This program focuses on intrapersonal (e.g., personality, cognition), interpersonal (e.g., relationship conflict, self-disclosure), and societal (e.g., race-ethnicity, class) forces as they affect personal and family well-being.

Many courses offer perspectives on interpersonal and family behavior through development of the infant, child, adolescent, young adult (courtship, early marriage), middle-aged adult (divorce-remarriage, parenthood), and the older adult (widowhood, grandparenthood). Some courses also focus on important social issues that affect individual and family functioning (e.g., violence). Courses at the upper-division level provide professional training for students seeking employment in such diverse occupations as family life educator, extension service specialist, probation officer, child development specialist, or child care administrator.

Service-research skills are also enhanced by opportunities to observe and interact with infants, toddlers, and young children in the Child Development Research Center. The center is accredited by the National Association for the Education of Young Children. Students will be required to pass a background check. Supervised experiences with community groups provide opportunities for interaction with older children, adolescents, couples, families, and the elderly. These experiences assist students in understanding developmental stages of human behavior and interpersonal relations as they occur in family or group care settings.

Undergraduate students may want to specialize in one or more of the areas in which courses are offered in the department. These areas include childhood, adolescence-adult development, family

relationships, or application-research. Students may specialize in one or more of these areas by taking departmental elective courses from the desired areas.

Enrollment in the department is limited and based on an adjusted cumulative 2.5 GPA. To continue enrolling in human development and family studies courses, students must maintain a GPA that meets or exceeds this standard. In addition, transfer students must have an adjusted cumulative 2.5 GPA. Students with a lower GPA may be provisionally admitted or continue to enroll in courses if a petition is submitted to the department and approved by the admissions committee.

Core Curriculum. All students in the department must complete the university's Core Curriculum requirements. In addition, students in the department must complete the following courses to fulfill the college's core requirements: HUSC 1100 (Introduction to Human Sciences); HUSC 3214 (Human Sciences Seminar); and either ADRS 2310 (Understanding Alcohol, Drugs, and Addictive Behaviors), NS 1325 (Nutrition, Foods, and Healthy Living), or PFP 3301 (Personal and Family Finance).

Students majoring in human development and family studies must take the following core courses for a total of 21 credit hours: HDFS 2300, Gender Roles: Life Span Developmental Perspective; HDFS 2303, Life Span Human Development; HDFS 3301, Theories of Human Development and the Family; HDFS 3320, Contemporary Family; HDFS 3324, Dynamics of Family Interaction; HDFS 3350, Development in a Cross-Cultural Perspective; and HDFS 3390, Research Methods.

Support Course Requirements. Students are required to take the following support courses for the major in human development and family studies: PSY 1300, General Psychology; SOC 1301 or 1320, Introduction to Sociology or Current Social Problems (also may be taken to fulfill the individual and group behavior requirement in the university Core Curriculum); ENGL 2311, Introduction to Technical Writing; APS 2300 Communication, Civility, and Ethics; and either MATH 2300 (Statistical Methods), PSY 3400 (Statistical Methods), or SOC 3391 (Introduction to Social Research I).

Specialization Areas. Students must select a total of 18 hours from A, B, and C in the following list:

A. Human Development and Family Studies Area – Choose 2 Courses (minimum 6 hrs.)

- HDFS 2322 Partnering: The Development of Intimate Relations
- HDFS 3306 Child and Adolescent Guidance
- HDFS 3310 Prenatal and Infant Development
- HDFS 3411 Laboratory Experiences With Infants and Toddlers
- HDFS 3312 Development During Childhood
- HDFS 3413 Laboratory Experiences With Young Children
- HDFS 3316 Development in Adolescence
- HDFS 3317 Problems of Adolescence
- HDFS 3318 Development in Young Adulthood
- HDFS 3319 Development in Middle Adulthood
- HDFS 3321 Human Sexuality Through Family Life Cycle
- HDFS 3322 Family in the Community
- HDFS 3326 Families in Crisis
- HDFS 3331 Parenting
- HDFS 3332 Aging in the Family
- HDFS 4306 Preparing Environments for Children

B. Application/Research Area – Choose one course for 3 hrs.

- HDFS 2320 Basic Interpersonal Skills
- HDFS 3360 Family Life Education and Ethics
- HDFS 4000 Individual Study
- HDFS 4310 Managing Early Childhood Programs
- HDFS 4314 Community Practicum in HDFS
- HDFS 4320 Research in HDFS
- HDFS 4343 Advanced Topics in HDFS
- HDFS 4390 Program Development and Evaluation

C. Department Electives – Choose 9 credit hours of electives from A and B or the following courses. Some students may want to concentrate their electives in one or two areas to demonstrate a specialization.

- ADRS 2125 Seminar in Addiction
 ADRS 2327 Substance Abuse Prevention
 ADRS 3325 Family Dynamics of Addiction
 ADRS 3329 Addiction, Recovery, and Relationships
 ADRS 4325 Treatment of Addictive Disorders
 ADRS 4329 Eating Disorders
 CFAS 4331 Introduction to Marriage and Family Therapy
 W S 2300 Introduction to Women's Studies

Human Development and Family Studies (HDFS)

Undergraduate Courses

- 2300. Gender Roles: Life Span Developmental Perspectives (3:3:0).** Introduction to gender role concepts and to the impact of gender and gender role systems on individual and family developmental processes. F, S. (W S 2301)
- 2303. [PSYC 2311, 2312, 2314] Life Span Human Development (3:3:0).** Introduction to the theories, processes, and enhancement of development for infants, young children, adolescents, and adults. F, S.
- 2305. [TECA 1354] Developmental Assessment of Young Children (3:3:1).** Prerequisite: 2.5 GPA. Discusses the goals, benefits, and uses of assessment techniques in tracking development of young children. Emphasizes integration of family/professional perspectives in the development process. F, S.
- 2311. [TECA 1311] Introduction to Early Childhood (3:3:0).** Prerequisite: 2.5 GPA. Introduction to the profession of early childhood focusing on developmentally appropriate practice, historical influences, program models, and current issues including legislation, public policy, and ethics. F, S.
- 2320. Basic Interpersonal Skills (3:3:0).** The study and application of interpersonal skills as they relate to various age levels and social contexts. F, S.
- 2322. Partnering: The Development of Intimate Relationships (3:3:0).** Intimate relationship development from adolescence through adulthood with an emphasis on relationship processes, diversity in types of partnering, and developmental/contextual variations in relationships. F, S.
- 3301. Theories of Human Development and the Family (3:3:0).** Prerequisite: 2.5 GPA. The major theories in human development and family studies. Course focuses on the meaning of theory to individual and family development over the lifespan. Implication of theory and program development and services are reviewed. (Writing Intensive)
- 3306. Child and Adolescent Guidance (3:3:0).** Prerequisite: 2.5 GPA and HDFS 3301. Development of strategies for promoting self-discipline, creative capacities, and positive relationships with children and adolescents. F, S.
- 3310. Prenatal and Infant Development (3:3:0).** Prerequisite: 2.5 GPA and HDFS 3301. Study of how to promote the psychomotor, social-emotional, and cognitive-language development of infants from the prenatal period through the first two years in their interactions with caregivers, peers, and the environment. F, S.
- 3312. Development During Childhood (3:3:0).** Prerequisite: 2.5 GPA and HDFS 3301. Examination of psychomotor, social-emotional, and cognitive-language development during childhood. F, S.
- 3316. Development in Adolescence (3:3:0).** Prerequisite: 2.5 GPA and HDFS 3301. Enhancing the psychosocial, social-emotional, and cognitive-language development of adolescents within their interactions with peers, adults, and the culture. F
- 3317. Problems of Adolescence (3:3:0).** Prerequisite: 2.5 GPA. Overview of problems associated with the adolescent years and training in use of helping skills appropriate for adolescent populations. S.
- 3318. Development in Young Adulthood (3:3:0).** Prerequisite: 2.5 GPA. Examination of individual developmental processes during the transition to adulthood and the first two decades of adult life. F

Curriculum for B.S. in Human Development and Family Studies

This plan assumes that the student is exempt from any additional foreign language requirement. If a student must take two semesters of a single foreign language, the hours may count towards the 21 hours of electives.

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	Natural Lab Science*	4
Mathematics Elective*	3	SOC 1301 or 1320	3
PSY 1300, General Psychology	3	POLS 2302, Amer. Public Policy	3
POLS 1301, Amer. Govt., Org.	3	Math. or Logical Reasoning*	3
Humanities*	3	TOTAL	16
TOTAL	16		

SECOND YEAR			
Fall		Spring	
Natural Lab Science*	4	Statistics (choose 1)	3
ENGL 2311, Intro. to Tech. Writing [^]	3	(MATH 2300, SOC 3391, PSY 3400)	
HDFS 2303, Life Span Human Dev.	3	Technology and Applied Science*	3
HIST 2300, History of U.S. to 1877	3	Visual and Performing Arts*	3
APS 2300, Comm., Civility & Ethics	3	HDFS 2300, Gender Roles	3
TOTAL	16	HIST 2301, History of U.S. Since 1877	3
		TOTAL	15

THIRD YEAR			
Fall		Spring	
HDFS 3301, Theories of Hum. Dev.	3	HUSC 3214, Human Sci. Sem. [^]	2
HDFS Elective	3	HDFS 3390, Research Methods [^]	3
HDFS 3350, Dev. in Cross-Cult. Pers.	3	HDFS 3324, Dynamics of Fam. Inter.	3
HDFS 3320, Contemporary Family	3	HDFS Elective	3
Human Science Core+	3	Minor or Elective	3
TOTAL	15	TOTAL	14

FOURTH YEAR			
Fall		Spring	
HDFS Elective (Group B)	3	HDFS Elective (Group A, B or C)	3
HDFS Elective (Group A, B, or C)	6	Minor or Elective	12
Minor or Elective	6	TOTAL	15
TOTAL	15		

TOTAL—122 hours

* Choose from Core Curriculum requirements

[^] Prerequisites apply

Students may choose courses in the HDFS Electives for career certifications such as Child Care Director, Child Life Specialist, Certified Family Life Educator, EC and FCSE Post-Baccalaureate Teacher Certification, etc. See an advisor for specific courses.

- 3319. Development in Middle Adulthood (3:3:0).** Prerequisite: 2.5 GPA. Examination of individual developmental processes from the mid-life transition through the middle years of adult life. S.
- 3320. The Contemporary Family (3:3:0).** Prerequisite: 2.5 GPA. Analysis of family interaction patterns with an introduction to family research. A study of family heritage, development, and networks emphasizing the successful family and sociocultural variations of family forms. F, S.
- 3321. Human Sexuality Through Family Life Cycle (3:3:0).** Prerequisite: 2.5 GPA. Human sexuality from a life cycle perspective, with an emphasis on developmental, familial, and societal factors that influence individual sexuality. F, S. (W S 3321)
- 3322. The Family in the Community (3:3:0).** Prerequisite: 2.5 GPA. Study of community resources as they relate to welfare of children and families. F, S.
- 3324. Dynamics of Family Interaction (3:3:0).** Prerequisite: 2.5 GPA. Examination of interpersonal processes in the family and other intimate groups. Conceptual analysis of family interaction patterns (e.g., communication, roles, relationships, power, decision making, love, conflict). F, S.
- 3326. Families in Crisis (3:3:0).** Prerequisite: 2.5 GPA and Sophomore standing. Examination of theories and strategies for helping families deal productively with crises. Consideration of child exceptionality, child abuse, unemployment, divorce, rape, alcoholism, death, and other crisis events. F, S.

Curriculum for B.S. in Human Development and Family Studies with Teacher Certification in Family and Consumer Sciences

Human development and family studies majors can choose an option that includes teacher certification in family and consumer sciences. The specialization provides a background in all family and consumer sciences subject areas and a certification to teach in Texas public school systems grade 8-12. Students seeking teacher certification must meet all requirements outlined in the College of Education section of this catalog. To be recommended for certification, graduates must achieve satisfactory performance on the TExES examination prescribed by the State Board of Education.

FIRST YEAR			
Fall		Spring	
HUSC 1100 or I S 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	HDFS Elective	3
Mathematics Elective*	3	ID 1380, Intro. to Interior Design	3
FCSE 2102, Intro. to Fam. and Cons. Sci.	1	POLS 2302, Amer. Public Policy	3
POLS 1301, Amer. Govt. Org.	3	Mathematics or Logical Reasoning*	3
CFAS 2300, Comm., Civility, & Ethics	3	TOTAL	15
Visual and Performing Arts*	3		
TOTAL	17		
SECOND YEAR			
Fall		Spring	
Natural Lab Science*	4	HDFS Elective	3
English Literature (choose any) [^]	3	HDFS 3310, Prenatal and Infant Dev. [^]	3
HDFS 3301, Theories of Human Dev.	3	PPF 2325 (S) or 3301	3
HIST 2300, History of U.S. to 1877	3	ENGL 2311, Intro. to Tech. Writing [^]	3
ADM 1303 (F), Clothing Const.	3	NS 1410, Science of Nutrition	4
EDSE 2300 or HDFS 3350	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	19	TOTAL	19
THIRD YEAR			
Fall		Spring	
FCSE 3301, Foundations of FCSE [^]	3	FCSE 3350 or PPF 2325 (S)	3
HDFS 3312, Dev. During Childhood [^]	3	HDFS 3411 [^] or 3413 [^]	4
HDFS Elective	3	EDSE 4310, Learning, Cog. & Instr. [™]	3
HDFS 3390, Reserach Methods in HDFS	3	EDLL 4382, Language, Literacy [™]	3
HDFS 3320, Contemporary Family	3	EDSE 4322, Diversity in Classroom ^{**}	3
EDIT 3318, Adv. Tech in Education	3	FCSE 4302, Field Exp. & Prof. App. (S) ^{**}	3
TOTAL	18	TOTAL	19
FOURTH YEAR			
Fall		Spring	
FCSE 4308 (F), Res. and Eva. in FCS ^{**}	3	FCSE 4601 (S), Student Teaching ^{**}	6
FCSE 4306 (F), Occupational FCS ^{**}	3	FCSE 4601 (S), Student Teaching ^{**}	6
HUSC 3214, Human Sci. Sem.	2	FCSE 4304, Inst. Man. in FCS ^{**}	3
HDFS Elective	3	TOTAL	15
RHIM 3460, Food Syst. Management I	4		
TOTAL	15		

TOTAL—137 hours

* Choose from Core Curriculum requirements

** Admission to Teacher Certification (Education) Program and a minimum 2.5 GPA required (apply prior semester).

(F) Offered fall semester only; (S) offered spring semester only.

[^] Prerequisites apply

Must take concurrently

- 3331. Parenting (3:3:0).** Prerequisite: 2.5 GPA. Basic principles and skills for parent effectiveness. Includes strategies for inclusion of parents in the developmental-educational processes of the child. F, S.
- 3332. Aging in the Family (3:3:0).** Prerequisite: 2.5 GPA. Needs that arise from changes in family relationships, living arrangements, income, and employment. F, S.
- 3350. Development in Cross-Cultural Perspective (3:3:0).** Prerequisite: 2.5 GPA. Critical examination of developmental and family theory research across a diverse range of cultures. F, S.
- 3360. Family Life Education and Ethics (3:3:0).** Prerequisite: 2.5 GPA. A problem-based approach to community family life education, with particular emphasis on teaching methodologies and professional ethics.
- 3390. Research Methods in Human Development and Family Studies (3:3:0).** Prerequisite: 2.5 GPA. Introduction to methods of research in human development and family studies. F, S. (Writing Intensive)

Bachelor of Science: Early Childhood Teacher Certification in Early Childhood to Fourth Grade

The early childhood specialization prepares professionals to work with children from infancy through fourth grade. A strong emphasis in child development provides the foundation for understanding the child as an individual within the context of the family, the peer group, and school settings. The program meets current Texas requirements for teacher certification and is accredited by the State Board for Educator Certification and the National Council for Accreditation for Teacher Education. State teacher certification is granted from early childhood through the fourth elementary grade. See an academic advisor for updated certification requirements that may occur from recent legislative mandates. Admission to teacher certification is competitive and is based on an overall GPA of not less than 2.7. Students seeking teacher certification must meet all requirements outlined in the College of Education section of this catalog. To be recommended for certification, graduates must achieve satisfactory performance on the TExES, an examination prescribed by the State Board of Education.

FIRST YEAR			
Fall		Spring	
HUSC 1100 or I S 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	HDFS 2305, Strat. of Studying HD	3
MATH 1320, College Algebra	3	POLS 2302, Amer. Public Policy	3
POLS 1301, Amer. Govt. Org.	3	Nat. Lab Sci. (Earth/Space Sci)*	4
GEOG 1300 or 2351	3	Oral Communication*	3
HDFS 2311, Intro. to Early Childhood	3	MUSI 2301 or 3336	3
TOTAL	16	TOTAL	19
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
English Elective	3	Natural Lab Science (Life Science)*	4
MATH 2370, Elem. Analysis I [^]	3	HDFS 3312, Dev. During Childhood [^]	3
Human Sciences Elective+	3	HDFS 3310, Prenatal and Infant Dev. [^]	3
HDFS 3301, Theories of Infant Dev.	3	HDFS 3350 or EDEL 2300	3
ART 3372, Rethinking Art Edu.	3	Math 3370, Elem. Geometry [^]	3
TOTAL	18	TOTAL	19
THIRD YEAR			
Fall		Spring	
EDSP 3300, Except. Child. and Youth #	3	EDLL 3351, Found. of Reading Inst. #	3
EDLL 3350, Children's Literature #	3	EDLL 3352, Lang. Lit. Acquisition #	3
EDIT 3318, App. of Tech. in Elem. Sch. #	3	Natural Lab (Physical Science)*	4
HDFS 3411, Experiences with Infants [^]	4	EDBL 3334, Lang. & Cog. Devel.#	3
HDFS 3306, Child and Adolescent Guid. [^]	3	HDFS 3413, Exp. with Young Child. [^]	4
HUSC 3214, Human Sc. Seminar	2	TOTAL	17
TOTAL	18		
FOURTH YEAR			
Fall		Spring	
EDEL 4360, Teaching Social Studies #	3	EDEL 4330, Capstone Course #	3
EDEL 4370, Teaching Mathematics #	3	EDEC 4000, Student Teaching#	9
EDEL 4375, Teaching Science #	3	TOTAL	12
EDEL 4380, Literacy in Content Areas #	3		
Hist 3310, Texas History	3		
HLTH 3313, Health for Preadol.	3		
or ESS 3335, Health and PE for Child.			
TOTAL	18		

TOTAL—137 hours

* Choose from Core Curriculum requirements.

Concurrent enrollment and acceptance into Teacher Certification Program (apply prior semester); 2.7 GPA minimum]

[^] Prerequisites apply.

+ HS Core; choose 1 course from: ADRS 2310, NS 1325, HDFS 2322, PPF 3301

Please review the standards in choosing sciences courses at the Web site (www.sbec.state.tx.us. Educator Standards EC-Grade 4 Science:

- a. Lie: PSS 2401, PSS 1411, BIOL 1402, GEOL 1350/1105
b. Earth & Space: GEOG 1401, ATMO 1300/1100, GEOL 1313/1101, ASTR 1400, ASTR 1401
c. Physical: PHYS 3400, PHYS 1401, CHEM 1305/1105

ALL COURSES MUST BE COMPLETED WITH A GRADE OF "C" OR BETTER.

- 3411. Supervised Experiences with Infants and Toddlers (4:2:4).** Prerequisite or concurrent: HDFS 3310 and 2.5 GPA. Supervised experiences with infants and toddlers, F,S (State law requires students to pass a background check.) (Writing Intensive)
- 3413. Supervised Experiences with Young Children (4:2:4).** Prerequisite or concurrent: HDFS 3312 and 2.5 GPA. Supervised experiences with young children. F,S. (State law requires students to pass a background check.) (Writing Intensive)
- 4000. Individual Study (V1-6).** Prerequisite: 2.5 GPA and written consent of supervising faculty member. Teaching assistantships, independents coursework, or student-initiated research experience. May be repeated once for credit. F, S.

Graduate Program / Human Development and Family Studies

These programs have prepared students for careers as university faculty, full-time researchers, medical school faculty, and human service providers.

The M.S. and Ph.D. programs in human development and family studies focus on families and individuals within families as they develop across the life span. Both degree programs offer flexibility in study that encourages students to pursue research in early childhood, adolescent development, adult development, and gerontology as well as in related substantive issues, including risk-taking behaviors, dating relationships, gender issues, program planning and evaluation, addictions, marriage, parenting, family violence, divorce, and blended families.

Graduate minors are also available in women's studies and adolescent and young adult risk-taking, which are interdisciplinary programs coordinated by graduate faculty within the department.

The M.S. degree requires a minimum of 30 hours of graduate coursework and 6 hours of thesis research. The Ph.D. degree requires a minimum of 70 hours of graduate coursework—12 hours of which are leveling requirements—plus at least 12 hours of dissertation research. Up to 30 transfer hours may be applied toward doctoral program requirements upon the approval of the student's committee and the Graduate School.

Applicants should contact the department concerning admission requirements, programs of study, and financial assistance. Admission to a graduate degree program requires the recommendation of the department and the Graduate School.

GP-IDEA Gerontology Concentration. In collaboration with the Great Plains Interactive Distance Education Alliance (GP-IDEA), the department offers an online specialization in gerontology within the M.S. in Human Development and Family Studies and a postbaccalaureate certificate program in gerontology. The master's concentration requires a total of 36 hours comprised of eight core courses and four elective courses. The certificate requires 21 hours comprised of five core courses and two elective courses. The gerontology offerings are designed to prepare professionals who are either working directly with older persons or are involved in education and research related to older populations. The programs have been designed to provide students with the core competencies identified by the Association for Gerontology in Higher Education.

Students are admitted to either the concentration or certificate program based on the same admission requirements and process as other department concentrations. Students may take required and elective online courses from Texas Tech (home institution) and from offerings of other collaborating institutions (host). Universities collaborating on the gerontology program are Colorado State University, Iowa State University,

Kansas State University, Oklahoma State University, and Texas Tech University.

The master's program consists of eight required three-credit courses (listed below) plus 12 credits of electives. The certificate program consists of five required three-credit courses, indicated by an asterisk (*) in the listing below. The remaining six credits can be taken from other core courses or from gerontology electives. Up to three credits of practicum experience may be included in either the master's or the certificate program.

- **Perspectives in Gerontology:*** An overview of current aging issues including the current focus of gerontology theory and research, critical social and political issues in aging, the interdisciplinary focus of gerontology, current career opportunities, and aging in the future.
- **Adult Development:*** This course explores the biological, psychological, and social factors that are associated aging. Although the focus is on the later years, information is presented from a life-span developmental framework. Empirical studies are reviewed and their strengths, limitations and implications for normative and optimal functioning are discussed.
- **Physical Health and Nutrition in Aging:*** This course identifies the basic physiologic changes during aging and their impacts in health and disease. The focus will be on successful aging with special emphasis on physical activity and nutrition. Practical application to community settings is addressed.
- **Economics, Public Policy, and Aging:** Policy development in the context of the economic status of the elderly populations. Retirement planning and the retirement decision; Social Security and public transfer programs for the elderly; intrafamily transfers to/from the elderly; private pensions; financing medical care for the elderly; prospects and issues for the future.
- **Environments and Aging:** Examination of attributes of physical environments that support special needs of older people and application of this knowledge to the design and management of housing, institutional settings, neighborhoods and communities.
- **Aging in the Family:** Theories and research related to personal, family, and societal adjustments in later life affecting older persons and their intergenerational relationships. Related issues including demographics also are examined through the use of current literature.
- **Program Evaluation and Research Methods:*** Overview of program evaluation, research methods, and grant writing in gerontology. Includes application of quantitative and qualitative methods in professional settings.
- **Professional Seminar in Gerontology:*** An integrative experience in which students will strengthen skills in ethical decision-making and behavior and apply those skills in related areas such as advocacy, professionalism, and family and workplace issues. Students from a variety of professions will apply unique perspectives to topics of common interest.

4306. **Preparing Environments for Children (3:3:0).** Prerequisite: 2.5 GPA and HDFS 3411 or 3413. Utilizing developmental principles acquired by the student in previous child development courses, this course focuses on the application of these principles to the design of environments for children. F, S.
4310. **Managing Early Childhood Programs (3:3:0).** Prerequisite: 2.5 GPA. Survey of principles and procedures for managing and implementing various types of childcare and early childhood programs.
4314. **Community Practicum in Human Development and Family Studies (3).** Prerequisite: 2.5 GPA and senior standing. Supervised experiences in established career-related positions; focus selected on basis of professional interest (some sites may require a background check). May be repeated once for credit. F, S.
4320. **Research in Human Development and Family Studies (3:3:0).** Prerequisite: 2.5 GPA and HDFS 3390 or consent of

instructor. Supervised faculty-initiated research experience in selected areas. May be repeated twice for credit. F, S.

4343. **Advanced Topics in Human Development and Family Studies (3:3:0).** Prerequisite: 2.5 GPA. This course focuses on recent developments in theory, philosophy, research, and/or applied approaches to human development and family studies.
4390. **Program Development and Evaluation (3:3:0).** Prerequisite: 2.5 GPA. Knowledge and experience in the practice of program development and evaluation. Class evaluates an ongoing program.

Graduate Courses

5101. **Teaching College Human Development and Family Studies (1).** Strategies and direction in teaching college-level human development and family studies courses including supervision,

- advice and assistance, and review of teaching materials. May be repeated one time for credit. Pass-fail grading.
5110. **Colloquium in Human Development and Family Studies (1:1:0)**. Prerequisite: Consent of instructor. Presentations of current research and discussions of the profession by department and visiting faculty. May be repeated for credit.
5302. **Introduction to Gerontology (3:3:0)**. A multidisciplinary introduction to aging and gerontological issues.
5310. **Theories of Human Development (3:3:0)**. Introduction to the application of concepts and theories in human development.
5311. **Problems in Human Development and Family Studies (3:3:0)**. May be repeated for credit.
5313. **Psychosocial Development (3:3:0)**. In-depth study of social, emotional, and psychological growth with emphasis on the development of personal and interpersonal competency.
5314. **Infant Development (3:3:0)**. Analysis of empirical research regarding development processes during the first two years of life.
5317. **Adolescent Development (3:3:0)**. Multidisciplinary survey of adolescent development including theories, research, and enhancement strategies.
5319. **Development in Adulthood (3:3:0)**. Survey of theory and research concerning psychosocial development during adulthood and review of strategies for research with adult populations.
5320. **Interpersonal and Family Dynamics (3:3:0)**. Group processes; factors influencing personal and family adjustment.
5321. **Family Theory (3:3:0)**. A comprehensive exploration of theory in family studies. The role of theory in empirical investigation; conceptual frameworks; strategies of theory building; examination of systems theory and a spectrum of other models useful in the interdisciplinary study of individual, couple, and family behavior.
5341. **Socialization Processes and Addiction (3:3:0)**. Multidisciplinary survey of socialization processes throughout the life span with implications for understanding addictions.
5344. **Aging and the Family (3:3:0)**. Detailed examination of the family relationships of adults in late life. Emphasis on intergenerational issues and the enhancement of development and family life in later years.
5349. **Quantitative Methods I in Human Development and Family Studies (3:3:0)**. An introduction to the quantitative methods and statistics necessary to conduct research with children and families through a developmental perspective.
5351. **Research Methods in Individual and Family Studies (3:3:0)**. Study of research strategies and techniques relevant to human development, family studies, and marriage and family therapy including experience in conducting research investigations.
5352. **Sex-Gender Roles (3:3:0)**. Survey of contemporary theory and research on sex-gender systems and roles and the impact of sex and gender on psychosocial development and relationship processes.
5353. **Issues and Research in Human Development and Family Studies (3:3:0)**. History, philosophy, and current issues relevant to the areas of family studies and human development. May be repeated for credit under various topics.
5361. **Parent-Child and Peer Relationships (3:3:0)**. Review of current research in parenting and peer relationships and implications for program development.
5380. **Relationship Development (3:3:0)**. Theory and research related to the formation of initial impressions of others and the development of interpersonal relationships.
5381. **Individual and Family Measurement (3:3:0)**. Detailed examination of measurement methods appropriate for individual and family research, consideration of strengths and weaknesses of each, and experience in development and application of measures.
6000. **Master's Thesis (V1-6)**.
6320. **Seminar in Risk Taking (3:3:0)**. Survey of theory and research in adolescent and adult risk-taking behaviors. Introductory course for graduate minor in risk taking.
6330. **Family Problems (3:3:0)**. Examines theoretical and empirical contributions to the understanding of treatment of family problems within a family systems perspective.
6352. **Quantitative Methods II in Human Development and Family Studies (3:3:0)**. Prerequisite: HDFS 5349. The second course in a four-course sequence focusing on methods for conducting research through a developmental perspective. Family data and the general linear model will be explored.
6363. **Advanced Topics in Human Development (3:3:0)**. Prerequisite: Consent of instructor. Current topics in human development across the life course. May be repeated for credit under various topics.
6364. **Quantitative Methods III in Human Development and Family Studies (3:3:0)**. Prerequisite: HDFS 5349, 5351, 6352. The third course in the quantitative methods sequence focusing on multivariate techniques involving multiple dependent variables in human development and family studies.
6365. **Quantitative Methods IV in Human Development and Family Studies (3:3:0)**. Prerequisite: HDFS 5349, 5351, 6352, 6364. The final course in a four-course sequence on methods for conducting research through a developmental perspective. A focus on factor analysis, structural equation modeling, HLM, etc.
6366. **Qualitative Methods in Human Development and Family Studies (3:3:0)**. Prerequisite: HDFS 5349 and 5351. This course will provide students with an overview of qualitative research methods in HDFS and will include exposure to qualitative data collection and analyses of data from multiple family members.
6370. **Analyzing Developmental Data (3:3:0)**. Prerequisite: Research methods, introductory statistics, or consent of instructor. Statistical methods for analyzing individual and family change over time and time ordered processes of interactional data.
6371. **Practicum in Human Development and Family Studies (3:3:0)**. Supervised experiences in professional positions. May be repeated for credit up to 9 hours.
6373. **Advanced Topics in Family Studies (3:3:0)**. Prerequisite: Consent of instructor. Current topics in family studies. May be repeated for credit under various topics.
6390. **Program Development and Evaluation (3:3:0)**. Reviews evaluation issues, critiques evaluation research, and undertakes planning and evaluation of original programs.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.



Department of Nutrition, Hospitality, and Retailing

Faculty

Lynn Huffman, Ph.D., Chairperson

Professors: Harp, Hoover, Huffman, Reed, Spallholz

Associate Professors: Adams, Blum, Boyce, Boylan, Dodd, Fowler, Roman-Shriver, Shriver, Stout

Assistant Professors: Binkley, Goh, Lauderdale, Wu, Yuan

Instructors: Barko, Edwards, Fagan, Hlavaty, Kloiber, Kolyesnikova, Sanchez, Ward

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Nutritional Sciences
- Bachelor of Science in Restaurant, Hotel, and Institutional Management
- Bachelor of Science in Retailing
- Master of Science in Nutritional Sciences
- Master of Science in Restaurant, Hotel, and Institutional Management
- Doctor of Philosophy in Nutritional Sciences
- Doctor in Philosophy in Hospitality Administration

In addition to the regular degree programs, this department provides a nine-month post-baccalaureate dietetic internship that is accredited by the American Dietetic Association (ADA) and meets the ADA eligibility requirements for dietetic registration.

Mission. The mission of the department is to provide quality education, research, and service focused on the knowledge and skills intrinsic in the disciplines nutrition, hospitality management, and retailing. To accomplish this mission, the department offers the following program areas: nutritional sciences; restaurant, hotel, and institutional management; and retailing.

Undergraduate Program

Bachelor of Science in Nutritional Sciences

The mission of the nutritional sciences program is to prepare individuals who will make a contribution to professions related to nutritional sciences and to society as a whole through quality education, research, and service. This program emphasizes the role of nutrition in the health and well being of people. The concentration prepares competent professionals for nutrition and dietetic careers in hospitals, schools, colleges, food service, business, and government agencies. Completion of courses for the Specialized Certificate in Hospitality, Nutrition, and Food Science offers students the opportunity to secure a family and consumer sciences teacher certification to teach nutrition in secondary schools. Nutritional sciences courses also contribute to the liberal education of all students who enroll in nutritional sciences classes.

Concentrations

A degree in nutritional sciences offers the following concentrations:

- **General Dietetics.** The Didactic Program in Dietetics (DPD) at Texas Tech is accredited by the Commission on Accreditation for Dietetics Education (CADE) and is designed to provide the student with an academic program that “provides for the achievement of knowledge and skills requirements for entry-level dietitians” as outlined by CADE. A verification statement signed by the program director is given to students who successfully complete all DPD requirements. A grade of C or better is required for all nutritional sciences, support, and human sciences core courses. CADE accredited graduates from the DPD are eligible to apply for an

internship (such as the post-baccalaureate internship offered at Texas Tech). After successful completion of both an undergraduate and a supervised practice program, the student is eligible to take the national examination given by the Commission of Dietetic Registration (CDR) and, after passing a national exam, become a Registered Dietitian (R.D.). General dietetics emphasizes the nutritional care and education of people and prepares the student to qualify for an internship; graduate school; or a position in a hospital, community agency, or a food service system or business with the prime responsibility of improving and maintaining the nutritional status of people.

- **Preprofessional Health Careers.** This option offers an academic path for individuals interested in medicine, optometry, pharmacy, physical therapy, and other allied health options.
- **Teacher Certification.** This option offers a career path for those interested in teaching nutrition at the junior high school and high school levels. Students complete a broad base of nutrition courses along with those that lead to teacher certification. Graduates will be eligible for a Specialized Certificate in Hospitality, Nutrition, and Food Science. Students seeking certification must meet all requirements outlined in the College of Education section of this catalog. Admission requirements for the teaching program include the completion of approximately 60 hours with an overall 2.5 GPA or better and a satisfactory level of performance on the THEA test or equivalent. Other requirements include a 2.5 GPA or better in professional education courses and the teaching field and a grade of C or better in all required concentration and support courses. To be recommended for certification, graduates must achieve a satisfactory level of performance on the TExES examination prescribed by the State Board of Education.
- **Nutritional Sciences Minor.** A student may minor in nutritional sciences by completing a minimum of 18 hours of selected coursework. Specific courses for the nutritional sciences minor are finalized and approved by the student in conjunction with the major and minor advisors. Required courses: NS 1301, 2420, 2310; choose 3 from NS 3325, 3340, 4330, 4350, and 4380.

Bachelor of Science in Restaurant, Hotel, and Institutional Management (RHIM)

The mission of the Restaurant, Hotel, and Institutional Management (RHIM) program is to prepare individuals who will make a contribution to the hospitality industry and to society as a whole through quality education, research, and service.

Concentrations

A degree in restaurant, hotel, and institutional management offers the following concentrations:

- **Hospitality Management.** The RHIM program prepares students for management career opportunities in the hospitality industry. The curriculum includes courses in nutritional sciences, arts and sciences, and both core and elective courses in RHIM. Classroom laboratory experiences keep pace with changes in the hospitality field and the required 800 hours of work experience allows students to become familiar with the hospitality industry. A 400-hour hospitality industry internship outside of Lubbock, which can count toward the 800-hour work experience, is also required. Texas Tech's RHIM program, recognized as one of the top programs in the nation, offers a multidisciplinary approach to hospitality education. The curriculum is designed to prepare the student to meet both current and future hospitality needs. The program emphasizes problem solving and creativity in addition to strong practical laboratory experiences. The RHIM program is accredited by the Accreditation Commission for Programs in Hospitality Administration.

- **Teacher Certification.** This option offers a career path for those interested in teaching hospitality at the junior high school and high school levels. Students complete a broad base of hospitality management courses and 800 hours of hospitality work experience along with those that lead to teacher certification. Graduates will be eligible for a Specialized Certificate in Hospitality, Nutrition, and Food Science. Students seeking certification must meet all requirements outlined in the College of Education section of this catalog. Admission requirements for the teaching program include the completion of approximately 60 hours with an overall 2.5 GPA or better and a satisfactory level of performance on the THEA test or equivalent. Other requirements include a 2.5 GPA or better in professional education courses and the teaching field and a grade of C or better in all required concentration and support courses. To be recommended for certification, graduates must achieve a satisfactory level of performance on the TEXES examination prescribed by the State Board of Education.
- **Restaurant, Hotel, and Institutional Management Minor.** A student may minor in restaurant, hotel, and institutional management by completing 18-19 hours of selected coursework. Specific courses for the RHIM minor are finalized and approved by the student in conjunction with the major and minor advisors. Courses: RHIM 2308, 3341, 3350, 3460, and 6 hours of RHIM electives.

Bachelor of Science in Retailing

The mission of the retailing program is to prepare individuals who will make a contribution to the retail industry and to society as a whole through quality education, research, and service. The retailing program's primary goal is to provide an innovative and challenging multidisciplinary curriculum that combines a creative approach to problem solving with an understanding of business principles to educate students to fill entry-level leadership positions as professionals aware of the role retailing plays in the enterprise system.

By focusing on both the role of diverse and global consumers and the complex infrastructure of retailing goods and services, faculty members maintain and expand a partnership between the retail industry and academics. Retailing courses emphasize integration of theory, team building, leadership, industry application, and career

Graduate Program

The department supervises degree programs leading to Master of Science and Doctor of Philosophy degrees. The Master of Science degree requires a minimum of 33 semester hours, including a thesis or 39 hours for a nonthesis plan. Courses must be chosen in consultation with the major professor. Students without appropriate background in the chosen specialization will be required to take undergraduate leveling courses designated by the department. The Doctor of Philosophy degree requires a minimum of 60 hours beyond the master's degree, including at least 18 hours in the specialization area.

The department also offers a nine-month dietetic internship program. Selected credits earned during the program may apply to an optional master's or doctoral degree. Twelve hours of graduate credit are required in supervised experience in health and food service facilities. Upon completing the internship, the student is eligible to take the Commission of Dietetic Registration written examination to become a registered dietitian.

Applicants should contact the program graduate advisor concerning admission requirements and programs of study. Admission to a graduate degree program requires the recommendation of the department as well as the approval of the graduate dean.

planning strategy. Coursework outside the major includes study in technology, communication, marketing, management, accounting, and economics. An internship program, retail lecture series, industry sponsored course projects, and a strong alumni base afford students the opportunity to interface with a dynamic combination of retail executives and organizations throughout their academic study.

The curriculum emphasizes work-related experiences, internship opportunities, and career placement. A 10-week, 300- to 400-hour supervised internship in the retail industry is required of each student with a retailing major. The supervised internship experience is planned jointly between the faculty and student. RTL 3389, Professional Practices in Retailing, is required the spring semester prior to enrollment in RTL 3690, Internship in Retailing. A 150-hour externship at the managerial level is required as a capstone experience.

Retailing Minor. A student may minor in retailing by completing 18 hours of selected coursework. Specific courses for the RTL minor are finalized and approved by the student in conjunction with the major and minor advisors. Courses include RTL 1340, 2340, 2350, and 9 hours of RTL upper-division courses.

Nutritional Sciences (NS)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1201. **Introduction to Dietetics (2:2:0).** Introduction to the field of dietetics including registration, ethical, legal, and professional issues. F
- 1301. **Introduction to Nutrition (3:3:0).** An introduction to nutrition and its role in human health. For nutrition majors and minors only. S.
- 1325. **[BIOL 1322, HECO 1322] Nutrition, Foods, and Healthy Living (3:3:0).** An introduction to the nutrients, their content in food, energy utilization, and the role of diet in health and disease. F, S.
- 1410. **Science of Nutrition (4:3:2).** Study of the nutrients found in foods and utilization of those nutrients by the body. Designed to convey the basic principles of nutritional science. F, S.
- 2310. **[HECO 1315] Principles of Food Preparation (3:2:2).** Application of scientific principles to food preparation. F, S.
- 2420. **Nutrition (4:3:2).** Prerequisite: NS 1301. Sources and roles of nutrients and their importance to human health. For nutrition majors and minors only. F.
- 3310. **Essentials of Dietetic Practice (3:2:2).** Prerequisite: NS 2420. Role of dietitian in modern health care system. Techniques of assessment, nutrition care planning, and documentation. Legal aspects of dietetic practice. F.
- 3320. **Nutrition and Diet Therapy for Allied Health Professionals (3:3:0).** Prerequisite: ZOO 2403. Principles of nutrition and diet therapy as applied to frequently encountered health problems. For nursing, pre-med, and other allied health students.
- 3325. **Sports Nutrition (3:3:0).** Prerequisite: NS 1301, 1325, or 1410. Nutrition concepts and applied nutritional practices for the competitive and amateur athlete and physically active individual. F.
- 3340. **Nutrition in the Lifecycle (3:3:0).** Prerequisite: NS 2420 and ZOO 2402. Factors that affect diet and nutrition throughout the life cycle. F, S.
- 3350. **Child Nutrition (3:3:0).** Nutritional needs of young children in relation to mental and physical development; cultural, social, and psychological aspects of food and dietary patterns.
- 3402. **Survey of Biochemistry (4:4:0).** Prerequisite: CHEM 2103, 2303 or 3105 and 3305. Survey of general biochemistry. F.
- 3411. **Dietetic Counseling Strategies (4:3:1).** Prerequisite: NS 3310. Application of interviewing, counseling, and educational techniques in dietetics, including individual and group methods. S.
- 4000. **Individual Study (V1-6).** Prerequisite: Written consent of supervising faculty member. May be repeated for up to 6 hours credit.
- 4120. **Medical Terminology (1:1:0).** Terminology in describing normal anatomical, physiological, and psychological conditions and those related to disease and its treatment. For students entering dietetic and allied health professions. S.
- 4130. **Field Work in Food and Nutrition (1:0:3).** Corequisite: NS 4330. Preplanned experiences with evaluation of student performance in hospitals, community health centers, clinics, and volume feeding establishments. May be repeated once for credit. F.

Nutritional Sciences: Preprofessional Health Careers Curriculum

FIRST YEAR			
Fall		Spring	
HUSC 1100 or I S 1100	1	ZOOI 2402, Anatomy & Physiology [^]	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric [^]	3
MATH 1351, Calculus I	3	CHEM 1308, 1108, Prin. of Chem. II [^]	4
CHEM 1307, 1107, Prin. of Chem I.+	4	POLS 2302, Amer. Public Policy	3
POLS 1301, Amer. Govt. Org.	3	NS 1301 (S), Intro. to Nutrition	3
PSY 1300 or SOC 1301	3	TOTAL	17
TOTAL	17		

SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
BIOL 1403 (F), Biology I	4	NS 3340, Nutrition in Life Cycle [^]	3
NS 2310, Princ. of Food Preparation	3	BIOL 1404 (S), Biology II	4
CHEM 3305, 3105, Organic Chem. [^]	4	CHEM 3306/3106, Organic Chem. [^]	4
NS 2420 (F), Nutrition	4	MATH 2300, Statistical Methods [^]	3
TOTAL	18	TOTAL	17

THIRD YEAR			
Fall		Spring	
PHYS 1403, General Physics I	4	Phys 1404, General Physics II	4
NS 3310 (F), Ess. of Dietetic Practice [^]	3	NS 3411 (S), Dietetic Couns. Strat. [^]	4
NS 3402 (F), Survey of Biochemistry [^]	4	NS 4320 (S), Nutritional Biochem. [^]	3
COMS 2300 or 3358, Oral Comm.	3	NS 4120 (S), Medical Term.	1
HUSC 3214, Human Sciences Seminar	2	MBIO 3401, Prin. of Microbiology	4
TOTAL	16	TOTAL	16

FOURTH YEAR			
Fall		Spring	
NS 4340 (F), Medical Nutr. Therapy I [^]	3	NS 4350 (S), Emerging Issues	3
NS 4330/4130 (F), Comm. Nutrition [^]	4	NS 4341 (S), Medical Nutr. Therapy II [^]	3
RHIM 4360, Exper. Methods w/Foods [^]	3	NS 4380 (S), Cultural Foods [^]	3
Human Sciences Elective+	3	Visual & Performing Arts*	3
Humanities Elective*	3	TOTAL	12
TOTAL	16		

TOTAL — 129 hours

NOTE: Students are expected to have competency in computer usage.

* Choose from Core Curriculum requirements.

[^] Prerequisites apply.

+ HS Core; choose 1 course from: ADRS 2310, HDFS 2322, PFP 3301.

(F) Offered fall semester only; (S) offered spring semester only.

Nutritional Sciences: General Dietetics Curriculum

FIRST YEAR			
Fall		Spring	
HUSC 1100 or I S 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	PSY 1300, General Psychology	3
Mathematics Elective*	3	CHEM 1308/1108 [^]	4
CHEM 1307/1107 [^]	4	POLS 2302, Amer. Public Policy	3
POLS 1301, Amer. Govt. Org.	3	NS 1301 (S), Intro. to Nutrition	3
NS 1201 (F), Intro. to Dietetics	2	TOTAL	16
TOTAL	16		

SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
ZOOI 2402, Anatomy & Physiology [^]	4	NS 3340, Nutrition in the Life Cycle [^]	3
NS 2420 (F), Nutrition [^]	4	RHIM 3322 (S), Hospitality Control II [^]	3
CHEM 2303/2103 (F), Intro. Organic [^]	4	NS 2310, Princ. of Food Prep.	3
TOTAL	15	AAEC 3401 [^] or MATH 2300 [^]	3-4
		TOTAL	15-16

THIRD YEAR			
Fall		Spring	
RHIM 3460, Food Syst. Manage. I [^]	4	RHIM 3470, Food Syst. Manage. II [^]	4
NS 3402 (F), Survey of Biochemistry [^]	4	FDSC 3301 or 3303	3
RHIM 3341, Hospitality Management [^]	3	NS 3411 (S), Dietetic Counseling Strat. [^]	4
HUSC 3214, Human Sciences Seminar [^]	2	RHIM 3390, Purchasing in Hosp. Ind. [^]	3
NS 3310 (F), Ess. of Dietetic Practice [^]	3	NS 4320 (S), Nutritional Biochemistry [^]	3
TOTAL	16	NS 4120 (S), Medical Terminology	1
		TOTAL	18

FOURTH YEAR			
Fall		Spring	
NS 4340 (F), Medical Nutritional Ther. I [^]	3	NS 4350 (S), Emerging Issues [^]	3
NS 4330/4130 (F), Comm. Nutr. I [^]	4	NS 4341 (S), Medical Nutr. Therapy I [^]	3
RHIM 4360, Exp. Methods w/Foods [^]	3	COMS 2300 or 3358	3
Human Sciences Elective+	3	NS 4380 (S), Cultural Foods [^]	3
Humanities Elective*	3	Visual & Performing Arts*	3
TOTAL	16	TOTAL	15

TOTAL — 127 hours

NOTE: Students are expected to have competency in computer usage.

* Choose from Core Curriculum requirements.

[^] Prerequisites apply.

+ HS Core; choose 1 course from: ADRS 2310, HDFS 2322, PFP 3301.

(F) Offered fall semester only; (S) offered spring semester only

4320. **Nutritional Biochemistry (3:3:0)**. Prerequisite: NS 2420 and 3402. Concepts of normal nutrition in relation to the chemistry and physiology of the human body. S.
4330. **Community Nutrition (3:3:0)**. Prerequisite: NS 2420; corequisite: NS 4130. Study of nutrition-related problems in the community and the various resources, activities, agencies, and programs involved in health promotion and disease prevention. F.
4340. **Medical Nutritional Therapy I (3:3:0)**. Prerequisite: NS 3310, 3340, 3402, and ZOOI 2402. Nutritional assessment and oral, enteral, and parenteral nutritional support. Pathophysiology, medical management, nutritional assessment, and nutritional therapy as they relate to protein energy malnutrition; trauma; obesity; diabetes mellitus; and endocrine, pancreatic, and gallbladder disorders. F.
4341. **Medical Nutritional Therapy II (3:3:0)**. Prerequisites: NS 4340. Pathophysiology, medical management, nutritional assessment, and nutritional therapy as they relate to disorders of the hepatic, gastrointestinal, cardiovascular, hematopoietic, immune, renal, and pulmonary systems; cancer; diseases of childhood; and pregnancy. S.
4350. **Emerging Issues in Food Science and Nutrition (3:3:0)**. Prerequisite: NS 2420 and senior standing. Readings, discussion, and analysis of trends and developments in food science and nutrition. S.
4380. **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. F (Writing Intensive)

Graduate Courses

5000. **Independent Study in Nutrition (V 1-6)**. Independent study in nutrition. May be repeated for credit.
5118. **Seminar (1:1:0)**. May be repeated for credit.
5300. **Perspectives in Food and Nutrition (3:3:0)**. Foundations of food and nutrition concepts. Does not apply to food and nutrition degree plan. May be repeated for credit.
5302. **Human Metabolism in Nutrition (3:3:0)**. Concepts of normal nutrition in relation to the chemistry and physiology of the human body. May not be counted toward a food and nutrition degree.
5303. **Community Nutrition (3:3:0)**. Study of nutrition related problems in the community and various resources, activities, agencies, and programs involved in health promotion and disease prevention. May not be counted toward NS degree.
5304. **Medical Nutrition Therapy I (3:3:0)**. Nutritional assessment and oral, enteral, and parenteral nutrition support. Pathophysiology medical management, nutritional assessment, and nutritional therapy as they relate to protein energy malnutrition, trauma, obesity, diabetes, and endocrine disorders. May not be counted toward NS degree.
5305. **Medical Nutrition Therapy II (3:3:0)**. Pathophysiology, medical management, nutritional assessment, and nutritional therapy as they relate to disorders of the hepatic, gastrointestinal, cardiovascular, hematretic, immune, renal, and pulmonary systems, cancer, diseases of childhood, and pregnancy. May not be counted toward NS degree.
5306. **Experimental Methods with Foods (3:2:3)**. Investigation of the physical and chemical factors influencing quality in food. May not be counted toward NS degree.
5307. **Emerging Issues in Food and Nutrition (3:3:0)**. Readings, discussion, and analysis trends and developments in food science and nutrition. May not be counted toward NS degree.
5308. **Cultural Aspects of Food (3:3:0)**. A study of the interaction of food and culture in various societies. May not be counted toward NS degree.
5310. **Nutrition of the Aged (3:3:0)**. Nutrition needs and factors affecting nutrition of the aged.
5311. **Problems in Nutrition (3:3:0)**. May be repeated for credit.
5320. **Resource Management in Dietetics (3:3:0)**. Prerequisite: Consent of instructor. Materials and human resources management in administration and clinical aspects of dietetics.
5321. **Dietetic Counseling Strategies (3:3:0)**. Application of interviewing, counseling, and educational techniques in dietetics including individual and group methods. May not be counted toward NS degree.
5327. **Carbohydrates and Lipids in Nutrition (3:3:0)**. Nutritional roles and metabolism of lipids and carbohydrates and metabolic responses to various dietary practices and diseases.

- 5329. **Minerals in Nutrition (3:3:0)**. Prerequisite: NS 4320 or consent of instructor. Study of minerals and their interrelationships in nutrition.
- 5330. **Introduction to Nutrition Research (3:3:0)**. Introduction to and critical review of current research designs and methodology in survey and controlled experiments; proposal, writing, reporting, and interpretation of data.
- 5331. **Issues in Nutrition (3:3:0)**. Prerequisite: NS 4320. Current issues in human nutrition with emphasis on interrelationships of nutrients in metabolism and their impacts on health.
- 5332. **Issues in Food Science (3:3:0)**. Current issues in food science with emphasis on the relationship of food science to human nutrition.
- 5333. **Vitamins in Nutrition (3:3:0)**. Prerequisite: NS 4320 or consent of instructor. Study of essential vitamins and factors affecting vitamin utilization.
- 5334. **Advanced Medical Nutrition Therapy (3:3:0)**. Prerequisite: NS 3340 or 4320 or consent of instructor. Physiological and metabolic bases for dietary modification in disease including assessment of biochemical and anthropometric indicators.
- 5336. **Nutritional Assessment and Data Interpretation (3:3:0)**. Methods, techniques, and data interpretation for assessing nutritional status of individuals and groups.
- 5350. **Nutritional Pathophysiology (3:3:0)**. Prerequisite: One semester of college biology or consent of instructor. An introduction to human pathophysiology with emphasis on the impact of nutritional influences.
- 5360. **Advanced Community Nutrition (3:3:0)**. Prerequisite: Consent of instructor. Study of community nutrition needs, resources, policies, programs, and applications of skills in health promotion.
- 5380. **Proteins and Amino Acids in Nutrition (3:3:0)**. Prerequisite: NS 4320 or consent of instructor. Nutritional roles, interrelationships, measurement of nutritional value, requirements, and metabolic processes of proteins in health and disease.
- 5601. **Internship in Dietetics (6:0:24)**. Prerequisite: Admission to the dietetic internship program. Internship experience in the practice of dietetics in clinical health care, food systems management, and community nutrition settings.
- 6000. **Master's Thesis (V1-6)**.
- 7000. **Research (V1-12)**.
- 8000. **Doctor's Dissertation (V1-12)**.

Nutritional Sciences: Family and Consumer Sciences Teacher Certification

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Adv. Coll. Rhetoric	3
ENGL 1301, Ess. Coll. Rhetoric	3	MATH 2300, Statistical Methods	3
Mathematics Elective*	3	POLS 2302, Amer. Public Policy	3
POLS 1301, Amer. Govt. Org.	3	NS 1410, Science of Nutrition	4
CHEM 1305/1105, Chem & Society I	4	CHEM 1306/1106, Chem & Society II	4
PSY 1300 or EDSE 2300	3	TOTAL	17
FCSE 2102, Intro. to FCS	1		
TOTAL	18		
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
ZOOL 2402, Human Anatomy & Physiol.	4	Human Sciences Elective+	3
ENGL 2311, Intro. to Technical Writing	3	Oral Communication *	3
RHIM 3460, Food Syst. Manage. I	4	English Literature (choose any)	3
NS 2310, Princ. of Food Preparation	3	RHIM 3470, Food Syst. Manage. II	4
TOTAL	17	TOTAL	16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
NS 3340, Nutrition in the Life Cycle	3	NS 4380 (S), Cultural Aspects of Food	3
NS 3325, Sports Nutrition	3	FCSE 4302 (S), Pro. App. in FCS**	3
RHIM 3341, Hospitality Management	3	NS 4350 (S), Emerging Issues	3
FDSC 3303, Food Sanitation	3	EDSE 4310, Learning, Co. & Inst. Des.**	3
FCSE 3301, Foundations of FCSE	3	EDSE 4322, Diversity & Lrn. in Class.**	3
Visual & Performing Arts*	3	EDLL 4382, Reading & Writing/Sec.**	3
TOTAL	18	TOTAL	18
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
FCSE 4308 (F), Research and Eval.**	3	FCSE 4304 (S), Inst. Mgmt. in FCS**	3
FCSE 4306 (F), Occ. Fam & Con. Sci.**	3	FCSE 4601 (S), Student Teaching**	6
NS 4330 (F), Community Nutrition	3	FCSE 4601 (S), Student Teaching**	6
HUSC 3214, Human Sciences Seminar	2	TOTAL	15
RHIM 4360, Experimental Foods	3		
TOTAL	14		

TOTAL—133 hours

NOTE: Students are expected to have competency in computer usage.

* Choose from Core Curriculum requirements

+ HS Core; choose 1 course from: ADRS 2310, HDFS 2322, PFP 3301

** Admission to Teacher Certification (Education) Program and a minimum 2.5 GPA required (www.edu.ttu.edu)

(F) Offered fall semester only; (S) offered spring semester only

Restaurant, Hotel, and Institutional Management (RHIM)

Undergraduate Courses

- 2308. **Hotel Operations (3:2:3)**. Principles and practices of managerial functions relating to the operation of hotel and motel facilities. F, S.
- 2310. **Introduction to Hospitality Management (3:2:1)**. Analyzes the nature of work, people, and the interrelationships within the hospitality industry. Explores various career options. F, S.
- 2312. **Introduction to Beverage Management (3:3:0)**. Principles and practices regarding the production, selection, storage, and serving of beverages. Emphasis on responsible beverage use in business and social settings. F, S, SSII.
- 2350. **Culture of Travel and Tourism (3:3:0)**. Study of the cultural and social benefits and outcomes of travel and tourism. For non-RHIM majors and not open to RHIM majors for credit.
- 3000. **Internship in Hospitality (V1-6)**. Prerequisite: RHIM 3100, sophomore standing and 2.5 GPA. Experiences in hospitality settings. May be repeated for a maximum of six hours credit. F, S, SSI, SSII.
- 3100. **Introduction to Internship in Hospitality (1:1:0)**. Introduction to concepts and expectations of the internship experience. F, S.
- 3303. **Computers in the Hospitality Industry (3:2:3)**. Prerequisite: Demonstrated computer competency. Examination and application of software and systems specific to the hospitality industry.
- 3308. **Hotel Group Sales and Services (3:3:0)**. Emphasis on the function of convention and meeting sales and service departments



Curriculum for B.S. in Restaurant, Hotel, and Institutional Management with Teaching Certification in Family and Consumer Sciences

FIRST YEAR		Spring	
<i>Fall</i>			
HUSC 1100 or I S 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	Mathematics Elective*	3
Mathematics Elective*	3	POLS 2302, Amer. Public Policy	3
POLS 1301, Amer. Govt. Org.	3	NS 1410, Science of Nutrition	4
RHIM 2310, Intro. to Hosp. Management	2	RHIM 2308, Hotel Operations	3
Visual & Performing Arts*	3	ECO 2305 Prin. of Economics	3
FCSE 2102, Intro. to Fam. & Con. Sci.	1	TOTAL	19
TOTAL	16		
SECOND YEAR		Spring	
<i>Fall</i>			
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
RHIM 3308, Hotel Group Sales & Serv.	3	COMS 3358, Bus. & Prof. Comm.	3
ENGL 2311, Intro. to Tech. Writing	3	English Literature (choose any)	3
RHIM 3460, Food Syst. Management I	4	RHIM 3390, Purchasing in Hosp. Ind.	3
Human Sciences Core Elective+	3	RHIM 3470, Food Syst. Manage. II	4
RHIM 3350, Travel and Tourism	3	TOTAL	16
TOTAL	19		
THIRD YEAR		Spring	
<i>Fall</i>			
RHIM 3320, Facilities Management	3	EDLL 4382, Reading, Writing, Second.**	3
ANSC 3404, Cons. Selec./Util.	4	FCSE 4302 (S), Prof. Applica. in FCS**	3
RHIM 3341, Hospitality Management	3	RHIM 3322 (S), Hospitality Control II	3
RHIM 3321 (F), Hospitality Control I	3	EDSE 4310, Learning, Cog. Inst.**	3
FDSC 3303, Food Sanitation	3	EDSE 4322, Diversity & Learning**	3
FCSE 3301, Foun. of FCS Educ.	3	RHIM 3100, Pre-Internship	1
TOTAL	19	TOTAL	16
INTERNSHIP			
RHIM 3000, Internship (should be away from Lubbock)	2		
FOURTH YEAR		Spring	
<i>Fall</i>			
FCSE 4308 (F), Res. & Eval. FCS [^] **	3	FCSE 4304 (S), Inst. Mgmt. in FCS**	3
RHIM 4415, Adv. Food Product. Manage.	4	FCSE 4601 (S), Student Teaching**	6
RHIM 4316, Hospitality Mgmt. Market.	3	FCSE 4301 (S), Student Teaching**	3
HUSC 3214, Human Sciences Seminar	2	TOTAL	12
FCSE 4306 (F), Occupational FCS [^] **	3		
RHIM 4313, Legal Asp. of Hosp. Ind.	3		
TOTAL	18		

TOTAL—137 hours

NOTE: Students are expected to have competency in computer usage.
NOTE: 2 hours of RHIM 3000, Internship, must be taken after RHIM 3110 and before last semester.

[^] Prerequisites apply.

* Choose from Core Curriculum requirements.

+ HS Core; choose 1 course from: ADRS 2310, HDFS 2322, PFP 3301

** Admission to Teacher Certification (Education) Program and minimum 2.5 GPA required (www.educ.ttu.edu)

(F) Offered fall semester only; (S) offered spring semester only

Curriculum for B.S. in Restaurant, Hotel, and Institutional Management

FIRST YEAR		Spring	
<i>Fall</i>			
HUSC 1100 or I S 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
ENGL 1301, Ess. Coll. Rhetoric	3	Mathematics Elective*	3
Mathematics Elective*	3	POLS 2302, Amer. Public Policy [^]	3
POLS 1301, Amer. Govt. Org.	3	NS 1410, Science of Nutrition	4
RHIM 2310, Intro. to Hosp. Management	3	RHIM 2308, Hotel Operations	3
RHIM 2312 or Elective	3	TOTAL	16
TOTAL	16		
SECOND YEAR		Spring	
<i>Fall</i>			
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
ECO 2305, Principles of Economics	3	Human Sciences Elective+	3
CMLL 1301, Indv. Studies in Mod. Lang.	3	Elective	3
RHIM 3460, Food Syst. Management I	4	RHIM 3350, Travel and Tourism	3
Elective	3	RHIM 3470, Food Syst. Manage. II [^]	4
TOTAL	16	TOTAL	16
THIRD YEAR		Spring	
<i>Fall</i>			
RHIM 3320, Facilities Management	3	ANSC 3404, Cons. Selec./Util.	4
COMS 3358, Bus. and Pro. Comm.	3	RHIM 3390, Purchasing in Hosp. Ind. [^]	3
RHIM 3341, Hospitality Management [^]	3	RHIM 3358, Human Res. in Serv. Ind.	3
RHIM 3321 (F), Hospitality Control I	3	RHIM 3322 (S), Hospitality Control II [^]	3
FDSC 3303, Food Sanitation	3	RHIM 4312, Beverage Control Man. [^]	3
RHIM 3100, Intro. to Internship in Hosp.	1	TOTAL	16
TOTAL	16		
INTERNSHIP			
RHIM 3000, Internship in Hospitality [^]	2		
FOURTH YEAR		Spring	
<i>Fall</i>			
RHIM 4322 (F), Hosp. Cost Control III [^]	3	RHIM 4300, Practicum [^] #	3
RHIM 4415, Adv. Food Product. Manage. [^]	4	RHIM elective<	3
Visual & Performing Arts*	3	RHIM 4316, Hosp. Manag. Marketing [^]	3
HUSC 3214, Human Sciences Seminar [^]	2	RHIM 4313, Legal Asp. of Hosp. Ind.	3
RHIM elective<	3	TOTAL	12
TOTAL	15		

TOTAL—125 hours

NOTE: Students are expected to have competency in computer usage.
NOTE: Two hours of RHIM 3000, Internship must be taken after RHIM 3100 and prior to graduation.

NOTE: RHIM 3000 is required prior to graduation and should be taken before last semester.

NOTE: Completing 800 hours of relevant hospitality industry experience is required prior to graduation.

* Choose from Core Curriculum requirements.

< Choose from RHIM 3308, 3330, 3332, 3355, 3380, 4320, 4325, 4330, 4360.

[^] Prerequisites apply.

+ HS core; choose 1 from: ADRS 2310, HDFS 2322 or 3320, PFP 3301.

Must take graduating semester.

(F) Offered fall semester only; (S) offered spring semester only.

related to lodging and tourism operations. Explores factors involved in the management of large group sales. F, S.

- 3320. Facilities Management (3:3:0).** Management principles and practices relative to the internal maintenance of public dining and lodging facilities. Systematic control of hospitality spaces to safeguard health and to use available aesthetic values. F, S.
- 3321. Hospitality Control I (3:3:0).** Introduction to hospitality control devices needed to measure fiscal success. F.
- 3322. Hospitality Control II (3:3:0).** Prerequisite RHIM 3321. Application of fiscal control devices in the hospitality industry. Includes computer applications in industry situations. S.
- 3330. Special Topics in Hospitality (3:3:0).** Semester long study of a specific topic pertinent to the hospitality industry. F, S.
- 3332. Customer Relations for Hospitality Enterprises (3:3:0).** Prerequisite: RHIM 2310. Evaluation of various facets of customer relations as they impact the hospitality industry.
- 3341. Hospitality Management (3:3:0).** Prerequisite: ENGL 1302. Factors involved in establishing hospitality operations, organization, administrative development, allocation of labor, and control. Examines hospitality organizations with emphasis on planning and problem analysis. F, S, SSI. (Writing Intensive)
- 3350. Travel and Tourism (3:3:0).** An analysis of the economic and cultural impact of the international travel and tourism

industry, including destination development, cultural integration, and demand for travel services. F, S, SSII.

- 3355. Club and Resort Management (3:3:0).** Principles and practices of the general managerial procedures utilized in private clubs and resorts. F, S.
- 3358. Human Resources in the Service Industry (3:3:0).** Explore human relations theories as they pertain to managing in the hospitality industry. F, S.
- 3380. Managed Services in the Hospitality Industry (3:3:0).** Analysis of on-site food service management and its importance to the hospitality industry.
- 3390. Purchasing in the Hospitality Industry (3:3:0).** Prerequisite: RHIM 3460. Current ethical, economic, legislative, and industrial developments related to purchasing food products and durable goods. F, S.
- 3460. Food Systems Management I (4:3:3).** Sophomore standing. Application of scientific food preparation and management principles to quantity food production. Includes laboratory experience in quantity food facility. F, S, SSI.
- 3470. Food Systems Management II (4:3:3).** Prerequisite: RHIM 3460 and 3 hrs. MATH. Optimum use of human, financial, and material resources by managers. Laboratory experiences include commercial food preparation and service. F, S, SSI.

Curriculum for B.S. in Retailing

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Adv. Coll. Rhetoric [^]	3
MATH	3	MATH	3
ENGL 1301, Ess. Coll. Rhetoric	3	ECO 2302 or 2305, Prin. of Eco.	3
RTL 1340, Intro. to Retailing	3	Human Sciences Elective*	3
POLS 1301	3	RTL 2340, Contemporary Issues in RtlI [^]	3
TOTAL	13	TOTAL	15
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. from 1877	3
BA 3302, Financial/Managerial Acct. or RHIM 3321, Cost Control I [^]	3	Natural Science*	4
ENGL 2311, Intro. to Technical Writing	3	POLS 2302, Amer. Public Policy	3
RTL 2350, Retail Promotion [^]	3	BA 3303, Foundations of Finance	3
Natural Science*	4	or RHIM 3322, Cost Control II [^]	3
TOTAL	16	Visual & Performing Arts*	3
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
RTL 3340, Intern. Retailing [^]	3	COMS 3358, Bus. and Pro. Comm.	3
RTL 3380, Retail Buying & Control [^]	3	RTL 3389 (S), Profes. Practices in Rtl. [^]	3
FDSC 3303, Food Sanitation	3	BA 3301, Marketing Conc. & Strat. or RHIM 4316, Hospitality Mgt. Mkt. [^]	3
BA 3305, Organizations Mgt. or RHIM 3341, Hospitality Mgt. [^]	3	RTL 3360, App. Concepts in Team. [^]	3
TOTAL	12	Elective or Minor	3
		TOTAL	15
INTERNSHIP			
RTL 3690 (SS), Internship in Retailing [^]	6		
FOURTH YEAR			
Fall		Spring	
RTL 4320, Category Mgt.	3	Elective	3
Elective	3	Elective or Minor	3
HUSC 3214, Human Sciences Seminar [^]	2	RTL 4360, Retail Management [^]	3
RHIM 3332, Cust. Relations in Hosp. [^] or RHIM 4320, Hosp. Entrepren. [^]	3	Humanities*	3
RTL 4330, Retailing Research [^]	3	TOTAL	12
TOTAL	14		
EXTERNSHIP			
RTL 4392 (SS), Externship in Retailing [^]	3		
TOTAL — 122 hours			

NOTE: Students are expected to have competency in computer usage.

* Choose from Core Curriculum requirements.

[^] Prerequisites apply.

(S) Offered in spring semester only; (SS) offered summer sessions only

- 4000. Individual Study (V1-6).** Prerequisite: Written consent of supervising faculty member. May be repeated for up to 6 hours credit. F, S, SSI, SSII.
- 4300. Practicum (3:3:0).** Prerequisite: RHIM 3000, graduating senior's final semester and 800 hours of work-experience training completed. Beginning a career through the development of job search strategies, interviewing skills, and resume writing. Students can interview with a large variety of companies for entry-level management positions. F, S, SSIII.
- 4312. Beverage Control Management (3:3:0).** Prerequisite: RHIM 3460. Selection, storage, and service of beverages with emphasis on inventory control, sales promotion, and profits. F, S.
- 4313. Legal Aspects of Hospitality Industry (3:3:0).** A study of the laws applicable to restaurants, hotels, and associated businesses. Includes duties, rights, and liabilities of institutions and guests. F, S.
- 4316. Hospitality Management Marketing (3:3:0).** Prerequisite: Senior standing. Application of marketing concepts, methods, and techniques used in the hospitality industry. Analysis of principles of consumer behavior, market research, promotion, and marketing strategy. F, S.
- 4320. Hospitality Entrepreneurship (3:3:0).** Prerequisite: Upper-division RHIM majors and minors. Aspects of opening and operating a small hospitality business. S.
- 4322. Hospitality Cost Control III (3:3:0).** Prerequisite: RHIM 3322. Utilization of fiscal control devices in the hospitality industry to develop financial assets and manage their application. F.
- 4325. Hospitality Field Study Tour (3:1:4).** Study of international/domestic hospitality operations. May be repeated once for credit. S.

- 4330. Contemporary Problems in the Hospitality Industry (3:3:0).** Prerequisite: Senior RHIM majors. In-depth examination of selected problems in the hospitality industry.
- 4360. Experimental Methods with Food (3:2:3).** Prerequisite: RHIM 3460 or NS 2310. Investigation of the physical and chemical factors influencing quality of food in personal and commercial settings; consideration of proportions, manipulations of ingredients, and additives in preparation.
- 4415. Advanced Food Production Management (4:2:6).** Prerequisite: RHIM 3470, FDSC 3303, and junior or senior standing. Assumption of maximum responsibility of management of actual food service operation based on sound managerial principles and successful food production and service techniques. Register through departmental office. F, S, SSIII. (Writing Intensive)

Graduate Courses

- 5001. Internship in the Hospitality Industry (V1-6).** Prerequisite: Consent of instructor. Internship experience in career-related positions in the hospitality industry.
- 5100. Seminar (1:1:0).**
- 5300. Perspective in Restaurant Hotel and Institution (3:3:0).** Foundation concepts in hospitality management. May be repeated for credit. Does not apply to a graduate degree.
- 5301. Colloquium in Hospitality Management (3:3:0).** Introduction to philosophies and processes involved in graduate study in the hospitality sector.
- 5308. Hotel Management (3:3:0).** An assessment of organizational and operational issues relating to the lodging industry. Students will examine current trends in the hotel industry and determine appropriate strategies for managing change.
- 5310. Sensory Evaluation of Food Products (3:2:3).** Principles and techniques of sensory evaluation of food products in personal and professional settings.
- 5311. Problems in Restaurant, Hotel, and Institutional Management (3:3:0).** May be repeated for credit.
- 5316. Hospitality and Service Marketing (3:3:0).** Examination of marketing theories and specific applications to the hospitality and service industry. Concentrates on differences of marketing concepts in service vs. products market.
- 5322. Financial Analysis in the Hospitality Industry (3:3:0).** A systems approach to the financial decision-making process in the hospitality industry.
- 5325. Hospitality Field Study Tour (3:1:4).** Study of international/domestic hospitality operations. May be repeated once for credit. S.
- 5332. Hospitality Control (3:3:0).** Managerial concepts that apply to the hospitality industry using the uniform system of accounts for lodging, restaurant, and club industries.
- 5333. Hospitality Management Research and Application (3:3:0).** Examination of hospitality management and research concepts and their application in hospitality management settings.
- 5340. Hospitality Consumer Behavior (3:3:0).** Analysis of hospitality customers with emphasis on application of theoretical based research.
- 5341. Strategic Management in the Hospitality Industry (3:3:0).** Prerequisite: Completion of RHIM core. Examination of strategy formulation, content development, implementation, and evaluation at the unit and multi-unit level.
- 5350. Travel and Tourism (3:3:0).** A study of principles and concepts of travel and tourism behavior. Emphasis on tourism theories, history, planning, development, and research techniques.
- 5353. Introduction to Restaurant, Hotel, and Institutional Management Issues and Research (3:3:0).** Analysis of issues and methods of research related to the study of food, equipment, design, consumer acceptance, concept development, cost analysis, and operational efficiency.
- 5355. Human Resources in the Hospitality Industry (3:3:0).** In-depth study of human resources management in the service industry. Emphasis on employment issues, labor relations, and government regulations.
- 5370. Food Systems Management (3:3:0).** Examination of current trends in food service operations and technology. Emphasis on the functional subsystems of procurement, production, service and delivery, and sanitation and maintenance.
- 5375. Operations Management for Service Industries (3:3:0).** Integration of quantitative production, operations methods,

- and traditional qualitative management in both the unit and multi-unit service operations.
5385. **Focus Group Research Methods (3:3:0)**. Exploration of focus group methodology to develop problem solving and decision-making skills.
6000. **Master's Thesis (V1-6)**.
6001. **Internship in Hospitality Administration (V1-6)**. Prerequisite: Admission to doctoral program and consent of instructor. Internship experience in career - related position in the hospitality industry.
6100. **Seminar (1:1:0)**.
6300. **Perspectives in Hospitality Administration (3:3:0)**. Foundation concepts in hospitality management. May be repeated for credit. Does not apply toward graduate credit.
6308. **Advanced Lodging and Leisure (3:3:0)**. Examines the lodging industry from a strategic management standpoint. Discussions and research will focus on industry interrelationships with economic, social, political, and financial entities.
6316. **Advanced Hospitality Marketing (3:3:0)**. An advanced investigation into the theories, strategies, and marketing policies influencing the corporate level decision making process and how they apply to the day to day operations of hospitality companies.
6320. **Franchising and Entrepreneurship in the Hospitality Industry (3:3:0)**. Examines managerial strategies and processes in starting, growing, and revitalizing hospitality businesses.
6322. **Financial Management In Hospitality Administration (3:3:0)**. Investigation of theories, strategies, and financial policies influencing corporate decisions in operations of domestic and international hospitality.
6330. **Theoretical Developments in Hospitality (3:3:0)**. Review and analysis of the history of the theoretical developments in the hospitality industry including a comparison with other disciplines.
6332. **Advanced Hospitality Control (3:3:0)**. Investigation of strategic cost management that includes financial and managerial accounting concepts relevant to the hospitality industry.
6340. **Organizational Management in Hospitality Administration (3:3:0)**. The study and practice of the latest concepts related to leadership and supervision in hospitality management.
6345. **Hospitality Business Ethics (3:3:0)**. Develop the cognitive skills and integrative abilities necessary to recognize moral distinctions which occur in the daily operations of businesses in the light of personal values and professional codes of ethics.
6346. **Category Management in the Hospitality Industry (3:3:0)**. The role of category management strategies and best practices in the effective implementation of customer service in the hospitality industry.
6350. **Advanced Travel and Tourism (3:3:0)**. An in-depth study of tourism supply, demand, policy, planning, development and marketing at the local, regional, state, national and international levels. Economic, social, political, and environmental considerations of tourism management and development will be a focus. Tourism-related research and experiences with tourism organizations and agencies are components of the course.
6370. **Advanced Food Systems Management (3:3:0)**. An examination of current technologies and processes in food industry related operations with emphasis on the subsystems of concept, and product development, production, and marketing.
6380. **Grants and Project Funding (3:3:0)**. Examination and application of the processes related to grants and sponsored projects, including identification of sources of funding, proposal development, and grant administration.
6381. **Community Action, Involvement, and Leadership (3:3:0)**. Analyze and assess opportunities for community involvement. Students gain insight into the interconnectedness of individuals, businesses, and the larger community through problem-based learning.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Retailing (RTL)

Undergraduate Courses

1340. **Introduction to Retailing (3:3:0)**. Basic principles, concepts, and practices in the operation of retail organizations. F, S.
2340. **Contemporary Issues in Retailing (3:3:0)**. Prerequisite: RTL 1340. Introductory survey of fundamental principles and current issues that affect retailing; emphasis on related influences from government, economics, technology, and society. F, S.
2350. **Retail Promotion (3:3:0)**. Prerequisite: RTL 1340. Comprehensive study of the principles and practices of merchandise communication through the interaction and coordination of sales promotion, personal selling, visual merchandising, advertising, special events, and public relations. F, S.
3340. **International Retailing (3:3:0)**. Prerequisite: RTL 2340, ENGL 2311; prerequisite or corequisite: ECO 2302 or 2305. Cultural differences, world markets, and political constraints encountered in international retailing strategy. F, S. (Writing Intensive)
3360. **Applied Concepts in Teamwork (3:3:0)**. Prerequisite: RTL 2340. Basic issues and concepts in the team building process, emphasis on application of curriculum through academic service-learning team projects. F, S. (Service-Learning)
3380. **Retail Buying and Control (3:3:0)**. Prerequisite: RTL 2340, 6 hours of math, and RHM 3322 or B A 3302. The application of planning, purchasing, and controlling inventories. F, S.
3389. **Professional Practices in Retailing (3:3:0)**. Prerequisite: RTL 2350, 3380, and departmental approval; enrollment proceeds RTL 3690. Principles of professional practices focusing on legal, ethical, and human resource workplace issues and effective managerial strategies. S.
3690. **Internship in Retailing (3:3:0)**. Prerequisite: RTL 3340; rising senior standing and departmental approval. Supervised applications of concepts, principles, and techniques learned in the classroom; emphasis on student participation in the retailing industry. Experiential workplace component must include a minimum of 300 hours of joint faculty-employer supervised employment. S.
4000. **Individual Study (V1-6)**. Prerequisite: Written consent of supervising faculty member prior to registration. Individual study or research under the guidance of a retailing faculty member to enhance the degree program. May be repeated for up to 6 hours credit. F, S, SSI, SSII.
4300. **Retailing Field Study Tour (3:1:4)**. Study of international/domestic retailers and manufactures. May be re-peated once for credit. S.
4320. **Retail Category Management (3:3:0)**. Prerequisite: RTL 2340; prerequisite or corequisite: RTL 3380. The application of category management strategies using industry software with emphasis on product selection, shelf merchandising, promotion, and pricing. F, S
4330. **Retailing Research (3:3:0)**. Prerequisite: RTL 3340, 3380. Comprehensive overview of research in the retailing process; emphasis on application-oriented techniques and processes for implementation. Required discussion. F, S. (Writing Intensive, Service-Learning)
4360. **Retail Management (3:3:0)**. Prerequisite: RTL 3340, COMS 3358, BA 3301 or RHIM 4316, , and BA 3305 or RHIM 3341. Capstone course with emphasis on interrelated functions in retail management examined through case study and problem-based academic service-learning team projects. Required discussion. F, S. (Writing Intensive, Service-Learning)
4392. **Retail Externship (3:1:4)**. Prerequisite: completion of all program requirements; final semester; pro-gram approval of employment site. Completion of 150 hours of joint faculty-employer supervised management-level employment.

College of Mass Communications

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About the College

The College of Mass Communications is one of the largest mass communications undergraduate programs in the United States and one of 107 programs in the nation accredited by the Accrediting Council on Education in Journalism and Mass Communications. The college is recognized as a leader among the nation's elite mass communications programs with a curriculum that emphasizes a broad-based communications education for undergraduate majors who must adapt to rapid changes in information/communications industries. The college emphasizes its internship opportunities and job placement services through its Career Center.

The college seeks to prepare students to become leaders in their respective professions. Our courses provide students with the opportunity to think critically and to communicate effectively.

The college supervises the following degree programs:

- Bachelor of Arts in Advertising
- Bachelor of Arts in Electronic Media and Communications
- Bachelor of Arts in Journalism
- Bachelor of Arts in Photocommunications
- Bachelor of Arts in Public Relations
- Master of Arts in Mass Communications
- Doctor of Philosophy in Mass Communications

The undergraduate and graduate programs prepare students for careers in professional areas of mass communications and/or to pursue additional graduate degrees.

Undergraduate Program

The College of Mass Communications is accredited by the Accrediting Council on Education in Journalism and Mass Communications (ACEJMC). The college operates under the general policy of the ACEJMC, which requires students to take a minimum of 80 semester hours in courses outside the major area of journalism and mass communications, with no fewer than 65 semester hours in the basic liberal arts.

To keep the curriculum abreast of trends and changes in mass communications and to broaden the education of majors by requiring

core subjects such as introduction to mass communications, mass media theories and society, mass communications law, and news writing, the minimum number of semester hours required by the college for the B.A. degree has been set at 122 hours. The minimum number of hours that can be taken within the college is 39.

First-semester freshmen enrolling in the college must meet the university-wide admission requirements and present ACT or SAT scores when entering the college. Students enrolling in the college for the first time will be designated as general mass communications students. Students enrolled in other colleges at Texas Tech may transfer into the college after earning at least 12 semester credit hours (excluding CLEP courses) with an adjusted GPA of 2.75 or greater.

The change from the general mass communications status, which is not a major, to a specific major will be accomplished after the following requirements have been met:

1. Completed the ACT or SAT examination with scores submitted to the college.
2. Made at least a C in ENGL 0301 (if required), 1301, and 1302.
3. Completed the college's economics requirement with a grade or grades of C or better.
4. Completed the college's mathematics requirement with a grade or grades of C or better.
5. Completed the entry-level course in the major sequence with a grade of C or better. The entry-level course in journalism is JOUR 2310, advertising is ADV 3310, public relations is P R 3310, electronic media and communications is EM&C 3300, and photocommunications is PHOT 3310.
6. Passed the college's grammar, spelling, and punctuation exam.

Core Curriculum Requirements. The Core Curriculum requirements ensure breadth in each academic program. These requirements have been incorporated into the college's undergraduate degree programs as per the state of Texas requirements listed in the Undergraduate Academics section of this catalog. Students should consult with an advisor in the Advising Center in Mass Communications (MC 113) prior to each registration period to ensure all requirements are being met in a manner consistent with timely graduation.

Course Load. A normal full-time course load is 15-19 hours per semester. In calculating the course load, the associate dean of undergraduate students will consider all active correspondence courses as a part of the course load. Course loads in excess of 19 hours require approval by the associate dean of the college. The maximum course load for a student on probation is 16 hours.

The normal course load for a single summer term is 6-8 hours. To meet graduation requirements, a graduating senior may petition to take 9 hours one term or a total of 15 hours in both terms.

Correspondence Courses. Approval for courses to be taken by correspondence must be obtained in the Advising Center (MC 113). All course prerequisites must be met to be granted enrollment. In all programs no more than 6 hours of correspondence coursework may be completed during the final 30 hours of the degree. Students must have junior status to enroll in a 3000- or 4000-level correspondence course. Courses counting toward a major or minor in the College of Mass Communications may not be taken by correspondence.

Catalog Selection. Students will use the catalog issued for the year in which they are first officially admitted to the college, or a more recent catalog if approved. However, if they later transfer to another

institution or another college at Texas Tech and then desire readmission to the college, they will use the catalog in effect when they are readmitted. For graduation purposes, a catalog expires after seven years at which time the current catalog becomes the catalog in effect.

Credit by Examination. A matriculated student may attempt credit by examination (described elsewhere in this catalog).

Approval from the associate dean of undergraduate students is required to take an examination a second time before six months have elapsed or if more advanced material in the same subject has already been completed.

Grades of D. Semester credit hours for a course in which a grade of D is earned may not be applied toward fulfillment of the major, adjunct, minor, or teaching field requirements for any degree program.

Grading Practices. The college conforms to university grading practices as set forth in the Undergraduate Academics section of this catalog. In addition, the following regulations apply within the college.

Except for those courses designated “may be repeated for credit” in this catalog, no course may be used more than once on a degree plan unless approved by the associate dean of undergraduate students.

Second Bachelor's Degree. Permission to enroll in courses to pursue a second bachelor's degree must be obtained at the Advising Center (MC 113). No second bachelor's degree is conferred until the candidate has completed at least 24 semester credit hours in residence, in addition to the courses counted toward the first bachelor's degree. Credit by examination courses will not satisfy the 24-hour residence requirement. A second bachelor's degree sought by a student who did not graduate from a public Texas university must include the required Core Curriculum.

Freshman Year. Entering freshmen develop their programs in conference with an academic advisor. The students report to their advisors for such individual conferences or group meetings as are needed for the purpose of orienting themselves to academic regulations and procedures, curricula, and degree requirements in their respective areas of interest.

Students are urged to take required freshman courses during the freshman year. During the sophomore year the student should complete the second year of English and all other freshman requirements. Normally, Core Curriculum requirements should be completed by the end of the sophomore year. Freshmen should not enroll in junior-senior level courses.

Admission of Transfer Students. Students requesting permission to transfer from another academic institution must meet the university-wide admission requirements. Transfer students must present ACT or SAT scores when entering the college. No more than 12 hours of journalism or mass communications courses will be accepted in transfer. Students requesting permission to transfer from another college at Texas Tech must have an adjusted GPA of 2.75 or better. In addition, they must provide the Advising Center (MC 113) with a transcript of all academic work. Approval will be granted at the Advising Center. The college will determine the applicability of any transferred credit to academic programs within the college. All transfer students will enter under the catalog in force at the time of transfer. The last 30 hours prior to graduation must be completed while enrolled in the college.

Final 30 Credit Hours. The final 30 semester credit hours of a degree program must be completed with Texas Tech enrollment. A maximum of 6 of these credit hours may be taken by Texas Tech correspondence. Credit for courses taken without prior approval from the associate dean of undergraduate students may not be applied to degree program requirements.

Degree Plan and Intention to Graduate. Students are encouraged to declare a major and minor with the Advising Center as soon as their academic goals are clearly defined. Students must declare a major and minor upon completing 60 hours of coursework. In addition, the Intention to Graduate form must be submit-

Graduate Program

The College of Mass Communications offers both the Master of Arts and the Doctor of Philosophy degrees.

Master of Arts

The Master of Arts in Mass Communications is designed to prepare students to enter the communications industry or to continue studies toward a Doctor of Philosophy. Depending upon courses selected, graduate students are prepared for careers or advanced study in the fields of media (journalism, publishing, and electronic communications), advertising, public relations, and related fields. Master of Arts students are offered two curriculum options: A 31-hour program of coursework that includes 6 hours of credit for a traditional research-based thesis or a professional program of 37 hours of coursework. Both options require a comprehensive examination.

Doctor of Philosophy

The Doctor of Philosophy in Mass Communications is designed to prepare students for careers in communications research and academia. Doctoral study includes coursework on the convergence of media and the integration of communications theories and disciplines. Completion of the Doctor of Philosophy requires 87 hours of graduate study beyond the baccalaureate degree or 60 hours beyond the Master of Arts, including 12 hours dedicated to a traditional research-based dissertation.

Students seeking admission to the graduate program should consult the college's associate dean of graduate studies before enrolling in any courses.

Upon entering the college's program, graduate majors may be required to take undergraduate or graduate leveling work. This requirement will depend on the student's prior academic or professional experience in mass communications. Leveling courses must be taken in addition to the graduate-hour requirements noted in the program options above. Students should consult the college's associate dean of graduate studies regarding these requirements.

ted upon completion of 80 hours of coursework. Students who have completed 80 or more hours will have a hold placed on their records until they file the Intention to Graduate form.

Other general rules for all students, regardless of major, enrolling in mass communications courses are as follows:

1. The student must have passed the prerequisite course with a grade of C or better when enrolling in an upper-level course (3000 or above).
2. All adjunct courses required for any major-minor sequence must be passed with a grade of C or better and may not be taken pass-fail.
3. Students who make less than a grade of C in a core course or a course required in a mass communications major-minor sequence must repeat and pass the course with a grade of C or better prior to graduation or prior to taking any course for which this course is a prerequisite.
4. All students must have an adjusted 2.75 GPA at the end of the semester before entering the second required course in the major-minor sequence or enrolling in an internship or practicum in their major.
5. The second required course in the major-minor sequence is JOUR 3312 for news-editorial journalism, JOUR 3314 for broadcast journalism, ADV 3312 for advertising, EM&C 3380 for electronic media and communications, P R 3312 for public relations, and PHOT 3316 for photocommunications.

6. Students must pass the college's grammar, spelling, and punctuation exam prior to enrolling in the first writing course (JOUR 2310).
7. No course may be repeated for credit unless so designated.
8. No course required by the college may be taken pass-fail unless required by a mass communications major-minor sequence.
9. Prerequisites are governed by the catalog in effect at the time the course is taken.
10. Students in majors and sequences in the college must take the following core courses: MCOM 1300, 3300, 3320, and JOUR 2310.
11. Sophomore standing (at least 30 hours) is required for entry into 3000-level courses in the college if prerequisites are not stated.
12. Junior standing (at least 60 hours) is required for all 4000-level courses in the college if prerequisites are not stated.
13. All students in majors and sequences are required to select a minor outside the college and complete a minimum of 18 semester hours, at least 6 of which must be on the junior-senior (3000-4000) level.
14. Students in any major or sequence in the college must pass 12 hours of English courses.
15. Major or minor mass communications courses may not be taken by correspondence.
16. Students who register for a course in which they have not passed the prerequisite with a grade of C or better will be dropped from the course.
17. Courses used for majors in the college may not be counted toward fulfilling the college's general degree requirements.

Teacher Education. Students who want to teach journalism in secondary schools must complete a degree in journalism and take the necessary courses in the College of Education to be certified to teach. Students should contact the Teacher Certification Office in the College of Education. The following courses constitute the required courses from the journalism secondary teaching field: JOUR 2300, 2310, 3310, 3312, 3380, 3390, 4350, 4370, PHOT 2310, MCOM 1300, 3300, and 3320. Passing the grammar, spelling, and punctuation exam prior to enrolling in JOUR 2310 is required.

Minors. Students selecting a minor in mass communications are required to pass the college's grammar, spelling, and punctuation exam, pass ENGL 1301 and 1302 with grades of C or higher and have a 2.75 adjusted GPA prior to enrolling in the first writing course in the college (JOUR 2310) if required for specific minor selected. A general Mass Communications minor consists of a minimum of 21 hours and must include 6 hours of junior and senior level courses. At least 12 of the 21 hours must be taken in residence. Specific required courses include MCOM 1300, 3300, 3320, and 12 hours from ADV 3310, EM&C 3300, 3308, 3310, JOUR 2300, 2310, PHOT 2310, and P R 3310. Additional minors are available in advertising, electronic media and communications, journalism, photocommunications, and public relations and are listed in each supervising department.

General Degree Requirements

Requirements for the degree of Bachelor of Arts apply to all baccalaureate degrees offered through the college 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, arts, mathematics, individual or group behavior, and natural sciences. It also provides the factual basis and insights requisite for specialized study and professional work in these fields.

General Requirements. See "Undergraduate Credit by Examination" in the Admissions section of this catalog for information on credit provided by test scores to meet these requirements. Students must take the specified number of hours in the areas listed below. With a few exceptions, courses from the minor may be used to satisfy these requirements. Except for the humanities and multi-cultural requirement, a course may not be counted in two different

areas of the general requirements nor may a course be counted in requirements for both the major and minor.

Semester Hours

English	12
The 12 hours of English must consist of ENGL 1301 and 1302 and two literature courses (excluding ENGL 2311, 2371, 3365, 3366, 3367, 3368, 3371, 3372, 3373, 4300, 4360, 4365, 4366, 4367, 4373, and 4378 because they are not literature courses). However, ENGL 2311 may be used as equivalent to fulfilling 3 hours of this requirement.	
Oral Communication	3
CFAS 2300, COMS 1300, 2300 or 3358, CH E 2306, MGT 3373 (may not be taken by correspondence), and PETR 3308. Public relations majors are required to take COMS 3358.	
Foreign Language	6-16
A student must complete 6 hours at the sophomore level or above in a single language. If 4 or more semesters of high school foreign language are accepted for admission, the student should consult the information preceding the course listing for the foreign language department. A student enrolling in the first-year sequence will have a requirement of 11-16 hours. A student who enrolls in the second-year sequence will have a 6-hour requirement. International students whose native language is not English and who graduated from a secondary school in their native country may satisfy this requirement by bringing their certificate of graduation to the Advising Center of the college. Credit by examination through the language laboratory is available for the following languages: French, German, Latin, and Spanish. Students who petition to complete the foreign language requirement via study abroad through a non-Texas Tech affiliated program will agree to have foreign language credit applied to their degrees based on scores on a language placement test administered by the language laboratory upon their return from the study abroad. Approval to do this must be granted in advance by the associate dean of undergraduate students. For more information, consult the Department of Classical and Modern Languages and Literatures.	
Mathematics and Logical Reasoning	6
All mathematics courses 1300 and above (except 3430) may be used. Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply. PHIL 2310 or 4310 may be used to satisfy 3 hours of this requirement. The following courses from the Core Curriculum may not be used: AAEC 3401, I E 3341, MUTH 3303, PSY 3400, and SOC 3391. MATH 2300 is required for all mass communications majors and will satisfy 3 hours of this requirement.	
Natural Science	8
Two courses including matching labs must be selected from natural laboratory sciences listed in the Core Curriculum options.	
Technology and Applied Science	3
Courses must be selected from the list of Core Curriculum options. Mass communications majors may not use EM&C 3300 or 3310 to satisfy this requirement.	
Individual or Group Behavior	6
All majors in the College of Mass Communications are required to complete an economics requirement (ECO 2305 or ECO 2301 and ECO 2302). If ECO 2305 is taken, the other 3 hours of individual or group behavior may come from the Core Curriculum options. Mass communications majors may not use ADV 4313, JOUR 4330, or MCOM 1300 to satisfy any part of this requirement. Courses used in a health major or minor may not be used to satisfy this requirement.	
American History	6
Students will normally enroll in HIST 2300 and 2301 although any American history courses will satisfy this requirement.	
Political Science	6
Students will enroll in POLS 1301 and normally in 2302. For more information, see the Department of Political Science section of this catalog. One course must be taken from a Texas college or university.	
Humanities	3
Fulfilled by 3 hours of English literature required for English requirement. Mass communications majors may not use JOUR 3350 to satisfy any part of this requirement.	
Visual and Performing Arts	3
Selected from Core Curriculum requirements approved list. Photocommunications majors are required to take ART 1302 or 1303	

to satisfy this requirement. Mass communications majors may not use EM&C 3308 to satisfy any part of this requirement.

Multicultural Requirement 3
Courses must be selected from the Core Curriculum requirements approved list. This course may also be used to satisfy another general degree requirement listed above.

Personal Fitness and Wellness 1
To satisfy the College of Mass Communications requirement of 1 hour of personal fitness and wellness, students are to complete successfully any PF&W course. Also accepted as fulfilling the requirement are AERS 1105, 1106, MILS 1101, 1102, MUEN 1103, a DAN, or ESS activity course. Students more than 25 years of age are exempt. Any student who has served honorably in the U.S. Armed Forces a minimum of 90 days may receive semester credit hours in personal fitness and wellness. Application for this credit must be made in the first semester of attendance at the university. Students participating in varsity athletics may enroll in the PF&W course that corresponds to their varsity sport. A maximum of 1 credit hour per academic year per sport may be earned in this manner.

Major, Minor, and Electives

In addition to the above requirements, the student must take major, minor, and elective courses sufficient to total 122 semester credit hours. The minor must be selected from outside the College of Mass Communications.

The minor may be any departmental minor, an established interdisciplinary minor, or a student-initiated interdisciplinary minor (with approval of the associate dean of undergraduate students of the college).

Many departments and programs have residency requirements for minors. See departmental or program listings for specific information. Courses used to fulfill the writing intensive requirement are to be taken in residence.

Students should have selected their major and minor fields by the time they reach their junior year. For the major subject they will be required to complete a minimum of 39 hours, including 6 hours of intensive writing courses. At least 18 hours of the major subject must be in courses at the junior-senior level. For the minor, a minimum of 18 hours must be completed (except in certain foreign languages as explained in the curriculum for languages), at least 6 of which must be of junior or senior level. All courses in the major and minor must be approved by the appropriate academic unit. Students are expected to develop a degree plan no later than the first semester of the junior year. Forms and information are available in the Advising Center.

A minimum of 40 hours of junior and senior work must be presented. Not more than 8 hours may be counted in applied music and/or music ensemble. Not more than 8 hours of personal fitness and wellness as well as exercise and sport sciences activity courses may be counted except for students offering exercise and sport sciences as a major, minor, or specialization.

Mass Communications (MCOM)

(To interpret course descriptions, see page 8)

Undergraduate Courses

1300. [COMM 1307] **Introduction to Mass Communications (3:3:0)**. A broad survey of communications in modern life with particular emphasis on print media, broadcasting, advertising, and public relations.
3300. **Mass Media Theories and Society (3:3:0)**. Prerequisite: Sophomore standing. Theory-based exploration of the relationship between the mass media and society, such as aggression and television violence.
3320. **Mass Communications Law (3:3:0)**. Prerequisite: Sophomore standing. A study of the legal problems facing journalists, broadcasters, and advertisers, including libel, privacy, regulation of radio-TV, ethics, and commercial speech.

3380. **Mass Communications Research Methods (3:3:0)**. Prerequisite: Sophomore standing and MATH 1330 and 1331, or 2300, or 2345. Comprehensive overview of mass communications research focusing on planning, designing, conducting, analyzing, interpreting, and applying research to address communication issues and problems.
4000. **Special Problems in Mass Communications (V1-3)**. Prerequisite: Consent of instructor. Individual research on approved problems or projects in mass communications areas. May be repeated for 3 hours credit.

Graduate Courses

5160. **Proseminar in Mass Communications (1:1:0)**. Designed to bring together students and faculty for professional and academic interchange with emphasis on research interests of faculty and advanced graduate students. Pass-fail only.
5320. **Mass Communications Law (3:3:0)**. A study of the legal problems facing journalists, broadcasters, and advertisers including libel, privacy, and regulation of telecommunications media and commercial speech.
5330. **Critical Studies in Mass Communications (3:3:0)**. Surveys a wide range of interpretive methods, cultural theories, and critical issues. Includes units on advertising, journalism, entertainment television, and the music industry.
5344. **Seminar in Public Opinion and Propaganda (3:3:0)**. A study of propaganda theory and methods. Bases of public opinion. Opinion-making processes in governments, political parties, pressure groups.
5347. **Studies in International Communications (3:3:0)**. A critical examination of the structure, control, and performance of the media systems of nations and regions.
5349. **Administration of Communications Media (3:3:0)**. For mass communications majors only. Problems of executive planning and management of newspapers, magazines, and broadcast media.
5362. **Seminar in Mass Communications (3:3:0)**. A comprehensive exploration of theory and research into the social, psychological, and economic problems affecting modern mass communications.
5364. **Research Methods (3:3:0)**. Basic communications research designs: exploratory, survey, experimental, content, and secondary analysis. Measures of central tendency, contingency analysis, correlation analysis.
5366. **Seminar in Mass Communications Theory (3:3:0)**. In-depth study of the theory and epistemology of mass communications. Integration, comparison, and extension of theories with respect to a specific problem area including practice in development of research hypotheses.
5370. **Internship in Mass Communications (3)**. Prerequisite: Consent of instructor. Supervised experience in an established career-related area of mass communications. May not be substituted for MCOM 6050.
5374. **Data Analysis (3:3:0)**. Prerequisite: MCOM 5364. The use and interpretation of statistics for data analysis. Covers the selection of statistical techniques, the use of statistics packages, and the interpretation of results.
6000. **Master's Thesis (V1-6)**.
6050. **Master's Report (V1-6)**.
6010. **Mass Communications Pedagogy (V1-3)**. In-depth study of and research into effective teaching methods for mass communications faculty in their specialized fields.
6310. **Contemporary Issues in Communications Technology (3:3:0)**. Seminar in the social, political, and economic impacts of communications technologies. Topics include diffusion of innovations, global communications systems, and audience research.
6315. **Integrated Communications Campaigns (3:3:0)**. Seminar in managing and analyzing the success of integrated communications campaigns.
6330. **Seminar in Media and Sport (3:3:0)**. This course examines the interaction of mass media and sport, including the related history; media economics; and the use of media by athletes, teams, and organizations.
6364. **Selected Research Methods (3:3:0)**. Prerequisite: Introductory statistics or permission. Rotating research methods course focusing on experimental, survey, content analysis or others. May be repeated twice when topics vary.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Advertising

Faculty

Donald W. Jugenheimer, Ph.D., Chairperson

Professors: Hudson, Jugenheimer

Assistant Professors: Bichard, Bradley, Gangadharbatla, Ortiz

Instructors: Rodriguez, West

About the Program

The advertising program in the College of Mass Communications develops leaders in advertising communications. Our students gain an understanding of the creative and business-related aspects of advertising, including copywriting, sales, graphic production, creative strategy, and media planning. The department also hosts industry professionals who speak to students about internships and careers in advertising.

Minors. Students selecting a minor in advertising are required to pass the college's grammar, spelling, and punctuation exam; pass ENGL 1301 and 1302 with grades of C or higher; and have a 2.75 adjusted GPA prior to enrolling in the first writing course (JOUR 2310). A minor in advertising consists of a minimum of 21 hours. At least 12 of the 21 hours must be taken in residence. Specific requirements for the advertising minor include ADV 3310, 3312, 3351, 3361, 4312, JOUR 2310, and MCOM 3380.

Additional minors are listed in each supervising department and are available in electronic media and communications, general mass communications, journalism, photocommunications, and public relations.

Advertising Curriculum

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	JOUR 2310	ADV 3351, 3361	ADV 4312
ECO 2305 or 2301 and 2302	ADV 3310	MCOM 3380	MCOM elective
MATH 2300, or 1330 and 1331, or 2345	MCOM 3300 ADV 3312 MCOM 3320	B A 3301 MCOM elective	MCOM elective B A 3302 or PFP 3301

Students majoring in advertising are required to complete 39 semester hours within the college, including the following: ADV 3310, 3312, 3351, 3361, 4312, JOUR 2310, MCOM 1300, 3300, 3320, and 3380. Also required are ECO 2305 or both ECO 2301 and 2302, MATH 2300 or MATH 1330 and 1331 or MATH 2345, B A 3301, and BA 3302 or PFP 3301.

Advertising (ADV)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 3310. Principles of Advertising (3:3:0).** Prerequisite: sophomore standing. An overview of the broad field of advertising. Acquaints students with the role of advertising in the American economy and social system and the procedures involved in planning advertising campaigns.
- 3312. Advertising Writing (3:2:3).** Prerequisite: ADV 3310, JOUR 2310, and a 2.75 adjusted GPA. Principles and practice of writing for advertising. Includes writing for internal audiences as well as for various media to meet advertising goals to persuade and inform mass audiences. (Writing Intensive)
- 3351. Advertising Media Planning (3:3:0).** Prerequisite: ADV 3310 and MATH 2300 or 1330 and 1331 or 2345 and a 2.75 adjusted GPA. A study of the various advertising media to provide students with a knowledge of the use of advertising media, methods of selection, and the skills and background required for media buying.
- 3361. Advertising Creative Strategy (3:2:3).** Prerequisite: ADV 3310, 3312. Computer proficiency with the major software packages in Adobe Creative Suite 2, including Illustrator,



- InDesign and Photoshop. Must be taken after or concurrently with ADV 3351. Analysis of the creative aspects of advertising, strategy, copy, layout, typography, and production. Provide practical application of how to plan and execute effective print and broadcast messages..
- 3390. Internship in Advertising (3).** Prerequisite: Junior or senior standing; ADV 3351 or 3361, 2.75 adjusted GPA, and recommendation of faculty member and internship coordinator. Minimum of 160 hours supervised employment in media or communications organization. Weekly reports, interviews, and term paper required. Must be taken pass-fail.
- 4000. Special Projects in Integrated Communications in Advertising (V1-3).** Prerequisite: Consent of instructor. A hands-on experience in developing and presenting an integrated communications campaign for a business problem or opportunity. May be repeated once for credit.
- 4300. Individual Study in Advertising (3).** Prerequisite: Senior standing, 9 hours of advertising courses, and consent of instructor prior to registration. May be repeated once for credit.
- 4304. Advanced Creative Strategy (3:3:0).** Prerequisite: ADV 3361 and consent of instructor. Advanced formulation and techniques of creative strategy with emphasis on copywriting. Includes participation in local, state, regional, and/or national advertising competitions.
- 4312. Advertising Campaigns (3:3:0).** Prerequisites: Completion, with grade of C or higher, of ADV 3310, 3312, 3351, 3361, JOUR 2310, and MCOM 3380. Integration of advertising research, message and media strategies and techniques, with special application to campaign planning and execution. Principles and applications of advertising campaign planning, preparation, and presentation taught in a problem-solving mode. (Writing Intensive)
- 4313. International Advertising (3:3:0).** A study of the practices and procedures of advertising on the international market.

Graduate Courses

- 5326. Advertising and the Consumer (3:3:0).** Survey and analysis of current behavioral science findings as related to advertising.
- 6315. Special Topics in Advertising (3:3:0).** A rotating topics course examining theory, research, economics, ethics, performance and practice of advertising. May be repeated twice when topics vary.
- 7000. Research (V1-12).**

Department of Electronic Media and Communications and Photocommunications

Faculty

L. Todd Chambers, Ph.D., Chairperson

Professor: Harp

Associate Professors: Chambers, Reeves

Assistant Professors: Cummins, Miller, Youngblood

Instructor: Galvez

About the Program

This department supervises degree programs for electronic media and communications as well as photocommunications.

Electronic Media and Communication. Designed to prepare students for survival in the new converged media environment, the Electronic Media and Communication (EM&C) program blends professional courses in broadcasting, digital production, and writing into a broad liberal arts education.

This is not simply a skills-oriented program. Instead, the program is devoted to outfitting students for leadership positions in electronic media industries.

To develop a profound understanding of the historical and cultural dimensions of electronic media, the EM&C core curriculum explores the social, technological, economic, and political contexts of mass communications. Then, in electives, students choose from a menu of courses that emphasize critical thinking, professionalism, management, and writing.

Minor. Students selecting a minor in EM&C are required to pass the college's grammar, spelling, and punctuation exam; pass ENGL 1301 and 1302 with grades of C or higher; and have a 2.75 adjusted GPA prior to enrolling in the first writing course (JOUR 2310). A minor in electronic media and communications consists of a minimum of 21 hours. At least 12 of the 21 hours must be taken in residence. Specific required courses include EM&C 3300, 3308, 3380, 4320; JOUR 2310; one course from EM&C 3370, 4370, 4375; and 3 hours of electives from EM&C courses. Addi-

tional minors are listed in each supervising department and are available in advertising, general mass communications, journalism, photocommunications, and public relations.

Photocommunications Program. The photocommunications program is designed to train students for careers in commercial photography, editorial assignments and photojournalism, digital photography, and digitally based visual media positions.

The program provides training in both conventional film-based and digital photography. Students will study black and white film shooting, processing, and darkroom printing, as well as the use of color films and digital media. Camera formats taught include 35mm, medium format, and large format. Both natural light and studio shooting situations are presented. Digital photography is addressed from both a camera and software aspect.

Minor. Students selecting a minor in photocommunications are required to pass the college's grammar, spelling, and punctuation examination; pass ENGL 1301 and 1302 with grades of C or higher; and have a 2.75 adjusted GPA prior to enrolling in the first writing course (JOUR 2310). A minor in photocommunications consists of a minimum of 21 hours. At least 12 of the 21 hours must be taken in residence. Specific required courses include the following: PHOT 3310, 3316, 3330, 3335, 4300 or 4303; JOUR 2310; and 3 hours from ADV 3310, EM&C 3300, 3308, 3310, and P R 3310.

Electronic Media and Communications Curriculum

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	EM&C 3300	EM&C 3380	EM&C 4320
MATH 2300 or 2345	MCOM 3300	EM&C writing	EM&C elective
ECO 2305 or 2301 and 2302	MCOM 3320 JOUR 2310 EM&C 3308	EM&C elective MCOM elective	EM&C elective

Students majoring in electronic media and communications are required to complete 39 semester hours within the college, including the following courses: MCOM 1300, 3300, 3320; JOUR 2310; EM&C 3300, 3308, 3380, 4320; one course from EM&C 3370, 4370 or 4375; and at least 9 hours from EM&C courses. Also required are ECO 2305 or both ECO 2301 and 2302; and MATH 2300 or 2345.

Photocommunications Curriculum

First Year	Second Year	Third Year	Fourth Year
ECO 2305 or 2301, 2302	PHOT 3310, 3316 MCOM 3300, 3320	PHOT 3330, 3335 JOUR 3312 or 3316	PHOT 4300 or 4303 PHOT 4312
MCOM 1300 MATH 2300 or 2345	JOUR 2310 MCOM elective	or EM&C 3370	

Students majoring in photocommunications are required to complete 39 semester hours within the college, including the following courses: PHOT 3310, 3316, 3330, 3335, 4300, 4303 or 4300 (different area of study), and 4312; JOUR 2310; MCOM 1300, 3300, and 3320; and one course from JOUR 3312 and 3316 or EM&C 3370. Also required are ART 1302 or 1303, ECO 2305 or both ECO 2301 and 2302, and MATH 2300 or 2345.

Electronic Media and Communications (EM&C)

Undergraduate Courses

- 3100. Electronic Media Activities (1:0:3).** Prerequisite: Sophomore standing and consent of instructor. Laboratory in broadcast and multimedia activities; limited to 3 hours for majors and minors, 1 hour for others. Must be taken pass-fail.
- 3300. Electronic Media and Society (3:3:0).** Prerequisite: Sophomore standing. Current and emerging telecommunications technologies, their integration into modern society and impact on information transfer.



- 3308. Visual Communications (3:3:0).** Prerequisite: Sophomore standing. An introduction to photographic techniques and visual design, including message interpretation, evaluation, recent trends, theories of visual perception, and use of images in media.
- 3310. Introduction to Electronic Media and Communications (3:3:0).** Prerequisite: Sophomore standing. Basic instruction in the origin, history, development, regulation, and social responsibilities of broadcasting and cable communications. Examines new technology and telecommunications systems.
- 3315. Principles of Digital Media Production (3:3:1).** Prerequisite: Sophomore standing, EM&C 3300, JOUR 2310. Provides students with the working knowledge required for basic production of digital graphics, video, and audio.
- 3333. Multimedia Development (3:3:0).** Prerequisite: ADV 3310; EM&C 3300, 3315; P R 3310 and JOUR 2310 or consent of instructor; for mass communications majors only. Provides students with the working knowledge required for multimedia production, including exposure to current software, design theory, and CD-ROM production.
- 3335. Video Production and Editing (3:3:1).** Prerequisite: EM&C 3315 or JOUR 3314. Introduction to the single video camera production process and audio, lighting, electronic graphics, and postproduction applications for creating and manipulating moving images for digital distribution.
- 3340. Programming and Promotion for Electronic Media (3:3:0).** Prerequisite: EM&C 3300, MATH 2300 or 2345, JOUR 2310. A comprehensive study of programming and promotion in the electronic media covering audience analysis, plus historical development and current programming practices and promotions.
- 3345. Analyzing Television (3:3:0).** An introduction to scholarly media analysis that examines the economic, technological, cultural, and creative dimensions of American television.
- 3350. News Presentation for Electronic Media (3:2:3).** Prerequisite: EM&C 3335 and JOUR 3350. The theory and practice of news presentation and the responsibilities and opportunities of the news anchor and news reporter.
- 3355. Ethnicity, Race, Gender in Media (3:3:0).** Examines issues surrounding ethnic, racial, and gender differences in media production and content from historical and contemporary perspectives.
- 3370. Writing for Electronic Media (3:3:1).** Prerequisite: EM&C 3300, JOUR 2310. A comprehensive study of the principles, procedures, design, and skill processes in writing informative, persuasive, and news and public affairs copy for electronic media programming. (Writing Intensive)
- 3380. Advertising for Electronic Media (3:3:0).** Prerequisite: ADV 3351 for advertising majors; EM&C 3300, JOUR 2310, MATH 2300, and an adjusted 2.75 GPA for EM&C majors. Study of the electronic media for persuasive promotion of ideas, goods, and services. Emphasis on principles employed in broadcast advertising budgets, sales promotions, and campaigns.
- 3390. Internship in Electronic Media and Communications (3).** Prerequisite: Junior or senior standing, EM&C 3340 or 3380 for sales or promotion, EM&C 3315 for production, 2.75 adjusted GPA, and recommendation of faculty member and internship coordinator. Minimum of 160 hours supervised employment in media or communications organization. Weekly reports, interviews, and term paper.
- 4300. Senior Projects in Electronic Media and Communications (3).** Prerequisite: Senior standing, 9 hours of EM&C courses, and consent of instructor prior to registration. May be repeated once for credit with different emphasis.
- 4315. Advanced Web Production (3:2:3).** Prerequisite: EM&C 3315 or JOUR 3310. Preparation and dissemination of media content to mass and niche audiences. Use advance production tools to personalize and manage Web content.
- 4320. Electronic Media Operations (3:3:0).** Prerequisite: EM&C 3380 and senior standing. An analytical study of the legal, economic, operational, sales, and policy factors of station organization and administration. Case studies and individual projects.
- 4325. Media Economics (3:3:0).** Prerequisite: EM&C 3300 and MATH 2300 or consent of instructor. An analytical study of media economics ranging from the local market to the global marketplace, emphasizing case analyses of both traditional and emerging media industries.
- 4370. Writing for Series Television (3:3:0).** Prerequisite: EM&C 3300 and JOUR 2310 or consent of instructor. A long-form intensive writing course. Provides an introduction to the

basic skills, professional standards, and creative challenges of scriptwriting for series television. (Writing Intensive)

- 4375. Writing for Feature Films (3:3:0).** Prerequisite: EM&C 3300 and JOUR 2310 or consent of instructor. Provides an introduction to the basic skills, professional standards, and creative challenges of scriptwriting for feature films. (Writing Intensive)
- 4380. Features and Documentaries for Electronic Media (3:2:3).** Prerequisite: EM&C 3315 or JOUR 3314 or consent of instructor. Techniques in writing and producing television features, documentaries, and related programming. Emphasis on pre- and post-production activities from research to final video editing.
- 4390. Electronic Media and Communications Practicum (3).** Prerequisite: Junior or senior standing; consent of EM&C chairperson prior to enrolling. A nonpaid supervised study opportunity is provided for the student to observe and analyze the methods, techniques, and creative processes of the media professional. Must be taken pass-fail.

Graduate Courses

- 6315. Special Topics in Electronic Media (3:3:0).** A rotating topics course examining sociopolitical impacts of communications technologies, economics of information industries and theoretical challenges of media convergence. May be repeated twice when topics vary.
- 7000. Research (V1-12).**

Photocommunications (PHOT)

Undergraduate Courses

- 2310. [COMM 1318] Principles of Photography (3:3:0).** Prerequisite: Sophomore standing and at least a 2.0 overall GPA. This course will cover the fundamentals of photography and photo appreciation. Students will need a 35mm SLR camera with manual capabilities. Not for photo majors.
- 3310. Photography I (3:3:0).** Prerequisite: Photocommunications major, sophomore standing. This class will cover the use of a 35mm digital SLR camera with manual capabilities.
- 3316. Photography II (3:3:0).** Prerequisite: PHOT 3310, JOUR 2310, and at least a 2.75 adjusted GPA. Students will learn the use of medium and large format cameras. Studio and location lighting skills will be covered for commercial photography situations.
- 3330. Digital Photography I (3:3:0).** Prerequisite: PHOT 3310 or instructor's consent. Students will learn to use image editing software specially tailored to the needs of photographers. Digital workflow will be discussed. This is a software class.
- 3335. Digital Photography II (3:3:0).** Prerequisite: PHOT 3330. Students will deal with the issues surrounding the production of accurate digital prints. Color management issues and calibration will be covered.
- 3390. Internship in Photocommunications (3:3:0).** Prerequisite: PHOT 3310 and 3316, 2.75 adjusted GPA, and recommendation of faculty member and internship coordinator. Professional work in mass media. Minimum of 160 hours of supervised employment in media or communications organization. Weekly reports, interviews, and term paper required. Must be taken pass-fail.
- 4300. Special Problems in Photography (3).** Prerequisite: PHOT 3316 or consent of instructor. This course is for individual or group study of areas of photography (i.e., documentary, advertising, history) or development of photography projects. May be repeated twice for credit when topics vary.
- 4303. Color Photography (3:2:3).** Prerequisite: PHOT 3316. Study of color negative film, transparencies, printing, filtration, and analysis. Laboratory work includes color printing, negative and transparency film processing.
- 4312. Senior Portfolio (3:1:4).** Prerequisite: Senior standing. Students will create a professional portfolio and promotional materials. The business and legal aspects of photography will be discussed.

Graduate Courses

- 6315. Special Topics in Photographic Media (3:3:0).** A rotating topics course examining the role and future of visual imagery and photography and their impact on society. May be repeated twice when topics vary.
- 7000. Research (V1-12).**

Department of Journalism

Faculty

Randolph Reddick, Ph.D., Chairperson

Professor: Reddick

Associate Professors: Dean, Saathoff, Watts

Assistant Professors: Fontenot

Instructors: Brewton, Edwards, Hensley, Wernsman

About the Program

The journalism program prepares students for meaningful careers in the leading news organizations of our day. Steeped in traditional journalism values, journalism classes emphasize the importance of storytelling, clarity, conciseness, accuracy, and fairness in reporting.

Augmenting journalism education based in valued traditions, the College of Mass Communications journalism faculty and staff work with news organizations in the Southwest to provide students meaningful internships and other career-advancing opportunities.

During the last few semesters of their studies, journalism majors tend to focus on print, broadcast or Web journalism. However, all majors get exposure to the unique attributes of each media environment, and they take at least one class in which they get experience telling stories in all three environments.

Minors. Students selecting a minor in journalism are required to pass the college's grammar, spelling, and punctuation exam; pass ENGL 1301 and 1302 with grades of C or higher; and have a 2.75 adjusted GPA prior to enrolling in the first writing course (JOUR 2310). A minor in journalism consists of a minimum of 21 hours. At least 12 of the 21 hours must be taken in residence. Specific course requirements include JOUR 2300, 2310, 3310, 3312, 3380, 4370, and 3 hours of electives from journalism courses. Additional minors are listed in each supervising department and are available in advertising, electronic media and communications, general mass communications, photocommunications, and public relations.

Journalism Curriculum

News-Editorial Concentration

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	JOUR 2310, 3310	JOUR 3312	JOUR 3390
JOUR 2300	MCOM 3300	JOUR 3380	JOUR 4350
ECO 2305 or 2301 and 2302	MCOM 3320	PHOT 2310	JOUR 4370
MATH 2300 or 2345			JOUR elective

Journalism Major. Students majoring in news-editorial (journalism) are required to complete 39 semester hours within the college, including the following courses: JOUR 2300, 2310, 3310, 3312, 3380, 3390, 4350, 4370, MCOM 1300, 3300, 3320, and PHOT 2310. Also required are ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Broadcast Concentration

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	JOUR 2310, 3310	JOUR 3314	JOUR 4350
JOUR 2300	JOUR 3312	EM&C 3335	JOUR 4370
MATH 2300 or 2345	MCOM 3300	JOUR/EM&C elective	JOUR 4390
ECO 2305 or 2301 and 2302	MCOM 3320		

Broadcast Journalism Concentration. Students in this sequence are enrolled as journalism majors and are required to complete 39 semester hours within the college, including the following courses: JOUR 2300, 2310, 3310, 3312, 3314, 4350, 4370, 4390, EM&C 3335, MCOM 1300, 3300, and 3320. Also required are ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Online Concentration

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	JOUR 2310, 3310	JOUR 3312	JOUR 3390
JOUR 2300	MCOM 3300	EM&C 4315	JOUR 4350
ECO 2305 or 2301 and 2302	MCOM 3320	PHOT 2310	JOUR 4370
MATH 2300 or 2345		JOUR/EM&C elective	

Online Journalism Concentration. Students in this sequence are enrolled as journalism majors and are required to complete 39 semester hours within the college, including the following courses: JOUR 2300, 2310, 3310, 3312, 3390, 4350, 4370, EM&C 4315; MCOM 1300, 3300, 3320, and PHOT 2310. Also required are ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Journalism (JOUR)

Undergraduate Courses

- 2300. [COMM 2302] Principles of Journalism (3:3:0).** An overview of the broad field of journalism for journalism and non-journalism majors. Extensive use of current literature as springboards for discussion of trends, movements, and principles of journalism.
- 2310. [COMM 2311] News Writing (3:2:3).** Prerequisite: Students must have a 2.75 GPA; C or better in ENGL 0301 (if required), 1301, and 1302; sophomore standing; and pass the grammar, spelling, and punctuation exam. Evaluation of news, news gathering methods, and writing. Required lab.
- 3310. News Presentation I (3:2:3).** Prerequisite: JOUR 2300 and 2310. Contemporary design and production of news package delivery, including newspaper, magazine, video and web formats.
- 3312. Reporting (3:2:3).** Prerequisite: JOUR 2310 and a 2.75 adjusted GPA. Discussion and practice in interviewing; reporting; and writing various types of stories, including meetings, conventions, accidents, and other general news stories. (Writing Intensive)
- 3314. Broadcast Journalism (3:2:3).** Prerequisite: JOUR 2310, 3310, and a 2.75 adjusted GPA. The study and practice of writing and editing news for radio and television. Emphasis on the principles, techniques, and forms of broadcast communication. (Writing Intensive)
- 3315. Digital News Packaging (3:2:3).** Prerequisite: JOUR 3314. Single video camera news production process; location shooting; and audio, lighting, electronic graphics, and postproduction applications for creating and manipulating digital video news packages.
- 3316. Magazine Writing (3:3:0).** Prerequisite: JOUR 2310. A study of the scope, influence, and responsibilities of the magazine



as a cultural and social force. Survey of editorial problems; intensive writing practice and emphasis on marketing magazine articles. (Writing Intensive)

- 3317. Publication Design and Graphics (3:2:3).** Prerequisite: ADV 3312, JOUR 3312, or PR 3312. Covers the contemporary design and production of mass media publications, including newsletters, annual reports, pamphlets, newspapers and magazines. Secondary emphasis on desktop publishing technologies.
- 3350. History of American Journalism (3:3:0).** Prerequisite: Sophomore standing. Study of the development of journalism in America from its European roots to the present and its interrelation with society.
- 3380. Editing (3:2:3).** Prerequisite: JOUR 2310, 3310, 3312. Advanced study of purposes and methods of preparing copy for media presentation, including headline writing and editing. Study and practice in print and online publishing.
- 3390. Internship in Journalism (3).** Prerequisite: Junior or senior standing; JOUR 2310, 3310, 3312; 2.75 adjusted GPA; and recommendation of faculty member and internship coordinator. Minimum of 160 hours supervised employment in media or communications organization. Weekly reports, interviews, and term paper required. Must be taken pass-fail.
- 4300. Individual Study in Journalism (3).** Prerequisite: Senior standing, 9 hours of journalism courses, and consent of instructor prior to registration.
- 4330. Public Opinion and Propaganda (3:3:0).** Prerequisite: Junior standing. The nature of public opinion and propaganda; the role of the press in its formation and how the press is influenced by public opinion.

- 4350. Multiplatform News Delivery (3:2:3).** Prerequisite: JOUR 4370 and either JOUR 3380 or EM&C 3335 or 4315. Capstone course on production of news in print, online, and broadcast environments.
- 4370. Advanced Reporting (3:2:3).** Prerequisite: JOUR 2310, 3310, 3312. A course in the interrelation and writing of news on social, political, and economic topics. Emphasis on precision journalism and the use of online computer technologies to acquire and disseminate information, implementation through lab assignments.
- 4390. Journalism Practicum (3).** Prerequisite: Junior or senior standing; JOUR 3314, 3312, 3310; 2.75 adjusted GPA; and recommendation of faculty member and internship coordinator. Minimum of 160 hours supervised employment in media or communications organization. Weekly reports, interviews, and term paper.

Graduate Courses

- 5315. Special Topics in Journalism (3:3:0).** Prerequisite: JOUR 3312 or consent of instructor. A course in the reporting of selected topics. Topics will rotate. Lecture and discussion implemented through off-campus reporting assignments. May be repeated once when topic varies.
- 6315. Special Topics in Journalism (3:3:0).** A rotating topics course examining theory and research into ethical, political and organizational issues affecting news gathering, reporting and journalistic performance. May be repeated twice when topics vary.
- 7000. Research (V1-12).**



Department of Public Relations

Faculty

D. Coy Callison, Ph.D., Chairperson

Professors: Hudson, M. Parkinson

Associate Professor: Callison

Assistant Professors: Gallagher, Seltzer, Wigley, Zhang

Instructor: L. Parkinson, Rodriguez

About the Program

Widely recognized as one of the fastest growing fields worldwide and recently eighth on the Forbes list of “where the jobs are,” public relations has become the most popular program in the College of Mass Communications and has more than 400 undergraduate majors.

Minors. Students selecting a minor in public relations are required to pass the college’s grammar, spelling, and punctuation exam; pass ENGL 1301 and 1302 with grades of C or higher; and have a 2.75 adjusted GPA prior to enrolling in the first writing course (JOUR 2310). A minor in public relations consists of a minimum of 21 hours. At least 12 of the 21 hours must be taken in residence. Specific required courses include JOUR 2310, P R 3310, 3312, 3341, 4312, MCOM 3380, and ADV 3310. Additional minors are listed in each supervising department and are available in advertising, electronic media and communications, general mass communications, journalism, and photocommunications.

Public Relations Curriculum

First Year	Second Year	Third Year	Fourth Year
ECO 2305 or 2301 & 2302	ADV 3310 P R 3310	PR 3312 P R 3341	B A 3302 or PFP 3301
MATH 2300, or 1330 and 1331, or 2345	JOUR 2310 MCOM 3300 MCOM 3320	B A 3301 COMS 3358 MCOM 3380 MCOM elective	P R 4312 MCOM elective MCOM elective
MCOM 1300		MCOM elective	

Students majoring in public relations are required to complete 39 hours within the college, including the following courses: P R 3310, 3312, 3341; MCOM 1300, 3300, 3320, 3380; ADV 3310; and JOUR 2310. Also required are ECO 2305 or both ECO 2301 and 2302; MATH 2300 or MATH 1330 and 1331 or MATH 2345; B A 3301, B A 3302 or PFP 3301; and COMS 2300 or 3358.

Public Relations (P R)

Undergraduate Courses

- 3310. Principles of Public Relations (3:3:0).** Prerequisite: Sophomore standing. A study of the policies and procedures of creating and maintaining goodwill among organizations’ various publics. Examines the many aspects of public relations as a staff and management function.
- 3312. Public Relations Writing (3:3:1).** Prerequisite: P R 3310, JOUR 2310, and an adjusted 2.75 cumulative GPA. An overview of the audience analysis, media analysis, and the logic and language skills needed to construct persuasive messages used in the public relations profession. (Writing Intensive)
- 3341. Public Relations Graphics and Production (3:3:1).** Prerequisite: ADV 3310 and 3312, or P R 3310 and 3312. Design, composition, layout, typography and production applied to public relations; use of computer as a layout and design tool for visual communications.
- 3390. Internship in Public Relations (3).** Prerequisite: Junior or senior standing; JOUR 2310, P R 3310, 3312; 2.75 adjusted GPA; and recommendation of faculty member and internship coordinator. Minimum of 160 hours supervised employment in media or communications organization. Weekly reports, interviews, and term paper required. Must be taken pass-fail.

- 4000. Special Public Relations Project in Integrated Communication (V1-3).** Prerequisite: Consent of instructor. A hands-on experience in developing and presenting a PR campaign for a business problem or opportunity. May be repeated once for credit.
- 4300. Individual Study in Public Relations (3).** Prerequisite: Senior standing, 9 hours of public relations courses, and consent of instructor prior to registration.
- 4308. Public Relations Management (3:3:0).** Prerequisite: MCOM 3380, P R 3341. Case analysis research literature, presentations, special reports, examination of contemporary issues, functions, management, organizational issues, integrated communication problems.
- 4312. Public Relations Campaigns (3:3:0).** Prerequisites: Completion, with grade of C or higher, of P R 3310, 3312, 3341, JOUR 2310, and MCOM 3380. Public relations campaign planning, preparation, and presentation in problem-solving mode. Setting objectives; executing research projects; evaluating creative media promotion; and preparing public relations plans, messages, budgets.

Graduate Courses

- 5340. Foundations of Public Relations (3:3:0).** Public relations history, principles, theory, writing, and critiques of cases and campaigns.
- 5343. Public Relations Problems and Cases (3:3:0).** Use of contemporary public relations problems and cases to study planning, strategy, and tactics, including the organization, execution, and control of the PR function in organizations.
- 6315. Special Topics in Public Relations (3:3:0).** A rotating topics course examining theory, research, and application related to planning, implementation and evaluation in public relations. May be repeated twice when topics vary.
- 7000. Research (V1-12).**



College of Visual and Performing Arts

Jonathan Marks, D.F.A., Interim Dean

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About the College

The College of Visual and Performing Arts offers a diverse array of programs and courses in art, music, theatre, and dance. The college seeks to prepare students who will be leaders in the profession by employing the highest standards in performance, teaching, research, and artistic and creative vision. The college provides students with opportunities to be innovative and confident, to think critically, and to be successful in their chosen field. Courses and degrees emphasize synthesis and connection via academic and creative programs, internships, and service learning. The college contributes cultural enrichment and an understanding of the arts locally, regionally, nationally, and internationally.

Undergraduate Program

Core Curriculum Requirements. The Core Curriculum requirements ensure breadth in each academic program. These requirements have been incorporated into the college's various degree programs. Students should consult the Undergraduate Academics section of this catalog for a listing of courses that satisfy the requirements in each category.

Major, Minor, and Electives. In addition to Core Curriculum requirements, students must take major, minor, and elective courses sufficient to total 120-138 semester hours. The minor (if applicable) may be any departmental minor from outside the major, an established interdisciplinary minor, or a student-initiated interdisciplinary or multidisciplinary minor (with approval of the appropriate associate dean of the college). Many departments and programs have residency requirements for the major and minor. See departmental or program listings for specific information.

Students should have selected their major and minor (if applicable) fields by the time they reach their junior year. For the major subject they will be required to complete a minimum of 36 semester hours including 6 hours of intensive writing courses. As indicated in the degree programs on the following pages, some majors require more than the 36-hour minimum. At least 18-24 hours of the major subject must be in courses at the junior-senior level. For the minor, a minimum of 18 semester hours must be completed

(except in foreign languages—explained under the department), at least 6 of which must be junior or senior level courses. All courses in the major and minor must be approved by the appropriate academic unit. A minimum of 40 semester hours of junior and senior work must be presented in the total degree. Information regarding graduate programs offered by the college is available within the individual departments. Students should consult an advisor for specific requirements of their degree programs.

Course Load. A normal course load is 15-19 hours per long semester. A student must be enrolled for a minimum of 12 hours to be considered full time. In calculating the course load, the dean will consider all active correspondence courses as a part of the course load. Course loads in excess of 19 semester hours require approval by an associate dean in the college. The maximum course load for a student on probation is 16 hours. The normal course load for a single summer term is 6-8 hours.

To meet graduation requirements, a graduating senior may petition to take 9 hours one summer term or a total of 15 hours across both summer terms.

Admission. Students seeking admission to a specific school or department within the college should consult "Admission Requirements for Specific Colleges" in the Undergraduate Admissions section of this catalog.

Admission of Transfer Students. Students requesting permission to transfer from another academic institution must meet the university-wide admission requirements. Students requesting permission to transfer from another college at Texas Tech must have an adjusted cumulative GPA of at least 2.0. Any student requesting to transfer into the College of Visual and Performing Arts must provide the CVPA Student Division Office (AD 218) with official transcripts of all academic work, both high school and college, and must meet any admission requirements of the units in the college as stated in the paragraph above. The CVPA Student Division Office grants final approval. The College of Visual and Performing Arts will determine the applicability of any transferred credit to academic programs in the college. All transfer students will enter under the catalog in force at the time of transfer. The last 30 hours prior to graduation must be completed while enrolled in the college.

Correspondence Courses. A Texas Tech resident student may apply coursework completed at a distance through Distance Education toward a bachelor's degree with prior approval of the academic dean (218 Administration Building). A student who has failed a course taken in residence may take that course or a degree plan alternative through the Division of Outreach and Distance Education with prior approval of the academic dean.

Catalog Selection. Students must use the catalog issued for the year in which they were first officially admitted to the college, or a more recent catalog if approved. However, if they are not enrolled at Texas Tech for one academic year or transfer to another institution or another college at Texas Tech, they must be readmitted to the College of Visual and Performing Arts and use the catalog in effect at the time of readmission. For graduation purposes, a catalog expires after seven years at which time the current catalog becomes the catalog in effect.

Credit by Examination. A matriculated student may attempt credit by examination (described in the Admissions section of this catalog) by obtaining written approval from the dean's office. Approval is required to take an examination if more advanced material in the same subject has already been completed.

Grading Practices. The college conforms to university grading practices as set forth in the Undergraduate Academics section of this catalog. Credit for a course in which a grade of D is earned may not be applied toward fulfillment of the major (sometimes including adjunct requirements), minor, or teaching field requirements for any degree program. Except for those courses designated “may be repeated for credit” in this catalog, no course may be used more than once on a degree plan unless it has been approved by the dean in the college.

Second Bachelor’s Degree. Permission to enroll in courses to pursue a second bachelor’s degree must be obtained from the office of the dean in the college. No second bachelor’s degree is conferred until the candidate has completed at least 24 semester hours in residence in addition to the courses counted toward the first bachelor’s degree. Out-of-state students must meet Texas Tech Core Curriculum requirements. Credit by examination and correspondence courses will not satisfy the 24-hour residence requirement.

Freshman Year. Entering freshmen develop their programs in conference with an academic advisor. The students report to their advisors for such individual conferences or group meetings as are needed for the purpose of orienting themselves to academic regulations and procedures, curricula, and degree requirements in their various areas of interest.

Final 30 Credit Hours. The final 30 credit hours of a degree program must be completed with Texas Tech enrollments. A maximum of 6 of these credit hours may be taken by Texas Tech correspondence. Credit for courses taken without prior approval may not be applied to degree program requirements.

Degree Plan and Intention to Graduate. Students are encouraged to file degree plans with the dean as soon as their academic goals are clearly defined. Students must file degree plans after completing 60 to 70 hours of coursework and no later than one year prior to the intended semester of graduation. The Intention to Graduate form must be submitted no later than one year before the proposed date of graduation.

Teacher Education. Prospective teachers should refer to the College of Education section of this catalog and the chair or undergraduate advisor of the school or department in which they wish to major within the College of Visual and Performing Arts.

Undergraduate Degrees

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; arts; mathematics; and social, behavioral, and natural sciences. It also provides the factual basis and the insights requisite for specialized study and professional work in these fields.

General Requirements. See “Undergraduate Credit by Examination” in the Admissions section of this catalog for information on credit provided by test scores to meet these requirements. Students must take the specified number of hours in the areas listed below. With a few exceptions, courses from the major and minor may be used to satisfy these requirements. Except for the multicultural requirement, a course may not be counted in two different areas of the general requirements nor may a course be counted in requirements for both the major and minor.

Semester Hours

English	6-12
At least 6 hours of English must consist of ENGL 1301 and 1302. Literature courses (which excludes ENGL 2311, 2371, 3365, 3366, 3367, 3368, 3371, 3372, 3373, 4300, 4360, 4365, 4366, 4367, 4373, and 4378 as they are not literature courses) are used to fulfill the additional 6 hours. However, ENGL 2311 or CLAS 1310 may be used as equivalents to fulfill 3 hours of this requirement.	
Oral Communication	3
COMS 1300, 2300 or 3358, CFAS 2300, CH E 2306, MGT 3373, PETR 3308.	

Foreign Language

A student must complete 6 hours at the sophomore level or above in a single language. If 4 or more semesters of high school foreign language are accepted for admission, the student should consult the information preceding the course listing for the foreign language department. A student enrolling in the first-year sequence will have a requirement of 11-16 hours. A student who enrolls in the second-year sequence will have a 6-hour requirement. International students whose native language is not English and who graduated from a secondary school in their native country may satisfy this requirement by bringing their certificate of graduation to the Student Division of the dean’s office. Credit by examination through the language laboratory is available for the following languages: French, German, Latin, and Spanish. Students who petition to complete the foreign language requirement via study abroad through a non-Texas Tech affiliated program will agree to have foreign language credit applied to their degrees based on scores on a language placement test administered by the language laboratory upon their return from the study abroad. Approval to do this must be granted in advance by the associate dean. For more information, consult the Department of Classical and Modern Languages and Literatures.

Mathematics and Logical Reasoning

Only one of MATH 1300, 1320, or 1420 may apply. Only one of MATH 1330 or 1430 may apply. All other mathematics courses 1320 and above (except 3430) may be used. MUTH 3303, PHIL 2310 or 4310, PSY 3400, or SOC 3391 may be used to satisfy 3 hours of this requirement.

Natural Science

If 4 or more high school semesters of natural laboratory science (not including general, physical, or applied science) are accepted for admission, the requirement is 8 hours; if not, the requirement is 11 hours. The first 8 hours of a student’s requirement must come from the natural science laboratory courses listed in the Core Curriculum. Additional required credit hours may come from those courses or from ANTH 3310, 3311, 4341, or HONS 3302.

Technology and Applied Science

Courses must be selected from the list of Core Curriculum options.

Individual or Group Behavior

Three hours must come from courses in individual or group behavior approved for Core Curriculum requirements. An additional 3 hours may come from the same list or from anthropology, economics, geography, political science, psychology, sociology, and social work but excluding courses cited as options for any other requirement.

U.S. History

Students normally enroll in HIST 2300 and 2301, although any U.S. history courses will satisfy the requirement.

Political Science

Students will enroll in POLS 1301 and normally in 2302. See the catalog section for the Department of Political Science within the College of Arts and Sciences. One course must be taken from a Texas college or university.

Humanities

Courses must be selected from the list of Core Curriculum Requirements.

Visual and Performing Arts

Satisfied in the majors

Multicultural Requirement

Three hours of coursework chosen from the Core Curriculum requirements approved list. This course also may be used to satisfy another general degree requirement listed above.

Personal Fitness and Wellness

If elected, hours may come from any two PF&W courses. For a specific physical activity, the completion of the course sequence is allowed if the sequence is taken in the appropriate order (i.e., beginning then advanced).

Total for Degree

In addition to the above requirements, students must take major, minor, and elective courses sufficient to total a minimum of 120 semester hours.

Major, Minor, and Electives. Students should have selected their major and minor fields by the time they reach their junior year. For

the major subject they will be required to complete a minimum of 36 semester hours, including 6 hours of intensive writing courses. As indicated in the degree programs on the following pages, some majors require more than the 36-hour minimum. At least 18-24 hours of the major subject must be in courses at the junior-senior level. For the minor, a minimum of 18 semester hours must be completed (except in certain foreign languages as explained in the curriculum for languages), at least 6 of which must be of junior or senior level.

The minor may be any departmental minor, an established interdisciplinary minor, or a student-initiated interdisciplinary minor (with approval of the associate dean in the Student Division of the College of Visual and Performing Arts).

Many departments and programs have residency requirements for the major and minor. See departmental or program listings for specific information. Courses used to fulfill the writing-intensive requirement should be taken in residence.

All courses in the major and minor must be approved by the appropriate academic unit. Students are expected to develop a degree plan no later than the first semester of the junior year. Forms and information are available in department offices. A minimum of 40 semester hours of junior and senior work are required to graduate.

Bachelor of General Studies

The Bachelor of General Studies (B.G.S.) is a unique program for students who wish to study multiple fields in equivalent depth. As an interdisciplinary liberal arts degree, it requires similar but slightly different general requirements as the Bachelor of Arts degree. Instead of a major and minor, the student selects three concentration areas, each of which meets the minimum requirements of an existing departmental or interdisciplinary minor. Together, the three concentration areas (minor fields) formulate a coherent specialization of interest to the student that is unavailable elsewhere in the university as an organized program of study. The student chooses the three concentrations in consultation with the College of Visual and Performing Arts academic advisor and, as necessary, the departmental or program advisors overseeing the minor areas. At least two of the three concentration areas must reside in the College of Visual and Performing Arts. Each concentration area consists of a minimum of 18 hours in the chosen discipline, for a total of 54 hours minimum across the three areas. Through these self-selected concentration areas combined with forming an integrated specialization and receiving a liberal arts foundation, the B.G.S. degree can prepare a student to pursue an intellectual and/or artistic interest, a career goal, or further study at the graduate or professional level.

Declaration of Major. Students declare the general studies major in the College of Visual and Performing Arts just as they do any major. A visit with the academic advisor (806.742.0700) is the best place to start, followed by visits to program advisors representing the three intended concentration areas.

Graduation Requirements. Requirements for the B.G.S. degree in the College of Visual and Performing Arts are as follows:

- 120 credit hours minimum.
- Minimum total of 40 junior/senior hours.
- Three concentration areas to total at least 54 hours, each comprising an existing departmental or interdisciplinary minor of at least 18 hours each; minimum 6 jr./sr. hours in each concentration; courses may be credited in only one concentration area; at least two of the concentration areas must come from the College of Visual and Performing Arts.
- Optional research project as independent studies within concentration area(s).
- Specified general degree requirements as shown.

	<i>Semester Hours</i>
English	6-12
Oral Communication	3
Political Science	6
U.S. History	6
Mathematics and Logical Reasoning	6
Natural Laboratory Science	8-11
Technology and Applied Science	3
Individual or Group Behavior	3-6
Humanities	3-6
Visual/Performing Arts	satisfied in concentrations
Personal Fitness and Wellness	0-2
Foreign Language	6-16
Multicultural Studies	3

Bachelor of Fine Arts

The curriculum leading to the Bachelor of Fine Arts (B.F.A.) degree provides highly professional programs in theatre arts, visual studies, communication design, and studio art. A minor is not required for this degree program. If an optional minor is elected, a course may not be credited in the requirements for both the major and minor.

	<i>Semester Hours</i>
English	6
Required Political Science, History	12
Oral Communication	3
Mathematics and Logical Reasoning	6
Natural (Laboratory) Science	8
Technology*	3
Individual or Group Behavior**	3
Humanities	3
Foreign Language	0-10
Entering students are expected to have had four semesters credit of a single foreign language in high school. Students who do not meet this requirement will be required to complete one year (or the equivalent) of a single foreign language taken at the college level. For more detailed information, refer to the "Foreign Language Requirement" listing in the Undergraduate Academics section of this catalog.	
Multicultural Requirement*	3
Three hours of coursework chosen from the Core Curriculum requirements approved list. This course may be used to satisfy another General Degree requirement. Consult the School of Art or the Department of Theatre and Dance.	
Professional Program (Select One)	
• Theatre Arts	86-89
• Visual Studies	76
(leading toward teacher certification)	
• Communication Design	82
• Studio Art	82
Professional Education	21
(teacher certification only)	
Total for Degree	120-138

* No additional hours required if satisfied within the requirements for the art and theatre majors.

** No additional hours required if ART 3311 or 4315 is included in upper-level art history requirements for art majors.

Bachelor of Music

Bachelor of Music degrees are offered with majors in music performance (MUPF), music composition (MUCP), music theory (MUTH), and music (MUTC-leading to teacher certification). A minor is not required for this degree program. If an optional minor is elected, a course may not be credited in the requirements for both the major and minor.

	<i>Semester Hours</i>
English	6
Oral Communication	3
Mathematics and Logical Reasoning	6
Six hours math or 3 hours math plus MUTH 3303	
Foreign Language	0-16

Entering students are expected to have had four semesters credit of a single foreign language in high school. Students who do not meet this requirement will be required to complete one year (or the equivalent) of a single foreign language taken at the college level. For more detailed information, refer to the "Foreign Language Requirement" listing in the Undergraduate Academics section of this catalog.

Humanities	3
Natural (Laboratory) Science	8
Technology and Applied Science	3
Required Political Science and History	12
Individual or Group Behavior	3
Multicultural Requirement*	3
Three hours of coursework chosen from the Core Curriculum requirements approved list. This course may be used to satisfy another General Degree requirement.	
Music Courses for Major (Select One)	
MUPF	85-92
MUCP	96
MUTH	87
MUTC	75-76
Professional Education	21
(teacher certification only)	
Total for Degrees	
MUPF	126-135
MUCP	137
MUTH	134
MUTC	137-138

* No additional hours required if satisfied within the requirements for music majors.

'3+3' Early Admission Joint Program With Texas Tech School of Law

Honors students in good standing who are working toward the B.A., B.S., B.F.A., B.M., or B.G.S. degree in the College of Visual and Performing Arts, the College of Arts and Sciences, or the Honors College may gain early admission to the Texas Tech University School of Law by completing coursework totaling a minimum of 100 semester hours in their undergraduate college and then completing the first year of coursework at the Texas Tech School of Law. To be eligible to participate in this program, students must meet all of the following criteria:

- Have an undergraduate GPA of at least 3.5.
- Have an LSAT score that places them in the top half nationwide.
- Have a SAT score of at least 1300 or an ACT score of at least 29.
- Be enrolled in the Honors College and making satisfactory progress toward a Visual and Performing Arts, Arts and Sciences, or Honors College degree (B.A., B.S., B.F.A., B.M., or B.G.S.) consistent with the regulations established by the colleges.
- Submit an Honors certification form to the Honors College at the time of application to the Law School.

Of the minimum 100 semester hours of undergraduate work, at least the last 30 must be completed in residence at Texas Tech. This minimum will apply to transfer students from other higher education institutions, provided they have satisfactorily completed the work outlined in the freshman and sophomore years or its equivalent.

Graduate Program / Visual and Performing Arts

Admission to graduate programs in the College of Visual and Performing Arts is a two-step process with requirements established by both the Graduate School and the school or department in which the student plans to study. The student should note carefully any particular requirements for admission established by the school or department in which he or she plans to major and contact the graduate advisor of the unit for more detailed information.

Ph.D. in Fine Arts

A multidisciplinary doctoral program leading to the Ph.D. degree in Fine Arts is offered by the faculties in the College of Visual and Performing Arts. The general aim of this program is to develop leadership in the fine arts. Accordingly, the curriculum involves a multidisciplinary approach to make candidates aware of the full scope and educational interrelatedness of the arts.

The program requires a minimum of 48 semester hours of graduate course work beyond the master's degree—33 in the major area and 15 in a multidisciplinary core of art, music, philosophy, and theatre arts. In addition, the program requires at least 12 hours enrollment in dissertation.

Work in the major area ordinarily involves required coursework along with an individualized curriculum that allows the candidate to pursue a professional goal relating to personal interests and competencies.

Each candidate will write a formal dissertation, ordinarily in the major area; however, students with appropriate backgrounds may be permitted to do interdisciplinary dissertations. The nature of the dissertation project may vary among three plans: traditional or interdisciplinary research, research devoted to solving a professional problem, or research based on an internship experience. Regardless of the project chosen, however, the

research will culminate in a formal document submitted to the dean of the Graduate School.

In addition to meeting the Graduate School's minimal requirements for admission, applicants must also be approved by their major departments and by the Visual and Performing Arts Graduate Committee. All applicants for the program must have completed a master's degree or its equivalent with emphasis in some area of the arts.

Core Courses

ART 5310	Historical and Critical Perspectives in the Visual Arts (3:3:0)
ART 5314	Visual Arts in Contemporary Context (3:3:0)
MUSI 5310	Historical, Critical Perspectives in Music (3:3:0)
MUSI 5314	Music in Contemporary Context (3:3:0)
PHIL 5310	History of Aesthetics (3:3:0)
PHIL 5314	Contemporary Aesthetics (3:3:0)
TH A 5310	Historical and Critical Perspectives in Theatre Arts (3:3:0)
TH A 5314	Theatre Arts in Contemporary Context (3:3:0)

Fine Arts Management

The associate dean of the college counsels a focus in Fine Arts Management within the Master of Arts degree program in Interdisciplinary Studies. This flexible option allows students to develop management leadership for fine arts institutions and governmental agencies. Courses are available in business administration and public administration, as well as in the arts. For a description of this program, see "Interdisciplinary Studies" within the Graduate School section of this catalog or contact the Associate Dean for Graduate Studies in the College of Visual and Performing Arts.

lent. (Note that the Honors College residency requirement generally calls for a minimum of three long semesters of work at Texas Tech for Honors graduation.)

The minimum 100 hours of work must satisfy all graduation requirements for the B.A., B.S., B.F.A., B.M. or B.G.S. degree in the home college at Texas Tech, with the exception of requirements in the minor (for students in the Honors College or the College of Visual and Performing Arts who do not have a minor, the hours will be applied toward elective credit). Students must also complete the minimum requirements for an Honors College designation as outlined in the *Honors Student Handbook*.

To earn the baccalaureate degree, the applicant for a degree under this plan must submit an official transcript from the Texas Tech School of Law after completion of the first year of law school. Evidence of successful completion of the first year of law school coursework (totaling 29 hours) will substitute for the 18 hours required for the minor and any electives needed (totaling up to 11 hours) for the baccalaureate degree.

For students in the College of Arts and Sciences, the total number of credit hours from outside the college (including those transferred as non-Arts and Sciences credit) and the credit hours from the School of Law applied to the baccalaureate degree cannot exceed 30. For students with a major in the Honors College or the College of Visual and Performing Arts, the 30-hour limit applies to courses from outside the student's major degree program that do not satisfy a Texas Tech Core Curriculum requirement.

Any student selecting the "3+3" Early Admission Program option should plan carefully in consultation with an Assistant or Associate Dean of the Honors College and the home college at least one year prior to beginning professional school. Also, due to the unique nature of the law school application process, students are strongly encouraged to meet with the Assistant Dean for Admissions at the School of Law at least two years prior to the desired start date for law school. Students must apply for the "3+3" program during the fall semester of their third year and must take the LSAT by December of that year. The Admissions Committee applies the same standards and procedures to both "3+3" applicants and traditional admission applicants.

Students wishing to pursue the "3+3" program must file a degree plan with an appropriate major and a law minor at least one semester prior to beginning their law school coursework.

Further information may be found at www.prelaw.ttu.edu, www.honr.ttu.edu, and www.law.ttu.edu/lawWeb/prospective/specialprograms/3plus3Program.shtm.

Visual and Performing Arts (VPA)

(To interpret course descriptions, see page 8.)

Undergraduate Course

3301. Critical Issues in Arts and Culture (3:3:0). Analysis of music, visual arts, theatre and dance as fundamental to contemporary society and relationship of arts to broader social context.

Graduate Course

5300. Topics in the Visual and Performing Arts (3:3:0). Prerequisite: Consent of instructor. Focused study of topics relevant to the arts, including, but not limited to, history, theory, and current issues such as arts management, interdisciplinary investigation, or cultural/sociological constructs. May be repeated for credit with different topic.

School of Art

Faculty

Christina (Tina) Fuentes, M.F.A., Interim Director

Professors: Dingus, Fuentes, Glover, Morrow, Tate, Waters, Wink
Associate Professors: W. Cannings, Check, Fehr, Flueckiger,

Germany, Granados, Martin, Slagle, Steele, Tedeschi
Assistant Professors: Akins-Tillet, Chua, Cortez, Elko, Elliott, D. Fowler, Lindsay, Tierney, VenHuizen, Yoo

Adjunct Faculty: S. Cannings, C. Fowler, Hartsfield, Milosevich, B. Wheeler, J. Wheeler

About the Program

This school supervises the following degree programs:

- Bachelor of Fine Arts in Visual Studies (leading to teacher certification)
- Bachelor of Fine Arts in Communication Design
- Bachelor of Fine Arts in Studio Art
- Bachelor of Arts in Art History
- Master of Art Education
- Master of Fine Arts in Art
- Doctor of Philosophy in Fine Arts with a major in Art

The school's degree programs are accredited by the National Association of Schools of Art and Design.

Undergraduate Program

Mission Statement. The School of Art is committed to providing a stimulating and challenging environment that will develop creative and scholarly potential in students, support faculty members in the pursuit of excellence in teaching and research, serve public and professional constituencies, and promote intercultural understandings through art.

Degree programs engage students in art through an examination of contemporary, historical, and cross-cultural issues, ideas, and actions in relation to multiple, diverse, and global visual cultures. The School of Art emphasizes exhibition opportunities, contemporary technologies, critical discourse, and interdisciplinary opportunities. The school offers students the opportunity to minor in art history, studio art, or fine art photography. Nonmajors who desire experience in the visual arts as part of their liberal education will find a varied selection of course offerings.

Transfer Students. The freshman and sophomore art curriculum is consistent with the art curriculum for higher education approved by the Coordinating Board. The School of Art at Texas Tech therefore respects the standard art core curriculum with regard to transfer credit. In some cases, a portfolio of previous work in art and a transcript of completed courses may be necessary for the purposes of advising and placement in the degree program.

Art Foundations. All students majoring in art are required to take 22 hours of Art Foundations courses in the areas of studio art and art history. These courses consist of the following: ART 1100, Introduction to Art; ART 1303, Drawing I: Introduction; ART 2304, Drawing II: Introduction; ART 1302, Design I: Introduction; ART 2303, Design II: Introduction; ART 1310, Art History Survey I; ART 2311, Art History Survey II; and ART 3312, Art History Survey III.

Advanced Placement. Entering art majors may be considered for advanced placement in the Art Foundations program through the College Board Advanced Placement Program (AP), International Baccalaureate (IB), or the School of Art Foundations Portfolio Review. Art majors who score a 4 or 5 on the College Board Exams in drawing portfolio, two-dimensional design portfolio, or three-dimensional design portfolio will receive credit for Drawing I, and/or Design I, and/or Design II (3-dimensional design) (ART 1302, 1303, 2303). Students also may be considered for advanced

placement by presenting a portfolio of artwork to the School of Art Foundations Portfolio Review Committee to determine if the portfolio merits course credit for Drawing I, Design I, and/or Design II. The Foundations Portfolio exam is a service provided to students who declare a major in art. It is not intended for students minoring in art or seeking to fulfill a fine arts general education requirement. Students who are awarded advanced placement through the College Board Advanced Placement Program (AP) or the School of Art Foundations Portfolio exam may earn 6 hours of college credit. Entering art majors who receive a 4 or 5 on the College Board Advanced Placement Program in art history will be exempt from taking ART 1310 and 2311. Majors who receive AP art history credit must take three upper-level art history courses.

Individualized Programs. Through a unified foundations program, the School of Art prepares students to develop increasingly specialized and diverse courses of study. No grade below C is accepted for transfer credit in majors, minors, or specializations. Most upper-level art courses are repeatable for credit and allow for individualized instruction.

Studio Art Centers International (SACI). Texas Tech University's association with SACI offers students the opportunity to study studio art, art history, and the Italian language in the heart of Florence, Italy. Year-long or summer study opportunities take full advantage of the rich past of Florence, its artistic resources, cultural offerings, and SACI's premier art facility and faculty. SACI is an accredited institutional member of the National Association of Schools of Art and Design.

School Residency Requirements. Students working toward a B.F.A. degree in visual studies, communication design, or studio art must complete a minimum of 30 hours of art in residence, 24 of which must be upper-division courses. Students working toward a B.A. degree in art history must complete at least 12 hours of upper-division art history courses in residence. At least 6 hours of upper-division art courses must be taken in residence for all minors in this school.

Correspondence Courses. Major or minor courses may not be taken by correspondence.

Writing Intensive Requirement. Six hours of the major must be in writing intensive courses. Students may satisfy this requirement by completing art history courses numbered 3000 or above (except 3312) and designated studio and/or design courses.

Technology and Applied Science Requirement. Students pursuing the B.F.A. in studio may satisfy this requirement by completing four courses from the following list: ART 3300, 3301, 3308, 3325, 3326, 3328, 3329, 3330, 3331, 3333, 3334, 3336, 3337, 3338, 3339, 4326, 4328, 4329, 4330, 4334, and 4338. Students pursuing the B.F.A. in visual studies may satisfy this requirement by completing ART 3362. Students pursuing the B.F.A. in communication design may satisfy this requirement by completing four courses in the major with the exception of ART 4359.

Art Minors. Students working toward any minor in art must complete a minimum of 18-21 semester hours, which must include 6 hours of junior and senior level courses. Hours applied to the minor area of study may not include courses used to fulfill requirements in the student's major. These courses, however, may make the student eligible immediately for upper-division courses throughout the 18-21 hours of the art minor. The area of communication design does not offer a minor.

Art History Minor. Students working toward an art history minor must complete a minimum of 18 hours and include ART 1310, 2311, and 3312. The remaining 9 hours must be chosen from a menu of courses offered at the 3000 and 4000 level. These courses are ART 3310, 3311, 3313, 3314, 3315, 3316, 3317, 3319, 4310, 4312, 4313, 4314, 4315, and 4318. Students minoring in art history are required to take at least two upper-level courses in art history in residence.

Studio Art Minor. Students working toward a minor in studio art must complete a minimum of 18 hours of coursework in the School of

Art. Hours applied to the minor area of study may not include courses used to fulfill requirements in the student's major. A 2-D studio art minor consists of ART 1302, 1303, 2304, and 9 hours in either drawing, painting, or printmaking. A 3-D studio art minor consists of ART 1303, 2303, 2304, and 9 hours in either ceramics, jewelry design and metalsmithing, or sculpture. For both the 2-D and 3-D studio art minors the remaining 9 hours will be determined by the School of Art academic advisor. Six of the 18 required hours must be taken at the junior or senior level in residency.

Fine Art Photography Minor. Students working toward a minor in photography must complete a minimum of 21 hours. The following courses are to be taken in sequence: ART 1302, 1303, 3325, 3329, 3319 (or ART 1309), 3326 (may be repeated). All advanced hours must be taken in residence.

Undergraduate Degrees

Bachelor of Fine Arts

Visual Studies Major

The Bachelor of Fine Arts in Visual Studies (leading toward art teacher certification) prepares graduates for the realities facing teachers today. The program emphasizes contemporary theories and social issues in art and education, including race, class, and gender inequalities, intercultural concerns, community activism, critical awareness, antibias methods, and alternative resources. Grounded in social theories, the coursework emphasizes visual cultures and contemporary art. Prior to student teaching, students participate in field practica in public schools and community settings, as well as with alternative populations such as children from low socioeconomic environs and incarcerated youth, children, and adults with differing abilities.

The B.F.A. degree with a visual studies major requires 76 semester hours of studio art and art history, 36-42 semester hours of professional education, and 38-51 semester hours of general requirements as stipulated by the College of Visual and Performing Arts. The minimum number of hours required for the visual studies major (leading to teacher certification) is a total of 134 credit hours. A minimum of 40 credit hours of junior and senior level courses are required for graduation.

Semester Hours

English	6
Oral Communication	3
COMS 1300, 2300, or 3358, CFAS 2300	
Mathematics and Logical Reasoning	6
Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply. All other mathematics courses 1320 and above (except 3430) may be used. PHIL 2310 or 4310 may be used to satisfy 3 hours of this requirement.	
Natural (Laboratory) Science*	8
Technology	0
ART 3362 satisfies this requirement.	
U.S. History (HIST 2300 and 2301)	6
Students normally will enroll in HIST 2300 and 2301, although any American history course will satisfy this requirement. CLEP allowed.	
Political Science (POLS 1301 and 2302)	6
CLEP allowed.	
Humanities	3
Foreign Language	0-10
Entering students are expected to have had four semesters credit of a single foreign language in high school. Students who do not meet this requirement will be required to complete one year (or the equivalent) of a single foreign language taken at the college level. For more detailed information, refer to the "Foreign Language Requirement" listing in the Undergraduate Academics section of this catalog.	
Multicultural Requirement	0
ART 1310, 2311, 3310, 3311, 3315, 3317, 3318, and 4315 satisfy this requirement.	
Individual or Group Behavior	0-3
ART 3311 or 4315 may be used to fulfill this requirement.	

Professional Education Requirement

All-Level Certification

EDSE 4310 3
 EDSE 4322 3
 EDLL 4382 3
 ART 4362 3
 ART 4365 3
 ART 4001 3
 ART 4000 3

Art Courses

Studio Foundations 13
 ART 1100, 1302, 1303, 2303, 2304
Art History Foundations 9
 ART 1310, 2311, 3312
Visual Studies Core 15
 ART 3360, 3362, 3364, 3365, 4361
2-Dimensional Studio Art 9
 Choice of three ART 3323, life drawing; ART 3321, painting;
 ART 3308, printmaking; or ART 3325, photography
3-Dimensional Studio Art 9
 Choice of three ART 3300 or 3301, ceramics; ART 3333, metals;
 and ART 3336 or 3337, sculpture
Art Electives* 3
 3 semester credit hours of 3000 level or above
Studio Area of Emphasis* 12
 12 semester credit hours of 3000/4000 level courses
Upper-Level Art History* 6
 If either ART 3311 or 4315 is not included in upper-level art history requirements, an additional 3 hours of Individual and Group Behavior must be included under Core Curriculum requirements.

* Consult with undergraduate faculty advisor.

Bachelor of Fine Arts

Communication Design Major

The Bachelor of Fine Arts in Communication Design addresses problem-seeking and problem-solving skills. Importance is placed upon conceptual development and the integration of form and information for the purpose of effective visual communication including current technological advances.

In addition, emphasis is placed on civic responsibility and the role of the graphic designer in the community. A curriculum that is responsive in this way will inevitably empower and foster critical thinking. Students hone not only their artistic and professional skills, but also their understanding of the fundamental issues of today's society and what they, as professional artists, can do in service to others.

The communication design curriculum consists of 82 semester hours of art and art history courses and 38-51 semester hours of general requirements as stipulated by the College of Visual and Performing Arts. The minimum number of hours required for majors in communication design is 120 with a minimum of 40 upper-level credit hours required for graduation.

Admission to Major. Admission to the communication design program is a two-step process: (1) apply to Texas Tech University and (2) apply to the communication design program for acceptance. Admission to Texas Tech University does not guarantee admission to the communication design program.

Majors are selected each year in the spring semester by a selective portfolio review and interview process. Students prepare for the review by enrolling in ART 2388 (Design Process) in the spring of their freshman year. Prerequisites for this course include ART 1303 and 1302. To register for ART 2388, students must be enrolled concurrently in ART 2304 and 2303, if not taken previously. The student presents the work produced in Design Process to the communication design faculty in mid-April.

The communication design area is a limited access program and the process is highly competitive. If a student is not accepted, he or she has the option to reapply the following spring. The program can be completed in four years unless a student is not accepted and opts to reapply, thereby increasing the matriculation time by one year.

The curriculum is based on a series of carefully sequenced classes that must be taken in order. Some courses are offered only in the

fall while others are offered only in the spring. If a sequenced course is missed, the student will not be allowed to progress in the emphasis area until that course is taken and completed.

Preportfolio Review. Once accepted, one additional portfolio review occurs prior to enrollment in ART 4382 (Portfolio Development). Students are required to present their work once again to the communications design faculty. Students must successfully pass the review before being granted entrance into the final portfolio class. If a student does not pass the review, prescription courses will be assigned before enrollment is granted.

Semester Hours

English 6
Mathematics and Logical Reasoning 6
 Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply. All other mathematics courses 1320 and above (except 3430) may be used. PHIL 2310 or 4310 may be used to satisfy 3 hours of this requirement.
Oral Communication 3
 COMS 1300, 2300, or 3358, CFAS 2300
U.S. History (HIST 2300 and 2301) 6
 Students normally will enroll in HIST 2300 and 2301, although any U.S. history course will satisfy this requirement. CLEP allowed.
Political Science (POLS 1301 and 2302) 6
 CLEP allowed.
Natural (Laboratory) Science 8
Technology 0
 Courses in major will satisfy this requirement.
Humanities 3
Foreign Language 0-10
 Entering students are expected to have had four semesters credit of a single foreign language in high school. Students who do not meet this requirement will be required to complete one year (or the equivalent) of a single foreign language taken at the college level. For more detailed information, refer to the "Foreign Language Requirement" listing in the Undergraduate Academics section of this catalog.
Multicultural Requirement 0
 ART 1310, 2311, 3310, 3311, 3315, 3317, 3318, and 4315 satisfy this requirement.
Individual or Group Behavior 0-3
 ART 3311 or 4315 may be used to fulfill this requirement.
Art Courses
Studio Foundations 13
 ART 1100, 1302, 1303, 2303, 2304
Art History Foundations 9
 ART 1310, 2311, 3312
Upper-level Art History 3
Communication Design Emphasis & Electives 45
Studio Art Electives 12

Bachelor of Fine Arts

Studio Art Major

The Bachelor of Fine Arts in Studio Art offers depth in the studio areas and requires 82 hours of art and art history courses in addition to the 38-51 hours of general requirements as stipulated by the College of Visual and Performing Arts. One-third of the semester hours in studio art above the Art Foundations must be outside the student's area of emphasis and must be chosen with advisor approval. The minimum number of hours required for majors in studio art is 120. A minimum of 40 credit hours of junior- and senior-level courses are required for graduation. Upon completion of the Studio and Art History Foundations courses, students select an area of emphasis from ceramics, jewelry and metals, painting, photography, printmaking, or sculpture, with the approval of faculty advisors. Within the studio art major and after approval of an advisor, a student may take a distribution of courses that combine digital media, photography, and printmaking. This combination of courses will enable students to experiment with various media and the technical aspects of digital imagery in creating fine art. Graduating studio art majors are required to participate in a group exhibition during the spring semester of their graduating year.

	<i>Semester Hours</i>
English.....	6
Mathematics and Logical Reasoning	6
Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply. All other mathematics courses 1320 and above (except 3430) may be used. PHIL 2310 or 4310 may be used to satisfy 3 hours of this requirement.	
Oral Communication	3
COMS 1300, 2300, or 3358, CFAS 2300	
U.S. History (HIST 2300 and 2301)	6
Students normally will enroll in HIST 2300 and 2301, although any U.S. history course will satisfy this requirement. Credit by examination for part of this requirement is available.	
Political Science (POLS 1301 and 2302)	6
Credit by examination for part of this requirement is available.	
Natural (Laboratory) Science	8
Technology*	0-3
Courses in major will satisfy this requirement.	
Humanities	3
Foreign Language	0-10
Entering students are expected to have had four semesters credit of a single foreign language in high school. Students who do not meet this requirement will be required to complete one year (or the equivalent) of a single foreign language taken at the college level. For more detailed information, refer to the "Foreign Language Requirement" listing in the Undergraduate Academics section of this catalog.	
Multicultural Requirement	0
ART 1310, 2311, 3310, 3311, 3315, 3317, 3318, and 4315 satisfy this requirement.	
Individual or Group Behavior	0-3
ART 3311 or 4315 may be used to fulfill this requirement.	
Art Courses	
Studio Foundations	13
ART 1100, 1302, 1303, 2303, 2304	
Art History Foundations	9
ART 1310, 2311, 3312	
Upper-level Art History	6
If either ART 3311 or 4315 is not included in upper-level art history requirements, an additional 3 hours of Individual or Group Behavior must be included under Core Curriculum requirements.	
Life Drawing/Digital	6
ART 3323 and 3324 or 3329	
2-Dimensional Studio Art	6
Choice of two: ART 3321, painting; ART 3308, printmaking; and ART 3325, photography	
3-Dimensional Studio Art	9
Choice of three: ART 3300 or 3301, ceramics; ART 3333, metals; and ART 3336 or 3337, sculpture	
Studio Area of Emphasis*	21
21 credit hours of which 18 must be upper level	
Studio Art Electives*	9
May include area of emphasis with approval of major advisor. 9 credit hours at the 3000 level or above; one course may be upper-level art history	
Senior Seminar	3
ART 4335 Studio Art and Visual Studies Majors	

* Consult with faculty advisor.

Bachelor of Arts

Art History Major

Students working toward the Bachelor of Arts degree with an art history major must complete 22 hours of Art Foundations courses, 30 hours of upper-level art history courses selected with the written consent of an advisor (at least 12 of which must be taken in residence and include 3 semester hours of senior thesis), and other requirements for the B.A. degree (see below). Prior to the last semester of the senior year, students are required to take 6 hours in a focus area in preparation for the senior thesis (3 credit hours). An art history major may complete either a traditional 18-hour minor or an 18-hour interdisciplinary research minor, subject to approval by the art history area advisor, in a field or fields outside of the School of Art. The minimum number of hours required for majors in art history is 120.

	<i>Semester Hours</i>
English.....	6
ENGL 1301, 1302	
Foreign Language	6
Students must complete 6 semester credit hours at the sophomore level or above in a single language. Depending on the student's focus area, more than one foreign language may be required to enter graduate school.	
Mathematics and Logical Reasoning	6
MATH 1300 or 1320 or 1420 plus one of a higher number (see catalog list of MATH courses)	
Oral Communication	3
Choose from COMS 1300, 2300, 3358, CFAS 2300	
Natural (Laboratory) Science	8
Technology	3
ART 3362 or see catalog list of options	
Individual or Group Behavior	0-3
ART 3311 or 4315 may be used to fulfill this requirement. Hours may become elective.	
U.S. History (HIST 2300 and 2301)	6
Students normally will enroll in HIST 2300 and 2301, although any U.S. history course will satisfy this requirement. Credit by examination for part of this requirement is available.	
Political Science (POLS 1301 and 2302)	6
Credit by examination for part of this requirement is available.	
Humanities	3
Multicultural Requirement	0
ART 1310 satisfies this requirement.	
Art Courses	
Studio Foundations	13
ART 1100, 1302, 1303, 2303, 2304	
Art History Foundations	9
ART 1310, 2311, 3312	
Art History Breadth	21
Art History Focus	6
Senior Thesis in Art History	3

Art (ART)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1100. Introduction to Art (1:1:0).** Introduction to art as an academic pursuit with its diverse elements and opportunities, objectives, resources, careers, and achievements. Required of all art majors prior to admission to upper-level courses. Offered fall semester only. Transfer credit acceptable. Pass-fail grading. For majors only.
- 1302. [ARTS 1311] Design I: Introduction (3:0:6).** Emphasis upon two-dimensional design; includes the fundamentals of line, color, value, texture, shape, space, and compositional arrangement. Students learn to apply verbal skills needed in advanced visual arts. Outside assignments. AP or portfolio waiver possible.
- 1303. [ARTS 1316] Drawing I: Introduction (3:0:6).** Investigation of a variety of media, techniques, and subjects. Students develop perceptual, descriptive, and verbal skills with consideration of drawing as a conceptual process as well as an end in itself. Outside assignments. AP or portfolio waiver possible.
- 1309. [ARTS 1301, 1313] Art Appreciation (3:3:0).** Survey of the visual arts of western and nonwestern cultures with emphasis on understanding art through form, content, and cultural context. Nonmajors and art minors only.
- 1310. [ARTS 1303] Art History Survey I (3:3:0).** A survey of painting, sculpture, architecture, and the minor arts from prehistoric times to the 14th century. AP waiver possible.
- 2303. [ARTS 1312] Design II: Introduction (3:0:6).** Prerequisite: ART 1302 or concurrent enrollment. Emphasis on the three-dimensional concept of design. Students learn to apply verbal skills needed in advanced visual arts. Outside assignments.
- 2304. [ARTS 1317] Drawing II: Introduction (3:0:6).** Prerequisite: ART 1303. Expansion of Drawing I stressing the expressive and conceptual aspects of drawing including developed descriptive imagery, use of color, abstraction, verbal skills, and the nude human figure as a subject. Outside assignments.

Graduate Program

Master of Art Education

The Master of Art Education (M.A.E.) degree program is comprised of a minimum of 36 semester hours of graduate work that includes 12 semester hours of art education core courses; 9-12 semester hours of related art courses; 6-9 semester hours as a minor (taken outside the school or with the option of classes within the School of Art); and a minimum of 6 semester hours of thesis, professional project, or studio problem leading to an art exhibition. The M.A.E. graduate coordinator will evaluate applicants who have met the minimum entrance requirements of the Graduate School. The applicant for the M.A.E. degree may be asked to submit a portfolio and/or slides of his or her art and, if possible, examples of student art to the preview committee. On the basis of these requirements, the preview committee will make recommendations concerning the acceptance of students to the M.A.E. degree program and will determine and prescribe any leveling work to be completed before or after acceptance. Teacher certification is available with an additional 18 hours of coursework and student teaching. Students applying for the Master of Art Education degree program **do not** need to submit scores for the Graduate Record Examination.

Master of Fine Arts

The Master of Fine Arts degree (M.F.A.) is the recognized terminal degree in the practice of art. It is offered with a major in art and requires a minimum of 60 semester hours of graduate work.

Specialization is possible in the areas of ceramics, jewelry design and metal-smithing, painting, photography, printmaking, or sculpture. Drawing may be selected as a secondary studio option or studio elective. Admission to the M.F.A. program normally presumes that students hold a Bachelor of Fine Arts degree in studio art. A graduate preview committee, composed of three graduate faculty members in the school, will examine a portfolio of the student's work and hold a personal interview, if feasible, with each student who meets the minimum entrance requirements of the Graduate School. On the basis of these examinations, the preview committee will make recommendations concerning acceptance to the M.F.A. program and will determine and prescribe any leveling work to be completed

before or after acceptance. Students applying for the Master of Fine Arts degree program do not need to submit scores for the Graduate Record Examination.

Ph.D. in Fine Arts

Within the Doctor of Philosophy degree in Fine Arts, the major in the School of Art (the art major) is titled "Critical Studies and Artistic Practice." This major examines diverse discourses in the visual arts, exploring their transdisciplinary margins as well as their disciplinary strengths. In addition to the Fine Arts Core of 15 hours, students enroll in a Critical Studies and Artistic Practice core of 12 hours, consisting of interdisciplinary topics in the visual arts. Beyond the two groups of core classes, students must complete a minimum of 33 hours of individualized coursework, including 12 hours of dissertation work. Individualized coursework may be chosen, with consent of the advisor, from two of the following fields: history of art, art education, critical studies, museum studies, arts administration, and studio art (if the student holds an appropriate master's), as well as theatre and music. Additional course work may be undertaken; however, the State of Texas limits students to 99 hours of doctoral study.

For acceptance into the doctoral program, the applicant must have completed a master's degree, or its equivalent, with emphasis in some area of the visual arts. Every effort is made to select candidates who show strong scholarship and professional competence. Art doctoral faculty will evaluate each applicant's professional goals and any evidence of progress toward these goals. More specific qualifications will pertain to specific career directions.

For admission into this program, the graduate art education and art history-criticism faculty review the applicant's dossier; a personal interview is recommended. Faculty submit recommendations to a three-member preview committee. If approved, the applicant is recommended by the committee to the college's Graduate Committee for acceptance into the program. Acceptance is also contingent upon satisfaction of all Graduate School requirements for admission. After admission, a specific degree plan is determined.

2311. [ARTS 1304] **Art History Survey II (3:3:0)**. A survey of painting, sculpture, architecture, and the minor arts from the 14th through 19th centuries. AP waiver possible.
2388. **Design Process (3:0:6)**. Prerequisite: ART 1303, 1302 and concurrently enrolled in art 2304 and 2303 if not previously taken. Preparation of application materials for submission to the faculty in consideration of communication design program acceptance.
3300. **Ceramics I: Introduction to Wheel (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Introduction to wheel throwing, glazing and firing. Outside assignments.
3301. **Ceramics I: Introduction to Handbuilding (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Introduction to handbuilding techniques, glazing, and firing. Outside assignments.
3308. **Printmaking I: Introduction (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Introduction to printmaking with sections designated for waterbase screenprinting, lithography, monoprints, woodcut, or etching. Outside assignments.
3310. **Greek and Roman Art (3:3:0)**. Prerequisite: ART 1309, 1310, or consent of instructor. An examination of the principal contributions of the classical world in the areas of architecture, sculpture, and painting. Emphases: Greek and Roman. Repeatable for credit. (Writing Intensive)
3311. **Native American Arts (3:3:0)**. An examination of Native American cultures of the United States as revealed in ancient and contemporary architecture, arts, and crafts. Repeatable for credit. (Writing Intensive)
3312. **Art History Survey III (3:3:0)**. Prerequisite: ART 1309, 2311, or consent of instructor. An introduction to artistic movements, events, innovations, and debates of the 20th and 21st centuries, as examined in an international cultural frame. Repeatable for credit.
3313. **Latin American Art (3:3:0)**. Prerequisite: ART 2311, 3312, or consent of instructor. Repeatable for credit. (Writing Intensive)
3314. **Art of the United States (3:3:0)**. Prerequisite: ART 1309, 2311, or consent of instructor. A survey of American art and architecture and their European background from 1520-1893. Emphases: 1520-1859 and 1859-1893. Repeatable for credit. (Writing Intensive)
3315. **Ancient Near Eastern and Egyptian Art (3:3:0)**. Prerequisite: ART 1309, 1310, or consent of instructor. A discussion of Ancient Near Eastern art and architecture from Neolithic times down to 500 B.C. and the arrival of the Greeks in Persia; Ancient Egyptian art and architecture is covered from predynastic to the conquest of Egypt by Rome in 31 B.C. Repeatable for credit. (Writing Intensive)
3316. **19th Century Art (3:3:0)**. Prerequisite: ART 1309, 2311, or consent of instructor. Begins with the 18th century, then focuses on Impressionism, Post-Impressionism, Symbolism, and the French ambience from which these movements emerged. (Writing Intensive)
3317. **Baroque Art (3:3:0)**. Prerequisite: ART 1309, 2311, or consent of instructor. A view of European art of the Counter Reformation and a consideration of the prevailing pressures that produced this art. Analyzes of the devices, effects, and dynamics of the age of change. Focuses on N. Baroque painting in Flanders and Holland. Repeatable for credit. (Writing Intensive)

3319. **Photographic Arts of the 19th and 20th Centuries (3:3:0)**. Prerequisite: ART 2311 or consent of the instructor. An examination of the development of photography and its relation to the other visual arts. (Writing Intensive)
3321. **Painting I: Introduction (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Introduction to painting concepts and techniques with designated sections for watermedia or oil. Outside assignments. Repeatable for credit.
3322. **Advanced Painting (3:0:6)**. Prerequisite: ART 3321 or consent of instructor. Emphasis on student's concepts and exploration of subject matter. Students select technical approach and media with instructor consent. Outside assignments. Repeatable for credit.
3323. **Drawing III: Life Drawing (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Application of developed representational skills to the study of human anatomical structure and drawing from life. Encouragement toward a more personal approach to descriptive drawing, using the figure as a uniquely meaningful subject. Outside assignments.
3324. **Advanced Life Drawing (3:0:6)**. Prerequisite: ART 3323 or consent of instructor. Development of individualized interpretation of the human figure using a variety of media and approaches with emphasis upon aesthetic and conceptual factors. Outside assignments. Repeatable for credit.
3325. **Photographic Arts I (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Introduction to creative black and white photography. Covers camera operation, exposure adjustments, film development, printing, and presentation. Outside assignments.
3326. **Advanced Photographic Arts (3:0:6)**. Prerequisite: ART 3325 or consent of instructor. Advanced fine art photography with topics that rotate each semester between color, studio still life, alternative cameras, documentary, and book arts. Outside assignments. Repeatable for credit.
3328. **Printmaking II (3:0:6)**. Prerequisite: Art Foundation, ART 3308 or consent of instructor. Advanced printmaking with topics that rotate each semester between in-depth study of printmaking methods of screenprinting, lithography, intaglio, or relief printing. Outside assignments. Repeatable for credit.
3329. **Introduction to Digital Imaging (3:0:6)**. Prerequisite: Art Foundations and basic Macintosh experience or consent of instructor. Introduction to digital image making for studio artists. Covers the creative use of drawing and photographic imaging software and a variety of input and output devices. Outside assignments.
3330. **Advanced Ceramics: Wheel (3:0:6)**. Prerequisite: ART 3330 or consent of instructor. Emphasis on developing student's technical expertise, conceptual skills, and problem-solving ability. Content normally different each time offered. Outside assignments. Repeatable for credit.
3331. **Advanced Ceramics: Handbuilding (3:0:6)**. Prerequisite: ART 3301 or consent of instructor. Develops student's technical expertise, conceptual skills, and problem-solving ability. Content normally different each time offered. Outside assignments. Repeatable for credit.
3333. **Metal and Jewelry Design (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Introduction to basic techniques used in metalsmithing and jewelry making. Emphasis on fabrication and design. Outside assignments. Repeatable once for credit.
3334. **Advanced Metal and Jewelry Design (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Further study of techniques used in metal-smithing and jewelry design. Development of individual direction and exploration of various media. Outside assignments. Repeatable for credit.
3336. **Sculpture I: Introduction to Metal Fabrication (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Introduction to sculpture through the study of metal fabrication, including a variety of welding and surface coloration techniques. Forge work and casting. Outside assignments.
3337. **Sculpture II: Introduction to Mixed Media (3:0:6)**. Prerequisite: Art Foundations or consent of instructor. Introduction to sculpture through the study of mixed media techniques and basic wood construction. Outside assignments.
3338. **Advanced Sculpture: Issues in Metal Fabrication (3:0:6)**. Prerequisite: ART 3336 or consent of instructor. Emphasis on developing student's technical expertise, conceptual skills, and problem solving ability. Rotating topics include kinetics and the object. Outside assignments. Repeatable for credit.
3339. **Advanced Sculpture: Intermedia (3:0:6)**. Prerequisite: ART 3337 or consent of instructor. Emphasis on developing student's technical expertise, conceptual skills, and problem solving ability. Rotating topics include installation and video-performance. Outside assignments. Repeatable for credit.
3360. **Introduction to Theories and Practice in Art (3:3:0)**. Prerequisite: Art Foundations or consent of instructor. Overview of the role of the visual arts in personal, social, and institutional contexts.
3362. **Technology in the Visual Arts (3:2:4)**. Prerequisite: Art Foundations or consent of instructor. Instructional and studio emphases on technology in the visual arts. Outside assignments.
3364. **Foundations of Art in Social Institutions (3:3:0)**. Prerequisite: ART 3360. Examination of historical, political, and pedagogical issues and policies of the visual arts in institutional settings. S.
3365. **Visual Culture (3:2:2)**. Examination of contemporary thought and practice in the visual arts.
3372. **Rethinking Art Education (3:2:2)**. Contemporary content and teaching in the visual arts. Non-majors only.
3381. **Typography (3:0:6)**. Prerequisite: ART 3385 and 4359. Theoretical and practical survey of visual typography. Typography fundamentals, historical contexts, visual organization, meaning, and expressive qualities of type as visual form and visible language.
3382. **Symbols (3:0:6)**. Prerequisite: ART 3385 and 4359. Exploration of symbols in design communication. Meaning, concept development, process, research, and problem solving are emphasized including appropriateness and responsibility to communicate effectively.
3383. **Type and Image (3:0:6)**. Prerequisite: ART 3381, 3382, and 3386. Study of the relationship between visual and verbal language. Exploration of the informative, expressive, and experimental potential to solve complex narratives. Form will be stressed.
3384. **Visual Systems (3:0:6)**. Prerequisite: ART 3381, 3382, and 3386. Development of integrated design systems and their systematic application of visual continuity. Emphasis on concept and the relationship between content and form.
3385. **Computer Design Methods I (3:0:6)**. Prerequisite: Program acceptance. Technical aspects of raster graphics. Stresses use of digital peripherals to capture and construct images, vector drawing, file integration, and digital production.
3386. **Computer Design Methods II (3:3:0)**. Prerequisite: ART 3385 and 4359. Technical aspects of page layout, file integration, and digital production will be introduced including digital peripherals as they relate to image capture.
4000. **Student Teaching in Art Secondary (V3-12)**. Prerequisite: Admission to student teaching. Supervised teaching involving a period of responsibility for art instruction in an accredited secondary school.
4001. **Student Teaching in Art Elementary (V3-6)**. Prerequisite: Admission to student teaching. Supervised teaching involving a period of major responsibility for art instruction and learning in accredited elementary schools.
4104. **Advanced Problems (1)**. Prerequisite: Consent of instructor. Advanced problems in an area of production in which the student has achieved competence. Repeatable for credit.
4304. **Advanced Problems (3)**. Prerequisite: Consent of instructor. Advanced problems in an area of production in which the student has achieved competence. Repeatable for credit.
4310. **Seminar in Art History (3:3:0)**. Prerequisite: 6 hours of art history or consent of instructor. Extensive exploration of a particular period in art history. Repeatable for credit. (Writing Intensive)
4311. **Senior Thesis in Art History (3)**. Prerequisite: Consent of instructor. An individual course of intensive study requiring in-depth reading and substantial written projects. (Writing Intensive)
4312. **Topics in 20th and 21st Century Art (3:3:0)**. Prerequisite: ART 3312 or consent of instructor. Major movements in modernism and post-modernism, including aesthetic and critical theories and databases. Repeatable for credit. (Writing Intensive)
4313. **Medieval Art of Europe (3:3:0)**. Prerequisite: Art 1309, 1310, or consent of instructor. Examines the artistic achievements of the medieval, focusing on art and architecture of the Christian faith and culture. Repeatable for credit. (Writing Intensive)
4314. **History of the Book as Art (3:3:0)**. Prerequisite: Art 1309, 1310, or consent of instructor. Historical investigations of books that have been regarded as visual art. Repeatable for credit. (Writing Intensive)
4315. **The Arts of Pre-Columbian America (3:3:0)**. An examination of the ideologies and cultures of Meso, Central, and South America as expressed in their arts, cities, iconography, and writing. Critical evaluation of contemporary approaches to these topics. Emphases: Central Mexico and Maya. Repeatable for credit. (Writing Intensive)

4318. **The Art of the Renaissance (3:3:0)**. Prerequisite: Art 1309, 2311, or consent of instructor. A study of aesthetic and intellectual directions in the Age of Humanism. Emphases: 15th Century Florence or Northern Italy and Venice. Repeatable for credit. (Writing Intensive)
4320. **Experimental Drawing (3:0:6)**. Prerequisite: ART 3324 and consent of instructor (must be drawing emphasis). Complete absorption with drawing as a total concept. Mature, individualistic development of a unique body of work utilizing a variety of media and surfaces. Outside assignments. Repeatable for credit.
4322. **Experimental Painting (3:0:6)**. Prerequisite: ART 3322 or consent of instructor. Individual exploration of subject matter and painting media directed toward the creation of a mature and consistent body of work. Outside assignments. Repeatable for credit.
4326. **Experimental Photographic Arts (3:0:6)**. Prerequisite: ART 3326 and consent of instructor. Exploration of advanced topics in photography directed toward the creation of a mature body of work. Outside assignments. Repeatable for credit.
4328. **Printmaking III (3:0:6)**. Prerequisite: ART 3308, 3328, or consent of instructor. Problems in printmaking areas. Controlled projects and individual criticism. Outside assignments. Repeatable for credit.
4329. **Advanced Digital Photo Imaging (3:0:6)**. Prerequisite: ART 3325 and 3329. Examination of advanced digital imaging with emphasis on photographic imagery. Students will explore digital art making and creative problem solving using both photographic and digital input and output. Outside assignments. Repeatable for credit.
4330. **Senior Studio: Ceramics (3:0:6)**. Prerequisite: Six hours of 3000 level ceramics and consent of instructor. Mature, individualistic exploration directed toward developing a comprehensive, cohesive body of work for evaluation. Outside assignments. Repeatable for credit.
4334. **Senior Studio: Metal and Jewelry Design (3:0:6)**. Prerequisite: Six hours of 3000 level metal and jewelry design and consent of instructor. Mature, individualistic exploration directed toward developing a comprehensive, cohesive body of work for evaluation. Outside assignments. Repeatable for credit.
4335. **Senior Seminar for Studio Art Majors (3:3:0)**. Prerequisite: B.F.A. studio and visual studies majors with senior standing. A capstone course. Basic and necessary information that will enable the student to compete in the professional art world and acquaint the student with the requirements for graduate admission and application procedures. Offered fall semester only. (Writing Intensive)
4338. **Senior Studio: Sculpture (3:0:6)**. Prerequisite: Six hours of 3000 level sculpture and consent of instructor. Mature, individualistic exploration directed toward developing a comprehensive, cohesive body of work for evaluation. Outside assignments. Repeatable for credit.
4350. **Topics in Communication Design (3:0:6)**. Prerequisite: Art 3383 and 3384. This course will explore a specific area of interest in a particular kind of communication design problem. Repeatable for credit.
4354. **Illustration (3:0:6)**. Prerequisite: Consent of instructor. Exploration of illustration through structured practical application. Image making, concept, style, appropriateness of imagery, and interpretation of narrative will be stressed. Repeatable for credit.
4355. **Professional Internship (3)**. Prerequisite: Consent of instructor. Provides on-site internship experience. Placement is student initiated and faculty approved. Student's progress will be monitored. Repeatable for credit.
4356. **Packaging (3:0:6)**. Prerequisite: Consent of instructor. Study and design of three-dimensional form and surface. Stresses problem solving and innovative thinking as they relate to the environment and ecological concerns. Repeatable for credit.
4357. **Online Media (3:0:6)**. Prerequisite: ART 3381, 3382, and 3386. Introduction to key concepts and underlying processes used to create interactive experiences, including implications of new technology on social construction of meaning as it relates to the professional field of design. Repeatable for credit.
4358. **Motion Graphics. (3:0:6)**. Prerequisite: Consent of instructor. Explores the interactive effects of time and motion, including visual rhythm, continuity, and relationship between form and content of visual communication. Repeatable for credit.
4359. **Design History (3:3:0)**. Prerequisite: Program acceptance. Examination of the evolution of the graphic arts. Discusses design innovators as well as styles and movements. Emphasis on 20th century.
4361. **Contemporary Visual Studies (3:3:0)**. Modern and postmodern socio-economics, political, and visual histories in art education.
4362. **Curriculum Theory and Instruction Methodology in Art (3:3:0)**. Prerequisite: ART 3364, 3365, or consent of instructor. Art teaching methodologies, including curriculum design, classroom organization and management, assessment strategies, and teaching effectiveness evaluation.
4365. **Visual Studies Seminar (3:3:0)**. Seminar focusing on teaching theories, curriculum development, communication strategies, real-life teaching scenarios, and student teaching preparation. (Writing Intensive)
4380. **Publication Design (3:0:6)**. Prerequisite: ART 3383, 3384, and 4357. Sequential design and structural systems dealing with experimentation of type, image, pacing, and form. Emphasizes concept development, research, writing, and presentation skills. Outside assignments.
4381. **Public and Social Service Design (3:0:6)**. Prerequisite: ART 3383, 3384, and 4357. Emphasis is placed on the role of the designer in the community, public awareness, and social responsibility. Stresses teamwork, communication, and interpersonal skills.
4382. **Portfolio Development (3:0:6)**. Prerequisite: Must pass portfolio review; prior to enrollment, ART 4380, 4381, and at least one communication design elective. Emphasizes resume development, final portfolio preparation and refinement, business procedures, self-promotion, and interviewing skills.

Graduate Courses

5100. **Advanced Art Unit (1)**. Prerequisite: Instructor approval. Individual investigation in art. May be repeated for credit.
5101. **Art Seminar (1:1:0)**. Prerequisite: Instructor approval. Required of all graduate students admitted to the MFA program. Students must complete three seminars by graduation. Topics vary. Pass-fail grading.
5102. **Teaching Studio Art in Higher Education (1:1:0)**. Required seminar of all studio art teaching assistants. Provides methodology and practical teaching strategies unique to teaching studio art courses.
5105. **Organizing Public Forums About Art (1:0:2)**. Graduate students gain preprofessional experience by organizing a series of scholarly public lectures, discussions, and/or events that focus on a single theme associated with art. Each course offering is unique. May be repeated.
5304. **Advanced Studio: Two-Dimensional (3)**. Prerequisite: Instructor approval. The development and execution of advanced two-dimensional studio problems. May be repeated for credit.
5305. **Advanced Studio: Three-Dimensional (3)**. Prerequisite: Instructor approval. The development and execution of advanced three-dimensional studio problems. May be repeated for credit.
5309. **Theories of Contemporary Art (3:3:0)**. Prerequisite: Instructor approval. Advanced survey of contemporary art theory and critical methods, with emphasis on the impact of the post-structuralist critique of representation.
5310. **Historical and Critical Perspectives in the Visual Arts (3:3:0)**. Historical and critical overview of the field including introduction to major theories and methodologies; study of particular artists, works, or movements that provide insight into specific creative techniques; basic media and techniques of the field; and interdisciplinary relationships with the other arts.
5311. **Art of Classical Antiquity (3:3:0)**. Prerequisite: Instructor approval. Examines architecture, painting, and sculpture of the Greek and Roman civilizations. Repeatable for credit.
5313. **18th and 19th Century Art (3:3:0)**. Prerequisite: Instructor approval. Principal developments in 18th and 19th century painting, sculpture, and architecture. Emphasis on Europe and the United States. Repeatable for credit.
5314. **The Visual Arts in Contemporary Context (3:3:0)**. Contemporary issues in the field: current artistic trends, theory and criticism, organization (e.g., funding, administration), and cultural policy (e.g., education, assessment, multicultural issues, censorship).
5315. **Arts of the Indian Americas (3:3:0)**. Prerequisite: Instructor approval. Examines art, culture, and architecture of North, Central, or South American Indians. Repeatable for credit.
5316. **Art Theory and Criticism (3:3:0)**. Prerequisite: Instructor approval. Examination of art works from antiquity to the early twentieth century using a variety of traditional and current artistic theories, critical models, and methodologies.
5317. **Renaissance and Baroque Art (3:3:0)**. Prerequisite: Instructor approval. Examination focusing upon major developments in

- Renaissance or Baroque painting, sculpture, architecture, and art criticism. Repeatable for credit.
5319. **20th-Century Visual Art (3:3:0)**. An examination of major developments in 20th-century painting, sculpture, graphic, and ceramic art. Repeated for credit with different emphasis.
5320. **Graduate Drawing (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in drawing. May be repeated for credit.
5322. **Graduate Painting (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in painting. May be repeated for credit.
5326. **Graduate Photography (3:0:6)**. Prerequisite: Instructor approval. Experimental investigation into varied aspects of photography as creative media. May be repeated for credit.
5328. **Graduate Printmaking (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in printmaking. May be repeated for credit.
5330. **Graduate Ceramics (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in ceramics. May be repeated for credit.
5331. **Ceramic Raw Materials (3:0:6)**. Prerequisite: Graduate standing and one graduate course in ceramics or consent of instructor. A specialized area of ceramics with emphasis on chemistry and formulation of clay bodies and glazes. Outside assignments and exams.
5334. **Graduate Metal and Jewelry Design (3:0:6)**. Prerequisite: Instructor approval. The exploration of personal direction and execution of advanced problems and techniques in metalsmithing and jewelry design. Emphasis will vary. May be repeated for credit.
5338. **Graduate Sculpture (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in sculpture. May be repeated for credit.
5340. **Transdisciplinary Approaches to Issues in the Arts (3:3:0)**. Instructors from two disciplines encourage the production of new knowledge and solutions by approaching a challenging issue or topic in art from multiple critical, theoretical, and historical perspectives. Team-taught course. Each offering is unique. May be repeated with change of topic.
5360. **Seminar in Art Education (3:3:0)**. Topics vary per course from faculty research to publication processes, ecology, technology, interpretation, and issues of power, privilege, and ideology. May be repeated for credit.
5361. **Critical Pedagogy in the Visual Arts (3:3:0)**. Corequisite: ART 5101. Introduction to curriculum materials and technology to develop awareness of and practice in innovative procedures for teaching visual arts disciplines. Offered online.
5362. **Historical Survey of the Teaching of Art (3:3:0)**. Survey of the historic growth of art education in Europe and America. Offered online.
5363. **Research Methods in the Visual Arts (3:3:0)**. Prerequisite: Instructor approval. A survey of research methods applicable to the visual arts. May be repeated for credit. Offered online.
5364. **Feminist Research Methodologies in Visual Studies (3:3:0)**. Prerequisite: W S 5310, equivalent, or pass entrance essay exam. This interdisciplinary course focuses on the vision and methods that feminist scholars use to study feminist issues within and across a range of traditional disciplines. (W S 5320)
5366. **Instructional Technology in the Visual Arts (3:3:0)**. Research in critical theories and the cultural implications of visual arts instructional technology in schools, museums, and alternative sites.
6000. **Master's Thesis (V1-6)**.
6001. **Master's Thesis: Professional Project (V1-6)**. Prerequisite: ART 5363, 9 hours of degree program coursework, and advisor approval. The professional project requires a written proposal, an oral defense of the proposal, a final written report, and an oral defense of the report. May be repeated 3 times for credit up to 6 hours.
6002. **Master's Thesis: Exhibition (V1-6)**. Prerequisite: ART 5363, 9 hours of degree program coursework, and advisor approval. A written proposal of an artistic problem leading to an exhibition which connects to teaching and culminates in a public lecture during the exhibition opening. May be repeated 3 times for credit up to 6 hours.
6301. **Master's Report (3)**. Repeatable for credit.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

School of Music

Faculty

William L. Ballenger, M.A., Director

Horn Professors: Van Appledorn, W. Westney

Professors: Ballenger, Barber, Deahl, Dent, Dickson, Henry, Killian, Lewis, Meek, Shinn, Stoune

Associate Professors: A. B. Anderson, Arnold, Barnes-Burroughs, Brumfield, D. Dees, Dolter, Dye, Elrod, Ezerman, Fried, Gilbert, Hughes, McKoin, McNeil, Rogers, L. Santa, M. Santa, Sharpe, Shea, C. J. Smith, C. M. Smith, Strieder, Wilson, Wood

Assistant Professors: C. Anderson, Berry, Houck, Leali, Martens, Pollard (Visiting), Skerik, A. Smith, Wass, Yon

Instructors: J. Dees (Visiting), Hollins (Visiting)

About the Program

The school supervises the following degree programs:

- Bachelor of Music in Performance
- Bachelor of Music in Music Composition
- Bachelor of Music in Music Theory
- Bachelor of Music in Music (leading toward teacher certification)
- Bachelor of Arts in Music
- Master of Music in Composition
- Master of Music in Performance
- Master of Music in Musicology
- Master of Music in Music Theory
- Master of Music Education
- Master of Music in Pedagogy
- Doctor of Philosophy in Fine Arts with a major in Music
- Doctor of Musical Arts in Composition
- Doctor of Musical Arts in Conducting
- Doctor of Musical Arts in Performance
- Doctor of Musical Arts in Piano Pedagogy

The school also participates in the ethnic studies and humanities minor programs. The school's degree programs are accredited by the National Association of Schools of Music.

Undergraduate Program

Courses for Nonmajors

Nonmusic majors may elect class or private instruction in voice or in any instrument subject to the availability of faculty. Students enrolled in applied music are carried at their maximum level of achievement, and the nonmusic major is not examined in competition with the music major. In addition to the above, courses designed to serve all students enrolled in the university include all major ensembles such as Marching Band (fall only—MUEN 1103, 3103, 3203); Symphonic, Concert, and University Bands (MUEN 3103, 3203); Orchestra (MUEN 3104, 3204); University Choir (MUEN 3101, 3201); University Singers, Women's Chorus and Men's Glee Club (MUEN 3101); Music Theatre (MUEN 3102, 3202); Jazz Ensembles and Combos (MUEN 3105); and Small-Medium Ensembles (MUEN 3106, 3110). Auditions are required for some of these ensembles; contact the ensembles office at 806.742.2272 for information about auditions. Nonmusic majors may also enroll in major courses in music, music composition, music literature, and music theory with consent of the instructor.

The following courses are designed specifically for nonmajors:

MUAP 1113, 1114, Voice. Open to both majors and nonmajors. Correct posture and studies for breath control, development of resonance, study of vowel formation, vocalization.

MUAP 1123, 1124, Group Keyboard Instruction I and II. Consent of instructor required. Beginning instruction in piano and

electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.

MUHL 1308, Music Appreciation. Beginning course for nonmajors. Appreciation of music is encouraged through consideration of a variety of musical styles.

MUHL 2308, 2309, Heritage of Music. Selected compositions will be studied through an interpretation of their historical, functional, and cultural significance.

MUHL 3304, History of Jazz. Historical and analytical survey of jazz from its beginning through “Rock”—its form, style, literature, and influence on 20th century music.

MUHL 3308, Masterpieces in Music. Representative musical works from the Baroque Period to the present are studied in relation to their historical and general cultural context.

MUHL 3310, History of Rock and Roll. This course focuses on hearing, understanding, and contextualizing Anglo-American rock and roll, a popular idiom rooted in the music of African Americans and rural whites.

MUTH 1300, Songwriting. A beginning course for nonmusic majors. A practical approach to music theory through songwriting. Includes aural training, notation, textual setting, melodic writing, and chord assignment.

Music Degree Programs

Performance degrees include majors in piano (pedagogy or accompanying specializations are also available), organ, voice, brass, woodwind, percussion, and stringed instruments. Majors are also offered in music composition and music theory. The Bachelor of Music (leading toward teacher certification) degree replaces the degree formerly known as the Bachelor of Music Education.

A minimum of 42 hours of music courses, 18 hours of which must be junior or senior level, are required for the Bachelor of Arts degree with a music major, including MUSI 1200, MUHL 2301, 2302, 2303, MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, and 3303. Bachelor of Arts students are required to enroll in four semesters of ensemble and lessons. Bachelor of Arts students also take a minor and complete the general degree requirements for the Bachelor of Arts degree. A minimum total of 120 hours is required for this degree.

Minors in Music. A student may seek a minor in music by completing 20 to 24 hours selected in consultation with the undergraduate advisor in the School of Music.

Residency Requirements. Students working toward a Bachelor of Music, Bachelor of Music (leading toward teacher certification), or a Bachelor of Arts with an emphasis in music must complete a minimum of 24 hours of music in residence at Texas Tech. Minors in music require minimum of 6 hours in residence at Texas Tech. Information is available in the School of Music office.

Admission and Assessment Requirements. Students applying to the School of Music will be admitted as music undeclared until their audition. **Acceptance to Texas Tech University does not ensure admission as a music major.** Music majors must audition in their declared principle applied area with the appropriate faculty for acceptance into any music program. After acceptance into the School of Music, music majors will participate in applied and academic assessment during each semester of enrollment. Students must maintain a grade of C or above in every course designated as part of the major area music curriculum. Students not receiving a grade of C in such course(s), will be allowed to repeat the course(s) twice to achieve the minimum grade of C. **University policy states that a student may repeat a course for credit only one time at the normal tuition rate; those repeating a course more than once must pay an additional cost-of-education fee.** Students who do not receive a minimum grade of C in a major area course after repeating it twice will no longer be able to continue their status as a music major and must declare a major other than music. See the

academic advisor in the School of Music for specific details regarding courses constituting the major area music curriculum.

The student must earn a minimum grade of C during each semester of freshman and sophomore theory to qualify for advancement.

Students wishing to change their majors to performance after having been accepted into another major in music must proceed through a formal acceptance process for performance in the appropriate applied and ensemble areas. Additional information about applied music is available from the School of Music. Graduation requirements in applied music vary according to the student’s degree and major.

Entering freshmen may receive credit for college-level work in music accomplished prior to entering the university. This may be done through advanced standing examinations administered by the faculty of the School of Music during the first semester of the freshman year after the student has obtained permission from the dean of the College of Visual and Performing Arts. Advanced standing examinations will be administered only in the fields of applied music and music theory. To receive credit by an advanced standing examination, the student must achieve a grade of not less than a B on such examination.

All students whose principal instrument is not keyboard must demonstrate keyboard proficiency as determined by the school.

Refer to the curriculum tables that follow and consult with an advisor for specific ensemble requirements pertaining to particular degree plans.

Recital Requirements. Performance majors are required to present a full-length senior recital. Piano performance majors with pedagogy emphasis are required to present a three-quarter length recital, and candidates for music with teacher certification or performance degrees must present a half-length recital. The recital program must be approved by the appropriate area faculty or applied faculty member and submitted to the Publicity Office at least two weeks prior to the recital for processing. Piano performance majors with chamber music and accompanying emphasis are required to present four recitals of standard accompaniment and chamber music repertoire. Permission to present each recital must be obtained from an examining jury at least two weeks prior to the recital.

Music composition majors are required to present a recital of their original compositions during the senior year. Permission to present the recital must be obtained from the composition faculty one semester prior to the recital.

Postponement or cancellation of a scheduled recital (without penalty) is allowed only with good reason such as illness or death in the family. Failure to pass a hearing or failure of preparation are not valid reasons. The appropriate applied faculty member must verify any reason for postponement or cancellation. If a recital is postponed for verified good reason, the student may reschedule in the same or subsequent semester. If a scheduled recital is postponed or canceled without verified good reason, the student may not reschedule during the same semester in which postponement or cancellation occurs.

All music majors must attend at least 12 weekly student recitals and at least 12 additional approved concerts or recitals per semester for six semesters.

Courses in Applied Music. Additional fees for applied music are shown in the Finances section of this catalog. Applied music students are required to practice a minimum of three clock hours per week for each semester-hour credit.

All tracks have the same Core Curriculum and professional education courses.

Core Curriculum

	<i>Semester Hours</i>
Basic Skills, ENGL 1301, 1302.....	6
Oral Communication	3
COMS 1300, 2300, or 3358, CFAS 2300	
Mathematics	6
MATH 1300 or 1320 and MUTH 3303 counted in music hours	

Natural Science	8
Technology,	3
MUSI 3341 satisfies this requirement	
U.S. History, HIST 2300, 2301	6
Political Science, POLS 1301, 2302	6
Individual or Group Behavior	3
See an advisor	
Humanities	3
Total Hours	44

Professional Education

Students should contact the College of Education concerning professional education course requirements for all-level certification.

Semester Hours

EDSE 4310	3
EDSE 4322	3
EDLL 4382	3
MUED 3311	3
MUED 3312	3
Student Teaching	6
Total Hours	21

All Level, Vocal Track

Principal Instrument: MUAP 1001, 1002, 2001, 2002, 3001, (2 credit hours each) 3002 (1), 3190

Secondary Instrument: MUAP 1103, 1303, 2103, 3103, 4103

Conducting: MUAP 3206, and 3207

Piano: Must pass proficiency level equivalent to MUAP 2124 if not piano principal.

Music: MUSI 1101, 1200, 3202, 3237, 3238, 3216, 3217

Music History and Literature: MUHL 2301, 2302, 2303, 4300

Music Theory: MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, 3303, MUCP 4207

Major Ensemble: 7 semesters

Total Track Hours: 73

Total Program Hours: 138

All Level, Instrumental Track

Principal Instrument: MUAP 1001, 1002, 2001, 2002, 3001, (2 credit hours each) 3002 (1), 3190

Secondary Instrument: MUAP 1103, 1104, 2103, 2104, 3103, 3104, 4103, 4104 (select 6)

Conducting: MUAP 3206, 3208

Piano: Must pass proficiency level equivalent to MUAP 2124 if not piano principal.

Music: MUSI 1101, 1200, 3202, 3237, 3238, and 3218 & 3219 or 3225 & 3226

Music History and Literature: MUHL 2301, 2302, 2303, 4300

Music Theory: MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, 3303, MUCP 4207

Major Ensemble: 7 semesters

Vocal Ensemble: 1 hour

Total Track Hours: 73

Total Program Hours: 138

All Level, Keyboard Track

Principal Instrument: MUAP 1001 (1), 1105, 1002 (1), 1106, 2001 (2), 2002 (2), 3001 (2), 3002 (1), 3190

Secondary Instrument: MUAP 1103, 2103, 3103, 4103

Conducting: MUAP 3206 and 3207 or 3208

Music: MUSI 1101, 1200, 3202, 3237, 3238, and 3216 and 3217, or 3218 & 3219, or 3225 and 3226

Music History and Literature: MUHL 2301, 2302, 2303, 4300

Music Theory: MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, 3303, MUCP 4207

Major Ensemble: 7 semesters

Vocal Ensemble: 1

Total Track Hours: 72

Total Program Hours: 137

Bachelor of Music Curriculum

The curriculum tables that follow are provided as a convenience to students and advisors. All music majors must plan their individual courses of study in consultation with a faculty advisor.

Music Composition Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 1001, Prin. Instr. or Voice Applied Music, Sec. Instr.*	2	MUAP 1002, Prin. Instr. or Voice Applied Music, Sec. Instr.*	2
MUCP 1201, Intro. Contemp. Mus.	2	MUCP 1202, Intro. Contemp. Mus.	2
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
Ensemble	1	Ensemble	1
Individual or Group Behavior	3	TOTAL	16
TOTAL	18		

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 2001, Prin. Instr. or Voice Applied Music, Sec. Instr.*	2	MUAP 2002, Prin. Instr. or Voice	2
MUCP 2301, Mus. Composition	3	MUCP 2302, Mus. Composition	3
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intern. Theory I	3	MUTH 2304, Intern. Theory II	3
MUTH 2103, Intern. Aural Skills I	1	MUTH 2104, Intern. Aural Skills II	1
Mathematics	3	Ensemble	1
Ensemble	1	Humanities	3
TOTAL	17	TOTAL	16

THIRD YEAR**			
<i>Fall</i>		<i>Spring</i>	
MUAP 3001, Prin. Instr. or Voice	2	MUAP 3002, Prin. Instr. or Voice	2
MUCP 3301, Mus. Composition	3	MUCP 3302, Mus. Composition	3
MUTH 3303, Form Ana. Synth.	3	MUTH 3316, 20th Cent. Tech.	3
MUCP 4207, Instrumentation	2	MUCP 4208, Orchestration	2
Tech. and App. Science	3	Oral Communication	3
Natural Science	4	Natural Science	4
Ensemble	1	Ensemble	1
TOTAL	18	TOTAL	18

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
MUHL 4300, Special Topics	3	MUCP 4402, Mus. Composition	4
MUCP 4401, Mus. Composition†	4	MUAP 4190, Sr. Recital	1
MUTH 4305, Modal Counterpoint	3	MUTH 4307, Tonal Cpt. & Fugue	3
HIST 2300, Hist. of U.S. to 1877	3	HIST 2301, U.S. Hist. Since 1877	3
POLS 1301, Amer. Govt., Org.	3	MUAP 3206, Conducting	2
Ensemble	1	POLS 2302, Amer. Pub. Pol.	3
TOTAL	17	Ensemble	1
		TOTAL	17

Total program hours—137

* The secondary instrument consists of one semester of study on each of three different instruments, to be determined in consultation with the student's advisor. In general, each secondary instrument should be a member of a different instrumental family (string, woodwind, brass, percussion, voice), and these should be distinct from the primary instrument family, so that the student gains familiarity with the broadest variety of instruments.

** Continuance in the major of music composition requires a formal review and approval of all freshman and sophomore work. The principal criteria are completion of all academic requirements through the sophomore year and a grade average in music theory courses of no less than a B.

† Candidates for the Bachelor of Music degree with a major in music composition are required to present a recital of their original compositions during the senior year. Permission to present the recital must be obtained from the composition faculty one semester prior to the recital.

Performance—Piano Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 1105, Keyboard Skills	1	MUAP 1106, Keyboard Skills	1
MUAP 1001, Piano	3	MUAP 1002, Piano	3
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
TOTAL	14	MUHL Elective	3
		TOTAL	18

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 2001, Piano	4	MUAP 2002, Piano	4
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
Oral Communications	3	Humanities	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
TOTAL	15	TOTAL	15

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 3001, Piano	4	MUAP 3002, Piano	3
Tech. & Applied Science	3	MUAP 3190, Jr. Recital	1
MUTH 3303, Form Ana. Synth.	3	MUAP 3206, Conducting	2
MUAP 4301, Keyboard Lit.	3	MUAP 4302, Keyboard Lit.	3
HIST 2300, Hist. of U.S. to 1877	3	HIST 2301, U.S. Hist. Since 1877	3
MUEN 3106-301, Accompanying	1	Natural Science	4
TOTAL	17	MUEN 3106-301, Accompanying	1
		TOTAL	17

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 4001, Piano	4	MUAP 4002, Piano	3
MUAP 4303, Piano Pedagogy	3	MUAP 4190, Sr. Recital	1
MUHL 4300, Special Topics	3	MUTH 4307, Tonal Cpt. & Fugue	3
POLS 1301, Amer. Govt., Org.	3	Individual or Group Behavior	3
MUEN 3106-301, Accompanying	1	POLS 2302, Amer. Pub. Pol.	3
Mathematics	3	MUEN 3106-301, Accompanying	1
TOTAL	17	Natural Science	4
		TOTAL	18

Total program hours—133

* Program shown is for performance majors. Pedagogy (135 hours) or collaborative piano (133 hours) specialization students should consult the chairperson of keyboard studies.

Performance—Organ Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 1001, Organ	3	MUAP 1002, Organ	3
MUAP 1001, Piano*	1	MUAP 1002, Piano*	1
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
TOTAL	14	TOTAL	15

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 2001, Organ	4	MUAP 2002, Organ	4
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
Oral Communications	3	Humanities	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
Music Elective	3	TOTAL	15
TOTAL	18		

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 3001, Organ	4	MUAP 3002, Organ	3
MUAP 3203, Church Serv. Playing	2	MUAP 3190, Jr. Recital	1
MUAP 3206, Conducting	2	MUAP 3207 or 3208, Chor. or Inst.	2
MUTH 3303, Form Ana. Synth.	3	HIST 2301, U.S. Hist. Since 1877	3
HIST 2300, Hist. of U.S. to 1877	3	Mathematics	3
MUEN 3106-301, Accompanying	1	Natural Science	4
Technology & Applied Science	3	MUEN 3106-301, Accompanying	1
TOTAL	18	TOTAL	17

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 4001, Organ	4	MUAP 4002, Organ	3
MUTH 4305 or 4307, Counterpoint	3	MUAP 4190, Sr. Recital	1
POLS 1301, Amer. Govt., Org.	3	MUAP 4201, Organ Pedagogy	2
MUHL 4300, Special Topics	3	MUHL or MUTH elective	3
MUEN 3106-301, Accompanying	1	Individual or Group Behavior	3
Natural Science	4	POLS 2302, Amer. Pub. Pol.	3
TOTAL	18	MUEN 3106-301, Accompanying	1
		TOTAL	16

Total program hours—131

* Optional for students with extensive piano background.

Performance—Voice Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 1001, Voice	2	MUAP 1002, Voice	2
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUAP 1303, Sing. Diction I	3	MUAP 1304, Sing. Diction II	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
ENGL 1301, Ess. Coll. Rhet.	3	ENGL 1302, Adv. Coll. Rhet.	3
MUEN 3102, Music Theatre	1	Ensemble	1
Ensemble	1	TOTAL	16
TOTAL	16		

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 2001, Voice	2	MUAP 2002, Voice	2
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
For. Lang. (German, French, Italian)	5	For. Lang. (Ger., French, Italian)	5
Oral Communications	3	Humanities	3
Ensemble	1	Ensemble	1
TOTAL	18	TOTAL	18

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 3001, Voice	3	MUAP 3002, Voice	2
MUAP 3303, Vocal Literature	3	MUAP 3190, Jr. Recital	1
MUTH 3303, Form Ana. Synth.	3	For. Lang. (2nd yr. Ger., Frn., Ital.)	3
Natural Science	4	Mathematics	3
For. Lang. (2nd yr.)	3	Natural Science	4
Ensemble	1	Ensemble	1
TOTAL	17	Technology & Applied Science	3
		TOTAL	17

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 4001, Voice	4	MUAP 4002, Voice	3
HIST 2300, Hist. of U.S. to 1877	3	MUAP 4190, Sr. Recital	1
POLS 1301, Amer. Govt., Org.	3	MUAP 3206, Conducting	2
Ensemble	1	POLS 2302, Amer. Public Pol.	3
MUAP 4305, Vocal Ped.	3	Ensemble	1
MUHL 4300, Special Topics	3	Individual or Group Behavior	3
TOTAL	17	HIST 2301, U.S. Hist. Since 1877	3
		TOTAL	16

Total program hours—135

Performance—Wind Instrument or Percussion Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 1001, Major Instr.	3	MUAP 1002, Major Instr.	3
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
Mathematics	3	ENGL 1301, Ess. Coll. Rhet.	3
Ensemble*	1-2	Ensemble*	1-2
TOTAL	13-14	TOTAL	14-15

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 2001, Major Instr.	3	MUAP 2002, Major Instr.	3
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
ENGL 1302, Adv. Coll. Rhet.	3	Oral Communications	3
Ensemble	1-2	Ensemble	1-2
TOTAL	14-15	TOTAL	14-15

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 3001, Major Instr.	3	MUAP 3002, Major Instr.	3
MUTH 3303, Form Ana. Synth.	3	MUAP 3190, Jr. Recital	1
HIST 2300, Hist. of U.S. to 1877	3	MUAP 3206, Conducting	2
Humanities	3	MUCP 4207, Instrumentation	2
Ensemble	1-2	HIST 2301, U.S. Hist. Since 1877	3
Technology & Applied Science	3	Natural Science	4
TOTAL	16-17	Ensemble	1-2
		TOTAL	16-17

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 4001, Major Instr.	3	MUAP 4002, Major Instr.	3
MUTH 4305 or 4307, Counterpoint	3	MUAP 4190, Sr. Recital	1
Individual or Group Behavior	3	MUHL or MUTH elective	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Pol.	3
Ensemble	1-2	Ensemble	1-2
MUHL 4300, Special Topics	3	Natural Science	4
TOTAL	16-17	TOTAL	15-16

Total program hours—122

* Twelve registrations in ensemble required.

Music Theory Curriculum

FIRST YEAR			
Fall		Spring	
MUAP 1001, Prin. Instr. or Voice	2	MUAP 1002, Prin. Instr. or Voice	2
Applied Music, Sec. Instr.*	1	Applied Music, Sec. Instr.*	1
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhet.	3
HIST 2300, Hist. of U.S. to 1877	3	HIST 2301, U.S. Hist. Since 1877	3
Ensemble	1	Ensemble	1
TOTAL	16	TOTAL	17
SECOND YEAR			
Fall		Spring	
MUAP 2001, Prin. Instr. or Voice	2	MUAP 2002, Prin. Instr. or Voice	2
Applied Music, Sec. Instr.*	1	MUHL 2303, Hist. of Music	3
MUHL 2302, Hist. of Music	3	Foreign Language**	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
Foreign Language**	3	Ensemble	1
Mathematics	3	Technology & Applied Science	3
Ensemble	1	TOTAL	16
TOTAL	17		
THIRD YEAR†			
Fall		Spring	
MUAP 3001, Prin. Instr. or Voice	2	MUAP 3002, Prin. Instr. or Voice	2
MUTH 3303, Form Ana. Synth.	3	MUTH 3316, 20th Cent. Tech.	3
MUCP 4207, Instrumentation	2	MUCP 4208, Orchestration	2
Oral Communication	3	Individual or Group Behavior	3
Humanities	3	Natural Science	4
Natural Science	4	MUAP 3206, Conducting	2
Ensemble	1	Ensemble	1
TOTAL	18	TOTAL	17
FOURTH YEAR			
Fall		Spring	
MUAP 4001, Prin. Instr. or Voice	2	MUAP 4002, Prin. Instr. or Voice	2
MUHL elective	3	MUHL elective	3
MUTH 4305, Modal Counterpoint	3	MUTH 4307, Tonal Cpt. and Fugue	3
MUTH 4302, Fund. of Comp.	3	MUTH 4303, Fund. of Comp.	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Pol.	3
Ensemble	1	Ensemble	1
MUHL 4300, Special Topics	3	TOTAL	15
TOTAL	18		

Total program hours—134

* Choice of secondary instrument(s) depends on the student's primary instrument and shall be determined in consultation with the student's advisor.

** The student must complete six hours of a language approved by the division at the sophomore level.

† Continuance in the major of music theory requires a formal review and approval of all freshman and sophomore work. The principal criteria are completion of all academic requirements through the sophomore year and a grade average in music theory courses of no less than a B.

Performance—Stringed Instrument Curriculum

FIRST YEAR			
Fall		Spring	
MUAP 1001, Major Instr.	3	MUAP 1002, Major Instr.	3
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhet.	3
MUEN 3104, Orch.*	1	MUEN 3104, Orch.	1
MUEN 3106, Chamber Music	1	MUEN 3106, Chamber Music	1
TOTAL	14	TOTAL	15
SECOND YEAR			
Fall		Spring	
MUAP 2001, Major Instr.	3	MUAP 2002, Major Instr.	3
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
Oral Communication	3	Humanities	3
MUEN 3104, Orch.	1	MUEN 3104, Orch.	1
Technology & Applied Science	3	MUAP 3206, Conducting	2
MUEN 3106, Chamber Music	1	MUEN 3106, Chamber Music	1
TOTAL	18	TOTAL	17
THIRD YEAR			
Fall		Spring	
MUAP 3001, Major Instr.	4	MUAP 3002, Major Instr.	3
MUTH 3303, Form Ana. Synth.	3	MUAP 3190, Jr. Recital	1
HIST 2300, Hist. of U.S. to 1877	3	MUHL or MUTH elective	3
Natural Science	4	Natural Science	4
MUEN 3104, Orch.	1	HIST 2301, U.S. Hist. Since 1877	3
MUEN 3106, Chamber Music	1	MUEN 3104, Orch.	1
TOTAL	16	MUEN 3106, Chamber Music	1
		TOTAL	16
FOURTH YEAR			
Fall		Spring	
MUAP 4001, Major Instr.	4	MUAP 4002, Major Instr.	3
MUTH 4305, Modal Counterpoint	3	MUAP 4190, Sr. Recital	1
or MUTH 4307, Count. & Fugue	3	MUCP 4207, Instrumentation	2
POLS 1301, Amer. Govt., Org.	3	Individual or Group Behavior	3
Mathematics	3	POLS 2302, Amer. Pub. Pol.	3
MUEN 3104, Orch.	1	MUEN 3104, Orch.	1
MUHL 4300, Special Topics	3	TOTAL	13
TOTAL	17		

Total program hours—126

* Guitar students participate in ensemble and chamber music for six semesters each.

(Music) Student Teaching All-Level (MUAL)

(To interpret course descriptions, see page 8.)

Undergraduate Course

4000. Student Teaching in Music All-Level (V1-12). Prerequisite: Attainment of admission standards for student teaching. Supervised teaching involving a period of major responsibility for instruction and learning in an accredited school.

Applied Music (MUAP)

Applied music instruction is offered in baritone, bassoon, carillon, clarinet, cornet or trumpet, double bass, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, tuba, viola, violin, violoncello, and voice.

Undergraduate Courses

1001, 1002, 2001, 2002, 3001, 3002, 4001, 4002. Applied Music (V1-4). Instrument or Voice.

1103, 1104 [MUSI 1188, 2188] Percussion (1:0:2 each). Fundamentals of playing and teaching percussion instruments. Laboratory ensemble experience.

1105, 1106, 2105, 2106. Keyboard Skills (1:0:2 each). Sight reading and ensemble skills. Required of all piano majors for

two semesters. Enrollment limited to piano majors, or by instructor consent.

1113, 1114 [MUSI 1183, 1184]. Voice (1:0:2 each). Correct posture and studies for breath control; development of resonance; study of vowel formation; vocalization. Simple songs. Laboratory ensemble experience.

1123, 1124 [MUSI 1114, 1115, 1181, 1182]. Group Keyboard Instruction I and II (1:0:2 each). Beginning instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.

1303. Singers' Diction I (3). Singers' diction in Latin, Italian, and English utilizing the International Phonetic Alphabet. Prerequisite for MUAP 1304.

1304. Singers' Diction II (3). Prerequisite: MUAP 1303. Singers' diction in French and German utilizing the International Phonetic Alphabet.

2103, 2104 [MUSI 1190, 2190]. Strings (1:0:2 each). Fundamentals of playing and teaching string instruments. Laboratory ensemble experience.

2123, 2124 [MUSI 2114, 2115, 2181, 2182]. Group Keyboard Instruction III and IV (1:0:2 each). Intermediate instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.

3101. Dimensions of Performance (1:1:1). An interactive course open to all performers. Expressive movement, group dynam-

ics, and free improvisations are used to maximize the spontaneity, confidence, and creativity of performers. May be repeated for credit.

- 3103, 3104. Brass Instruments (1:0:2 each).** Fundamentals of playing and teaching brass instruments. Laboratory ensemble experience.
- 3105. Technology for the Applied Music Teacher (1:0:2).** Prerequisite: MUSI 3341 or consent of instructor. Implementation of music technologies in applied teaching studios. Topics covered include MIDI-based materials and equipment, instructional software, and audio/visual recording.
- 3190. Junior Recital (1).** Prerequisite: MUAP 3001 on the same instrument or voice; Corequisite: Concurrent enrollment in MUAP 3002. Credit no credit grading.
- 3205. Jazz Improvisation (2).** Prerequisite: Consent of instructor. Study and application of techniques of improvisation in jazz performance. May be repeated for credit.
- 3206. Conducting (2:2:0).** Basic conducting techniques.
- 3207. Choral Conducting (2).** Prerequisite: MUAP 3206. Specific techniques of choral conducting and choral rehearsal.
- 3208. Instrumental Conducting (2).** Prerequisite: MUAP 3206. Advanced baton techniques, score reading, and interpretation.
- 3303. Vocal Literature (3).** Prerequisite: MUHL 2301, 2302. Historical and comparative analytical survey of the standard vocal literature of the 19th and 20th centuries.
- 4103, 4104. Woodwinds (1:0:2 each).** Fundamentals of playing and teaching woodwinds. Laboratory ensemble experience.
- 4190. Senior Recital (1).** Prerequisite: MUAP 4001 on the same instrument or voice; Corequisite: Concurrent enrollment in MUAP 4002. Credit no credit grading.
- 4301, 4302. Keyboard Literature I and II (3 each).** A survey of keyboard literature from earliest times to the present. Class performance and listening.
- 4303, 4304. Piano Pedagogy (3 each).** Teaching procedures for prospective piano teachers, including rudiments, techniques, and materials.
- 4305. Vocal Pedagogy (3).** Pedagogical attitudes in identifying and solving vocal problems based on a thorough knowledge of functional anatomy with an emphasis on the following: anatomy of breathing, phonation, articulation, as well as repertoire selection, memorization skills, coaching, program development, and performance skills.
- 4307. Choral Conducting (3).** Prerequisite: MUAP 3207. Study and performances of representative choral works of all periods. Participation in a major choral organization required. An individual study course.
- 4308. Instrumental Conducting (3).** Prerequisite: MUAP 3208. Study and performance of instrumental works of all periods. Participation in a major instrumental ensemble required. An individual study course.

Graduate Courses

- 5001. Applied Music (V1-4).**
- 5101. Dimensions of Performance (1:1:1).** An interactive course open to all performers. Expressive movement, group dynamics, and free improvisation are used to maximize the spontaneity, confidence, and creativity of performers. May be repeated for credit.
- 5105. Technology for the Applied Music Teacher (1:0:2).** Prerequisite: MUSI 3341, 5341, or consent of instructor. Implementation of music technologies in applied teaching studios. Topics covered include MIDI-based materials and equipment, instructional software, and audio/visual recording.
- 5202. Collaborative Skills for Pianists (2).** Advanced study and practice of professional skills in accompanying and chamber music. These include score preparation, elements of texture and style, and relating effectively to soloists.
- 5205. Jazz Improvisation (2).** Prerequisite: Consent of instructor. Study and application of techniques of improvisation in jazz performance. May be repeated for credit.
- 5302. Applied Music Literature (3).** 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.
- 5303. Pedagogy of Applied Music (3).** 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.

Graduate Program

The Graduate Certificate in Piano Pedagogy is designed for the professional piano teacher. The 12- to 15-hour curriculum, with flexible scheduling, provides enrichment and skill development both musically and pedagogically. It can also assist participants in qualifying as Nationally Certified Teachers of Music through Music Teachers National Association.

The Master of Music degree consists of a minimum of 30 hours of graduate work, including recitals for the performance major, thesis for the musicology or music theory major, and an original composition for the composition major. The Master of Music Education degree may be attained with a 30-hour program including a thesis or a 36-hour program without a thesis. For the performance or the accompanying-chamber music major, two public performances are required. Both performances must be judged satisfactory by the student's applied music faculty committee. The conducting student may present either two performances or one with a paper in support of the performance. The Master of Music degree in string pedagogy or keyboard pedagogy may be attained with a 36-hour program without thesis or recitals.

The musicology specialization in the doctoral program requires one foreign language. Other specializations may or may not have this requirement, depending on the dissertation area. Except for the musicology major (one foreign language), no foreign language requirement exists for the Master of Music degrees or for the Master of Music Education degree; however, vocal performance majors must demonstrate singing proficiency in French, German, and Italian.

Some applicants for admission to graduate programs in music are required to submit scores for the General Test of the Graduate Record Examination. Students applying for the Master of Music in performance or the Doctor of Musical Arts degree programs do not need to submit these scores. Students beginning a master's degree program take placement tests in music history and music theory, as well as in applied music if the major is performance or in music education if the major is music education. Texas Tech graduates with a bachelor's degree in music or music education are required to take the placement examinations. All students beginning doctoral study must complete preliminary examinations. All placement and preliminary examinations are administered by the School of Music during the registration period of each semester. Deficiencies, if any, may be removed by appropriate leveling work. The prospective graduate student should also consult the Graduate Studies section of this catalog for admissions requirements.

The Doctor of Musical Arts degree is a 45-hour program oriented toward professional practice in music emphasizing the creation or performance of musical works and the application and transmission of knowledge about musical works. Specializations are in performance, conducting, composition, and piano pedagogy. A nondissertation program, the degree culminates in four doctoral performance projects which are designed to suit the professional interests and aspirations of the student. Of singular importance is the inclusion of 9 credit hours of fine arts courses drawn from visual arts, theatre, and aesthetics. Additional information may be obtained from the School of Music.

The music major in the Ph.D. degree in Fine Arts consists of a minimum of 60 semester hours, which includes fine arts requirements and electives, an individualized music curriculum, and a dissertation. Specializations are in composition, music history, theory, conducting, music education, administration, performance, and pedagogy. This program is explained in the introductory catalog section to the College of Visual and Performing Arts.

5304. **Techniques of String Education (3)**. Study of the latest trends in individual and group string instruction. Laboratory observation and analysis.
5305. **String Methods and Etude Materials (3)**. Advanced studies in the materials, methods, procedures, philosophies, and/or techniques of string pedagogy. Final demonstration project, research paper, and/or recital required.
- 5306, 5307. **Conducting Techniques and Analysis (3 each)**. Structural analysis and study of conducting problems. Individual instruction course. Participation in a major ensemble required. May be repeated with consent of instructor.
5313. **Materials and Methods of Keyboard Instruction (3)**. Investigation of elementary and intermediate levels of piano methods, repertoire, and pedagogical procedures.
5314. **Problems in Keyboard Pedagogy (3)**. Advanced studies in the materials, methods, procedures, philosophies, and/or techniques of keyboard pedagogy. Final demonstration project, research paper, and/or recital required.
5315. **Techniques of Group Piano Instruction (3)**. Materials, methods, and procedures for teaching class piano, with particular attention to managing electronic keyboard laboratories.
5323. **Diction for Singers (3:3:0)**. A comprehensive study of the basic rules of German, French, and Italian lyric diction using the International Phonetic Alphabet to analyze and transcribe vocal repertoire.
5333. **Dynamics of Studio Teaching (3)**. Practical exploration of the successful teacher-student relationship in the music studio, applicable to any performance area. Topics include learning styles, personality types, communication skills, and motivation.
6000. **Thesis Recital (V1-6)**.

Music Composition (MUCP)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1201, 1202 [MUSI 1286, 1287] **Introduction to Contemporary Music (2 each)**. For composition majors. A survey of current trends, with activities emphasizing creative musicianship and new technology in composition. May be an individual study course. (For songwriting, see MUTH 1300.)
- 2301, 2302 [MUSI 1386, 2386]. **Music Composition (3 each)**. For composition majors. Prerequisite: MUCP 1202 or the equivalent. Work in traditional forms and media and also electronic media, together with the principles of notation, layout, reproduction, and copyright. May be an individual study course.
3001. **Projects in Electronic and Experimental Music (V2-4)**. For composition majors. Prerequisite: MUCP 1202, or the equivalent, and instructor approval. Independent study and creative projects utilizing the resources of the Experimental Music Studio. May be repeated for credit.
- 3301, 3302. **Music Composition (3 each)**. For composition majors. Prerequisite: MUCP 2302 and formal approval to continue in the Bachelor of Music program in Music Composition. Continued work in both traditional and electronic media. May be an individual study course.
4207. **Instrumentation (2:2:0)**. Prerequisite: MUTH 2404 or equivalent, or by permission of the division of theory and composition. A study of the properties of woodwind, brass, percussion, and string instruments, their transpositions, and their sectional treatment, leading to full scorings for both band and orchestra.
4208. **Orchestration (2)**. Prerequisite: MUCP 4207. More advanced work in scoring for both band and orchestra.
- 4401, 4402. **Music Composition (4 each)**. For composition majors. Prerequisite: MUCP 3302 or the equivalent. Advanced work on a larger scale, culminating in a senior recital as noted in the curriculum. May be an individual study course.

Graduate Courses

5307. **Contemporary Techniques (3)**. A study of current musical practices and the materials of new music, emphasizing the work of living composers. May be an individual study course.
- 5308, 5309. **Composition (3 each)**. Prerequisite: MUCP 4402, MUTH 4303, or equivalent. Advanced writing for chamber ensembles, orchestra, band, chorus, or electronic media. May be individual study courses. May be repeated for credit.

5312. **Advanced Orchestration (3)**. Scoring for large instrumental, choral, and dramatic ensembles. May be an individual study course.
6000. **Master's Thesis (V1-6)**.

Music Education (MUED)

Undergraduate Courses

3311. **Curriculum and Instruction in Education and Music (3:3:0)**. Prerequisite: Junior standing and acceptance to the Teacher Education Program. Foundations, patterns, and issues in curriculum development. Preparation of resource-teaching units. Transfer and application to the discipline of music. Field experiences required.
3312. **Methods in Education and Music (3:3:0)**. Prerequisite: Junior standing and acceptance to the teacher education program. Foundations of teaching, methods and techniques, evaluation, and classroom management. Transfer and application to the discipline of music. Field experiences required.

Graduate Courses

- 5211, 5212, 5213. **Teaching Applied Music in the Public Schools I, II, III (2 each)**. Techniques, materials, and procedures for class and individual instruction of applied areas in the public schools. I. Woodwinds; II. Brass; III. Percussion.
5326. **Instrumental Music Workshop (3:3:0)**. Prerequisite: Departmental approval. Emphasis upon the organization and development of instrumental groups in the public schools, and upon development of performance excellence by these groups. May be repeated in a new section.
5332. **Learning and Music (3:3:0)**. A study of aesthetic, sociological, and psychological foundations of music education applied to teaching. An emphasis is given to historical development and present day applications.
5333. **Tests, Measurements, and Evaluations in Music (3:3:0)**. A study of general descriptive statistical measures as applied to music testing. Emphasis is placed upon existing music aptitude and achievement tests used in the discipline.
5337. **Workshop of Contemporary Trends in Elementary Music Education (3:3:0)**. For graduates in elementary education and for specialists in music at the elementary level. Music activities for elementary school students stressing techniques and materials of current pedagogical approaches. Topics will vary. May be repeated for credit.
5340. **Introduction to Graduate Studies in Music Education (3:3:0)**. A study of historical perspectives, basic concepts, and present research practices in music education.
5344. **Special Problems in Music Education (3)**. Prerequisite: Consent of advisor. Investigation and execution of special problems in the field of music education. May be repeated with a new problem.
6000. **Master's Thesis (V1-6)**.

Music Ensemble (MUEN)

Undergraduate Courses

1103. **Marching Band (1:0:5)**.
2100. **New Music Ensemble (1:0:3)**.
3101. **Choir (1:0:3)**.
3102. **Music Theatre (1:0:3)**.
3103. **Band (1:0:3)**.
3104. **Orchestra (1:0:5)**.
3105. **Jazz Ensemble (1:0:3)**.
3106. **Small Ensemble (1:0:1)**.
3110. **Medium Ensemble (1:0:2)**.
3201. **University Choir (2:0:5)**.
3202. **Music Theatre (2:0:5)**.
3203. **Band (2:0:5)**.
3204. **Orchestra (2:0:5)**.

Graduate Courses

5101. **Choir (1:0:5)**.
5102. **Music Theatre (1:0:5)**.
5103. **Band (1:0:5)**.
5104. **Orchestra (1:0:5)**.

5105. **Jazz Ensemble (1:0:5).**
 5106. **Small Ensemble (1:0:1).**
 5107. **New Music Ensemble (1:0:5).** The rehearsal and performance of twentieth-century music, with an emphasis upon the works of living composers. Audition required.
 5110. **Medium Ensemble (1:0:2).**

Music History and Literature (MUHL)

Undergraduate Courses

1308. [MUSI 1306, 1307] **Music Appreciation (3:3:0).** Beginning course for nonmajors. Encourages appreciation of music through consideration of a variety of musical styles.
 2301. **History of Music (3:3:0).** Prerequisite: MUSI 1200. Survey of music history, culture and style from antiquity to 1650. Part I of MUHL 2301, 2302, 2303 sequence.
 2302. **History of Music (3:3:0).** Prerequisite: MUSI 1200, MUHL 2301. Survey of music history, culture and style from 1650-1800. Part II of MUHL 2301, 2302, 2303 sequence. (Writing Intensive)
 2303. **History of Music (3:3:0).** Prerequisite: MUSI 1200, MUHL 2301, and 2302. Survey of music history, culture and style from 1880-present. Part III of MUHL 2301, 2302, 2303 sequence. (Writing Intensive)
 2308, 2309 [MUSI 1308, 1309] **Heritage of Music (3:3:0 each).** For nonmusic majors. Studies selected compositions through an interpretation of their historical, functional, and cultural significance.
 3304. **History of Jazz (3:3:0).** Historical and analytical survey of jazz from its beginning through "Rock" its form, style, literature, and influence on 20th century music.
 3308. **Masterpieces in Music (3:3:0).** For nonmusic majors. Studies representative musical works from the Baroque Period to the present in relation to their historical and general cultural context.
 3310. **History of Rock and Roll (3:3:0).** This course focuses on hearing, understanding, and contextualizing Anglo-American rock and roll, a popular idiom rooted in the music of African Americans and rural whites.
 4300. **Special Topics in Music History and Literature (3:3:0).** Prerequisite: MUHL 2301 and 2302. Topics may cover any historical period of music, music literature, or composers. May be repeated under a different topic.
 4321. **Constructs in Ethnomusicology (3:3:0).** Detailed examination of topics in ethnomusicology (the study of musical behavior in its original contexts) and its history, philosophies, methods and areas of study.

Graduate Courses

5300. **Graduate Music History Survey (3:3:0).** Repertoire, context, and composers. Prerequisite to graduate music history unless waived by placement examination or by consent of Musicology Division. Not intended to fulfill major or minor graduate degree requirements.
 5311. **Symphonic Literature (3:3:0).** Studies in the development of orchestral music from the Classic Period to the present.
 5312. **Chamber Music Literature (3:3:0).** Studies in the development of chamber music from the Classic Period to the present.
 5313. **Great Composer Seminar (3:3:0).** Critical examination of the works of a single composer, e.g., Bach, Haydn, Mozart, Beethoven, Wagner, Verdi, Brahms, or Stravinsky. A different composer will be studied each time the course is offered. May be repeated for credit.
 5320. **Topics in Music History (3:3:0).** Topics include specific styles, ethnomusicology, vernacular musics, graduate history review, advanced research projects, and others as needed. May be repeated for credit on different topic; 12 maximum credit hrs.
 5321. **Constructs in Ethnomusicology (3:3:0).** Detailed examination of topics in ethnomusicology (the study of musical behavior in its original contexts) and its history, philosophies, methods and areas of study.
 5330. **Music in the United States (3:3:0).** A study of 20th century American music together with its historical and cultural background.
 5331, 5332, 5333, 5334, 5335, 5336, 5337. **Seminar in the History and Literature of Music; Medieval (5331), Renaissance (5332), Baroque (5333), Classic Period (5334), Romantic Period (5335), Twentieth Century (5336), World**

Music (5337) (3:3:0 each). May be repeated with consent of instructor.

6000. **Master's Thesis (V1-6).**

Music Technology (MUMT)

Undergraduate Courses

1261. **Foundations of Music Technology (2:2:0).** Prerequisite: For majors only or consent of instructor. A survey of the history, current trends, and innovations in music technology. May be an individual study course.
 2361. **Sound Synthesis and Sampling (3:3:0).** Prerequisite: MUMT 1261, MUCP 1201, or equivalent. Basic theory and practical techniques of analog and digital sound synthesis and sampling. Open to both majors and nonmajors.
 3342. **Advanced Synthesis and MIDI I (3:3:0).** Prerequisite: MUMT 2361; majors only or consent of instructor. Overview of the Musical Instrument Digital Interface (MIDI) protocol, along with associated hardware and software. Emphasis will be on basic MIDI communication, systems, and theory.
 3343. **Advanced Synthesis and MIDI II (3:3:0).** Prerequisite: MUMT 3342; majors only or consent of instructor. Development of intermediate and advanced projects using MIDI systems. Emphasis on inter-application and inter-device control.
 3351. **Authoring Systems for Music (3:3:0).** Prerequisite: C S 1303 or equivalent; majors only or consent of instructor. Overview of computer music synthesis languages, authoring systems, and programming environments, including work with Max, Csound, HMSL, and others.
 3361. **Digital Audio I (3:3:0).** Prerequisite: MUMT 1261, MUCP 1201; majors only or consent of instructor. A practical introduction to the foundational theories and techniques of digital signal processing as related to musical composition, performance, and production.
 3362. **Digital Audio II (3:3:0).** Prerequisite: MUMT 3361; majors only or consent of instructor. Provides an exploration of advanced concepts in digital audio applied to the field of music technology, including work in the areas of music education, performance, production, and research.
 4362. **Special Topics in Music Technology (Senior Project) (3).** Prerequisite: Completion of all other MUMT coursework; majors only or consent of instructor. The culminating course for music technology, consisting of a senior project developed in consultation with the instructor. May be repeated once for credit.

Music (MUSI)

Undergraduate Courses

1101. **Introduction to Music Teaching (1:1:2).** Overview of music teaching careers. Includes field-based observations and guest lecturers from the music professions. Open to all music majors.
 1200. **Introduction to Research and Style Analysis (2:2:0).** Music research, reading, writing, and study skills required for academic success.
 2000. **Independent Studies in Music (V1-3).** Individual study at the freshman and sophomore levels, providing greater depth than required by the established curricula. Enrollment and credit hours subject to the approval of divisional coordinators.
 2301. [MUSI 1304] **Essential Elements of Music (3:3:0).** Basic elements of music with appropriate techniques and principles of singing, playing, moving to, and listening to music. For students preparing to teach young children. Not for music majors.
 3202. **Music for the Adolescent (2).** Content, organization, and administration of large and small instrumental and choral ensembles, programs of individual applied music, and appreciation of music for the adolescent.
 3216, 3217. **Choral Techniques (2 each).** Materials, repertoire, and procedures for preparing choral performances.
 3218, 3219. **String and Orchestral Techniques (2 each).** Materials, repertoire, and procedures for preparing orchestral and string ensemble performances.
 3225, 3226. **Band Techniques (2 each).** Prerequisite: 2 yrs. college marching experience. Materials, repertoire, and procedures for preparing band performances. Must be taken sequentially.
 3237, 3238. **Music for Children (2 each).** 3237 prerequisite to 3238. A study of musical activities, materials, and creative ideas. Emphasis on developing the child's voice, movement, playing

of simple melodic and harmonic instruments, and listening skills. For majors and specialists only.

3336. **Music for Young Children (3:3:0)**. Simultaneous study of music and the development of the young child. Basic singing, listening, and age-appropriate activities and repertoire are emphasized.
3341. **Introduction to Technology for Musicians (3:3:0)**. Prerequisite: Music reading skills and basic keyboard skills. Introduces technological resources for all aspects of the musical experience. Topics covered include computer-assisted instruction, computer-generated notation, MIDI sequencing, digital sampling, and nonmusic topics such as Web site development.
4000. **Individual Studies in Music (V1-3)**.

Graduate Courses

5100. **Teaching Music in College (1)**.
5310. **Historical and Critical Perspectives in Music (3:3:0)**. Historical and critical overview of the field including introduction to major theories and methodologies, study of particular artists, works or movements that provide insight into specific creative techniques, basic media and techniques of the field; and interdisciplinary relationships with the other arts. Not for music majors.
5314. **Music in Contemporary Context (3:3:0)**. Contemporary issues in the field including current artistic trends, theory and criticism, organization (e.g., funding, administration), and cultural policy (e.g., education, assessment, multicultural issues, censorship).
5341. **Introduction to Technology for Musicians (3:3:0)**. Introduction to technological resources for all aspects of the musical experience, primarily from the standpoint of the Macintosh operating system. Topics covered include computer-assisted instruction, music printing, MIDI sequencing, digital sampling, HyperCard software development, and nonmusic topics such as word processing, graphics, multimedia, and electronic communication.
5342. **Advanced Technology for Musicians (3)**. Prerequisite: MUSI 3341 or 5341 or consent of instructor. Intensive and extensive student-centered study topics to be selected from programming and software development in music, MIDI sequencing, multimedia development, advanced music notation, and digital sampling and synthesis.
7000. **Research (V1-12)**.
7301. **Music Bibliography and Research (3)**. Required of all doctoral students.
8000. **Doctor's Dissertation (V1-12)**.
- 8301, 8302, 8303, 8304. **Doctoral Performance Projects I-IV (3 each)**. Individual directed projects in music performance or composition.

Music Theory (MUTH)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1101. **Developmental Aural Skills (1)**. For music majors or with consent of instructor. Developmental diction, sight singing, and keyboard skills.
1103. **[MUSI 1116, 1216, 1316] Elementary Aural Skills I (1:0:2)**. Corequisite: MUTH 1303. For music majors or with consent of instructor. Dictation, sight-singing, and keyboard skills.
1104. **[MUSI 1117, 1217, 1317] Elementary Aural Skills II (1:0:2)**. Prerequisite: Completion of MUTH 1303 and 1103 with a grade of C or better, or equivalent. Corequisite: MUTH 1304. Dictation, sight-singing, and keyboard skills.
1300. **Songwriting (3:3:0)**. A beginning course for nonmusic majors. A practical approach to music theory through songwriting. Includes aural training, notation, textual setting, melodic writing, and chord assignment.
1303. **[MUSI 1311] Elementary Music Theory I (3:3:0)**. Corequisite: MUTH 1103. For music majors or with consent of instructor. Melody, rhythm, and diatonic harmony.
1304. **[MUSI 1312] Elementary Music Theory II (3:3:0)**. Prerequisite: Completion of MUTH 1303 and 1103 with a grade of C or better, or equivalent. Corequisite: MUTH 1104. Melody, rhythm, and diatonic harmony.
2103. **[MUSI 2116, 2216] Intermediate Aural Skills I (1:0:2)**. Prerequisite: Completion of MUTH 1304 and 1104 with a grade of C or better, or equivalent. Corequisite: MUTH 2303. Dictation, sight-singing, and keyboard skills.

2104. **[MUSI 2117, 2217] Intermediate Aural Skills II (1:0:2)**. Prerequisite: Completion of MUTH 2303 and 2103 with a grade of C or better, or equivalent. Corequisite: MUTH 2304. Dictation, sight-singing, and keyboard skills.
2303. **[MUSI 2311] Intermediate Music Theory I (3:3:0)**. Prerequisite: Completion of MUTH 1304 and 1104 with a grade of C or better, or equivalent. Corequisite: MUTH 2103. Diatonic and chromatic harmony.
2304. **[MUSI 2312] Intermediate Music Theory II (3:3:0)**. Prerequisite: Completion of MUTH 2303 and 2103 with a grade of C or better, or equivalent. Corequisite: MUTH 2104. Diatonic and chromatic harmony; survey of twentieth-century techniques.
3303. **Form, Analysis, and Synthesis (3:3:0)**. Prerequisite: Completion of MUTH 2304 and 2104 with a grade of C or better or equivalent. The analysis and synthesis of Classical, Romantic, Impressionist, and Contemporary styles, including harmonic and nonharmonic practices and the principles of both small and large part-forms. May be an individual study course.
3316. **Analysis of Post-Tonal Music (3:3:0)**. Prerequisite: Completion of MUTH 2104 and MUTH 2304 with a C or better. A study of analytic techniques and their application in post-tonal music.
- 4302, 4303. **Fundamentals of Composition (3 each)**. Prerequisite: MUTH 3303. Original writing in small forms for voice, solo instruments, and small ensembles; the development of individual style. An individual study course.
4305. **Modal Counterpoint (3)**. Prerequisite: Completion of MUTH 2304 and 2104 with a grade of C or better or equivalent. A study of 16th century vocal counterpoint, beginning with the principles of melodic writing and concentrating upon the analysis and synthesis of polyphonic textures, as found in the motet and the mass.
4307. **Tonal Counterpoint and Fugue (3)**. Prerequisite: Completion of MUTH 2304 and 2104 with a grade of C or better or equivalent. The analysis and synthesis of 18th century counterpoint in two to four voices, concentrating upon the instrumental style and techniques of the invention and the fugue.

Graduate Courses

5300. **Studies in Harmony and Voice Leading (3)**. Common-practice harmony, counterpoint, and figured bass. Prerequisite to enrollment in graduate music theory unless waived by placement or preliminary examination or by consent of the theory-composition division. Not intended to fulfill major or minor graduate degree requirements.
5301. **Dictation and Sight-Singing (3)**. Studies in melodic, harmonic, and contrapuntal dictation, complemented by the sight-singing of equivalent materials. Prerequisite to enrollment in graduate music theory unless waived by placement examination or by consent of the division chair. Does not fulfill graduate degree requirements.
- 5303, 5304. **Styles (3:3:0 each)**. A study of the development of harmonic, melodic, rhythmic, modal, and tonal practices from Gregorian Chant to the present.
5306. **Pedagogy of Theory (3)**. A survey of the materials, organization, techniques, and problems of college freshman and sophomore theory courses.
5310. **Modal Counterpoint (3)**. A study of sixteenth-century vocal counterpoint, beginning with the principles of melodic writing and concentrating on the analysis and synthesis of polyphonic textures, as found in the motet and the Mass.
5311. **Tonal Counterpoint and Fugue (3)**. The analysis and synthesis of eighteenth-century counterpoint in two to four voices, concentrating upon the instrumental style and techniques of the invention and the fugue.
5315. **Analysis of Tonal Music (3:3:0)**. Prerequisite: Successful completion of MUTH 5300 and MUTH 5301 or consent of instructor. A study of analytic techniques and their application in tonal music.
5316. **Analysis of Post-Tonal Music (3:3:0)**. Prerequisite: Successful completion of MUTH 5300 and MUTH 5301 or consent of instructor. A study of analytic techniques and their application in post-tonal music.
5320. **Special Topics in Music Theory (3)**. Topics include history of music theory, advanced analysis projects, and other topics as needed. Some topics offered on-line. May be repeated for credit on different topic.
6000. **Master's Thesis (V1-6)**.

Department of Theatre and Dance

Faculty

Frederick B. Christoffel, M.F.A., Chairperson

Professors: Bert, Christoffel, Marks, Whitmore

Associate Professors: Chansky, Donahue

Assistant Professors: Adair, Bilkey, Durham, Gelber, Mann, Merz

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Dance
- Bachelor of Arts in Theatre Arts
- Bachelor of Fine Arts in Theatre Arts
- Master of Arts in Theatre Arts
- Master of Fine Arts in Theatre Arts
- Doctor of Philosophy in Fine Arts with a major in Theatre

The department is an accredited program of the National Association of Schools of Theatre and sponsors a major season of plays in the University Theatre, a season of student-directed plays in the Laboratory Theatre, a summer repertory season of plays, and various workshops. In addition, the Department of Theatre and Dance sponsors chapters of Alpha Psi Omega (national theatre honorary), Chi Tau Epsilon (national dance honorary), and the United States Institute of Theatre Technology.

The department is an institutional member of the Texas Educational Theatre Association, the Texas Nonprofit Theatre Inc., the Southwest Theatre and Film Association, the Association for Theatre in Higher Education, the United States Institute of Theatre Technology, and the American College Dance Festival Association.

Undergraduate Program

Grades below C in required courses of theatre and dance majors and minors are not acceptable in fulfillment of degree requirements. Transfer students must complete the following minimum numbers of credit hours of major or minor courses in residence at Texas Tech: B.A. theatre majors, 15 hours; B.F.A. theatre majors, 30 hours; B.A. dance majors, 15 hours; theatre or dance minors, 6 hours.

Bachelor of Arts

Theatre Arts Major. The minimum number of hours required for the B.A. in Theatre Arts is 120, at least 40 of which must be at the junior and senior levels. Students seeking the B.A. degree with a major in theatre arts must complete the following requirements in addition to those required by the university and the College of Visual and Performing Arts: TH A 1101, 1102, 1103, 1301, 1303, 2302, 3105, 3303, 3304, 3305, 3308, 3309, 3335, 4302, two hours of dance, and 3 hours of theatre arts electives for a total of 39 to 42 hours.

Theatre Arts Minor. For a minor in theatre arts, the following courses for a total of 18 hours (of which a minimum of 6 hours must be taken in residence) are required: TH A 1303, 2302, 3335; 3 hours from the following list with no course counted more than once: TH A 1101, 1102, 1103, 1104, 3105, or 1 hour from any dance course; one of the following courses: TH A 3308 or 3309; as well as one of the following courses: TH A 3303, 3304, or 3305.

Dance Major. Students accepted to Texas Tech University who wish to seek a B.A. degree or minor in dance must also audition for the dance program. Auditions are held once every spring semester and consist of prospective students learning and performing movement in three different technical styles; solos will not be seen. Acceptance to Texas Tech University does not ensure admission as a dance major. The minimum number of hours required for the B.A. in Dance is 120, at least 40 of which must be at the junior and senior levels. Students seeking the B.A. degree with a major in dance must com-

plete the following requirements in addition to those required by the university and the College of Visual and Performing Arts. Core Requirements: DAN 1100 (3 semesters), 1103, 1105, 1109, 1206, 2202, 3103, 3105, 3109, 3208, 3301, 3309, 3313, 4103, 4105, 4109, 4210, TH A 1303, 3304; Electives (9-12 hours): DAN 1101, 1106, 1108, 2209, 3000, 3101, 3206, 4000, 4202, 4208, 4301; 3 hours from TH A 1104, 2302, 2306, 3303, 3305, 3308, 3309, 4208, VPA 3301, MUSI 2301, MUHL 3304, 3308, 3310, 4321.

Dance Minor. Students seeking a minor in dance should complete the following coursework: 2 credit hours from DAN 1103, DAN 3103, or DAN 4103; 2 credit hours from DAN 1109, DAN 3109, or DAN 4109; 2 credit hours from DAN 1105, DAN 3105, or DAN 4105; DAN 1100 (2 semesters); DAN 2202; DAN 3208; DAN 3309; and DAN 3313.

Bachelor of Fine Arts

Students seeking preprofessional training leading to a B.F.A. degree in theatre arts major in either acting or design technology. Entrance to the B.F.A. program is by audition and interview. Students usually audition for the program at the end of their third long semester and are admitted at the discretion of the faculty. Continuance in the program is dependent upon annual review and the faculty's assessment of the student's timely progress. Students whose progress is found unsatisfactory will be placed on programmatic probation.

Students on programmatic probation who fail to improve will be removed from the program. The minimum number of hours required for B.F.A. theatre majors is 130, at least 40 of which must be at the junior and senior levels. Note that some of the following courses must be completed before entering the B.F.A. program; students should consult advisors for details.

Core Requirements

TH A 1101, 1102, 1103, 1104, 1303, 2101, 2302, 3104, 3105, 3303, 3304, 3305, 3308, 3309, 3335, 4208, 4302, 4303.

Acting Courses

TH A 1301, 1302, 2312, 3105 (two times additional to core), 3106, 3302, 3306, 3307, 3322, 3332. In addition, students must complete 23 hours from the following: TH A 2306, 4000, DAN 1100, 1101, 1103, 1105, 1106, 1109, 1206, 2202, 2209, 3000, 3101, 3103, 3105, 3109, 3206, 3208, 3313, 4103, 4105, 4109, 4301, MUAP (voice) 1001, 1002, 1113, 1114, 2001, 2002, 3001, 3002.

Design and Technology Courses

TH A 2306, 3306, 3307, 3336, 3337, 4108 (twice), 4309 (twice), 4310 and 4311; ART 1303, 2304. Also 15 hours must be selected from TH A 3100, 3101, 3102, 3103, 4000, 4309, 4310, 4311 or ART 3323.*

* Students with an emphasis in scenery, lighting, or costume design must take 6 of the additional 15 hours in their area of specialization.

Teacher Education

Students desiring all-level certification in theatre arts must include the following courses within their overall degree plan: TH A 1301, 1303, 2101, 2302, 3303, 3304, 3305, 3308, 3309, 4302, and one 3-hour theatre arts elective. Students desiring secondary certification in dance must include the following courses within their overall degree plan: DAN 1100 (twice), 1206, 2202, 3103, 3105, 3109, 3208, 3301, 3309, 3313, 4103, 4105, 4109, 4301 (or VPA 3301), and 3 hours from MUHL 3304, 3310, 4321, or TH A 3304. The overall degree plan for the B.F.A. or B.A. degree in theatre arts and for the B.A. degree in dance constitutes the academic major for purposes of recommendation for teacher certification.

Bachelor of Arts in Theatre Arts Recommended Curriculum

FIRST YEAR	
Fall	Spring
TH A 1101, Activities: Scenery & Props	1 TH A 1102, Activities: Lighting & Sound
TH A 1301, Voice for the Actor	3 DAN Course
TH A 1303, Introduction to Theatre	3 ENGL 1302, Adv. Coll. Rhetoric
ENGL 1301, Ess. of Coll. Rhetoric	3 HIST 2301 (or other U.S. history*)
HIST 2300 (or other U.S. history*)	3 Mathematics/Logic Required Course
Mathematics/Logic Required Course	3 Humanities Required Course*
TOTAL	16 TOTAL 15

SECOND YEAR	
Fall	Spring
TH A 1103, Activities: Costume & Makeup	1 TH A 3105, Rehearsal & Performance
TH A 2302, Principles of Acting I	3 TH A 3303, Principles of Scenery
TH A 3335, Script Analysis	3 POLS 2302 (or other approved POLS*)
POLS 1301, Amer. Govt., Org.	3 Foreign Language Required Course
Foreign Language Required Course	5 Minor Required Course*
TOTAL	15 TOTAL 15

THIRD YEAR	
Fall	Spring
TH A 3304, Principles of Lighting	3 TH A 3305, Principles of Costuming
TH A 3308, History of Theatre I	3 TH A 3309, History of Theatre II
Foreign Language Required Course	3 Foreign Language Required Course
Minor Required Course*	3 Oral Communication Required Course*
Minor Required Course*	3 Minor Required Course*
TOTAL	15 TOTAL 15

FOURTH YEAR	
Fall	Spring
TH A 4302, Stage Directing Methods	3 Minor Required Course*
TH A Elective*	3 TH A, Minor, or Core Elective*
Ind. or Group Behavior Required Course*	3 TH A, Minor, or Core Elective*
Natural Lab Science Required Course	4 Natural Lab Science Required Course
Minor Required Course*	3 TOTAL 13
TOTAL	16

Total program hours—120 minimum

* Requires 40 hours of upper-division classes; 22 hours are satisfied by the major; 18 must be satisfied by minor courses and/or core curriculum. Courses marked with an asterisk (*) are potential upper-division courses.

Dance (DAN)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

1100. [DANC 1112, 1113, 1151, 1152, 1212, 1213, 1251, 1252, 1351, 1352, 2112, 2113, 2151, 2152, 2210, 2211, 2212, 2213, 2251, 2252, 2351, 2352]. Dance Production Activities (1). Participation in a dance production, either as a choreographer, performer, designer, or crew member. May be repeated twice for credit.
1101. [DANC 1110, 1210] **Tap I (1:0:3)**. A study of basic tap dance techniques, performance, and choreography. May be repeated once for credit.
1103. [DANC 1147, 1247, 1347]. **Jazz I (1:0:3)**. A study of basic jazz dance techniques, performance, and choreography. May be repeated once for credit.
1105. [DANC 1141, 1241, 1341]. **Ballet I (1:0:3)**. A study of basic ballet dance techniques, performance, and choreography. May be repeated once for credit.
1106. **Conditioning for Performers (1:0:3)**. An introduction to systems of physical conditioning specific to the needs of dance and theatre performers. May be repeated once for credit.
1108. **Hip Hop (1:0:3)**. A study of basic hip hop dance techniques, performance, and choreography. May be repeated once for credit.
1109. [DANC 1145, 1245, 1345] **Modern I (1:0:3)**. A study of basic modern dance techniques, performance, and choreography. May be repeated once for credit.
1206. **Musical Stage Dance (2:1:2)**. An introduction to basic principles of dance styles associated with musical theatre.
2202. **Improvisation (2:1:2)**. A study of basic movement improvisation techniques and skills. May be repeated once for credit.
2209. **Somatics (2:1:2)**. An introduction to a variety of somatic frameworks through theoretical and kinesthetic experience.
3000. **Special Topics in Dance (VI-3)**. Prerequisite: Consent of instructor. Introduction to special topics in dance for in-depth study. May be repeated for credit with different topics.

Bachelor of Fine Arts in Theatre Arts (Acting Specialization) Recommended Curriculum

FIRST YEAR	
Fall	Spring
TH A 1101, Activities: Scenery & Props	1 TH A 1102, Activities: Lighting & Sound
TH A 1303, Introduction to Theatre	3 TH A 1302, Movement for the Actor
TH A 2101, Stage Makeup	1 TH A 2312, Principles of Acting II
TH A 2302, Principles of Acting I	3 DAN Elective*
TH A 3106, Auditioning	1 ENGL 1302, Adv. Coll. Rhetoric
ENGL 1301, Ess. of Coll. Rhetoric	3 Mathematics/Logic Required Course
Mathematics/Logic Required Course	3 TOTAL 15
TOTAL	15

SECOND YEAR	
Fall	Spring
TH A 1301, Voice for the Actor	3 TH A 3304, Principles of Lighting
TH A 3303, Principles of Scenery	3 TH A 3309, History of Theatre II
TH A 3308, History of Theatre I	3 Oral Communication Required Course
Required BFA Elective(s)*	3 POLS 2302 (or other approved POLS)
POLS 1301, Amer. Govt., Org.	3 Humanities Required Course
TOTAL	15 TOTAL 15

THIRD YEAR	
Fall	Spring
TH A 1103, Activities: Costume & Makeup	1 TH A 3305, Principles of Costuming
TH A 3302, Acting Period Styles I	3 TH A 3322, Acting Period Styles II
TH A 3335, Script Analysis	3 Required B.FA Elective(s)*
Required BFA Elective(s)*	3 Natural Lab Science Required Course
Ind. or Group Behavior Required Course	3 HIST 2301 (or other U.S. history)
HIST 2300 (or other U.S. history)	3 TOTAL 16
TOTAL	16

FOURTH YEAR	
Fall	Spring
TH A 1104, Activities: House Mgmt.	1 TH A 3104, Adv. Activities: House Mgmt.
TH A 3332, Acting Period Styles III	3 TH A 4303, Theory & Prac. of Playwriting
TH A 4208, Professional Career Mgmt.	2 Required B.FA Elective(s)*
TH A 4302, Stage Directing Methods	3 Natural Lab Science Required Course
Required B.FA Elective(s)*	6 TOTAL 14
TOTAL	15

Total program hours—130 minimum[^]

* Choose 23 hours of electives from the following: TH A 2306, 4000, DAN 1100, 1101, 1103, 1105, 1106, 1109, 1206, 2202, 2209, 3000, 3101, 3103, 3105, 3109, 3206, 3208, 3313, 4103, 4105, 4109, 4301, MUAP 1001, 1002, 1113, 1114, 2001, 2002, 3001, 3002. Many of the above courses are repeatable for credit. Please see head of area for approved substitutions.

[^] Additional required coursework:

- TH A 3306 and 3307, Practicum in Repertory Theatre I and II, must be taken once (only offered in summer sessions).
- TH A 3105, Rehearsal and Performance, must be taken three times. TH A 3105 should be taken during semesters the student is acting in or stage managing a departmental production.

3101. **Tap II (1:0:3)**. Prerequisite: DAN 1101. A study of intermediate/advanced tap dance techniques, performance, and choreography. May be repeated once for credit.
3103. **Jazz II (1:0:3)**. Prerequisite: DAN 1103 or consent of instructor. A study of intermediate jazz dance techniques, performance, and choreography. May be repeated twice for credit.
3105. **Ballet II (1:0:3)**. Prerequisite: DAN 1105 or consent of instructor. A study of intermediate ballet dance techniques, performance, and choreography. May be repeated twice for credit.
3109. **Modern II (1:0:3)**. Prerequisite: DAN 1109 or consent of instructor. A study of intermediate modern dance techniques, performance, and choreography. May be repeated twice for credit.
3206. **Staging the Musical (2:0:4)**. Prerequisite: DAN 1206. An advanced study of musical stage dance composition with a focus on choreography and performance.
3208. **Principles of Choreography (2:1:2)**. Prerequisite: DAN 1103, 1105, 1109, 2202, or consent of instructor. An introduction to and practical application of basic principles and skills of dance making.
3301. **Dance Aesthetics (3:3:0)**. An investigation of history and trends in dance theory, research, and philosophy. (Writing Intensive)
3309. **Pedagogy (3:3:0)**. Investigation and practical application of contemporary teaching theories and methodologies. (Writing Intensive)
3313. **Dance History (3:3:0)**. History and philosophy of dance and the relationship of dance to allied arts.

**Bachelor of Fine Arts in Theatre Arts
(Design/Technology Specialization)
Recommended Curriculum**

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
TH A 1101, 02, or 03, Practicum	1	TH A 1101, 02, or 03, Practicum	1
TH A 1303, Intro to Theatre	3	TH A 3303, 04, or 05, Principles	3
TH A 2101, Stage Makeup	1	Art 1303, Drawing I	3
TH A 3303, 04, or 05, Principles	3	ENGL 1302, Adv. Coll. Rhetoric	3
ENGL 1301, Ess. of Coll. Rhetoric	3	Mathematics/Logic Required Course	3
Mathematics/Logic Required Course	3	POLS 1301, Amer. Govt., Org	3
TOTAL	14	TOTAL	16
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
TH A 1101, 02, or 03, Practicum	1	TH A 1104, Prac House Management	1
TH A 2302, Principles of Acting	3	TH A 3309, History of Theatre II	3
TH A 3303, 04 or 05, Principles	3	TH A 4309, Scene Des or 4311, Light Des	3
TH A 3308, History of Theatre I	3	Required B.FA Elective(s)*	3
TH A 2306 or 3336 or 3337	3	ART 2304, Drawing II	3
TOTAL	13	Ind. or Group Behavior Required Course	3
		TOTAL	16
SUMMER			
<i>Summer I</i>		<i>Summer II</i>	
TH A 3306, Practicum in Summer Rep I	3	U.S. History Required Course	3
TH A 3307, Practicum in Summer Rep II	3	Oral Communication Required Course	3
TOTAL	6	TOTAL	6
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
TH A 4310, Costume Design	3	TH A 4303, Playwriting	3
TH A 3335, Script Analysis	3	TH A 4309, Scene Des or 4311, Light Des	3
TH A 4108, Practicum in Scene Paint	1	Required B.FA Elective(s)*	3
TH A 2306 or 3336 or 3337	3	U.S. History Required Course	3
TH A 3104, Adv House Management	1	Natural Lab Science Required Course	4
Required B.FA Elective(s)*	3	TOTAL	16
TOTAL	14		
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
TH A 4108, Practicum in Scene Paint	1	TH A 4309, Scene Des or 4311, Light Des	3
TH A 4302, Stage Directing Methods	3	Required B.FA Elective(s)*	6
TH A 4208, Professional Career Mgmt.	2	POLS 2302 (or other approved POLS)	3
TH A 2306 or 3306 or 3307	3	Humanities Required Course	3
Natural Lab Science Required Course	4	TOTAL	15
TOTAL	13		

Total program hours— 130 minimum

* 15 hours of electives must be taken from the following: TH A 3100, 3101, 3102, 3103, 4000, 4309, 4310, 4311 or ART 3323. Students with an emphasis in scenery, lighting, or costume design must take 6 of the additional 15 hours in their area of specialization. Many of the above courses are repeatable for credit. Please see head of area for approved substitutions.

^ Additional required coursework:

- TH A 3105, Rehearsal and Performance, should be taken during the semester a student is stage managing a Lab or Mainstage theatre production.

Bachelor of Arts in Dance Recommended Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
At least 1 technique class from:	1	At least 1 technique class from:	1
-DAN 1103/3103/4103, Jazz I, II, or III		-DAN 1103/3103/4103, Jazz I, II, or III	
-DAN 1105/3105/4105, Ballet I, II, or III		-DAN 1105/3105/4105, Ballet I, II, or III	
-DAN 1109/3109/4109, Mod. I, II, or III		-DAN 1109/3109/4109, Mod. I, II, or III	
DAN 1100, Dance Production Activities	1	DAN 1206, Musical Stage Dance	2
TH A 1303, Intro to Theatre & Dance	3	ENGL 1302, Advanced Coll. Rhetoric	3
DAN 3313, Dance History	3	Natural Lab Science Required Course	4
ENGL 1301, Ess. of Coll. Rhetoric	3	Mathematics/Logic Required Course	3
Mathematics/Logic Required Course	3	Ind. or Group Behavior Required Course*	3
TOTAL	14	TOTAL	16
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
At least 2 technique classes from:	2	At least 1 technique class from:	1
-DAN 1103/3103/4103, Jazz I, II, or III		-DAN 1103/3103/4103, Jazz I, II, or III	
-DAN 1105/3105/4105, Ballet I, II, or III		-DAN 1105/3105/4105, Ballet I, II, or III	
-DAN 1109/3109/4109, Mod. I, II, or III		-DAN 1109/3109/4109, Mod. I, II, or III	
DAN 1100, Dance Production Activities	1	DAN 3208, Prin. of Choreography	2
DAN 2202, Improvisation	2	POLS 2302 (or other approved POLS*)	3
Communications Required Course*	3	Foreign Language Required Course	5
POLS 1301, Amer. Govt., Org.	3	Minor Required Course*	3
Dance (or other) electives**	3	Dance Electives**	2
TOTAL	14	TOTAL	16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
At least 1 technique class from:	1	At least 1 technique class from:	1
-DAN 1103/3103/4103, Jazz I, II, or III		-DAN 1103/3103/4103, Jazz I, II, or III	
-DAN 1105/3105/4105, Ballet I, II, or III		-DAN 1105/3105/4105, Ballet I, II, or III	
-DAN 1109/3109/4109, Mod. I, II, or III		-DAN 1109/3109/4109, Mod. I, II, or III	
DAN 1100, Dance Production Activities	1	DAN 3309, Pedagogy (OR DAN 4301)	3
DAN 3301, Aesthetics (OR Minor Course)	3	Foreign Language Required Course	3
Humanities Required Course*	3	TH A 3304, Principles of Lighting	3
Foreign Language Required Course	3	Minor Required Course*	3
Minor Required Course*	3	Dance Electives**	2
TOTAL	14	TOTAL	15
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
At least 1 technique class from:	1	At least 1 technique class from:	1
-DAN 1103/3103/4103, Jazz I, II, or III		-DAN 1103/3103/4103, Jazz I, II, or III	
-DAN 1105/3105/4105, Ballet I, II, or III		-DAN 1105/3105/4105, Ballet I, II, or III	
-DAN 1109/3109/4109, Mod. I, II, or III		-DAN 1109/3109/4109, Mod. I, II, or III	
DAN 4210, Senior Project	2	DAN 4301 or Multicultural (OR DAN 3309)	3
Natural Lab Science Required Course	4	Additional Vis. & Perf. Arts Course^	3
HIST 2300 (or other U.S. history*)	3	HIST 2301 (or other U.S. history*)	3
Minor Course (OR DAN 3301, Aesthetics)*	3	Minor Required Course*	3
Minor Required Course*	3	Dance Electives**	2
TOTAL	16	TOTAL	15

Total program hours— 120 minimum

* Requires 40 hours of upper-division classes. Courses marked with an asterisk (*) are potential upper-division courses.

** Choose 6-9 hours electives from the following: DAN 1101, 1106, 1108, 2209, 3000, 3101, 3206, 4000, 4202, 4208, 4301.

^ See advisor for approved list of courses for additional Visual & Performing Arts elective; approved courses differ from the Visual & Performing Arts core requirement selections.

- 4000. **Projects in Dance (V1-3)**. Prerequisite: Consent of instructor. This course is designed for students interested in pursuing guided independent projects in dance. May be repeated for credit.
- 4103. **Jazz III (1:0:3)**. Prerequisite: DAN 3103 or consent of instructor. A study of advanced jazz dance techniques, performance, repertory, and choreography. May be repeated twice for credit.
- 4105. **Ballet III (1:0:3)**. Prerequisite: DAN 3105 or consent of instructor. A study of advanced ballet dance techniques, performance, repertory, and choreography. May be repeated twice for credit.
- 4109. **Modern III (1:0:3)**. Prerequisite: DAN 3109 or consent of instructor. A study of advanced modern dance techniques, performance, contemporary repertory, and choreography. May be repeated twice for credit.
- 4202. **Contact Partnering (2:0:3)**. Prerequisite: DAN 2202. A study of contact partnering skills, techniques, and improvisations as practiced in contemporary dance.
- 4208. **Advanced Choreography Workshop (2:0:4)**. Prerequisite: DAN 3208. An in-depth workshop focusing on creating, performing, and critiquing choreography.
- 4210. **Senior Project (2)**. Prerequisite: DAN 3208. Senior presentation of an original dance composition and portfolio of work.

- 4301. **World Dance Forms (3:3:0)**. A study of dances from different cultures, their histories, and their influences on contemporary American dance and culture.

Theatre Arts (TH A)

(To interpret course descriptions, see page 8.)

Undergraduate Courses

- 1101. **Theatre Activities: Scenery and Properties (1)**. Opportunity to participate extensively in theatre activities in scenery and properties.
- 1102. **Theatre Activities: Lighting and Sound (1)**. Opportunity to participate extensively in theatre activities in lighting and sound.
- 1103. **Theatre Activities: Costume and Makeup (1)**. Opportunity to participate extensively in theatre activities in costume and makeup.
- 1104. **Theatre Activities: House Management (1)**. Opportunity to participate extensively in theatre activities in the area of house management.
- 1301. **[DRAM 2336] Voice for the Actor (3:3:3)**. Explores “freeing” the natural resources of the human voice with emphasis on characterization and vocal flexibility.

Graduate Program

Master of Arts

The Master of Arts degree in Theatre Arts requires a minimum of 30 semester hours beyond the baccalaureate. Completion of the M.A. degree requires a thesis and a final exam.

Master of Fine Arts

The Master of Fine Arts degree is a terminal professional degree that provides for intensive concentration in performance and pedagogy, design, playwriting, or arts administration. A minimum of 60 hours is required beyond the baccalaureate. Completion of the M.F.A. degree requires a thesis or a thesis project. In the case of performance and pedagogy and design candidates, the thesis project is based on a performance or production project accomplished during their program. In the case of playwriting candidates, the thesis is based on a script that is produced during their program.

Ph.D. in Fine Arts

The department participates with the faculties in art, music, and philosophy in a multidisciplinary program leading to the Ph.D. degree in Fine Arts. This degree is detailed in the catalog section that introduces the College of Visual and Performing Arts.

Doctoral students whose major area is theatre can choose two of the following fields of concentration: acting and directing;

design; history, theory, and criticism; arts administration; and playwriting. Work towards the degree is both scholarly and practical, requires a minimum of 60 semester hours at the graduate level beyond the master's degree, includes a rigorous comprehensive examination, and culminates in a dissertation requirement that allows a choice of several avenues of research.

Applicants for the Ph.D. program with the major area of theatre must have completed a master's degree or its equivalent in theatre or a related field. Applicants must meet minimum Graduate School requirements, be recommended by the faculty, and be approved by the Graduate Committee within the college.

For admission to any graduate program in theatre, the applicant must fulfill all requirements of the Graduate School as well as departmental requirements (contact graduate advisor in the department). All incoming students must take a diagnostic examination at the start of the fall term. This will provide a basis for faculty decisions about any leveling courses that may be required and credits that may be transferred. After this examination, a degree plan must be decided upon and filed; master's students must file during their first term and doctoral students should file before the end of the second term.

To be educated practically as well as academically, all graduate students are expected to participate actively in the department's production program.

1302. [DRAM 1322]. **Movement for the Actor (3:3:3)**. Explores the physical skills necessary for the actor with emphasis on individual physical creativity and imagination. Required of B.F.A. acting majors.
1303. **Introduction to Theatre (3:3:0)**. Introduction to theatre as a career and academic pursuit: basic concepts, practices, and values. Required of all theatre majors prior to admission to upper-level courses. Offered in fall semester only. For theatre majors and minors only.
2101. [DRAM 1141, 1241, 1341] **Stage Makeup (1:0:3)**.
2301. [DRAM 1351] **Introduction to Acting (3:3:0)**. Fundamental principles of acting for nonmajors, with emphasis on establishing a working vocabulary and basic acting process. Applies toward Visual and Performing Arts requirement.
2302. **Principles of Acting I (3:3:3)**. Explores the fundamental principles of acting. Emphasis on establishing a process and working vocabulary necessary for the profession.
2303. [DRAM 1310] **Theatre Appreciation (3:2:2)**. Study and application of the various activities and methods of theatrical practice. Attendance at representative plays is required. Applies toward Visual and Performing Arts requirement.
2304. [COMM 2366, DRAM 2366] **Introduction to Cinema (3:3:1)**. A study of the cinematic art form. Applies toward Visual and Performing Arts requirement.
2306. **Stage Management (3:3:0)**. Prerequisite: TH A 1303. An in-depth study of the functions and responsibilities of the stage manager in the performing arts.
2312. [DRAM 1352] **Principles of Acting II (3:3:3)**. Prerequisite: TH A 2302. Explores representative acting theories in practice with emphasis on given circumstances and character development. Required of B.F.A. acting majors.
3100. **Advanced Theatre Activities: Stage Management (1)**. Prerequisite: TH A 2306. Opportunity to participate extensively in theatre activities in stage management in University Theatre productions.
3101. **Advanced Theatre Activities: Scenery and Properties (1)**. Opportunity to participate extensively in theatre activities in scenery and properties with emphasis on leadership experiences.
3102. **Advanced Theatre Activities: Lighting and Sound (1)**. Prerequisite: TH A 3304. Opportunity to participate extensively in theatre activities in lighting and sound with emphasis on leadership experiences.
3103. **Advanced Theatre Activities: Costume and Makeup (1)**. Prerequisite: TH A 3305. Opportunity to participate extensively in theatre activities in costume and makeup with emphasis on leadership experiences.
3104. **Advanced Theatre Activities: House Management (1)**. Opportunity to participate extensively in theatre activities in house management with emphasis on leadership experiences.
3105. **Rehearsal and Performance (1)**. Credit for acting or stage managing in departmental productions or acting in approved directing scenes. May be repeated for credit.
3106. **Auditioning (1:0:2)**. Prerequisite: TH A 1301 and 2302. A practicum for developing audition techniques and examining guidelines for audition procedures, with emphasis on resume organization and audition material selection and performance.
3302. **Acting Period Styles I (3:3:3)**. Prerequisite: TH A 2312. Scene study in a spectrum of periods and styles, from the Greeks to Renaissance theatre. Required of B.F.A. acting majors.
3303. **Principles of Theatrical Scenery (3:2:3)**. Prerequisite: TH A 1303 or 2303. The study of technical problems of play production. Design, construction, and painting of scenery and properties and special effects. Enrollment in noncredit lab is required.
3304. **Principles of Theatrical Lighting (3:2:3)**. Prerequisite: TH A 1303 (or 2303) and 3303. Study of the theory and practice of theatrical stage lighting. Elementary electricity, lighting control and instruments, lighting design. Enrollment in noncredit lab is required.
3305. **Principles of Theatrical Costuming (3:2:3)**. Prerequisite: 1303 or 2303. Study and application of the theories and techniques of theatrical costuming. Survey of historical dress. Design for the stage. Construction of theatrical clothing. Enrollment in noncredit lab is required.
- 3306, 3307. **Practicum in Repertory Theatre I, II (3:0:9 each)**. Prerequisite: TH A 1303, 2302, or equivalent. Practical work in the organization, mounting, and presentation of plays in a repertory situation. May be repeated for credit.
3308. **History of Theatre I (3:3:0)**. A comprehensive review of world theatre from its beginning to the 17th century. (Writing Intensive)
3309. **History of Theatre II (3:3:0)**. A comprehensive overview of world theatre from the 17th century to the present. (Writing Intensive)
3322. **Acting Period Styles II (3:3:3)**. Prerequisite: TH A 2312. Scene study in a spectrum of periods and styles from Restoration to contemporary theatre. Required of B.F.A. acting majors.
3332. **Acting Period Styles III (3:3:3)**. Prerequisite: TH A 2312. Scene study in the performance of Shakespearean texts and the conventions and performance styles of Elizabethan theatre. Required of B.F.A. acting majors.
3335. **Script Analysis (3:3:0)**. An introduction to dramatic structure and methods of script analysis as a preparation for writing, directing, designing, performing, and criticizing plays. (Writing Intensive)
3336. **Computerized Drafting for the Theatre (3:2:3)**. Traditional and computer-aided drafting techniques for theatrical presentation.

3337. **Computer Rendering for the Theatre (3:2:3)**. Computer-aided rendering techniques and portfolio tools for theatrical presentation.
4000. **Projects in Theatre and Dance (V1-6)**. Prerequisite: Junior or senior standing and 9 hours of theatre or dance and consent of instructor. Individual study under the guidance of a faculty member. Repeatable for credit.
4108. **Scene Painting (1)**. Prerequisite: TH A 3303 and 3304. Study of the art and craft of scene painting styles and techniques. Repeatable for credit.
4208. **Professional Career Management (2:2:0)**. Prerequisite: Junior or senior standing. An overview of the various aspects of developing and managing a career in the performing arts including auditioning, resume writing, portfolio development, and contract evaluation.
4302. **Stage Directing Methods (3:2:3)**. Prerequisite: Junior or senior standing, TH A 1303, 2302, 3303, 3304, and 3305. Study and practice of fundamental principles and techniques of directing. Student direction of representative plays.
4303. **Theory and Practice of Playwriting (3:3:0)**. Prerequisite: TH A 3335. Study of the techniques of dramaturgy. Practical work in the writing of drama. May be repeated for credit. (Writing Intensive)
4309. **Principles of Scene Design (3:0:9)**. Prerequisite: TH A 1303, 3303, and 3304. Study of theory and practice of theatrical scene design. May be repeated for credit.
4310. **Costume Design (3:0:9)**. Prerequisite: 1303 and 3305. Theory and practice of costume design for technical production. Repeatable for credit.
4311. **Theory and Practice of Lighting Design (3:0:9)**. Prerequisite: TH A 1303, 3303, and 3304. Study of the theory, process, and practice in lighting design for theatre, opera, and dance. Repeatable for credit.

Graduate Courses

5300. **Dramatic Analysis (3:3:0)**. Study of dramatic structures and script analysis methods as a preparation for writing, directing, designing, performing, and criticizing plays.
5301. **Playwriting I (3:3:0)**. Prerequisite: TH A 5300. Basic graduate-level study in the theory and practice of playwriting, focusing on crafting the short play.
5302. **Playwriting II (3:3:0)**. Prerequisite: TH A 5301. Instruction and practice in crafting the full-length play script. May be repeated once for credit.
5303. **Theatre Scene Design (3:0:9)**. Advanced work in the process of designing for the stage. Includes work on models, sketches, renderings, and theatre drafting. May be repeated for credit.
5304. **Theatre Lighting Design (3:0:9)**. Advanced work in theatrical lighting design with an emphasis on the use of light as artistic expression. May be repeated for credit.
5305. **Theatre Costume Design (3:0:9)**. Advanced work in the total process of designing costumes for the stage through design projects for representative plays. May be repeated for credit.
5306. **Theatre History Survey (3:3:0)**. A survey of the major periods and traditions of world theatre and various approaches to theatre historiography. Required of all theatre arts doctoral students.
- 5307, 5308. **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.
5309. **Seminar in Theatre History (3:3:0)**. Prerequisite: An undergraduate major in theatre arts or consent of instructor. Consideration of the theatre of a specific historical epoch, or the comparative study of the theatre of several periods.
5310. **Historical and Critical Perspectives in Theatre Arts (3:3:0)**. Historical and critical overview of the field including introduction to major theories and methodologies; study of particular artists; works or movements TH A provide insight into specific creative techniques; basic media and techniques of the field; and interdisciplinary relationships with the other arts.
5311. **Advanced Directing (3:2:3)**. Prerequisite: Undergraduate directing course or consent of instructor. Study of procedures and techniques of directing. Enrollment in noncredit lab is required.
5312. **Theatre Management (3:3:0)**. 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. **Theatre Arts in Contemporary Context (3:3:0)**. Study of contemporary issues in the field: Current artistic trends, theory and criticism, organization (e.g., funding, administration), and cultural policy (e.g., education, assessment, multi-cultural issues, censorship).
5315. **Reading Playscripts (3:3:0)**. Reading and analysis of numerous playscripts and a study of the way in which they are produced in performance.
5316. **Marketing the Arts (3:3:0)**. An approach to the field of current theories and practices of arts marketing.
5317. **Funding the Arts (3:3:0)**. A seminar in locating and arranging funding for arts organizations.
5318. **Advocacy for the Arts (3:3:0)**. Study of the importance and impact of external environments on the formation, production, and funding of arts activities.
5320. **Theatre Planning (3:3:0)**. A study of the planning and design of theatre facilities.
5321. **Playwriting III (3:3:0)**. Prerequisite: TH A 5301 or consent of instructor. Study of selected topics in the theory and practice and process of playwriting.
5322. **New Script Production (3)**. Practical work for playwrights participating in the production of their original full-length scripts.
5323. **Problems in Lighting, Costuming, and Scenery (3:3:0)**. Development of scenery, costume, and lighting designs for selected plays and theatre buildings from research to presentation.
5324. **The Teaching of Acting (3:3:0)**. Study of modern theories and practices of acting and actor training. Design of the acting course.
5325. **Period Styles in Acting (3:3:3)**. Prerequisite: TH A 5329. Scene study in various periods ranging from Ancient Greece through Medieval, Spanish Golden Age, Jacobean, Restoration, and beyond. Two labs at progressive skill levels.
5326. **Seminar in Directing Methods (3:3:0)**. A study of the methods of selected modern directors and directing theories.
5327. **Special Problems in Directing (3)**. Individual directing project on or off campus. Project must be approved by instructor before enrollment.
5328. **Special Problems in Playwriting (3)**. Prerequisite: TH A 5301. Advanced study in developing, writing, and revising play scripts. May be repeated for credit.
5329. **Advanced Scene Study (3:3:3)**. Scene study in realist and contemporary acting styles. Various approaches to acting in 20th century drama. Required of all first-year acting and directing MFA students.
5331. **Studies in Contemporary Theatre (3:3:0)**. A seminar in contemporary theatre theories and practices.
5333. **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.
5334. **Topics in Acting (3:3:3)**. In-depth workshop in specific acting styles, genres, national and ethnic theatres, and techniques or training.
5336. **Graphics Presentations for the Theatre: Computer Drafting (3:2:3)**. Computer-aided drafting techniques for theatrical presentations.
5337. **Graphics Presentations for the Theatre: Computer Rendering (3:2:3)**. Computer-aided rendering techniques and portfolio tools for theatrical presentations.
5341. **Seminar in Dramatic Theory (3:3:0)**. Prerequisite: An undergraduate major in theatre arts or consent of instructor. The consideration of a specific theoretical approach to the theatre or the comparative study of several theoretical approaches. Repeatable for credit.
5343. **Seminar in Voice and Movement (3:3:3)**. Intensive training in specific voice and movement techniques and methodologies culminating in a studio performance of improvisations, montages, and solo performances.
5350. **Seminar in Theatre Research Methods (3:3:0)**. Examination of research and critical processes in dramatic history, theory, and performance or production through current philosophical orientations, methodologies, and techniques. Required of all graduate students.
5372. **Dramaturgy (3:3:0)**. Study of the role of the dramaturgy in the theatre with emphasis on research, artistic collaboration, and the development of new works.
6000. **Master's Thesis (V1-6)**.
6001. **Internship (V1-6)**. Prerequisite: Consent of instructor. Service assignment in an arts organization for students in the graduate theatre and dance program. May be repeated for credit.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Health Sciences Center

School of Allied Health Sciences

Paul P. Brooke Jr., Ph.D., Dean

Office of Admissions and Student Affairs | 2B 194 HSC
Texas Tech University Health Sciences Center | 3601 4th St.
Lubbock, TX 79430-6294 | T 806.743.3220
allied.health@ttuhsc.edu | www.ttuhsc.edu/sah

Graduate School of Biomedical Sciences

Roderick Nairn, Ph.D., Dean

2B 106 HSC | Texas Tech University Health Sciences Center
3601 4th St. | Lubbock, TX 79430-6206 | T 806.743.2556
graduate.school@ttuhsc.edu | www.ttuhsc.edu/gsbbs

School of Nursing

Alexia Green, Ph.D., Dean

Nursing Program Offices | 2B 164 HSC
Texas Tech University Health Sciences Center | 3601 4th St.
Lubbock, TX 79430-6264 | T 806.743.2730
Undergraduate Program | T 800.493.3954

- Traditional | T 806.743.2737
- RN-B.S.N. | T 806.743.4843
- Second Degree | T 806.743.4844

 Graduate Program | T 800.851.8240 | T 806.743.2730 (Ext. 309)

General Information

Texas Tech University Health Sciences Center cooperates with Texas Tech University to offer undergraduate and graduate programs in selected areas related to the health sciences. The Texas Tech University Health Sciences Center programs are administered through the School of Medicine, School of Pharmacy, School of Allied Health Sciences, Graduate School of Biomedical Sciences, and the School of Nursing.

Texas Tech University Health Sciences Center programs are accredited by the Commission of the Southern Association of Colleges and Schools to award bachelor's, master's, doctoral, and professional degrees. Questions about the accreditation status of TTUHSC may be directed to the Commission on Colleges at 1866 Southern Lane, Decatur, GA, 30333, T 404.679.4500.

The School of Allied Health Sciences offers bachelor's, master's, and doctor's level studies in athletic training; clinical laboratory science; clinical services management; rehabilitation sciences; occupational therapy; physical therapy; physician assistant studies; speech-language pathology; audiology; communication sciences and disorders; speech, language, and hearing sciences (undergraduate); molecular pathology; and rehabilitation counseling. Programs are currently offered at the master's and doctor's level within the Graduate School of Biomedical Sciences in health services research, biotechnology, cell and molecular biology, biochemistry and molecular genetics, medical microbiology, pharmaceutical sciences, pharmacology and neuroscience, and physiology. The School of Nursing offers bachelor's and master's level programs and collaborates with the Texas Woman's University College of Nursing to offer a Ph.D. in nursing.

Prospective students and others interested in services for students with disabilities should make inquiries to the program offices. Qualified students are considered for admission without regard to race, color, religion, sex, national origin, or disability.



School of Allied Health Sciences

Paul P. Brooke Jr., Ph.D., Dean

About the School

The Health Sciences Center School of Allied Health Sciences offers the following degree programs:

- Bachelor of Science in Clinical Laboratory Science
- Bachelor of Science in Clinical Services Management
- Bachelor of Science in Speech, Language and Hearing Sciences
- Master of Science in Speech-Language Pathology
- Master of Science in Clinical Practice Management
- Master of Science in Molecular Pathology
- Master of Physician Assistant Studies
- Master of Athletic Training
- Master of Occupational Therapy
- Master of Physical Therapy
- Master of Rehabilitation Counseling
- Doctor of Audiology
- Doctor of Philosophy in Communication Sciences and Disorders
- Doctor of Science in Physical Therapy

All programs are fully accredited and most include both didactic and clinical practice components. Admission to School of Allied Health Sciences programs is competitive and by application to the school. Admission and application deadlines vary for each program.

Admission to Texas Tech University does not confer admission to the Texas Tech University Health Sciences Center School of Allied Health Sciences nor does admission to the School of Allied Health Sciences confer admission to Texas Tech University.

Prospective students and other interested persons are encouraged to contact the Office of Admissions and Student Affairs for information on allied health careers and educational programs. Students who are attending Texas Tech University and wish to take the courses to satisfy prerequisite requirements for these professional programs may enroll in the College of Arts and Sciences as allied health sciences majors. These students will be advised through the Office of Preprofessional Health Careers at Texas Tech University, Room 340, Chemistry Building, 806.742.3078.

Department of Clinic Administration and Rehabilitation Counseling

Faculty

C. Robin Satterwhite, Ed.D., Chairperson

Professor: Brooke

Assistant Professors: Brooks, Hooten, House, Johnston, Keller, Pasupathy, Ramey, Satterwhite, Spears

About the Program

This department offers study in the following degree programs:

- Bachelor of Science in Clinical Services Management
- Master of Science in Clinical Practice Management
- Master of Rehabilitation Counseling

Undergraduate Program

Bachelor of Science, Clinical Services Management. The program objective is to expand educational access to graduates who have an Associate of Applied Science degree (A.A.S.) from a community college technical program in allied health or related disciplines. This program will provide the appropriate educational foundation and prerequisite hours to students who have an A.A.S. degree and desire to pursue a baccalaureate degree. Examples are certified occupational therapy assistants, medical technologists, physical therapy assistants, radiology technologists, respiratory care technicians, EMS technicians, or business related fields.

Curriculum. The Bachelor of Science in Clinical Services Management degree program is a “2 + 2” format designed to provide wide exposure to the skills, knowledge, and abilities needed for success in supervisory management in our healthcare delivery system. Students “attend” classes in a nontraditional format through the use of internet distance learning technology using the WebCT platform. The curriculum allows for completion of degree requirements at a pace set by the ability and availability of the student.

The program consists of 54 semester credit hours of upper-level undergraduate courses. Courses will rotate and students will register as they appear each semester. There is no prescribed sequencing of courses within the program. Students will select courses from their degree plan and register each semester to complete the 120-hour degree plan objective. The distance education format will rely primarily on internet-based (WebCT) course offerings.

Application Information. Applicants to the B.S., CSM program at TTUHSC must have earned an Associate of Applied Science degree from an accredited community college or university. Students must also complete the Texas common core courses by their anticipated graduation date to be awarded a baccalaureate degree.

Applications will be accepted on an ongoing basis. Each semester the School of Allied Health Sciences Admissions Office will provide admissions applications and processing. After receiving applications, notice of acceptance will be given 60 days prior to the next semester of class offerings.

Clinical Services Management (AHCM)

4301. **Introduction to Healthcare Management (3:3:0).** Reviews basic healthcare management principles and studies the roles and functions of contemporary healthcare managers.
4302. **Financial Management for Clinical Supervisors (3:3:0).** Examines the basic principles of financial management related to clinical support activities.
4303. **Principles of Personnel Management for Clinical Supervisors (3:3:0).** Provides an overview of interpersonal dynamics, conflict resolution, and supervisor responsibilities.

4304. **Management of Clinical Services in Healthcare Organizations (3:3:0).** Provides an overview of operations management and practical decision-making by analyzing the day-to-day operations in clinical support service activities.
4305. **Capital Project Design (3:3:0).** Methods for management of capital projects. Topics include financial considerations, procurement, site preparation, contracting, scheduling, and acceptance for operational readiness.
4306. **Marketing Principles and Entrepreneurship for Healthcare Professionals (3:3:0).** The course covers the principles of marketing and their application in healthcare delivery systems.
4307. **Material Management for Clinical Supervisors (3:3:0).** An overview of identifying material requirements for a clinical support service activity, commercial sources, procurement, tendering contracts, and inventory management controls.
4311. **The U.S. Healthcare System (3:3:0).** A review of the healthcare system, both public and private sector examining organizational structures and the legislative, legal, and market impacts upon the current integrated delivery system.
4312. **Foundations of Managed Care (3:3:0).** Examines principles of managed care and contemporary issues in the organization and administration of managed healthcare organizations.
4313. **Community Health Issues (3:3:0).** A review of national, state, and local community agencies; preventive health services, public health, wellness, personal fitness, stress management, changing lifestyles, and analysis of national issues in the past 50 years.
4314. **Quality Assurance and Risk Management (3:3:0).** An overview of legal requirements and ethical standards in healthcare. Topics include the principles of total quality management (TQM), continuous quality improvement (CQI), joint commission on accreditation of healthcare organizations (JCAHO) requirements, quality assurance, risk management, outcomes measures, bench-marking, and utilization management in the clinical support service setting. Includes an overview of case law that has resulted from expectations of patients and payers, fiduciary responsibility of hospital boards and districts, and changing technology.
4315. **Issues in Gerontology for Healthcare Managers (3:3:0).** Overview of the physical, psychosocial, cognitive, cultural, and environmental factors that affect persons as they age. Special topics include financial and administrative issues that affect patient service, adaptive equipment, assistive technology, and community resources.
4316. **Integrated Delivery Systems and Organizational Relationships (3:3:0).** An overview of the components and organizational issues of integrated delivery systems.
4317. **Statistics for Healthcare Supervisors (3:3:0).** Introduction to descriptive and inferential statistics, quantitative and qualitative research designs, and relate their application for clinical and managerial operations in a healthcare organization.
4318. **Healthcare Law and Ethics (3:3:0).** An introduction to the regulatory, legal and ethical issues related to the healthcare delivery industry. Topics of study are directed toward reimbursement issues; utilization review; HIPPA; patient rights; malpractice; long-term regulatory issues; and federal, state and local statutes.
4320. **Long-Term Care Management (3:3:0).** This course is an overview of the nursing home industry and the managerial requirements associated with long-term care institutions. This course provides an introduction to state and federal regulatory aspects of facility management, care delivery systems, and reimbursement and personnel administration.
4321. **Regulatory Aspects of Long-Term Care (3:3:0).** This course presents an analysis of regulatory requirements in the daily operational environment of a certified and licensed long-term care facility. Topics in this course include Texas, Federal and JCAHO regulatory requirements of the care as well as architectural and life safety code compliance issues of long-term care facility operations.
4331. **Leadership in Healthcare Organizations (3:3:0).** An overview of management theory and leadership principles. Topics include behavioral and managerial practices with emphasis upon interpersonal relations, problem solving skills, time management, stress management, and wellness.

Graduate Program

Master of Science, Clinical Practice Management. The goal of the Master of Science in Clinical Practice Management is to offer a superior graduate-level program consisting of evidence-based research, a focused management-based curriculum, individualized instruction, and mechanisms for personal and professional growth as a clinic manager.

The MSCPM is designed to provide practicing clinicians with skills that will allow them to excel as a clinical supervisor. The increasing complexity of theoretical and applied knowledge required for practice and the growing demand for innovative problem solvers has necessitated the development of a cost-effective graduate program geared toward the practicing clinician.

Curriculum. The degree is entirely distance-based, designed specifically to increase the availability to as many working practitioners as possible. The use of WebCT in association with the Internet will provide a top-quality educational program requiring no coursework requirements on a traditional campus. The program is focused towards the practicing clinicians and their specific needs in today's changing environment, utilizing a mechanism that is student friendly and effective. Students entering the program will be required to complete 36 semester hours to meet degree requirements. They will include 30 hours of core class requirements and 6 hours of elective courses.

Application Information. Individuals applying to the program should already hold a bachelor's degree from a regionally accredited college or university, preferably in physical or occupational therapy, speech language pathology, nursing, athletic training, physician assistant, or any other health-related field. To be considered for admission, an overall grade point average of 2.7 on a 4.0 scale in the last 60 hours of college credit is required.

Master of Rehabilitation Counseling. The last few decades have seen an increasing recognition of the need and right of persons with disabilities to access meaningful work and employment. Rehabilitation counseling specialists work in assisting persons with disabilities to make vocational decisions, obtain employment, and gain independence. Federal legislation, changes in the labor market and an increasing awareness of the skills and abilities possessed by persons with disabilities

have resulted in excellent employment opportunities in this field. State agencies, non-profit organizations, health care facilities, private rehabilitation firms, insurance companies, health management organizations, probation and corrections, educational institutions, private industry, and research organizations all offer employment to rehabilitation counseling professionals.

The master's degree in rehabilitation counseling is offered by distance education and full-time residency on campus is not required. To be considered for admission, the applicant should hold a bachelor's degree from a regionally accredited college or university and an overall GPA of 2.7. Provisional admission may be offered to applicants with a GPA of less than 2.7, but such applications are considered on an individual basis. Graduate Record Examination (GRE) or Millers Analogies Test (MAT) scores are not required for entry into the MRC program. Prior work or volunteer experience in human service settings is considered a valuable attribute for applicants, but is not mandatory. Persons with disabilities are particularly encouraged to apply.

Application Information. Students may start their program in either the fall or spring semester. Applications must be received in the School of Allied Health Sciences Admissions and Student Affairs Office by May 15 for the fall semester and October 1 for the spring semester. It is the applicant's responsibility to assure that all supporting documentation is received by the deadline. Detailed information on application procedures and admission criteria can be obtained by contacting either the program director at 806.743.3242 or the School of Allied Health Sciences Admissions and Student Affairs Office 806.743.3220.

Upon successful completion of the professional program, students may apply to take the rehabilitation counseling certification examination, and if successful, be awarded certification as a Certified Rehabilitation Counselor (CRC).

Students will normally submit a completed application form, transcripts, a letter outlining their rationale for applying to the program, three letters of reference, and a resume or summary of previous work or volunteer experience in rehabilitation. Qualified candidates will be contacted for an interview.

- 4360, 4361. **Special Topics (3:3:0).** Guided independent research projects with focus upon a management problem in the clinical support service setting.
4401. **Healthcare Management Information Systems (4:4:0).** The basic concepts and tools for collecting and analyzing data used by healthcare organizations. Topics include an overview of current desktop computer technology, local area networks (LAN) and integration of information system networks.
4477. **Case Study I (4:4:0).** This course provides a review and application of the principles studied within the CSM curriculum. This course will place specific emphasis on financial analysis, industry analysis, internal analysis, competitive advantage, marketing, and strategic planning and analysis.
4478. **Case Study-Management Project in Special Topics (4:2:4).** Guided independent management project with a focus upon a problem related to the specialty area of their A.A.S. degree discipline, or professional interest in a healthcare management issue.

Clinical Practice Management (AHCP)

5301. **Foundations of Rehab (3:3:0).** This course explores the history and underlying evolution of rehabilitation practice. Issues associated with the evolving position that rehabilitative providers face are addressed in this course. This course consists of current practice patterns, paradigms, and theoretical treatment models. Additionally, the driving forces that make up our clinical models are discussed and evaluated for effectiveness.
5302. **Consumer Dimensions of Healthcare (3:3:0).** This course examines the influence of social-economic factors such as age, gender, ethnicity, race, and financial status on healthcare delivery. The focus is to provide the practicing clinician a more effective background to facilitate a culturally competent approach to healthcare. Topics include organizational culture, customer-oriented service, contemporary demographic trends, and the implications of these trends for effective clinical practice.
5303. **Research Methods (3:3:0).** This course provides the basic statistical and methodological principles underlying clinical and theoretical research, research design, and techniques for conducting appropriate literature reviews. Students will critically evaluate measurement systems, interpretations of findings, and methodologies applied within the literature.
5305. **Current Medical Issues in Healthcare (3:3:0).** This course presents current medical issues that influence managers in today's dynamic healthcare environment. The course will include discussion of emerging technologies, innovative medical procedures, pharmacology issues, and current epidemiological issues. Focus is on implications on managerial decisions, organizational response, and reimbursement issues.
5306. **Healthcare Delivery System (3:3:0).** This course provides the student with the basic understanding of the local and international origins, evolution, and trends in institutional and non-traditional healthcare delivery. Hospitals, ambulatory care organizations, managed care organizations, integrated delivery systems, and other models are discussed in detail. Additionally, various practitioners' roles in the delivery of care within the different models are addressed.
5307. **Practice Management I (3:3:0).** This course discusses managerial principles, operations, and functions within healthcare delivery systems. Examination will focus on issues such as

- organizational design, operational measurement, and stakeholder management. Topics include theories of leadership, management, customer service, and negotiation.
- 5308. Practice Management II (3:3:0).** The course includes personnel management, organizational behavior, and operational issues within healthcare delivery systems. Examination will focus on individual, interpersonal, and group management; employment law; selection; discipline; motivation; staffing; productivity; and team building.
- 5309. Business Statistics (3:3:0).** This course provides statistical knowledge needed to function in day-to-day business operations. This course will take existing data from the student's work environment and use it to chart, graph, manipulate, and extract relevant statistical information and trends. Topics include statistical concepts, methods, and practical application.
- 5310. Coding and Healthcare Law (3:3:0).** This course addresses current CPT and HCPCS coding issues and healthcare related laws. The course will provide the learner with current coding requirements, reimbursement changes, and legal issues facing the healthcare industry. Topics include utilization review, HIPPA, patient rights, and malpractice legislation.
- 5311. Healthcare Finance and Resource Management (3:3:0).** This course covers principles of financial management, analysis, reporting, and allocation of resources. Issues addressed are interpretation of multiple financial statements, utilization of finance-based equations and ratios, and implementation of financial analysis in planning. Additionally, focus is placed on management and allocation of resources, including materials and inventory management.
- 5312. Strategic Planning (3:3:0).** This course addresses the dimensions of market assessment and associated business entry policy. Topics include product line development, business plan development, planning for success, and measuring and presenting outcomes. Entrepreneurial skills, marketing, project development, SWOT analysis, and market growth assessment are significant topics addressed.
- 5315. Professional Development and Healthcare Ethics (3:3:0).** This course guides the student's growth through professional development. Topics include effective communication, education, professionalism, ethical issues, practice expectations, and promotion of the student's profession.
- 5316. Independent Study (3:0:0).** Students are offered the choice of doing an independent comprehensive literature review, research, or practice-based work related to gerontology. Students design their study plan with faculty assistance.
- 5317. Public Policy and Issues in Aging (3:3:0).** This course focuses on the development and evaluation of public policy, state and federal legislative processes, insurance and financial planning, retirement income, protective services, and legal issues that affect the population, especially older individuals. The course investigates current events related to the public policy implementation, using both educational and consumer-based literature.
- 5308. Research Methodologies and Interpretation of Research Findings (3:3:0).** Exploration of current trends in research in rehabilitation and related fields. Basic research design, methodologies, analysis, and interpretation will be reviewed. A discussion of the applications of research methodologies, findings, and interpretations in guiding and evaluating rehabilitation counseling practice (e.g. – choosing interventions, planning assessments, evaluating results, etc.) is also included. (Writing Intensive)
- 5309. Group Counseling Theory and Practice (3:3:0).** This course is designed to prepare counselors to become knowledgeable and skillful in using theoretical constructs of group counseling with individuals with disabilities. Attention is given to theories of counseling, elements of leadership in group counseling, healthy and dysfunctional behaviors, culturally diverse perspectives, and legal and ethical issues.
- 5315. Special Topics/Seminars in Rehabilitation Counseling (3:3:0).** Specialized seminars or courses in specific areas of VR as identified by faculty, students, or the community.
- 5321. Vocational Assessment (3:3:0).** Exploration of the approaches, techniques, instruments, and interpretation of vocational assessment, with a strong emphasis on the identification and integration of assessment information from a multi-disciplinary perspective.
- 5322. Employment Development and Placement (3:3:0).** The roles and techniques involved in the development of employment options and placement of persons with disabilities in employment are explored in-depth. Topic areas to be explored include job analysis, job development, work site modification, ergonomics, role of assistive technology, job placement, employer contacts, supported employment, post placement support, job coaching, and building natural supports.
- 5342. Rehabilitation and Substance Abuse (3:3:0).** This course will provide instruction in the issues and treatment of substance abuse as they pertain to persons with disabilities. Attention will be given to treatment modalities, exploring research topics, and building counseling techniques appropriate for this area of service provision. (Writing Intensive)
- 5343. Introduction to Private Sector Rehabilitation (3:3:0).** This course focuses on the work of rehabilitation counselors in a proprietary, or private setting. An introduction to the different areas of rehabilitation services in the private sector, and the means for preparing each area of employment. Comparison of private versus public sector rehabilitation philosophy. Focus on workers compensation, case management, disability management, long-term disability, and forensic rehabilitation. Examination of resources unique to the field and ethical and legal considerations of private sector rehabilitation.
- 5346. Psychiatric Rehabilitation (3:3:0).** Addresses the issues and methods of working with persons that experience psychiatric disabilities. The course will cover areas of psychopathology, assessment issues, treatment and service options, and vocational and integration issues.
- 5416. Clinical Internship I (4:4:0).** Supervised VR counseling internship located in a rehabilitation counseling services setting. Activities will include an orientation to program components, policies and procedures; an introduction to staff and their role and function; review of confidentiality and ethical standards; observation of all aspects of VR counseling services; work assignments encompassing the tasks of regularly employed VR counselors from intake to placement and/or discharge; reporting/charting and all documentation requirements as set forth by the organization, and evaluation of student performance (including self-evaluation, field site supervisor evaluation, and faculty supervisor evaluation).
- 5517. Clinical Internship II (5:5:0).** Supervised VR counseling internship located in a rehabilitation counseling services setting. Activities will include an orientation to program components, policies and procedures; an introduction to staff and their role and function; review of confidentiality and ethical standards; observation of all aspects of VR counseling services; work assignments encompassing the tasks of regularly employed VR counselors from intake to placement and/or discharge; reporting/charting and all documentation requirements as set forth by the organization, and evaluation of student performance (including self-evaluation, field site supervisor evaluation, and faculty supervisor evaluation).
- 5611. Practicum (6:6:0).** Supervised rehabilitation counseling practicum fostering personal growth, skills development, and insights into the VR process and issues that affect service delivery. Includes both on-campus and classroom experiences (audio/videotape and individual/group interactions) and off-campus experiences in settings that facilitate the development of basic rehabilitation counseling and practice skills. This course may be repeated if the 100-hour requirement is not met.

Rehabilitation Counseling (AHRC)

- 5301. Foundations of Rehabilitation Counseling (3:3:0).** Introduction to the history and philosophy of rehabilitation, and the legislative and policy background underpinning the modern delivery of rehabilitation counseling services. (Writing Intensive)
- 5302. Counseling Theories (3:3:0).** Introduction to the principles of behavior, personality, and human development. Exploration of individual, group, and family counseling theories and practices as they apply to persons with disabilities.
- 5303. Medical Aspects of Disability (3:3:0).** Introduction to the medical aspects and implications of disability. Review of medical terminology, functional limitations, medical treatment and vocational implications as they apply to VR. The identification of appropriate medical intervention resources is discussed.
- 5304. Vocational and Career Development (3:3:0).** Major theories and approaches to career development and exploration, with particular emphasis on the importance of meaningful employment and a career focus. (Writing Intensive)
- 5305. Case Management (3:3:0).** Review of the case management process, including case finding, service coordination, and client advocacy. Discussion of the planning process to maximize personal independence, and the role of the VR process in the identification and use of community resources. The role of computer technology in caseload management, functional assessment, job matching, etc.
- 5306. Psycho-Social Aspects of Disability (3:3:0).** Exploration of the psychological and social aspects of disability, with particu-

Department of Laboratory Sciences and Primary Care

Faculty

Hal S. Larsen, Ph.D., Chairperson

Professors: Larsen, Sawyer

Associate Professors: Hubbard, Maxwell, Rice-Spearman, Taylor

Assistant Professors: Christensen, Collins, Diemer, Hamilton, Hendrix, Jankowski, O'Brien, Ream, Redman, Tatum

Faculty Associate: Chestnutt

About the Program

This department offers study in the following degree programs:

- Bachelor of Science in Clinical Laboratory Science
- Master of Physician Assistant Studies
- Master of Science in Molecular Pathology

Undergraduate Program

Clinical Laboratory Science Program. Medical Technologists (MT) or Clinical Laboratory Scientists (CLS) perform diagnostic laboratory procedures in hospital, clinic or veterinary laboratories. Diagnostic analyses in hematology, chemistry, microbiology, immunology, and urinalysis yield information which is of vital importance in establishing a medical diagnosis.

The clinical laboratory science program requires students to complete two years of lower division courses followed by a two-year upper-division professional curriculum at Texas Tech University Health Sciences Center. Admission is by application only. Transfer students may also apply.

The program in Clinical Laboratory Science offers three options: a standard option, a premedical (dental, veterinary, pharmacy) option, and a prephysician assistant option. Students enrolled in the premedical option are assigned to a faculty advisor. Particular attention is given in the areas of course selection, MCAT preparation, recommendations, and personal expectations. Students enrolled under this option will also have the opportunity to attend lectures in the TTUHSC School of Medicine and tour different areas of the medical complex.

Honors College students accepted into the CLS program may complete Honors College credit in the School of Allied Health Sciences and graduate with the honors designation. Professional level courses are listed and described in the School of Allied Health Sciences Catalog. Students who wish to apply should contact the Office of Admissions and Student Affairs at the School of Allied Health Sciences for information and forms. Contact Information: Lori Rice-Spearman, Program Director, 806.743.3252.

Clinical Laboratory Science Prerequisite Curriculum Standard Option

Content Area	TTU Equivalent	Semester Hours
Biology or Anatomy and Physiology	BIOL 1403 and 1404; or ZOO 2403 and 2404	8
Science Elective*	(Genetics)	3-4
Chemistry	CHEM 1307 & 1107, 1308 & 1108, and 2303 & 2103	12
English	ENGL 1301 and 1302	6
History	HIST 2300 and 2301	6
Political Science	POLS 1301 and 2302	6
Mathematics (Coll. Alg.)	MATH 1320	3
Microbiology	MBIO 3401	4
Electives**		9
TOTAL		57-58

* Genetics recommended if pursuing the M.S. in molecular pathology.

** Electives must be social/behavioral sciences, humanities, and visual and performing arts.

Prephysician Assistant Option

Content Area	TTU Equivalent	Semester Hours
Biology	BIOL 1403 and 1404	8
Anatomy and Physiology	ZOO 2403 and 2404	8
Microbiology	MBIO 3401	4
Chemistry	CHEM 1307 & 1107, 1308 & 1108, and 2305 & 2105	12
English	ENGL 1301 and 1302	6
Mathematics (Algebra)	MATH 1320	3
History	HIST 2300 and 2301	6
Political Science	POLS 1301 and 2302	6
Nutrition	F&N 1325	3
Behavior Science		6
Elective*		3
TOTAL		71

* Electives must be humanities and visual and performing arts.

Premedical Option

Content Area	TTU Equivalent	Semester Hours
Biology	BIOL 1403 and 1404	8
Chemistry	CHEM 1307 & 1107, 1308 & 1108, 3305 & 3105, and 3306 & 3106	16
English	ENGL 1301 and 1302	6
History	HIST 2300 and 2301	6
Statistics-Mathematics	MATH 1351 or 2300	3
Microbiology	MBIO 3401	4
Physics	PHYS 1306 & 1103 and 1307 & 1104	8
Political Science	POLS 1301 and 2302	6
Science Elective*		3-4
Elective**		9
TOTAL		69-70

* Genetics recommended if pursuing the M.S. in molecular pathology.

** Electives must be social/behavioral sciences, humanities, and visual and performing arts.

Clinical Laboratory Sciences (AHMT)

(To interpret course descriptions, see page 8.)

- 3015. Special Problems in Clinical Laboratory Science (V1-3).** A study of specific problems in clinical laboratory science under faculty direction.
- 3110. Introduction to Clinical Laboratory Science (1:1:0).** An overview and introduction to the profession. (Writing Intensive)
- 3310. Urinalysis and Body Fluids I (3:2:3).** Analysis of the physical, chemical, and microscopic parameters of urine and body fluids. Special emphasis is placed on understanding kidney function and pathology.
- 3400. Clinical Chemistry I (4:3:6).** An introduction to the basic principles and methodologies of clinical chemistry.
- 3405. Clinical Bacteriology I (4:3:6).** Study of the isolation, cultivation, identification, and susceptibility testing of pathogenic bacteria. The taxonomy, physiology, and pathogenesis of medically important bacteria are covered.
- 3450. Clinical Chemistry II (4:3:6).** Prerequisite: 3400. The qualitative and quantitative chemical analysis of blood and other body fluids. Correlation of test results to health and disease states.
- 3455. Principles of Immunology (4:3:6).** Fundamentals of immunology and the human immune system. An introduction to the theory, practical application, and technical performance of immunologic and serologic procedures used in diagnostic laboratory medicine.
- 3460. Clinical Bacteriology II (4:3:6).** Prerequisite: AHMT 3405. A continuation of AHMT 3405 with an emphasis on clinical correlations and case studies.
- 3465. Immunohematology I (4:3:6).** Prerequisite: AHMT 3455. The theory, practical application, and technical performance of blood bank procedures required for transfusion of blood, blood components, and the handling and storage of blood components. Correlation of test results to normal and abnormal physiology.
- 3470. Hematology I (4:3:6).** An introduction to the study of coagulation, blood cells, blood forming organs, and related diagnostic laboratory procedures.
- 4105. Senior Seminar (1:1:0).** A Comprehensive review of topics in clinical laboratory science.

4185. **Clinical Correlations (1:1:0)**. Prerequisite: AHMT 3400, 3405, 3450, 3455, 3460, 3465, 3470, 4480. Review of current topics and case studies in clinical laboratory science.
4300. **Applied Statistics and Research (3:3:0)**. Introduction to descriptive, inferential, and non-parametric statistics related to basic and clinical science. (Writing Intensive)
4305. **Molecular Diagnostics (3:3:0)**. Introduction to basic genetics and genetic testing techniques used in molecular and forensic pathology.
4320. **Laboratory Management (2:3:0)**. An introduction to management with emphasis upon management issues and concerns specific to the clinical laboratory. (Writing Intensive)
4455. **Clinical Parasitology and Mycology (4:3:6)**. Prerequisite: AHMT 3405 and 3460. Study of medically significant protozoan and helminthic parasites and their vectors, and pathogenic fungi.
4480. **Hematology II (4:3:6)**. Prerequisite: AHMT 3470. The study of blood cells and their abnormalities with emphasis on disease processes.
4640. **Clinical Preceptorship I (6:6:0)**. An introductory supervised clinical practicum in an affiliated clinical laboratory.
4741. **Clinical Preceptorship II (7:7:0)**. An intermediate supervised clinical practicum in an affiliated clinical laboratory.
4842. **Clinical Preceptorship III (8:8:0)**. An advanced supervised clinical practicum in an affiliated clinical laboratory.

Molecular Pathology (AHMP)

5100. **Issues in Molecular Pathology I (1:1:0)**. Presentation of current topics regarding the biomedical application of genetic information using a journal club format. Ethical issues, regulatory issues, and principles of educational methodologies will also be discussed.
5101. **Issues in Molecular Pathology II (1:1:0)**. Prerequisite: AHMP 5100. Basic business and management principles relative to laboratory management and administration will be presented.
5300. **Applied Statistics and Research (3:2:3)**. Introduction to descriptive, inferential, and non-parametric statistics related to basic and clinical science; introduction to the process of basic and clinical research and research design.
5301. **Clinical Laboratory Survey (3:3:1)**. Survey of the clinical laboratory that includes common laboratory assays (hematology, clinical chemistry, microbiology, transfusion services, and body fluids) and addresses the purpose, function, and utilization of laboratory services.
5309. **Human Molecular Genetics (3:3:0)**. This course covers DNA structure and function, chromosomes, cells and development, pedigree analysis, and reviews the basic techniques used in the laboratory. In addition, various genome sequencing projects and the insights they provide into the organization, expression, variation, and evolution of our genome, especially as they relate to the study and treatment of human disease are discussed. Discussion of mapping, identifying, and diagnosing the genetic causes of mendelian and complex diseases and cancer. (Writing Intensive)
5405. **Applied Molecular Techniques I (4:3:6)**. Introduction to basic genetic testing techniques used in molecular and forensic pathology with discussion of quality laboratory practice including quality control, quality assurance, and quality improvement. Lab component will focus on the use of DNA and RNA technologies in clinical settings in addition to their use in identity testing. (Writing Intensive)
5406. **Molecular Biology of the Cell (4:4:0)**. Comprehensive survey course in eukaryotic molecular biology and genetics required by all students planning a career in molecular pathology or basic biomedical research.
5407. **Pathophysiology (4:4:0)**. Presentation of the basis of human disease with regard to the major determinants of disease in human organ systems with discussion of normal anatomy and physiology.
5408. **Applied Molecular Techniques II (4:3:6)**. Prerequisite: AHMP 5405. Advanced training and technical experience in the use of DNA and RNA technologies applied to the clinical setting. Independent work on research project. (Writing Intensive)
5741. **Graduate Research (V1-3)**. Corequisite: AHMP 5742. Supervised independent advanced molecular clinical research in an affiliated laboratory. Course culminates in the preparation of an original scientific paper and public presentation of the research project. (Writing Intensive)
5742. **Clinical Preceptorship (V1-3)**. Corequisite: AHMP 5741. Supervised advanced molecular clinical practicum in an affiliated laboratory with emphasis on patient testing, quality assurance, and case studies assessment.

Physician Assistant (AHPA)

5101. **Introduction to the Physician Assistant Profession (1:1:0)**. This lecture series explores the role and socialization of the physician assistant as a healthcare professional. The course discusses the history of the profession, the evolution of the physician-PA team, maintenance of professional credentials, professional organizations, program accreditation, professional liability, practice issues and future trends.
5201. **Medical Ethics and Jurisprudence (2:2:0)**. This lecture series examines prominent ethical issues in healthcare delivery. Students are engaged in discussion of ethical dilemmas relevant to clinical practice and the unique relationship of the physician and physician assistant. The course also examines quality assurance and risk management, legal issues, practice statutes and rules regulating physician assistant practice in Texas.
5301. **Clinical Laboratory (3:3:0)**. This lecture series describes the significance, ordering and interpretation of laboratory studies routinely ordered in the clinical setting. Concepts of microbiology, including immunology and infectious disease will be examined. Case studies are incorporated into the teaching process.
5306. **Pharmacology I (3:3:0)**. This lecture series introduces the actions of basic pharmacologic agents in the human. The mechanism of action, principal actions and adverse reactions of conventional classes of drugs is examined. A review of fundamental pharmacology calculations, measurements and symbols are performed. This course is taught in part by interactive teleconferencing from the TTUHSC campus in Lubbock and partly at the PA program main facility in Midland.
5307. **Pharmacology II (3:3:0)**. This lecture series builds on Pharmacology I. The action and interaction of pharmacological agents is discussed. Therapeutic applications, adverse reactions and contraindications to familiar drugs are considered. Instruction in proper writing of prescriptions is presented. This is a distance-learning course taught by interactive teleconferencing from the TTUHSC campus in Lubbock.
5308. **Neuroscience (3:3:0)**. This lecture series details the human nervous system, with emphasis on the recognition of neuroanatomical arrangement. The course explores neurophysiology and concepts of neurochemistry. This is a distance-learning course taught by interactive teleconferencing from the TTUHSC campus in Lubbock.
5309. **Pediatrics (3:3:0)**. This lecture series surveys the acute and chronic disease states frequently encountered in the primary care setting as well as normal child growth and development. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing critical thinking and a problem-oriented approach to diagnosis and treatment. The family medicine relevance to neonatology, pediatrics, speech/language and genetic disease is explored. Referral of patients to other healthcare providers or agencies is discussed. Case studies and patient education are incorporated into the teaching process.
5310. **Medical Interviewing (3:2:2)**. This course focuses on the "how to" aspects of patient interviewing, communication skills, and counseling skills. It stresses attributes of respect for self and others, adherence to the concepts of privilege and confidentiality in communicating with patients and a commitment to the patient's welfare. Class sessions include lectures, interviewing labs and role-playing exercises. Small groups meet on a regularly scheduled basis each week to discuss and "actively" practice interviewing skills. This practice may include interviewing other students, simulated patients, or real patients in the hospital.
5311. **Cardiology (3:3:0)**. This lecture examines the complex disease states frequently encountered in the adult internal medicine setting. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing a problem oriented approach to diagnosis and treatment. The approach to problems in cardiology and EKG interpretation is explored.
5312. **Clinical Medicine III (3:3:0)**. This lecture series examines the complex disease states frequently encountered in the primary care medicine setting. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing critical thinking and a problem oriented approach to diagnosis and treatment. Referral of patients to other healthcare providers or agencies is discussed. The approach to problems in orthopedic and musculoskeletal disease processes including acute, chronic, continuing, rehabilitative care is explored. Case studies and patient education are incorporated into the teaching process.

Graduate Program

Physician Assistant Program. The Department of Laboratory Sciences and Primary Care offers study towards a graduate degree in Physician Assistant Studies. The master's degree program is offered at a TTUHSC site located on the campus of Midland College in Midland, Texas. To be considered for admission, the applicant must have completed at least 66 semester hours of prerequisite courses with a cumulative GPA of 3.2 or above. A baccalaureate degree is not required for admission. Individuals already holding a baccalaureate or graduate degree in another field are eligible, but they must meet the same prerequisite course and grade requirements as all other applicants. Contact the School of Allied Health Sciences Admissions and Student Affairs Office or the Physician Assistant Studies Program for specific requirements.

Applications are accepted through the Central Application Service for Physician Assistants (CASPA) beginning in the summer preceding the year of expected matriculation. New classes begin each year in late May. Applications must be received by CASPA by December 15 to be considered for admission into the professional curriculum, beginning the following May. It is the applicant's responsibility to ensure that all required supporting documentation is received by the deadline.

Upon successful completion of the professional program, students are eligible to take the NCCPA National Certification Examination required for state licensure to practice as a physician assistant in Texas. Further information about the program, school requirements, and other related matters may be obtained from the School of Allied Health Sciences Admissions and Student Affairs Office or the Physician Assistant Program.

The following table illustrates the prerequisites for the Allied Health Physician Assistant Program.

Physician Assistant Prerequisite Curriculum

Content Area	TTU Equivalent	Semester Hours
English	ENGL 1301 and 1302	6
College Algebra	MATH 1320 (or higher level math)	3
Biology	BIOL 1403 and 1404	8
Microbiology	MBIO 3401	4
Human Ana. and Phys.	ZOOL 2403 and 2404	8
General Chemistry	CHEM 1307 & 1107 and 1308 & 1108	8
Behavioral Science		9
Human Nutrition	NS 3320 or 3340	3
Statistics	MATH 2300 or PSY 3400	3
Electives*		14
TOTAL		66

* Computer Basics and Medical Terminology recommended but not required.

Molecular Pathology Program. The diagnostic molecular scientist is a professional who is qualified by academic and applied education to provide service in the molecular diagnosis of acquired, inherited and infectious diseases. The goal of molecular diagnostics is to enhance the value of clinical laboratory services by providing an environment in which new tests based on the application of knowledge and new techniques at the most basic cellular level (i.e., molecular techniques) can be established, validated, and applied to the testing of patient specimens.

The entry level degree is the Master of Science in Molecular Pathology. To qualify for admission to the program, applicants must have completed or plan to complete a bachelor's degree with all prerequisite courses from an accredited U.S. college or university prior to enrollment. A cumulative grade point average of 3.0 or above is necessary to qualify for admission. Applications may be submitted at any time; however, applications must be received by March 1 to be considered for enrollment when coursework begins the following summer. All qualified candidates selected by the admissions committee will be invited for an on-campus interview. Prerequisite requirements include the following:

- Graduate of a NAACLS accredited Clinical Laboratory Science Program (cumulative 3.0 GPA including a 3 credit hour genetics course) or
- Graduate of a NAACLS accredited Clinical Laboratory Technician Program with a bachelor's degree (cumulative 3.0 GPA including a 3 credit hour genetics course) or
- Graduate of an accredited university with a bachelor's degree in chemistry, biology, biochemistry, or microbiology that includes the following courses:

Semester Hours

General Chemistry with Lab.....	8
Microbiology.....	4
Biochemistry.....	3-4
Cell Biology	4
Anatomy & Physiology	4
College Algebra	3
General Biology	8
Organic Chemistry.....	8

5313. Clinical Medicine IV (3:3:0). This lecture surveys the acute and chronic disease states frequently encountered in the primary care setting. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing critical thinking and a problem oriented approach to diagnosis and treatment. The family medicine relevance to genitourinary, reproductive (including family planning) and endocrinology processes including acute, chronic, continuing, rehabilitative care are explored. Referral of patients to other healthcare providers or agencies is discussed. Case studies and patient education are incorporated into the teaching process.

5403. Clinical Medicine I (4:4:0). This lecture series examines the complex disease states frequently encountered in the adult internal medicine setting. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing critical thinking and a problem oriented approach to diagnosis and treatment. The approach to problems in pulmonology and gastroenterology are explored including the important aspects acute, chronic, continuing and rehabilitative care. The role of proper nutrition for health and disease prevention is discussed. Referral of patients to other

healthcare providers or agencies is discussed. Case studies and patient education are incorporated into the teaching process.

5404. Clinical Medicine II (4:4:0). This lecture series surveys the acute and chronic disease states frequently encountered in the primary care setting. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing critical thinking and a problem oriented approach to diagnosis and treatment. The family medicine relevance to EENT, infectious disease, dermatology, hematology/oncology and alternative/complementary medicine and the important aspects of acute, chronic, continuing and rehabilitative care are explored. Referral of patients to other healthcare providers or agencies is discussed. Case studies and patient education are incorporated into the teaching process.

5406. Physiology (4:4:0). This lecture series investigates human physiology through a detailed explanation of the functions and activities of bodily processes as related to healthcare. It discusses the fundamental principles of cellular physiology, considers the important concepts necessary for understanding the integrated cellular function of the human body and develops the explanation of human physiology as relevant to the health professional. The lectures assimilate an approach to major organs systems

- and develop important concepts and principles necessary for understanding the integrated function of major organ systems of the human body.
5407. **Pathology (4:4:0).** This lecture series integrates normal human physiology with the pathological basis of disease. It illustrates abnormal cellular physiologic function in disease conditions, introduces major concepts of cellular pathophysiology and demonstrates abnormal physiologic function in disease conditions. The principles of cellular pathophysiology are applied to organ system pathology and the study of representative and important diseases. The lectures examine the function of major organ systems in addressing the pathological basis for disease and the role of the human immune system.
5501. **Human Anatomy (5:4:2).** This lecture/laboratory encompasses a regional study of the gross morphological features of the human body emphasizing functional anatomy. A portion of the laboratory experience involves computer-assisted learning. Students participate in human cadaver prosection laboratory sessions held at TTUHSC in Lubbock on four days during the semester. The lecture portion is a combination of distance-learning and onsite activity taught in part by interactive teleconferencing from the TTUHSC campus in Lubbock and partly at the PA program main facility in Midland.
5502. **Physical Examination (5:3:2).** This is a lecture/laboratory series in which the pediatric, adult, geriatric and trauma patient physical examination is demonstrated and practiced. Students learn and apply the techniques of a comprehensive physical examination with the proper use of diagnostic instruments. Integration of the medical history (AHPA 5310, Medical Interviewing) with the physical examination is reviewed and rehearsed. The laboratory experience utilizes students acting as patients, other simulated patients and real patients in a long-term care facility.
6301. **Clinical Medicine VI (3:3:0).** This lecture series explores issues in preventive medicine, including health maintenance and risk factor reduction in the community. The course considers occupational health as well as acute, chronic and communicable diseases. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing critical thinking and a problem-oriented approach to diagnosis and treatment. The family medicine relevance to geriatrics, neurology, urology, nephrology, and speech/language disorders is explored. Responses to death and dying, advance directives and end-of-life decisions are discussed. Referral of patients to other healthcare providers or agencies is discussed. Case studies and patient education are incorporated into the teaching process.
6302. **Medical Spanish (3:3:0).** This lecture is designed to introduce the non-Spanish-speaking healthcare provider to basic and essential medical Spanish terminology in order to elicit information necessary to obtain a comprehensive medical history and perform a physical examination. Laboratory/Radiographic results and treatment plans are also included.
6304. **Healthcare Management (4:4:0).** This lecture series informs and prepares the graduate for basic clinical office or hospital practice management. Discussion emphasizes reimbursement issues, coding/billing procedures, licensing and authorization of privileges that are exclusive to physician assistant practice. The impact of socioeconomic issues and healthcare delivery systems are also explored.
6306. **Medical Psychology (3:3:0).** This lecture series analyzes acute and chronic psychiatric diseases frequently encountered in primary care clinical practice. It also explores personality development, child development, normative responses to stress, psychosomatic manifestations of illness and injury, sexuality, responses to death and dying and basic counseling techniques. Adherence to the concepts of privilege and confidentiality in communicating with patients and a commitment to the patient's welfare is stressed. The course will apply interviewing techniques developed in AHPA 5310, Medical Interviewing, to the approach to the patient with a psychiatric illness.
6404. **Master Project Track (4:4:0).** This course is taught during the grand rounds held at the completion of each clerkship and includes a research and writing project. The basics of biomedical research are explored prior to the writing phase. Students are instructed on the techniques necessary to search and interpret the medical literature and its application to patient care. Students prepare and submit a manuscript for evaluation. The document must be informative, established from published evidence based research and stress current and operational knowledge of new medical findings. Throughout the clinical year during grand rounds at the end of each clinical rotation, the students are instructed and monitored in developing a text suitable for publication.
6501. **Clinical Medicine V (5:4:2).** This lecture series explores specialized and tertiary healthcare. Students learn the importance of the relationship between primary care practice and specialty practices. Areas of study include medical specialties, surgical specialties, and emergency medicine. Technical healthcare in sophisticated, research and teaching hospitals is evaluated. This course prepares the student for clinical clerkships. Discussions address appropriate protocol, behavior and dress within the clinical setting. Weekly workshops enable students to learn and perform procedures that are essential to clinical practice. Students perform histories and physical examinations and develop further case presentation skills. A summative evaluation of clinical skills will be administered near the end of the clinical curriculum. PACKRAT (Physician Assistant Clinical Knowledge Rating and Assessment Tool) will be administered as a summative evaluation at the end of the didactic phase, and then administered again at the end of the clinical phase to document the student's progress in developing a medical data base. Case studies and patient education are incorporated into the teaching process.
6601. **Family Medicine Clerkship (6:0:40).** This clerkship provides experience with common diseases and chronic illnesses in the family practice setting and is composed of one six-week rotation. The learning experience includes the family medicine approach to direct care, initial care, comprehensive care and continuity of care. The student participates in the promotion and application of preventive medicine and wellness maintenance techniques as an important aspect of family practice.
6602. **Internal Medicine Clerkship (6:0:40).** This clerkship provides clinical experience with acute and chronic illnesses seen in the general internal medicine practice and is composed of one six-week rotation. The student experiences the traditional approach to the comprehensive care of adult patients to include continuity of care. Provides clinical experience in preventive medicine, health and wellness maintenance techniques, especially in secondary and tertiary settings.
6603. **Prenatal Care and Gynecology Clerkship (6:0:40).** This clerkship provides a six-week clinical experience in the care of prenatal and gynecologic patients. Training will emphasize the examination of the female patient with focus on the most common gynecologic problems and their diagnostic assessment, the formulation of appropriate treatment plans, the utilization of preventive medicine modalities and the evaluation and education of the prenatal patient.
6604. **Pediatrics Clerkship (6:0:40).** This clerkship is designed to provide PA students with experience in the specialty of pediatric medicine and is composed of one six week rotation. This clerkship provides the opportunity for students to gain general pediatric knowledge and to apply that clinical knowledge to the development of the necessary proficiency for a PA to function in a primary care pediatric setting.
6605. **Emergency Medicine Clerkship (6:0:40).** The Emergency Medicine clerkship will provide the PA student with experience in the emergency department with urgent and emergent medical problems and with trauma and surgical cases and is composed of one six-week rotation. It includes the emergency approach to direct initial and comprehensive care for patients in the acute care setting.
6606. **Geriatrics Clerkship (6:0:40).** The geriatric clerkship provides a clinical experience with one of the most rapidly growing patient populations in the United States. The six-week rotation provides the student with an opportunity to create a knowledge base and to gain clinical experience in the unique medical, psychosocial, environmental and cultural aspects of aging.
6607. **Psychiatry Clerkship (6:0:40).** The six-week psychiatry clerkship provides experience with common acute and chronic psychiatric diseases and illnesses in both the outpatient and inpatient settings. The student learns about and interacts with public and private treatment facilities for substance abusers and their affiliated support groups, local public counseling agencies, and state psychiatric facilities.
6608. **General Surgery Clerkship (6:0:40).** The six-week clerkship in surgery provides experience in the presentation and treatment of surgical disease and illness. This rotation allows the PA student to experience the approach to and the management of the surgical patient in the preoperative, intraoperative, and postoperative phase of care.

Department of Rehabilitation Sciences

Faculty

Steven F. Sawyer, Ph.D., Chairperson

Professor: Brooke

Associate Professors: Clopton, Daniel, Domenech, James, Knotts, Sawyer, Sizer

Assistant Professors: Brismee, Brueilly, Cobb, Dedrick, Elliot, Geddie, K. Gilbert, J. Jackson, McGalliard, Potter, Poulsen, Ramey, Scott, Smith, Steadman, Stickley, Taylor, Whisner, Wilkinson, Williamson

About the Program

This department offers study in the following degree programs:

- Master of Athletic Training
- Master of Occupational Therapy
- Master of Physical Therapy
- Doctor of Science in Physical Therapy

Athletic Training. “Certified athletic trainers (ATCs) are medical experts in preventing, recognizing, managing, and rehabilitating injuries that result from physical activity” as described by the National Athletic Trainers’ Association. Athletic trainers are integral members of the healthcare team, working under the direction of a licensed physician and in collaboration with other healthcare professionals, administrators, coaches, and parents. Career opportunities exist in settings such as college/university athletic departments, secondary school systems, professional sports, sport medicine clinics, corporate/industrial settings and other healthcare environments.

The master’s degree in athletic training (MAT) is a Commission on Accreditation of Athletic Training Education (CAATE) accredited entry-level program offered at the TTUHSC-Lubbock campus only. The MAT program is a 59 semester credit hour, two year lock step program combining didactic and clinical education to meet the educational needs of students. Admission into the MAT program is competitive. To be considered for admission, the candidate must hold a bachelor’s degree with a minimum cumulative GPA of 2.7 or above from an accredited college or university, completed or plan to complete all prerequisite courses prior to enrollment with a GPA of 2.7, and have some knowledge of the profession. Prerequisite courses include the following:

Semester Hours

Anatomy and Physiology	6-8
Exercise Physiology	3
Statistics	3
Nutrition	3
Kinesiology or Biomechanics	3
Physics (recommended)	3
Chemistry (recommended)	3
Proof of First Aid and CPR from an approved provider	

The Office of Admissions and Student Affairs accepts applications each year between September 1 and February 1 for admission into the class beginning the following May. Applicants wishing to apply for early admission to the program should submit their application by October 15. Class size is limited and all admissions are competitive. It is the applicant’s responsibility to assure that all required supporting documentation is received by the deadline. For complete admission information visit the School of Allied Health Sciences Web site at www.ttuhs.edu/sah.

Upon graduation students will be eligible to sit for the Board of Certification and the Texas Licensure credentialing examinations. Requirements for individual credentialing varies by state according to athletic training practice acts and state regulations governing athletic training.

Occupational Therapy Program. Occupational therapy enables clients to develop or maintain the physical, cognitive, and emotional abilities needed to meet the demands of work, home, and community environments. Occupational therapists may also modify tasks and environments to facilitate optimal performance. The occupational therapist assesses the individual’s strengths and weaknesses, determines how these affect the ability to function in daily life, and then develops prevention, maintenance, or rehabilitation programs that are meaningful to the individual. Therapists are involved in collaboration with parents, families, and significant others; treatment planning and implementation; administration; research; education; consultation; and service. They also offer services focusing on prevention of impairment and disability.

Occupational therapy practitioners are licensed professionals whose education includes the study of human growth and development with specific emphasis on the social, emotional, and physiological aspects of illness and injury. Practitioners must complete supervised clinical internships in a variety of healthcare settings and pass a national examination.

Graduates of the program will be able to sit for the national certification examination for the occupational therapist administered by the National Board for Certification in Occupational Therapy (NBCOT). After successful completion of this exam, the individual will be an Occupational Therapist, Registered (OTR). Most states require licensure in order to practice. **A FELONY CONVICTION MAY AFFECT A GRADUATE’S ABILITY TO SIT FOR THE CERTIFICATION EXAMINATION OR ATTAIN STATE LICENSURE.**

The program is fully accredited by the Accreditation Council for Occupational Therapy Education of the American Occupational Therapy Association (ACOTE). ACOTE may be contacted at the following address: Accreditation Department, American Occupational Therapy Association, Inc., 4720 Montgomery Lane, P.O. Box 31220, Bethesda, MD 20824-1220 (301) 652-AOTA.

The Office of Admissions and Student Affairs accepts applications each year between September 1 and February 1 for admission into the class beginning the following May. Applicants wishing to apply for early admission to the program should submit their application by October 15. The entry-level master’s degree in occupational therapy is offered at the TTUHSC Lubbock campus only. For more complete admissions information, visit www.ttuhs.edu/sah; 806.743.3220; allied.health@ttuhs.edu; or mail inquiries to Admissions and Student Affairs, MS 8310, 3601 4th Street, Lubbock, TX 79430.

Prerequisite courses for entry into the master’s program include those listed below or their approved equivalents for a total of 90 hours.

Semester Hours

English	6
Physics and/or Biomechanics	3
Anatomy and Physiology w/lab	6-8
Introductory Psychology	3
Developmental Psychology (across the life span)	3
Abnormal Psychology	3
Introductory Sociology	3
Statistics	3
Electives	58-60
TOTAL	Minimum of 90

Physical Therapy Program. Physical therapy is a health profession with the primary purpose of promoting optimal human health and function through the application of scientific principles to prevent, identify, assess, correct, and alleviate acute or prolonged movement dysfunction. As members of the healthcare team, physical therapists evaluate, treat, and instruct human beings to alleviate and/or limit physical disability and pain from injury, disease, and other conditions. Physical therapists may use physical elements such as heat, cold, sound, light, water, exercise, electricity, massage, mobilization, and positioning to reach patient goals.

The entry level degree is the Master of Physical Therapy degree. This degree will be offered at three of the four Texas Tech University Health Sciences campuses: Amarillo, Lubbock, and Odessa.

The Office of Admissions and Student Affairs accepts applications each year between September 1 and February 1 for admission into the class beginning the following May. Applicants wishing to apply for early admission to the program should submit their application by October 15. Class size is limited and all admissions are competitive. It is the applicant's responsibility to assure that all required supporting documentation is received by the deadline.

Prerequisite courses for entry into the master's program include those listed below or their approved equivalents for a total of 90 hours. These courses may be completed at any accredited college or university, but in general only 66 hours may transfer from a two-year college.

Semester Hours

English/Technical Writing	6
Psychology and Sociology	6
Mathematics	3
Statistics	3
General Biology	8
Anatomy and Physiology	6-8
(one course must be upper division)	
Gen. Chemistry (lab. required)	8
Gen. Physics (lab. required)	8
Electives*	46-48
TOTAL.	Minimum of 90

* Recommended courses: Speech, developmental and general psychology.

Upon successful completion of the professional program, students are eligible to take the state licensure examination that is required to practice as a physical therapist.

Further information about the program, school requirements, and other related matters may be obtained from the School of Allied Health Sciences.

Doctor of Science in Physical Therapy. The mission of the Doctor of Science in Physical Therapy (Sc.D.) Program is to provide post-professional education to practicing physical therapists in Texas. There is a strong need for advanced clinical mastery and physical therapy, creating unique decisions and functions for practicing physical therapists. The Sc.D. program will provide practitioners with opportunities to develop the advanced knowledge base, clinical skills, and professional competencies needed for state-of-the-art evaluation and treatment of their patients, as well as the successful management of clinical services located in isolated practice settings. The Sc.D. program provides clinicians a means to develop into highly skilled participants in clinical education and research, thus contributing to the growth and development of evidence-based practice within the profession.

Program Description. The Sc.D. is a clinical doctoral degree designed for licensed physical therapy practitioners to develop into advanced clinicians. It emphasizes orthopaedic physical therapy in response to the great number of orthopaedic afflictions suffered by patients from the agrarian economy of West Texas. Over 80 percent of all patients seeking physical therapy services suffer from orthopaedic afflictions. Thus, this program will provide concentrated study at the applied doctoral level in the clinical science areas of orthopaedic physical therapy practice.

The Sc.D. program emphasizes orthopaedic physical therapy diagnostics and manual therapy. Courses will be conducted through a weekend format with Web-based course enhancement. Faculty and students communicate with each other in person, via phone or fax, and through the electronic mail or internet. Students entering the program should have ready access to a computer and be familiar with word processing, spreadsheet, and internet applications. Students without computers are required to purchase one and become familiar with it prior to beginning the program.

Admission to the Program. The following requirements will be considered for admission into the program:

- A bachelor's or master's professional degree in physical therapy
- At least one year of clinical experience
- Currently practicing as a physical therapist
- All official college transcripts
- Acceptable grade point average
- Two supporting letters of reference

Application Process. Although applications may be submitted at anytime, applications are considered approximately three months prior to the beginning of the summer term. It is in the best interest of the applicant to apply as early as possible. Two reference letters are required: One from a professional colleague and one from a previous or present employer.

All application materials should be sent to the Texas Tech University Health Sciences Center, Office of the Registrar, 3601 4th Street, Lubbock, Texas 79430-8310. Applicants should understand that fulfillment of the basic requirements does not guarantee admission.

Athletic Training (AHAT)

(To interpret course descriptions, see page 8.)

5098. **Practicum in Athletic Training (V1-5).** A structured remediation of clinical observation, hands-on clinical experience and skills, and/or on-field athletic training. Designed to meet the individual needs of the student.
5099. **Independent Study in Athletic Training (V1-5).** Designed to meet the professional student's particular needs and may include a structured review of previously presented classroom and/or laboratory experiences, literature review and discussion. Anatomy teaching assistants may enroll in a structured independent study.
5105. **Research Seminar (1:1:0).** This course focuses on the application of information introduced in Research Methods (AHAT 5200). Emphasis will be placed on becoming good consumers of the literature.
5120. **Research-Directed Study I (1:0:3).** Progression of the student's research project as deemed satisfactory by the student's project advisor. The job application process, cover letter, resume writing, and interviewing skills are also covered.
5124. **Seminar in Athletic Training (1:0:3).** Graduate seminar focusing on current events in athletic training and preparation for BOC certification and Texas Licensure athletic training credentialing exams.
5126. **Research-Directed Study II (1:0:3).** Completion of a research project including preparation of a manuscript suitable for publication in the sports healthcare literature.
5130. **Athletic Training Review (1:1:0).** This course is devoted to developing a study schedule and registering for Athletic Training credentialing exams. Comprehensive written and practical exams will allow students to assess their readiness to sit for the BOC exam.
5200. **Research Methods (2:2:0).** Development of a working knowledge of descriptive and experimental research techniques and statistics.
5201. **Clinical Experience I (2:0:6).** A supervised educational experience in athletic training under the supervision of a certified athletic trainer. The objective is to obtain hands-on experiences in a variety of athletic training settings including intercollegiate, high school, and clinical/industrial.
5206. **Clinical Experience II (2:0:6).** A supervised educational experience in athletic training under the supervision of a certified athletic trainer. The objective is to obtain hands-on experiences in a variety of athletic training settings including intercollegiate, high school, and clinical/industrial.
5210. **Orthopaedic Assessment I (2:1:3).** Theory, principles, clinical applications and literature review associated with athletic training evaluation, assessment, and management of musculoskeletal conditions within the head, neck, and spine.
5222. **Introduction to Clinical Education (2:0:6).** An introduction to basic skills necessary to practice as an athletic training student. The main concepts are medical terminology, basic documentation, OSHA training, first responder responsibili-

- ties, taping techniques, safe modality application, and identification of common general medical conditions. Hands-on surface anatomy with palpation labs are utilized.
5223. **Special Populations and Concerns for the Athletic Trainer (2:1:3).** Examination and discussion of issues related to sports nutrition and the physiological demands of exercise. Survey of injury and illness risk factors associated with sports participation by the preadolescent/adolescent, geriatric, disabled, male, and female athlete.
5224. **Management/Identification of General Medical Conditions (2:2:0).** Study of the etiology, pathology, and clinical manifestations of common illnesses, infectious diseases, and dermatological conditions in athletic populations.
5225. **Clinical Experience III (2:0:6).** A supervised educational experience in athletic training under the supervision of a certified athletic trainer. The objective is to obtain hands-on experiences in a variety of athletic training settings including intercollegiate, high school, and clinical/industrial.
5227. **Current Medical Diagnosis and Treatment I (2:2:0).** Physician presentation of the medical approach to the management of musculoskeletal disorders and afflictions. Course content includes etiology, differential diagnosis, prognosis, medical and surgical management, and prophylactic measures for each condition relevant to athletic training.
5228. **Clinical Experience IV (2:0:6).** A supervised educational experience in athletic training under the supervision of a certified athletic trainer. The objective is to obtain hands-on experiences in a variety of athletic training settings including intercollegiate, high school, and clinical/industrial.
5302. **Rehabilitation of Sports Injuries (3:2:3).** Assimilation of all aspects of patient evaluation, treatment, and rehabilitation of injuries, with a focus on functional rehabilitation and return to activity.
5304. **Special Topics in Athletic Training (3:3:0).** This course will cover topics such as cell biology, psychosocial concerns, and pharmacology as they relate to the athletic training profession.
5305. **Clinical Kinesiology (3:3:0).** Problem-solving approach to the study of human movement with integration of biomechanics fundamental to understanding exercise concepts and musculoskeletal evaluation. The course includes the study of length-tension curves, active and passive insufficiencies, application of lever systems and moments of force to the human body, biomechanical properties of human tissues and joint ergonomics, postural and gait assessment.
5322. **Administration of Athletic Training Programs & Professional Development (3:3:0).** The planning, coordinating, and supervising of all administrative components of an athletic training program. Coverage includes theories and concepts in the management of sports healthcare delivery systems, facilities, equipment, and financial resources.
5401. **Orthopaedic Assessment II (4:2:6).** Theory, principles, clinical applications and literature review associated with athletic training evaluation, assessment, and management of musculoskeletal conditions within the upper extremity. Scenario-based evaluation of the upper and lower extremity and spine will conclude this course.
5403. **Management and Prevention of Injuries (4:3:3).** A study of athletic training room procedures stressing the practical aspects of care and prevention of athletic injury. The course covers the cognitive, affective, and psychomotor objectives of athletic training room procedures and management of acute injuries.
5405. **Patient Evaluation and Management 1 (4:3:3).** Development of clinical skills fundamental to patient management, including an introduction to orthopaedic assessment, clinical evaluation procedures, and presentation of the concepts and application of therapeutic exercise.
5500. **Anatomy (5:3:6).** Integrated study of gross human anatomy embodying gross morphology and coordinating with development and histological aspects of the body. Included is regional dissection with emphasis on integumentary, musculoskeletal, nervous, circulatory, and respiratory systems.
5506. **Patient Evaluation and Management II (5:3:6).** This course emphasizes the use of physical agents and biofeedback, and expands on the theory, principles, literature review, and clinical applications associated with patient management. Theory, principles, literature review, and clinical applications associated with athletic training evaluation, assessment and management of musculoskeletal conditions within the lower extremity are covered.

Occupational Therapy (AHOT)

5071. **Fieldwork II: Specialization (3-6:0:3-6).** Prerequisites: AHOT 5631, 5632. Optional additional full-time, supervised clinical experience in an area/facility of the student's choice.
5072. **Special Topics in Occupational Therapy (1-3:1-3:0).** Selected topics of interest to occupational therapy. Please note that this course is not offered every year.
5073. **Individual Projects (1-3:1-3:0).** Approval of instructor and program director. Provides an opportunity for students to undertake a special project in an area of interest.
5105. **Clinical Reasoning for Fieldwork (1:1:0).** This course will prepare students for their first fieldwork rotation. Professional behavior, personal success strategies, and professional success strategies will be utilized in this course. Clinical reasoning will focus on procedural, interactive, conditional, and pragmatic reasoning.
5106. **Fieldwork I:1 (1:0:3).** Prerequisites: AHOT 5105, 5310, 5313, 5403, 5411. One week (40 hours), supervised, opportunity to observe clinical practice and to participate, within limits, in the occupational therapy process with individuals and groups. Students will develop clinical reasoning skills and complete treatment notes and a concept map on clientele seen as part of Fieldwork I:1.
5111. **Introduction to Occupational Therapy (1:0:3).** Introduction to key terms and concepts used in occupational therapy practice. Course includes self-paced learning and testing for medical terminology. This course introduces students to OT professional practice and prepares them for learning theoretical foundations and clinical reasoning.
5112. **Research Seminar (1:1:0).** Prerequisites: AHOT 5316, 5217. During this course students will be introduced to qualitative research methods and gather and analyze data and/or write research reports while working on a research team with classmates, OT clinicians and faculty members. Each of the four types of clinical reasoning may be employed depending on the topic of the student's collaborative project. This is a writing intensive course.
5113. **Research Seminar II (1:0:3).** Prerequisite: AHOT 5112. Prepares the student for participation in beginning-level research. Students continue to gather and analyze data and/or write research reports while working on a research team with classmates, OT clinicians and faculty members. Each of the four types of clinical reasoning may be employed depending on the topic of the collaborative project. This is a writing intensive course.
5200. **Fieldwork I:2 (2:0:3).** Prerequisites: AHOT 5105, 5106, 5405. Two weeks (80 hours), supervised, opportunity to observe clinical practice and to participate, within limits, in the occupational therapy process with individuals and groups. As possible, this will allow students to explore occupational therapy contributions in "non-traditional" or "role-emerging" settings. Students will develop clinical reasoning skills and complete treatment notes and a concept map on clientele seen as part of Fieldwork I:1.
5209. **Applied Kinesiology in Occupational Therapy (2:1:3).** Corequisite: AHOT 5500. An analysis of normal human movement, including explanations of how movements are produced at specific joints and their influence on occupation. This course builds a scientific basis for assessment, intervention, and procedural clinical reasoning.
5207. **Psychosocial Interventions in Occupational Therapy (2:2:0).** Prerequisites: AHOT 5111, 5310, 5402. Examines the psychosocial dimensions of human performance, therapeutic strategies for individuals with secondary psychosocial issues, and occupational therapy intervention for persons with primary psychiatric issues.
5211. **Occupational Therapy Process: Hand and Upper Extremity (2:1:3).** Prerequisites: AHOT 5500, 5209, 5313. This course integrates anatomy, kinesiology, assessment, and intervention principles for the treatment of upper extremity and hand conditions. Common injuries and conditions for the shoulder, elbow, forearm, wrist, and hand are covered. Advanced splinting skills are taught. This course prepares students in the areas of assessment and intervention and clinical reasoning.

- 5212. Occupational Therapy Practice: Assistive Technology (2:1:3).** Prerequisites: AHOT 5111, 5313. This course includes assessments and interventions involving assistive technology. Topics will include, but are not limited to, assistive devices, seating systems, various switches, communication augmentative systems, environmental controls, home assessments, ergonomic assessments, and computer systems. This course prepares the student in the areas of assessment, intervention and clinical reasoning.
- 5214. Common Conditions in Occupational Therapy: Part 1 (2:2:0).** Prerequisites: AHOT 5500, 5111. First course in a series of two courses that provides an overview of the etiology, epidemiology, signs and symptoms, associated conditions/complications, prognosis, and medical management of disorders and injuries that are relevant to occupational therapy practice. This course focuses on conditions in three broad areas: children/pediatrics, mental health, and orthopedics. Develops student's scientific and procedural reasoning by improving one's knowledge of conditions. Examines areas of occupation, occupational performance, and occupational roles potentially affected as a result of the condition or complications of the condition (conditional reasoning).
- 5215. Common Conditions in Occupational Therapy: Part 2 (2:2:0).** Prerequisite: AHOT 5214. Second course in an overview of the etiology, signs and symptoms, associated conditions/complications, prognosis and medical management of disorders and injuries in children and adults relevant to occupational therapy practice. This course focuses on conditions in several broad areas: neurological conditions, spinal cord injury, cancer, burns, and universal/safety precautions for healthcare providers. Examines areas of occupation, occupational performance, and occupational roles potentially affected as a result of the condition or complications of the condition (conditional reasoning). Develops students' scientific and procedural reasoning by improving their knowledge of conditions.
- 5217. Planning Occupational Therapy Research (2:2:0).** Prerequisite: AHOT 5316. Research teams will develop a proposal for a beginning-level clinical research project and submit an application to the Institutional Review Board for approval of the proposal. Skills in procedural and conditional reasoning are reinforced through the process of proposal development. This course is writing intensive.
- 5220. Case- and Population-Based Clinical Reasoning (2:2:0).** This course focuses on the exploration of illness and/or disability experiences from the perspectives of the individual, healthcare professional, and society. Students will examine the influences of culture, poverty and ethics on disability through conditional and interactive reasoning using case studies and personal reflection.
- 5237. Advanced Clinical Reasoning for Fieldwork (2:2:0).** Prerequisites: AHOT 5105. This course will prepare students for level II fieldwork rotations and will require students to utilize advanced clinical reasoning skills. This course will address the shift from classroom to clinic, supervision, dealing with fieldwork-related problems, preparing for the national certification exam, and planning a continuing education workshop. Clinical reasoning will focus on procedural, interactive, conditional, ethical and pragmatic reasoning.
- 5309. Applying Neuroanatomy in Occupational Therapy (3:3:0).** Prerequisite: AHOT 5500 A study of the structure and function of the human nervous system. Discussion of neurological diagnoses and theories for treatment. Application of those concepts to occupational therapy is made with concept and case maps, which fosters clinical reasoning.
- 5310. Theory and Foundations of Occupational Therapy (3:3:0).** Prerequisite: AHOT 5111. Study of the philosophical, theoretical, and professional concepts that are foundational to occupational therapy as well as the study of occupation-based theories, frame of references, and treatment approaches. Develops students' theoretical reasoning.
- 5311. Overview and Analysis of Occupational Therapy Assessment (3:2:3).** Prerequisites: AHOT 5310, 5313. Overview, analysis, and application of psychometrics, basic statistics, and characteristics of assessment instruments. Develops students' procedural and interactive reasoning skills through the administration, interpretation, and documentation of a variety of assessment tools utilized in occupational therapy practice with clients across the life span.
- 5313. Introduction to Evaluation and Intervention in Occupational Therapy (3:2:3).** Prerequisite: AHOT 5111. Introduction to key OT practice skills including basic evaluation techniques, clinical documentation, clinical safety, physical handling techniques, interventions, and splinting. Prepares students in the area of assessment, intervention, and clinical reasoning.
- 5314. Health and Community Settings (3:3:0).** Prerequisites: AHOT 5310. Reviews trends affecting healthcare system delivery and implications for community practice. An appreciation for difference in cultural and social systems is emphasized. Evaluation of community needs, alternative settings, practice expansion, and consultation skills are discussed. Through use of case mapping and service learning students explore professional skills needed for community practice.
- 5315. Organization and Management in Occupational Therapy (3:3:0).** Overview of management theories, budgeting, marketing, writing a business plan, strategic planning, performance appraisals, interviewing, billing and OT procedures, insurance and payment systems, and documentation issues. Prepares students in professional practice and theoretical background for management or supervision in the healthcare field.
- 5316. Research Process in Occupational Therapy (3:3:0).** Prerequisite: AHOT 5311. This course is the first in a series of research courses designed to prepare the student as both a consumer of research and a participant in beginning-level research. Content includes an introduction to the research process, resources necessary for research in occupational therapy, evaluation and use of the professional literature relevant to occupational therapy practice, professional writing skills and quantitative analysis methods (inferential statistics). Skills in procedural and conditional reasoning are developed through literature search and by writing an evidence-based practice paper. This course is writing intensive.
- 5403. Developmental Theory and Practice in Occupational Therapy (4:3:3).** Prerequisite: AHOT 5310 Conceptual [and treatment] theories and practice frameworks which guide pediatric practice are linked with the treatment techniques and strategies that they guide. The occupational therapy process in pediatric settings is discussed. Skills in procedural reasoning are built through hands-on lab activities and written assignments requiring the application of theories to practice. This course is writing intensive.
- 5404. Developmental Foundations and Assessment of Occupational Performance (4:3:3).** Prerequisites: AHOT 5311, 5403. Focus is on the skill progressions in typical and atypical development and how those sequences are used in pediatric occupational therapy assessment and treatment. Lab experiences involve the observation and assessment of children. Students apply all four types of clinical reasoning (conditional, interactive, narrative and procedural).
- 5405. Occupational Therapy Practice in Adult Rehabilitation (4:3:3).** Prerequisites: AHOT 5214, 5215, 5310, 5311, 5313. This course builds on student knowledge in prerequisite courses, applying specific OT techniques to diagnostic areas and individual conditions found in adults. Students will also learn how the various adult practice settings influence clinical reasoning skills. Instruction and laboratory practice incorporate active learning to cultivate critical thinking skills needed in practice. Using competency checklists and treatment plans completed in class and in the clinic, students will apply pragmatic reasoning skills required for fieldwork.
- 5406. Occupational Therapy Practice with Older Adults (4:3:3).** Prerequisites: AHOT 5310, 5311, 5313. Overview of the physical, psychosocial, and cognitive issues commonly seen in older adults and the impact of these conditions on occupational performance. Includes aging theory, assessment and intervention techniques training. Case and concept mapping are used to integrate clinical reasoning.
- 5407. Advanced Clinical Reasoning: Children and Adolescents (4:3:3).** Prerequisite: AHOT 5404. This course assists students in synthesizing course content from across the curriculum to integrate their clinical reasoning and treatment skills in pediatric occupational therapy practice. In treatment discussions, case mapping and supervised treatment sessions students

- practice all four types of clinical reasoning (conditional, interactive, narrative and procedural).
5500. **Human Anatomy (5:3:12)**. Integrated study of gross human anatomy embodying gross morphology and coordinating with developmental and histological aspects of the body. Included is regional dissection with emphasis on the musculoskeletal, nervous, circulatory and respiratory. Lays a scientific foundation for other courses in the curriculum. Human cadaver dissection is the primary lab activity.
5931. **Fieldwork II:1 (6:0:6)**. Prerequisites: Successful completion of all previous professional and fieldwork courses and approval of program director. Full-time, supervised clinical experience for 12 weeks (480 hours). Development of knowledge and skills needed for entry-level practice. Use of the occupational therapy process and clinical reasoning skills, working with individuals and groups. Introduction to clinical administration, supervision, quality assurance, consultation, and research.
5932. **Fieldwork II:2 (6:0:6)**. Prerequisites: Successful completion of all previous professional and fieldwork courses and approval of Program Director. Full-time, supervised clinical experience for 12 weeks (480 hours). Development of knowledge and skills needed for entry-level practice. Use of the occupational therapy process and clinical reasoning skills, working with individuals and groups. Introduction to clinical administration, supervision, quality assurance, consultation, and research.
- ### Physical Therapy (AHPT)
5099. **Independent Study in Physical Therapy (1-6 hours)**. Prerequisite: instructor approval. This course is a structured review of previously presented classroom and/or laboratory experiences. A literature review and discussion, clinical observation and/or hands-on clinical experience may be required. Each independent study is designed to meet the student's particular needs.
5104. **Clinical Education (1:1:0)**. This course emphasizes the different forms of communication necessary for the physical therapist student to succeed as a professional. Documentation of patient care, interpersonal relationships with patients and professionals, and patient education principles and techniques are emphasized. Grading requirements and documentation of the student's upcoming clinical education experience are included topics.
5122. **Residual Limb Care and Prosthetics (1:1:0)**. Prerequisite: AHPT 5505, 5506 This course includes the study of technological materials and devices used in rehabilitation of patients with residual limbs, including the study of biomechanics, gait, and proper fit of upper and lower extremity prostheses. Selection criteria for prosthetics and physical therapy management for persons with recent amputations are included.
5124. **Research Process 2 (1:1:0)**. Prerequisite: AHPT 5223. This course focuses on developing skills to critically read and analyze peer-reviewed scientific literature. Students are instructed on searching the scientific literature with electronic databases.
5128. **Research Process 3 (1:1:0)**. Prerequisites: AHPT 5223, 5124. This course focuses on the development of writing skills and students make contributions to the scientific literature.
5152. **Seminar in Physical Therapy 1 (1:1:0)**. This is a seminar course examining issues in the field of physical therapy. Specific subject matter varies.
5202. **Principles of Kinesiology (2:1:3)**. This course focuses on applied human anatomy and basic kinesiology with emphasis on normal form and function as it relates to physical therapy practice. Lab experiences focus on surface anatomy and palpation.
5204. **Healthcare Issues and Ethics (2:2:0)**. This course includes the study and application of legal guidelines and ethical principles as they relate to healthcare practice. Special emphasis is placed on ethical dilemmas relevant to the practice of physical therapy including current issues and problems affecting healthcare.
5205. **Neuroscience 1 (2:2:0)**. This course provides an introduction to nervous system function and pathophysiology. An emphasis is placed on axon physiology and its relevance to electrical modalities, synaptic neurotransmission, and nervous system anatomy. Students are introduced to pathologies of the nervous system and corresponding physical therapy interventions.
5206. **Pharmacology (2:2:0)**. This course focuses on the study of pharmacology and its relationship to pathophysiology, emphasizing implications for the practice of physical therapy. Basic principles of pharmacology and pharmacokinetics are addressed with focus on the mechanism of action and effects of specific drugs on the musculoskeletal, cardiovascular and central nervous system.
5211. **Therapeutic Exercise (2:1:3)**. This course focuses on prescriptions and interventions using various therapeutic exercise techniques. Lab experiences focus on teaching therapeutic exercises to patients in various settings.
5223. **Research Process 1 (2:2:0)**. This course introduces students to fundamentals of experimental research design and statistics as they apply to physical therapy practice and scientific literature.
5227. **Current Medical Diagnosis and Treatment 1 (2:2:0)**. This course examines the pathology, medical diagnosis process, and medical and surgical interventions of patients with musculoskeletal conditions that are commonly seen by physical therapists.
5228. **Motor Control and Learning (2:2:0)**. This course emphasizes the principles and various theories of motor control and motor learning and their application to physical therapist practice.
5231. **Clinical Reasoning 1 (2:1:3)**. This course is a structured, interactive review of previously presented classroom material. The focus is on synthesizing materials learned thus far and applying the information to clinical cases. The course includes an on-line supplementary review of information in preparation for a successful licensure examination process.
5232. **Clinical Reasoning 2 (2:1:3)**. Prerequisite: AHPT 5231. This course is a structured, interactive review of previously presented classroom material. The focus is on synthesizing materials learned thus far and applying the information to clinical cases. The course includes an on-line supplementary review of information in preparation for a successful licensure examination process.
5233. **Clinical Reasoning 3 (2:1:3)**. Prerequisite: AHPT 5232. This course is a structured, interactive review of previously presented classroom material. The focus is on synthesizing materials learned thus far and applying the information to clinical cases. The course includes an on-line supplementary review of information in preparation for a successful licensure examination process.
5234. **Graduate Seminar (2:2:0)**. Prerequisite: AHPT 5233. This course is designed to prepare graduates for the licensure examination and entering the work force. The course includes an on-line supplementary review of information in preparation for a successful licensure examination process.
5237. **Current Medical Diagnosis and Treatment 2 (2:2:0)**. Prerequisite: AHPT 5227. This course examines the pathology, medical diagnosis process, and medical and surgical interventions of patients with cardiopulmonary conditions that are commonly seen by physical therapists.
5243. **Current Medical Diagnosis and Treatment 3 (1:1:0)**. Prerequisite AHPT 5237. This course examines the pathology, medical diagnosis process, and medical and surgical interventions of patients with neuromuscular conditions that are commonly seen by physical therapists.
5245. **Orthotic Devices (2:2:0)**. The course includes the study of materials, biomechanics, selection, and proper fit of upper extremity, lower extremity and spinal orthotics. Wheelchair prescription and fitting are included. Introduction to powered mobility options, environmental controls, and augmentative communication devices are included.
5304. **Clinical Applied Physiology (3:2:3)**. Prerequisite: AHPT 5500 This course includes the study of exercise physiology, including normal physiological responses to acute and chronic exercise, and physical training principles. This course also emphasizes concepts of health promotion and wellness.
5305. **Clinical Kinesiology (3:2:3)**. Prerequisite: AHPT 5202. This course focuses on the study of human movement with integration of biomechanics fundamental to understanding exercise concepts and musculoskeletal evaluation. Ergonomics, basic postural, and gait assessment are included.
5320. **Early Growth and Development (3:3:0)**. This course focuses on the study of human growth and development issues and theories. The emphasis is on typical and atypical physical growth and motor development, and on developmental testing. The course includes the study of social-emotional, cognitive, and language development and cultural influences on growth and development.
5321. **Adult Development and Aging (3:3:0)**. This course focuses on the physical, psychological, emotional, cultural and socioeconomic influences involved with adult development.

- Considerable emphasis is placed on age-related changes and current literature regarding concepts in this area.
5325. **Physical Therapy Administration (3:3:0)** This course provides initial personnel management perspectives and skills needed by the entry-level physical therapist in a clinical setting. It focuses on organizing, directing, developing, and measuring the management and entrepreneurial components of physical therapist practice. Billing and coding procedures are included.
5335. **Musculoskeletal Evaluation and Management 2 (3:2:3)**. Prerequisite: AHPT 5430. This course focuses on physical therapy examination, evaluation, prognosis, intervention, and outcomes for patients with musculoskeletal disorders of the spine, based on current research, evidence, and practice guidelines. Lab experience focuses on specific tests and measures and interventions.
5341. **Developmental Evaluation and Management (3:2:3)**. Prerequisite: AHPT 5320. This course focuses on physical therapy examination, evaluation, prognosis, intervention, and outcomes for children with neuromuscular, musculoskeletal, or developmental disorders based on current research, evidence, and practice guidelines. The course includes the requirements for physical therapy practice in specialized settings such as neonatal intensive care, Birth to Three programs, and public schools. Lab experience focuses on specific tests and measures and interventions.
5343. **Cardiopulmonary Evaluation and Management (3:2:3)**. Prerequisite: AHPT 5304. This course focuses on physical therapy examination, evaluation, prognosis, intervention, and outcomes for patients with cardiopulmonary disorders based on current research, evidence, and practice guidelines. Lab experience focuses on specific tests and measures and interventions.
5405. **Pathophysiology of Body Systems (4:4:0)**. This course focuses on general physiological principles of diseases and disorders that affect organ systems of the body. There is an emphasis on integrating the interrelationship between different organ systems in the context of clinical correlations relevant to physical therapists. Neuromuscular, musculoskeletal, cardiopulmonary, endocrinology, and immune system and body fluids and electrolytes, neoplasias, and genetic disorders will be discussed from molecular and systems perspectives.
5420. **Neuroscience 2 (4:3:3)**. Prerequisite: AHPT 5205. This course focuses on the functional relationships of neuroanatomical structures in the human nervous system. Topics include the organization of the nervous system in terms of development, mechanisms of processing of sensory and motor information (including receptors and reflexes), and pathological conditions of the nervous system.
5430. **Musculoskeletal Evaluation and Management 1 (4:2:6)**. Prerequisite: AHPT 5506. This course focuses on physical therapy examination, evaluation, prognosis, intervention, and outcomes for patients with musculoskeletal disorders in the extremities based on current research, evidence, and practice guidelines. Lab experience focuses on specific tests and measures and interventions.
5436. **Clinical Experience 1 (4:0:12)**. Prerequisites: AHPT 5506, 5104. This eight-week full-time clinical experience allows the student to practice acquired skills and learn additional basic clinical skills, while acting as a student physical therapist under the direct supervision of a licensed professional. The student performs all aspects of patient care and other professional duties, and may practice in an inpatient or outpatient setting. All prior coursework prepares the student, and additional information and skills are gained in the clinic.
5438. **Clinical Experience 2 (4:0:12)**. Prerequisites: AHPT 5436, 5335. This eight-week full-time clinical experience allows the student to practice acquired skills and learn additional clinical skills including all basic and advanced musculoskeletal skills, while acting as a student physical therapist under the direct supervision of a licensed professional. The student performs all aspects of patient care and other professional duties, and may practice in an inpatient or outpatient setting. All prior coursework prepares the student, and additional information and skills are gained in the clinic.
5444. **Adult Neurological Assessment and Rehabilitation (4:3:3)**. Prerequisite: AHPT 5228. This course focuses on physical therapy examination, evaluation, prognosis, intervention, and outcomes for adult patients with neuromuscular disorders based on current research, evidence, and practice guidelines. Lab experience focuses on specific tests and measures and interventions.
5446. **Clinical Experience 3 (4:0:12)**. Prerequisite: AHPT 5444, 5341, 5438. This eight-week full-time clinical experience allows the student to practice all previously acquired skills and learn additional clinical skills as the culmination of physical therapy training, while acting as a student physical therapist under the direct supervision of a licensed professional. The student performs all aspects of patient care and other professional duties, and may practice in an inpatient or outpatient setting. The student practices in either a neurologic setting or in an elective setting selected according to the student's individual needs and desires. All prior coursework prepares the student, and additional information and skills are gained in the clinic.
5448. **Clinical Experience 4 (4:0:12)**. Prerequisites: AHPT 5444, 5341, 5446. This eight-week full-time clinical experience allows the student to practice all previously acquired skills and learn additional clinical skills as the culmination of physical therapy training, while acting as a student physical therapist under the direct supervision of a licensed professional. The student performs all aspects of patient care and other professional duties, and may practice in an inpatient or outpatient setting. The student practices in either a neurologic setting or in an elective setting selected according to the student's individual needs and desires. All prior coursework prepares the student, and additional information and skills are gained in the clinic.
5500. **Human Anatomy (5:3:6)**. This course is the integrated study of human gross anatomy including gross morphology, coordinated with developmental and histological aspects of the body. Regional dissection is included with emphasis on the integumentary, musculoskeletal, nervous, circulatory, and respiratory systems.
5505. **Patient Evaluation and Management 1 (5:3:6)**. Prerequisite: AHPT 5500. This course focuses on basic examination skills and tests and measures used in a variety of settings. It also includes beginning level intervention skills, and principles of care used in acute care settings, including medical terminology and basic documentation skills. Beginning-level problem solving skills are developed using case studies.
5506. **Patient Evaluation and Management 2 (5:3:6)**. Prerequisite: AHPT 5505. This course focuses on examination, tests and measures, and interventions used in a variety of settings. The course emphasizes the use of physical agents and modalities. This course includes the care of burns and wounds.

Physical Therapy — Doctor of Science

6201. **Advanced Clinical Practice for Shoulder Afflictions (2:2:0)**. Examination and treatment of dysfunction in the shoulder complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches to arthritis/arthrosis, impingement, instability, labral afflictions, and soft tissue lesions. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6202. **Advanced Clinical Practice for Elbow and Forearm Afflictions (2:2:0)**. Examination and treatment of dysfunction in the elbow/forearm complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6203. **Advanced Clinical Practice for Wrist and Hand Afflictions (2:2:0)**. Examination and treatment of dysfunction in the wrist/hand complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6204. **Advanced Clinical Practice for Hip Afflictions (2:2:0)**. Examination and treatment of dysfunction in the hip complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination,

- pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6205. **Advanced Clinical Practice for Knee Afflictions (2:2:0)**. Examination and treatment of dysfunction in the knee complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6206. **Advanced Clinical Practice for Ankle and Foot Afflictions (2:2:0)**. Examination and treatment of dysfunction in the ankle/foot complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6207. **Advanced Clinical Practice for Upper Cervical Spine Afflictions (2:2:0)**. Examination and treatment of dysfunction in the upper cervical complex. The lecture components of this course include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6208. **Advanced Clinical Practice for Lower Cervical Spine (Disc Segment) Afflictions (2:2:0)**. Examination and treatment of dysfunction in the cervical disc segments (CDS). Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6209. **Advanced Clinical Practice for Cervico-Thoracic Junction Afflictions and TOS (2:2:0)**. Examination and treatment of dysfunction in the cervico-thoracic junction. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6210. **Advanced Clinical Practice for Thoracic Spine and Rib Afflictions (2:2:0)**. Examination and treatment of dysfunction in the thoracic spine and ribs. Lecture components of include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6211. **Advanced Clinical Practice for Sacroiliac and Lumbar Primary Disc Afflictions (2:2:0)**. Examination and treatment of lumbar 1 degree disc-related disorders, as well as dysfunction at the sacroiliac joint. Lectures include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, treatment to 1 degree disc afflictions, and joint-specific treatment measures to the sacroiliac joint.
6212. **Advanced Clinical Practice for Lumbar Secondary Disc Afflictions (2:2:0)**. Examination and treatment of 2nd degree disc related disorders in the lumbar spine. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical lab sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6213. **Clinical Internship (2:2:0)**. Prerequisite: 6 of the previously listed clinical courses. Sc.D., P.T. students will be given the opportunity to develop and enhance advanced clinical skills associated with evaluation and treatment of the extremities. Students will be guided by a clinical mentor and will use skills in problem solving, diagnosis, treatment selection, and management implementation for orthopaedic dysfunction in the spine and or extremities.
6214. **Clinical Internship 2 (2:2:0)**. Prerequisite: All 12 of the previously listed clinical courses. Students, guided by a clinical mentor, will be given the opportunity to develop and enhance advanced clinical skills associated with evaluation and treatment of the spine.
6215. **Research Internship I (2:2:0)**. Prerequisite: AHPT 6201 through 6212. Sc.D. students will be given the opportunity to conduct directed literature review and concept development that pursues a line of inquiry that is agreed upon between the student and faculty mentor. A manuscript will be required for course completion.
6216. **Research Internship II (2:2:0)**. Prerequisite: AHPT 6201 through 6212, and 6215. Sc.D. students will continue the process begun in AHPT 6215, with emphasis on the development of concepts and hypotheses, analysis and synthesis of ideas, and evaluation of current clinical research practices in the pre-elected area of study. A manuscript will be required for course completion.
6301. **Issues in Orthopaedic Physical Therapy and Manual Therapy 1 (3:3:0)**. Survey of the professional issues surrounding the advanced practice of orthopaedic physical therapy and manual therapy, including history of orthopaedic manual therapy, legal and ethical aspects of manual therapy, risk management, and communication and patient education in clinical management.
6302. **Issues in Orthopaedic Physical Therapy and Manual Therapy 2 (3:3:0)**. Survey of selected topics in basic and applied science as they relate to orthopaedic physical therapy and manual therapy, including neurophysiology, histology, exercise physiology, and applied medical science.
6303. **Basic and Applied Science in Orthopaedics (3:3:0)**. Prerequisite: AHPT 7302 or consent of the instructor. Addresses select basic science processes associated within the musculoskeletal system, including histology and physiology of bone, cartilage, tendons, and ligaments. Muscle physiology will be discussed as it relates to orthopaedic dysfunction.
6304. **Orthopaedic Physical Therapy Screening (3:3:0)**. Enhances knowledge and clinical skills designed to assist in the screening of patients for orthopaedic conditions which require examination by a physician. Radiology and laboratory screening are presented as special topics to further the therapist's understanding of pathology and the clinical implications of patient presentation.
6305. **Updates in Orthopaedic Surgical Management (3:3:0)**. Evaluation of recent developments from the literature in orthopaedic surgical management, in terms of indications, methodology, and rehabilitation. Emphasis will be placed on the implications of each procedure for rehabilitation.
6311. **Clinical Studies in Anatomy: a Lab Course (3:3:0)**. Evaluation of prosected human cadaveric specimens with emphasis on musculoskeletal structures. Each session will include a short lecture at the beginning for review of anatomical structures to be observed, as well as the relevance of each of those structures to examination and treatment of orthopaedic afflictions.
6312. **Neuroscience in Orthopaedic Physical Therapy (3:3:0)**. Prerequisite: AHPT 6302 or consent of the instructor. Addresses select neuroscience processes associated within the musculoskeletal system, including the neuroscience of motor planning, initiation and control; sensory function and integration; and dysfunction of the nervous system as it relates to orthopaedic afflictions such as pain production and control.
6313. **Biomechanics in Orthopaedic Physical Therapy (3:3:0)**. Theory and application of biomechanical principles to orthopaedic physical therapy practice emphasizing the biomechanics of musculoskeletal structures, including bone, cartilage, ligament, tendon, and muscle tissue. Emphasis on joint and tissue mechanics will be related to musculoskeletal injury and orthopaedic affliction.
6314. **Motor Control in Orthopaedic Physical Therapy (3:3:0)**. Relates theory and application of motor control and learning principles to orthopaedic physical therapy practice. Emphasis on motor control strategies associated with musculoskeletal function, and motor control dysfunction associated with orthopaedic pathologies.
6315. **Advanced Healthcare Administration (3:3:0)**. Addresses fundamental and contemporary issues in organization and management of physical therapy services, with an emphasis on the ambulatory setting. Topics include design, structure, and effective operation of contemporary healthcare services; strategic planning, conflict resolution, managed care systems, insurance regulations, and third-party reimbursement.

6316. **Marketing in Outpatient Physical Therapy (3:3:0).** Addresses fundamental and contemporary issues in marketing as they apply to outpatient physical therapy services, including epidemiology, market analysis, managerial economics, financial planning, marketing strategy decisions, structural relationships, marketing tactics, forecasting, marketing ethics, and entrepreneurship.
7000. **Clinical Research/Education Project (V1-3).** Independent clinical project centering on either a clinical research or teaching design. Content and goals will be established through mutual consent between the student and the project committee.
7104. **Clinical Research/Education Project Presentation (1:1:0).** Student presents the development and findings from the clinical project (with either a research or teaching emphasis) before the Sc.D., PT faculty, other students, and clinicians from the community.
7301. **Seminar in Clinical Research Design (3:3:0).** Study of methods in clinical research. Processes of obtaining, processing, interpreting, and using clinical data.
7302. **Non-Parametric Statistics for Clinical Research (3:3:0).** Methods in non-parametric statistical analysis and qualitative design. Explore various non-parametric tools and include one,

two, and k-sample designs. Emphasis on clinical research using either single-case or small clinical samples.

7303. **Instructional Technology in Allied Health (3:3:0).** Use of technology in educational instruction and evaluation including computer-assisted instructional design, as well as Web-based educational models and design.
7304. **Educational Evaluation in Allied Health (3:3:0).** Discussion of educational evaluation theory and tools, emphasizing methods of objective and performance-based evaluation. Students will learn to draft specific evaluation measures used in an educational setting.
7305. **Curriculum Design and Teaching in Allied Health (3:3:0).** Discussion of the theories and applications of curriculum design, emphasizing applications to entry-level and post-professional educational settings in physical therapy.
7306. **Parametric Statistics for Clinical Research (3:3:0).** Introduces various tools used in parametric statistical analysis including correlation, regression, t-test, analysis of variance, and selected multivariate designs. Emphasis will be placed on research findings that evaluate specific clinical populations.

Department of Speech, Language and Hearing Sciences

Faculty

Rajinder K. Koul, Ph.D., Chairperson

Professor: Koul

Associate Professors: Paschall, Sancibrian

Assistant Professors: Aoyama, Bogenschutz, Corwin, Dembowski, Gustafson, Hicks, Keller, Zhang, S. Zupancic

Clinical Instructors: Arnold, Dragga, LeFave, Perry, Sims, L. Zupancic

Instructor: Flores

About the Program

This department offers study in the following degree programs:

- Bachelor of Science in Speech, Language and Hearing Sciences
- Master of Science in Speech-Language Pathology
- Doctor of Audiology
- Doctor of Philosophy in Communication Sciences and Disorders

Undergraduate Program

The ability to communicate is our most basic human characteristic. Communication is essential to learning, working, and social interactions. However, one in 10 Americans has a communication disorder because of a stroke, an undetected hearing loss, a stuttering problem, a language disorder, a movement or muscle problem, or some other problem that interferes with speech, language, or hearing. This makes them the single largest population of challenged Americans. To meet these needs, speech-language pathologists and audiologists are educated to diagnose and treat all communication disorders and their related problems. Diagnostic techniques include many behavioral, cognitive, physiological, and technological procedures designed to assess speech, language, and hearing. Treatment for communication disorders is varied and often employs an interdisciplinary approach. Working closely with physicians, dentists, psychologists, educators, engineers, physical therapists, occupational therapists, and dietitians, the speech-language pathologist or audiologist is solely responsible for treating the patients' communicative needs.

Speech-language pathologists and audiologists provide professional services in many different types of facilities such as hospitals, rehabilitation centers, nursing care facilities, community clinics, colleges and universities, burn clinics, private offices, state and local health departments, public and private schools, and state and federal governmental agencies. Services are provided for all ages and may be administered over a brief period or continue for several years.

Admission to the Bachelor of Science Program. Admission to the baccalaureate program begins in March of each year for the following fall class. Class enrollment is limited. Admission guidelines include (1) a formal application, (2) a cumulative 3.0 GPA, (3) a grade of C or better in all prerequisite courses, (4) demonstration of superior communication skills, and (5) proof of appropriate immunizations against infectious diseases. Applicants whose native language is not English must earn a score of at least 550 on the Test of English as a Foreign Language prior to admission. Applicants whose prerequisite courses were taken longer than seven years ago should contact the department to determine current acceptability. Students are required to adhere to all policies as outlined by the department, the School of Allied Health Sciences, and Texas Tech University Health Sciences Center. Students also have specific rights as outlined in the *Student Handbook*.

Prerequisite courses for entry into the bachelor's program include those on the following table or their approved equivalents for a total of 66 hours. These courses may be completed at any accredited college or university. Course requirements may change without notice.

Students should be aware that the terminal degree for licensure in speech-language pathology is at the master's level and licensure in audiology is at the doctor's level. For further information on these advanced degrees, contact the admissions office at the School of Allied Health Sciences.



Speech, Language and Hearing Sciences Prerequisite Curriculum

Content Area	TTU Equivalent	Semester Hours
English*	ENGL 1301, 1302, and 2311 or 3365, or 3366	9
U.S. History	HIST 2300 and 2301	6
U.S. Political Science	POLS 1301 and 2302	6
Mathematics**	MATH 1320 (or higher level) and 2300 or PSY 3400 or SOC 3391	6
Lab. Sciences		12
One biological/life science, one physical science required. Suggested courses are BIOL 1402, ZOO 2402, PHYS 1401		
Social and Behavioral Sciences***		12
Any courses from anthropology, communication, education, human development and family studies, health, philosophy, psychology, or sociology.		
Multicultural		3
Humanities		3
Visual & Performing Arts		3
General Electives		6
TOTAL		66

* One technical writing course is required.

** One course in statistics is required.

*** One course addressing life span issues and one course addressing multicultural issues are required.

Speech, Language and Hearing Sciences (AHSL)

(To interpret course descriptions, see page 8.)

- 3219. Supervised Observation Laboratory: AUD (2:2:0).** A supervised observation of various audiometric procedures and patient types. Discussion of clinical protocols, assessment, and management for individuals with hearing disorders. (Writing Intensive)
- 3220. Supervised Observation Laboratory: SLP (2:2:0).** A supervised observation of clinical assessment and management of individuals with speech and language disorders. May be repeated for credit. (Writing Intensive)
- 3221. Clinical Methods (2:2:0).** A review of clinical methodologies used in speech-language pathology and audiology, including specific clinical activities, report writing, and professional development. (Writing Intensive)
- 3320. Introduction to Communication Disorders (3:3:0).** An overview of communication disorders which can affect children and adults. The impact of these disorders on an individual's psychological, social, emotional, cultural, and educational status will be discussed.
- 3321. Speech Science (3:3:0).** An introduction on the production, perception, and processing of speech, including acoustic phonetics.
- 3322. Hearing Science (3:3:0).** An introduction to the physics of sound, acoustics, and psychoacoustics.
- 3323. Language Development (3:3:0).** An introduction to current theories of language and language development, including methods of obtaining and analyzing language samples. (Writing Intensive)
- 3324. Language Disorders (3:3:0).** An emphasis on language disorders across the life span. Topics include the nature and etiologies of language disorders, with an overview of the principles of treatment. (Writing Intensive)
- 3325. Fluency Disorders (3:3:0).** An extensive review of current information on fluency disorders in children and adults, including clinical assessment and management strategies.
- 3422. Anatomy and Physiology (4:4:0).** A study of the anatomical and physiological aspects of speech and hearing in both normal and clinical populations.
- 3426. Articulation and Phonological Disorders (4:3:1).** The basic principles of assessment and treatment for children and adults with phonological and articulatory disorders. Includes lab for development of advanced clinical transcription skills. (Writing Intensive)
- 3427. Phonetics (4:3:1).** An introduction to production and classification of speech sounds, principles and theories of phonetics, emphasis on development of clinical transcription skills. (Writing Intensive)
- 3442. Clinical Audiology (4:3:1).** An introduction to hearing assessment techniques and auditory disorders, with adaptation of testing for special populations such as infants, geriatrics, and different language backgrounds. The student will gain proficiency with pure-tone, speech, and impedance testing techniques.

- 4280. Clinical Practicum: SLP (2).** A supervised clinical experience in case management. May be repeated for credit.
- 4290. Clinical Practicum: Audiology (2).** A supervised clinical experience in case management. May be repeated for credit.
- 4300. Senior Research Project (3).** An individual study of a specific problem in one of the areas of speech or hearing disorders. Students are required, in advance of registration, to consult with the instructor and secure approval of the specific project to be pursued.
- 4344. Multicultural Issues in Communication Disorders (3:3:0).** Assessment and management of communication disorders in culturally and linguistically diverse populations. Topics include typical and disordered communication, and perspectives on clinical, theoretical, and research implications.
- 4410. Basic Sign Language for the Health Professions (4:4:0).** An intensive, introductory course in American Sign Language. Issues related to deaf culture and the use of signs in healthcare settings will be discussed.
- 4426. Neural Bases of Speech and Language (4:3:1).** An exposure to neuroanatomy and neurophysiology through individualized and interactive learning. This course provides strong foundations for future graduate courses in aphasia and motor speech disorders, as well as an understanding of neuroanatomy, neurophysiology, and neuropathologies of speech and language.
- 4427. Assessment Procedures (4:3:1).** The development of competencies in the selection, use, and interpretation of a wide range of speech and language assessment procedures for children and adults from diverse etiologic, cultural, and ethnic groups.
- 4446. Diagnostic Audiology (4:3:1).** This course will present advanced diagnostic techniques for children and adults including those from diverse populations or with special needs.

Speech-Language Pathology (AHSL)

- 5010. Independent Study (V1-3).** A course used for individual leveling plans created by the program director.
- 5100. Foundations (1:1:0).** A forum for the discussion of professional issues in communication disorders. May be repeated for credit.
- 5110. Capstone Course (1:1:0).** A comprehensive review of the nature of human communication and swallowing processes; prevention, assessment and intervention for communication and swallowing disorders; and research principles and professional issues.
- 5143. Aural Rehabilitation Lab (1:0:1).**
- 5201. Speech Science: Clinical Applications (2:2:0).** Review of basic concepts of acoustic and articulatory phonetics, with specific reference to their application to clinical populations in communication disorders. Selective literature review illustrating acoustic and physiologic analysis of speech disorders, and the application of laboratory and clinical instrumentation for the analysis of disordered speech and language.
- 5239. Evidence-Based Practice in Communication Disorders (2:2:0).** This course is designed to prepare students for understanding and conducting research in speech and language science. Emphasis is placed on how to conduct a literature search and write a literature review. Students will learn how to present research findings at professional meetings, and how to apply research findings in evidence-based practice.
- 5243. Aural Rehabilitation (2:2:0).** The study of aural habilitation and rehabilitation procedures, intervention techniques, and the use of amplification for hearing-impaired children and adults. Psychosocial issues of hearing loss will be discussed in relation to the hearing impairment as well as the cultural history of the patient.
- 5310. Special Topics in Speech Pathology (3:3:0).** Directed study for non-thesis candidates. May be repeated for credit.
- 5320. Research Design (3:3:0).** The purpose of this course is to summarize the basic concepts of science and research. Emphasis will be placed on the nature of experimental designs and basic inferential statistical analyses. Discussions will also include the application of relevant methodologies in clinical settings.
- 5325. Childhood Speech Disorders (3:3:0).** Current approaches to assessment and management of pediatric speech disorders and developmental phonological disorders in special populations.
- 5328. Seminar in Voice Disorders (3:3:0).** Advanced discussion of the etiology, diagnosis, and treatment of voice disorders.
- 5329. Fluency Disorders (3:3:0).** An extensive review of current information on fluency disorders in children and adults.
- 5330. Dysphagia (3:3:0).** A detailed study of the anatomy and physiology of normal and disordered swallowing patterns,

Graduate Program / Speech, Language and Hearing Sciences

Master of Science in Speech-Language Pathology. This professional education requires two years of study beyond the baccalaureate level. Admission into the professional program begins in February of each year for the fall class. Class enrollment is limited each year and admission is competitive. To be considered for admission into the professional program, the applicant must meet a number of requirements that include a baccalaureate degree in communication disorders or completion of leveling coursework. Students have two options for satisfying the requirements for the comprehensive examination. They may conduct an independent investigation culminating in a master's thesis or complete a two-day written examination.

Professional Doctorate in Audiology (Au.D.). This professional education requires four years of study beyond the baccalaureate level which includes a professional externship year. Admission into the professional program begins in fall of each year. Class enrollment is limited each year and admission is competitive. To be considered for admission into the professional program, the applicant must meet a number of requirements that include a baccalaureate degree in communication disorders, basic sciences, or a similar program. Admissions are also open to current holders of a master's degree in audiology via application and portfolio review. Students will complete both a clinical research project and comprehensive audiology examinations before graduation.

Students enrolled in either program are required to adhere to all policies as outlined by the department, the school, and the Health Sciences Center. Students also have specific rights as

outlined in the student handbook. Students must maintain a 3.0 grade-point average to continue in the program.

Doctor of Philosophy in Communication Sciences and Disorders. Admission to the Ph.D. program in communication sciences and disorders requires the recommendation of the department as well as the approval of the Dean of the School of Allied Health Sciences. The objective is to prepare students for careers in research and teaching. Admission to the degree program is competitive and decisions on admissions normally are made each spring for the fall semester. The department awards teaching and research assistantships on a competitive basis. Applicants for the program may specialize in audiology, communication sciences, or speech-language pathology. Doctoral students in audiology may pursue research in electrophysiology, psychoacoustics, auditory physiology, cochlear implants, hearing instrumentation, and pediatric audiology. Doctoral students who specialize in speech-language pathology may pursue research in phonology, speech perception, bilingualism, developmental disabilities, neurogenic communications disorders, and augmentative communication. Contact information: Dr. Raj Koul (rajinder.koul@ttuhsc.edu) or Dr. Candace Hicks (candace.hicks@ttuhsc.edu).

For additional information concerning a career in either speech-language pathology or audiology contact the department. Graduate clinical programs are accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association.

with discussion of current diagnostic techniques and treatment alternatives.

5362. **Motor Speech Disorders (3:3:0).** A study of the neurologic foundations of speech, speech disorders that can develop as a result of damage to the nervous system, and the ways in which motor speech disorders can be addressed, diagnosed, and managed.
- 5381–5385. **Graduate Clinical Practicum: SLP (3:3:0 each).** Supervised clinical practice in speech and/or language pathology.
5424. **Pediatric Language Assessment and Intervention (4:4:0).** Comparison of typical and atypical language in children from infancy through adolescence. Assessment and management strategies for diverse populations, and varied service delivery models.
5463. **Adult Language Assessment and Intervention (4:3:1).** Effects of normal aging on communication. Assessment and intervention models for acquired adult language disorders (e.g., aphasia, dementia, traumatic brain injury). Medical terminology and report writing is also included.
5466. **Augmentative and Alternative Communication (3:3:0).** A study of the emerging area of augmentative and alternative communication, including a perspective on how these alternative and augmentative systems fit within the broad area of communication development and disorders.
6000. **Master's Thesis (3).** May be repeated for credit. Consent of instructor required.

Audiology (AHSL)

7000. **Doctoral Research (V1-3).** May be repeated for credit. Instructor permission is required.
7020. **Au.D. Independent Study (V1-3).** Independent study for advanced students in the fourth year of the Au.D. program. Three enrollments required before graduation. May not be taken before all courses and comprehensive examinations are successfully completed. May be repeated for credit.
7030. **Clinic Independent Study (V1-3).** Independent study for students in summer clinical placements in the first two years of the Au.D. program. This course can be repeated for credit.
7130. **Advanced Concepts in Audiology (1:1:0).** Provide training on using additional testing and techniques to expand the diagnostic and rehabilitative focus of audiologists.
7147. **Aural Rehabilitation Lab (1:0:1).** Designed to provide clinical training on using additional testing and techniques to expand the diagnostic and rehabilitative focus of audiologists.
7164. **Auditory Electrophysiology Lab (1:0:1).** Hands-on experiences with equipment utilized to allow students to practice and demonstrate the skills instructed in "auditory electrophysiology" lecture course.
7166. **Research Colloquium (1:1:0).** Seminar discussion on applied research techniques in the field of audiology. Emphasis is placed on analyzing research applied to patients across the life span.
7175. **Professional Issues in Audiology (1:1:0).** Overview of the social, political, and economic climate in hearing healthcare delivery. Basic and advanced strategies for practice management and development. Interprofessional relationships and responsibilities. Supervision of other professionals.
7249. **Auditory Neuroscience (2:2:0).** This course will assist students in understanding anatomy/physiology and cell biology of the auditory system from cochlea up to cortex, subsidized by introduction of nervous system and neural signaling and virtual lab exercise. Completion of this course should establish a solid base for understanding, applying, designing, and initiating different auditory test applications and research.
7251. **Counseling in Audiology (3:3:0).** An introduction to counseling the communicatively disordered and their families. Emphasis on special education, vocational and emotional issues surrounding hearing impairment. Considerations of special populations and life span issues will be included.
7264. **Auditory Electrophysiology (2:2:0).** Covers theoretical knowledge and applied skills of normal and pathological auditory systems.
7267. **Clinical Electrophysiology (2:2:0).** This course will provide clinical instruction in the application of electrophysiological testing techniques and interpretation. Emphasis will be placed on evaluation of auditory functional and site of lesion testing, protocols, and interpretation.
7321. **Clinical Observation and Methods (3:0:3).** Supervised observation of clinical assessment and management of individuals with communication disorders.
7322. **Auditory Processing Disorders (3:3:0).** This course is designed to address the functional aspects of the auditory system. It will include an overview of anatomy, testing for auditory processing

- disorders, differential diagnosis, and management. It will also include information on differentiating functional difficulties as symptomology of other disabilities versus auditory processing disorders as the primary diagnosis.
7324. **Language Disorders (3:3:0)**. An emphasis on language disorders across the life span. Topics include the nature and etiologies of language disorders, with an overview of the principles of treatment.
7340. **Auditory Anatomy and Physiology (3:3:0)**. This course is an in-depth exposure to the structure and function of the auditory system. Emphasis is placed on peripheral structure and function, up to and including important brainstem nuclei. An introduction to cortical structures and processing is presented.
7343. **Cortical Connections (3:3:0)**. Seminar course related to cortical processing speech and other acoustic signals and perceptual stimuli. Includes a discussion of cellular, intracellular, and cortical communication and connections involved in analysis and perception of sound, including speech.
7345. **Advanced Amplification (3:3:1)**. Advanced topics in clinical amplification including programmable instruments, digital processing and digital amplification, multimicrophone technology and other noise reduction systems will be presented.
7347. **Aural Rehabilitation (3:3:0)**. The study of aural habilitation and rehabilitation procedures, intervention techniques, and the use of amplification for hearing-impaired children and adults. Psychosocial issues of hearing loss will be discussed in relation to the hearing impairment as well as the cultural history of the patient.
7348. **Educational Audiology (3:3:0)**. Audiological considerations in educational settings. The incidence, treatment and educational sequelae of hearing impairment in the auditory-verbal classroom will be covered.
7352. **Clinical Disorders in Audiology (3:3:0)**. The purpose of this course is to provide students with information to understand the following areas: (1) the anatomy and physiology of auditory mechanisms; (2) etiology and pathology of auditory disorders; and (3) audiological and otologic evaluation/management of auditory disorders.
7355. **Instrumentation and Conservation (3:3:0)**. This course will present the physiologic and behavioral effects of noise exposure, hearing conservation programs and clinical services to children and adults from diverse populations. Instrumentation associated with the measurement of noise across multiple environments will be a central aspect of the course.
7365. **Balance Function (3:3:2)**. Covers theoretical knowledge and applied skills of normal and pathological vestibular system. Includes laboratory.
7370. **Cochlear Implants (3:3:0)**. Electrophysiology of implantable devices. Also includes processor strategies, and speech/language learning in prelingually deafened listeners.
7390. **Clinical Practicum-Individualized Experience (3:3:0)**. The course is intended to allow for individualized student instruction of clinical procedures and protocols. This course may be repeated for credit.
- 7391-7399. **Clinical Practicum (3:3:0 each)**. Supervised clinical practicum in audiology.
7442. **Psychoacoustics and Auditory Perception (4:3:1)**. This course will present the physiological bases of auditory perception and the corresponding behavioral manifestations including higher-level cognitive and developmental aspects of speech perception. Includes laboratory.
7446. **Diagnostic Audiology (4:3:1)**. This course will present advanced diagnostic techniques for children and adults including those from diverse populations or with special needs.
7450. **Pediatric Audiology (4:3:1)**. A study of behavioral and objective audiological evaluation, as well as the habilitation and rehabilitation, of infants and children.
7544. **Amplification (5)**. A comprehensive introduction of amplification devices, methods, and techniques. Consideration of special populations and their diverse needs will also be included.
8000. **Doctoral Research Seminar (6)**. Students will enroll in pre-dissertation research projects. This research is expected to make a significant contribution to the student's chosen area of study.
8320. **Cortical Connections (3:3:0)**. This course will study the functional significance of the complex array of connections between cortical regions and subcortical regions that support cortical functions. Topics covered include brain and language, animal communication, motor speech processes, the descending pathways, memory and attention, cortical processing of pitch information, thalamocortical organization, cerebellum and cognition, perception of complex sounds, and sound source localization.
8321. **Linguistics (3:3:0)**. This course is designed to prepare students for understanding and conducting research in speech and language science. Emphasis is placed on how to conduct a literature search and write a literature review. Students will learn how to present research findings at professional meetings, and how to apply research findings in evidence-based practice.
8322. **Advanced Auditory Research (3:3:0)**. Seminar devoted to the understanding of frontier knowledge in the area of auditory research and to applying the knowledge in developing and performing research projects. May be repeated as topic varies.
8323. **Seminar in Language and Culture (3:3:0)**. Selected topics on language and culture will be explored through reading of current research in the field. Topics include psycholinguistics, sociolinguistics, dialects, language variations, bilingualism, multicultural and multilingual communication, speech perception and production, and language development. May be repeated as topic varies.
8324. **Seminar in Augmentative and Alternative Communication (3:3:0)**. The purpose of this course is to present the theoretical and clinical basis of AAC. Emphasis will be placed on evaluating efficacy of AAC intervention with individuals with developmental and acquired disabilities. Discussions will include application of relevant research methodologies in clinical settings. May be repeated as topic varies.
8325. **Seminar in Speech Perception (3:3:0)**. Seminar devoted to the area of understanding speech. Topics will include research and clinical application of speech perception studies. May be repeated as topic varies.
8326. **Seminar in Speech Intelligibility, Noise and Reverberation (3:3:0)**. The effects of noise and reverberation can be detrimental to the communication process. This course provides students with a review of speech production and perception along with an in-depth look at the effects of perceiving speech cues under real world conditions. May be repeated as topic varies.
8327. **Seminar in Acoustical Indices (3:3:0)**. Predicting speech intelligibility performance for hearing impaired listeners under real world conditions has been elusive. This course provides students with the fundamentals of various indices, the ongoing research, and future practices and needs. May be repeated as topic varies.
8328. **Seminar in Pediatric Audiology (3:3:0)**. Selected studies in infant, child and adolescent audiology. Studies can include areas such as diagnostic audiology, aural rehabilitation in children and educational audiology. May be repeated as topic varies.
8329. **Seminar in Adult Neurogenics (3:3:0)**. Seminar devoted to the study of the impact of neurological impairments on the speech and swallowing abilities of adults. Topics will include pathophysiology of neurogenic communication disorders and dysphagia, quality of life in adults with neurological impairments, and research in adult neurogenics. May be repeated as topic varies.
8330. **Seminar in Healthcare Policy and Administration (3:3:0)**. Seminar devoted to study of major issues facing U.S. healthcare in the 21st century. Topics will include an overview of the U.S. healthcare organizations and delivery systems, economics of healthcare policy, issues of access to care, managed care, quality assessment, and healthcare finance.
8331. **Clinical Phonetics: Acoustic and Articulatory Phonetics Applied to Speech Disorders (3:3:0)**. This course addresses the acoustic phonetic and physiological phonetic characteristics of speech disorders. Those disorders include dysarthria, aphasia, apraxia, and developmental articulation disorders. The primary focus will be on methods of describing speech disorders from an acoustic perspective through the study of classic and recent research studies, however, physiological mechanisms underlying the disordered acoustic signal will also be selectively addressed. The course will include laboratory exercises in the acoustic analysis of normal and disordered speech.
9000. **Doctoral Dissertation (9)**. The Doctor of Philosophy degree in Communication Sciences and Disorders is a research degree and is conferred only in recognition of high achievement in independent scientific research and scholarship.

Graduate School of Biomedical Sciences

Roderick Nairn, Ph.D., Dean

About the Program

Development of a strong program of graduate education in the basic biomedical and related health sciences is one of the responsibilities and goals of the Texas Tech University Health Sciences Center. Present-day medicine cannot exist outside the academic framework and intellectual discipline which the biological, chemical, and medical sciences provide. Graduate training in these areas, an integral component of the overall program of the Health Sciences Center, is provided by the Graduate School of Biomedical Sciences.

Opportunities are offered for study and research leading to the following degrees:

- Master of Science in Biotechnology
- Master of Science in Cell and Molecular Biology
- Master of Science in Biochemistry and Molecular Genetics
- Master of Science in Medical Microbiology
- Master of Science in Pharmaceutical Sciences
- Master of Science in Pharmacology and Neuroscience
- Master of Science in Physiology
- Doctor of Philosophy in Cell and Molecular Biology
- Doctor of Philosophy in Biochemistry and Molecular Genetics
- Doctor of Philosophy in Medical Microbiology
- Doctor of Philosophy in Pharmaceutical Sciences
- Doctor of Philosophy in Pharmacology and Neuroscience
- Doctor of Philosophy in Physiology

Individual program descriptions can be found within the specific department or program sections in this catalog.

Students interested in pursuing a career in academic medicine as a physician-scientist may apply to the M.D.–Ph.D. program. The M.D.–Ph.D. program permits a student to complete the requirements of both the degrees in one of the approved graduate programs. M.D.–Ph.D. students may receive a stipend, tuition scholarships for both the medical and graduate portions of the program, and health insurance for the duration of the stipend. This program is designed to be



completed in seven years and will provide the student with rigorous training in both clinical medicine and biomedical research. Students interested in this program should indicate their interest on the application forms submitted to the Texas Medical and Dental Schools Application Service (TMDSAS) at www.utsystem.edu/tmdsas.

The graduate courses listed in this section are available to graduate students at Texas Tech University or other qualified applicants as a graduate interdisciplinary student (GIDS). Applications must be made to the Graduate School of Biomedical Sciences, the application fee (\$45 for U.S. citizens and \$45 for international students) paid, and registration accomplished at TTUHSC. Currently enrolled TTUHSC and Texas Tech students are exempt from the fee.

Further information about graduate programs offered through the Health Sciences Center Graduate School of Biomedical Sciences may be obtained by contacting the Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, Lubbock, Texas 79430, 806.743.2556, 800.528.5391, FAX 806.743.2656, or e-mail graduate.school@ttuhsc.edu. For more information and to apply online, visit www.ttuhsc.edu/gsbs.

The policies and procedures for the Graduate School of Biomedical Sciences differ from those established by Texas Tech University Graduate School. Policy information is available on the Web site at www.ttuhsc.edu/gsbs. Programs are subject to change, depending on availability of resources and educational goals.

Interdisciplinary Courses

The following interdisciplinary courses are available in addition to course offerings in the individual departments and divisions throughout the Graduate School of Biomedical Sciences.

Graduate School of Biomedical Sciences (GSBS)

(To interpret course descriptions, see page 8.)

5101. Responsible Conduct of Research (1:1:0). This course will address the regulatory and ethical environment of today's biomedical research using lectures and case discussions. Course is required for all GSBS students.

Neuroscience (GIDN)

5910. Integrated Neurosciences (9:8:1). This cooperative, interdepartmental effort offers a detailed study of the nervous system. Students examine both gross and fine structure and function from the subcellular through the behavioral level. (GPHY 5910)

Health Communications (GIHC)

5319. Seminar in Current Topics of Information Sciences (3:3:0). Prerequisite: Must be enrolled or accepted in a graduate program. Course varies each semester emphasizing information science topics including Internet training. (Writing Intensive)

Preventive Medicine (GIPM)

6303. Principles of Epidemiology (3:3:0). Considers the variety, behavior, and distribution of both infectious and noninfectious diseases in populations. It will show how an understanding of the etiology, transmission, and pathogenesis of disease can lead to methods of disease prevention. Emphasis will be placed on the principles and methods of epidemiologic investigation. Arranged.

6304. Topics in Community Health (3:3:0). Consider various topics in epidemiology, preventive medicine, and community health not normally included in other courses. Emphasis on the interactions of various agencies in the community to abate hazards and promote health. May be repeated for credit with change in content. Arranged.

Department of Cell Biology and Biochemistry

Faculty

Harry M. Weitlauf, M.D., Chairperson

Professors: Chilton, Everse, Faust, Hutson, Pence, Reid, Stocco, Weitlauf

Associate Professors: Beale, Coates, Cornwall, Coué, Hardy, Lee, Little, MacDonald, Pelley, Pfarr, Sridhara, Whelly, Schneider Williams, Wright

Assistant Professors: Dufour, Thomas, Urbatsch, Webster

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Cell and Molecular Biology
- Master of Science in Biotechnology
- Master of Science in Biochemistry and Molecular Genetics
- Doctor of Philosophy in Cell and Molecular Biology
- Doctor of Philosophy in Biochemistry and Molecular Genetics

Cell and Molecular Biology. The purpose of the Ph.D. program is to prepare students for careers in cellular, developmental, and molecular biology. Employment opportunities for graduates of this program include traditional university professorships, positions in the biotechnology industry, and governmental appointments. The curriculum centers around three courses: Cell Function and Structure, Advanced Cell Biology, and Biochemistry. During the first year of study, the student will progress through a minimum of three laboratory rotations in order to determine his or her research interest. Dissertation topics can be pursued in the following areas: Regulation of gene expression, RNA processing, the role of transcription factors in cellular transformation and differentiation, cell cycle, cell and molecular biology of intercellular communication, control of microtubular function, embryo implantation, molecular mechanisms of epididymal sperm function, proliferation and differentiation of gonadal cells, molecular basis of gamete interactions, molecular regulation of ovarian development and function, and development and regeneration of the nervous system.

The Master of Science program in Cell and Molecular Biology offers two instructional tracks. The research track is designed for students who need extra preparation for the Ph.D. program or whose career track is geared toward technical or staff level positions in industry or universities. Students undertake study and research in similar areas as that of the Ph.D. program. The education-medical track is designed for students whose eventual goal is towards a teaching career in the anatomical sciences. Students in the education-medical track take courses in the anatomical sciences and in modern instructional methods and design, and will participate in the teaching mission of the medical school as teaching assistants.

Students with undergraduate degrees in biology and chemistry are well suited for this program. Please contact Dr. Martine Coué 806.743.1558 or Pam Roddy 806.743.2701 for more information concerning admission to this program.

Biochemistry and Molecular Genetics. The biochemistry and molecular genetics program is designed to prepare students for research and teaching careers in biochemistry and molecular biology as related to the medical and life sciences. Admission to the program requires prior coursework in mathematics, general physics, organic chemistry, analytical chemistry, and biological science. Students with deficiencies in any of these areas may be conditionally admitted pending successful completion of leveling courses prescribed by the program. Students are required to take GBCH 5421, 6522, 6533, and 6441 or their equivalents as determined by

the department. In addition, students are urged to take or to have successfully completed courses in physical chemistry, statistics, and computer programming.

Generally within 12 months after enrolling in the program, each student will take a preliminary examination in general biochemistry. After a major portion of the required coursework has been completed, the student must pass a qualifying examination that consists of two parts: a written portion in the form of an original research proposition designed to demonstrate the student's comprehension of some field of study related to biochemistry, ability to develop hypotheses, and competence in the design and conduct of promising and significant experiments; and an oral portion in which the student is expected to defend the proposition and demonstrate an understanding of the fundamental concepts and principles of biochemistry that relate to the proposition.

During the first year in the program, students will rotate through at least three different laboratories to broaden their education and research experience and to help them identify a field of specialization for their dissertation research. Major areas of current research include studies of the regulation of gene expression in a variety of eukaryotic tissues, biochemistry of development, mechanisms of hormone action, biochemistry of neoplasia, genetics of somatic cells in culture, biochemistry of membranes, mechanisms of enzyme action, and recombinant DNA.

Information covering specific requirements for degree programs is contained in the departmental Graduate Student Handbook. For more information, contact Dr. Sandra Whelly, the program advisor, at 806.743.2503.

Biotechnology Master of Science Biomedical Track. Although this program is listed among degrees offered by the Department of Cell Biology and Biochemistry, it is an interdisciplinary degree supported by all basic science departments in the Health Sciences Center. The Texas Tech University general academic campus administers a complimentary track in Applied Science Biotechnology.

The biomedical track is a 21-month curriculum consisting of two terms (nine months) of coursework and 12 months of full-time laboratory research. It is typically a nonthesis degree with an optional thesis at the end of the second year by arrangement with the advisor. The research component may be completed either at the HSC campus or at a biotechnology industry laboratory. Students who choose to do their research at the HSC campus will work with a member of the biotechnology graduate faculty. All biotechnology graduate faculty have active research programs that emphasize use of molecular biology methods.

Prerequisites for the program include a bachelor's degree in science with at least one semester of organic chemistry. Please contact Dr. Daniel Hardy 806.743.2053 for more information regarding admission to the program.

Cell and Molecular Biology (GANM)

5110, 5210. Histology I and II (1:1:1, 2:2:4). Correlation of the structural organization with functional specializations of human tissues and organs; clinical correlations are also an integral part. Since this is the histology course offered in the first-year medical curriculum, departmental approval prior to registration is required.

5112, 5212, 5312. Laboratory Methods (1:0:2, 2:0:4, 3:0:6). Prerequisite: Consent of instructor. Taken as (1) a hands-on introduction to the laboratories in which a student may wish to do dissertation research or (2) after a student is well established in his or her dissertation research, additional rotations can be done to gain expertise in techniques applicable to the student's research but not available in the faculty advisor's laboratory. Repeatable if different methods are covered for each registration.

5113, 5213, 5313. Selected Topics in Cell and Developmental Biology (1:1:0, 2:2:0, 3:3:0). Topics vary from semester to semester and reflect the research interests of the faculty. Recent offerings have included oncogenes and molecular biology

of hormone action. May be repeated provided that different topics are covered for each registration.

5321. **Advanced Gross Anatomy (3:0:3)**. An in-depth gross anatomical study devoted to one of the following areas of emphasis: topographical anatomy, head and neck, thorax and abdomen, pelvis and perineum, extremities and back, depending on the student's needs. The course may be repeated for credit if another area of emphasis is selected.
5611. **Gross Anatomy (6:2:10)**. A highly integrated introductory course of anatomical study (including human prosection) which embodies the gross morphology of the body and coordinates it with the clinical, developmental, and microscopic aspects of the human body.
6000. **Master's Thesis (V1-6)**.
6340. **Cell Function and Structure (3:3:0)**. Topics include structure/function relationships involved in DNA replication, transcription, protein tracking, cytoskeletal organization and function, cell division, and adhesion.
6620. **Advanced Cell Biology (6:6:0)**. Prerequisite: GANM5321. This course will cover advanced topics in cell biology and is designed for senior students who have completed introductory cell biology courses. The topics covered will include regulatory mechanisms that control the development of metazoan organisms, cell cycle regulation, cancer, and reproductive and stem cell biology.
7000. **Research (V1-12)**.
7101. **Seminar (1:1:0)**. Students will attend and participate in departmental seminars.
8000. **Doctoral Dissertation (V1-12)**.

Biochemistry and Molecular Genetics (GBCH)

5421. **General Biochemistry (6:6:0)**. Human life processes at the molecular level with emphasis on biochemical homeostasis and control mechanisms.
6000. **Master's Thesis (V1-6)**.
6101. **Biochemistry Conference (1:1:0)**. Informal conferences between faculty and students considering topics of current interest in biochemistry not normally included in other courses. Literature search, evaluation, organization, writing, and oral

presentation by the student are emphasized. Different topic each semester. May be repeated for credit.

- 6135, 6235, 6335, 6535. **Topics in Biochemistry (1:1:0, 2:2:0, 3:3:0, 5:5:0)**. Prerequisite: Consent of instructor. Lectures in specific areas of biochemistry not normally included in other courses. May be repeated for credit with change of content.
6441. **Cell Signaling (4:4:0)**. Topics include structure and function of membranes and organelles, mechanisms of transcription and translation, and regulation of cellular processes including both the endocrine and nonendocrine aspects.
6522. **Molecular Biology of Eukaryotes: Nucleic Acids (5:5:0)**. Prerequisite: GBCH 5921 or equivalent and consent of instructor. Study of nucleic acid biosynthesis and gene expression and its control in eukaryotes, as well as studies and applications of principles of genetic engineering to nucleic acid structure and molecular biology.
6533. **Molecular Biology of Eukaryotes: Proteins (5:5:0)**. Prerequisite: GBCH 5421 or equivalent and consent of instructor. An in-depth description of the process of protein biosynthesis, degradation and regulation in eukaryotes, as well as the study of physicochemical methods used to characterize proteins and their molecular structure.
7000. **Research (V1-12)**.
7101. **Biochemistry Seminar (1:1:0)**.
8000. **Doctor's Dissertation (V1-12)**.
9000. **Postdoctoral Research (V1-12)**.

Biotechnology, Medical (GBTC)

5338. **Biochemical Methods (3:1:6)**. Provides integrated approach to modern biochemical techniques. Present methods used to manipulate a gene, purify and characterize the enzymatic properties of the encoded protein.
6000. **Master's Thesis (V1-6)**.
6101. **Biotechnology Seminar (1:1:0)**.
6301. **Introduction to Biotechnology (3:3:0)**. Broad coverage of topics with high current interest and utility to the medical and agricultural biotechnology industries. Emphasizes application of technologies.
7000. **Research (V1-12)**.



Department of Microbiology and Immunology

Faculty

Ronald C. Kennedy, Ph.D., Chairperson

Professors: Chaffin, Fralick, Hamood, Kennedy, Nairn, Rolfe, Straus

Associate Professors: Bright, San Francisco, Siddiqui

Assistant Professors: Chiriva-Internati, Filleur, Reilly

Research Assistant Professors: Colmer-Hamood

Joint Faculty: Cobos, Frezza, Griswold, Jumper, Lampe, Lyte, Pence, Schneider, Williams

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Medical Microbiology
- Doctor of Philosophy in Medical Microbiology

The coursework and information presented below describe those aspects of the programs of particular interest to students choosing to study and conduct research in the areas of medical microbiology which are traditionally found in a medical center.

Students seeking information concerning admission to the graduate program in medical microbiology, training, and research opportunities or teaching and research assistantships in the department should contact the chairperson of the department. For further information, see www.ttuhs.c.edu/som/microbiology.

Microbiology (GMIB)

- 5181, 5281, 5381. **Selected Topics in Microbiology (1:1:0; 2:2:0; 3:3:0)**. Prerequisite: Consent of instructor. Specific areas in microbiology and immunology or related research not normally included in other sources. May be repeated for credit.
5240. **Cellular and Molecular Immunology (3:0:3)**. Core curriculum course. Consent of instructor. Cellular and Molecular Immunology is a study of the development of the immune system, and immunity against microbes and tumors, and diseases caused by inappropriate immune responses.
5350. **Introduction to Microbiology (3:0:3)**. Core curriculum course. Consent of instructor. A study of the classification, structure, virulence and pathogenesis of the microorganisms that cause human disease and the ways to control these organisms.
5399. **Introduction to Microbiological Research (3:0:3)**. Exposure to experimental design, research methodology and data analysis in the laboratories of three faculty members.
6000. **Master's Thesis (V1-6)**.
6201. **Medical Parasitology (2:1:1)**. Overview of important protozoan helminth, arthropod infections, and vectors of disease.
6237. **Medical Mycology for Graduate Students (2:2:0)**. Prerequisite: Medical or pathogenic microbiology or consent of instructor. A study of the biology of pathogenic fungi and human mycoses.
6323. **Genetics and Molecular Biology of Prokaryotes (3:3:0)**. Prerequisite: Biochemistry and general microbiology. Current concepts on the molecular biology and genetics of prokaryotes with emphasis on regulation of gene expression.
6324. **The Molecular Biology of Pathogenic Bacteria (3:3:0)**. Prerequisite: Medical microbiology, biochemistry. Lectures and discussions concerning the molecular analysis of mechanisms by which pathogenic bacteria produce infections. The regulation and expression of virulence factors are emphasized.
6325. **The Biology of Animal Viruses (3:3:0)**. Prerequisite: General biochemistry and general microbiology. Emphasis will be placed on DNA and RNA tumor viruses, tumor suppressor genes and human immunodeficiency virus.
6329. **Advances in Immunology (3:3:0)**. Prerequisite: GMIB 6345, 6346, 6347 or consent of instructor. Current knowledge of the immune system with emphasis on molecular and cellular interactions.

6335. **The Pathogenesis of Infectious Disease (3:3:0)**. Prerequisite: Medical or pathogenic microbiology or consent of the instructor. A study of the processes by which microorganisms produce disease in humans and how the host responds.
6345. **Cellular and Molecular Immunology (3:3:0)**. Beginning student. A study of the development of the immune system and immunity, including defenses against microbes and tumors and diseases caused by inappropriate immune responses.
6346. **Medical Bacteriology (3:3:0)**. Beginning student. A study of bacterial classification, structure, virulence and pathogenesis of the bacteria that cause human disease and the ways to control these organisms.
6347. **Medical Mycology, Parasitology, and Virology (3:3:0)**. Beginning student. A study of the classification, structure, and pathogenesis of fungi, parasites, and viruses that cause human disease and the ways used to control these organisms.
7000. **Research (V1-12)**.
7101. **Microbiology Seminar (1:1:0)**.
8000. **Doctoral Dissertation (V1-12)**.

Department of Pharmaceutical Sciences

Faculty

Quentin R. Smith, Ph.D., Chairperson

Professors: Bickel, Mehvar, Smith, Thekkumkara, Wang

Associate Professors: Abbruscato, Gunaje, Rao, Siddiqui,

Srivastava, Srivenugopal, Stoll, Weis, Wright

Assistant Professors: Ahsan, Arumugam, Borges, Lockman, Moridani, Shek, Veronin, Weidanz

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Pharmaceutical Sciences
- Doctor of Philosophy in Pharmaceutical Sciences

The department is housed in the Texas Tech School of Pharmacy at Amarillo. Pharmaceutical sciences encompass all those areas of pharmacy research that pertain to drug design, delivery, formulations, and therapeutics. The faculty members of the department exhibit research interests and expertise in drug design and delivery, pharmacology, pharmaceuticals (including formulations and industrial pharmacy), pharmacokinetics, drug receptor modeling, molecular and reproductive biology, biochemistry, pathophysiology, immunology and cancer therapy, toxicology, and pharmacy administration. The graduate program in pharmaceutical sciences is designed to educate students for careers in pharmaceutical industry, academia, and federal agencies including the FDA. Admissions requirements include a degree in pharmacy, chemistry, biology, or related areas, acceptable GRE scores, and a TOEFL score of at least 550 (written) or 213 (electronic) for international students. Teaching and research assistantships are awarded on a competitive basis. The departmental courses are listed below. For more information contact Dr. Thomas Abbruscato, graduate program advisor, 806.356.4015 ext. 287 or email pharmsci.gradadv@ttuhs.c.edu.

Pharmaceutical Sciences (GPSC)

5101. **Topics in Pharmacology (1:1:0)**. Special topics in pharmaceutical sciences that are not normally included in other courses. May be repeated for credit with change in content.
5201. **Topics in Pharmacology (2:2:0)**. Special topics in pharmaceutical sciences that are not normally included in other courses. May be repeated for credit with change in content.
5210. **Graduate Pharmaceutics Part 1**. This course will cover various pharmaceutical dosage forms and drug delivery systems.

5211. **Graduate Pharmaceutics Part 2.** This course will cover the basic principles of pharmaceutics for the development of formulations that are stable and therapeutically effective.
5301. **Topics in Pharmacology (3:3:0).** Special topics in pharmaceutical sciences that are not normally included in other courses. May be repeated for credit with change in content.
5304. **Principles of Drug Action (3:3:0).** Principles that govern drug action within the body (pharmacodynamics) as well as drug absorption, distribution, metabolism, and excretion (pharmacokinetics).
5307. **Pharmaceutical Sciences Research Methods (3:3:3).** A lecture and laboratory course designed to provide an overview of current research methods in pharmaceutical sciences under direct guidance of a faculty member.
5310. **Drug Design and Discovery (3:3:0).** Prerequisite: GPSC 5304. Overview of new methods for quantitative SAR, computer-aided drug design, mass screening, and combinatorial chemistry.
5320. **Drug Metabolism (3:3:0).** Analysis of primary metabolic enzymatic systems involved in the clearance of drugs from the body and the mechanisms that regulate their activity.
5325. **Medicinal Chemistry (3:3:0).** A comprehensive study of the chemistry molecules and their interactions to aid in the understanding of concepts such as drug discovery and design.
5330. **Pharmacokinetics (3:3:0).** A quantitative treatment at the graduate level of the dynamics of drug disposition in the body and the national design of drug dosage regimens.
5335. **Physiology-based Pharmacology Part 1.** Drug classes and mechanisms of action. Drugs acting on chemical mediators. Drugs affecting major organ systems including the cardiovascular, peripheral and central nervous systems.
5336. **Physiology-based Pharmacology Part 2.** Drug classes and mechanisms of action. Drugs acting on chemical mediators. Drugs affecting major organ systems including the cardiovascular, peripheral and central nervous systems.
5340. **Molecular Drug Action (3:3:0).** Analysis of drug action at the molecular level, including molecular biology and signal transduction.
5350. **Advanced Pharmaceutics (3:3:0).** Prerequisite: Drug Delivery Systems 3 or equivalent. Quantitative treatment of reactions of pharmaceutical interest. Drug decomposition, approaches to stabilization and preservation, accelerated stability analysis, complexation, and micromeritics.
5356. **Advanced Principles of Disease (3:3:0).** Pathophysiological mechanisms at the molecular and cellular level. Lecture and discussion will cover the etiology, pathogenesis, functional changes, and clinical significance of general diseases.
5360. **Industrial Pharmacy (3:3:0).** Principles of formulation of powders, capsules, and compressed and coated tablets for conventional and controlled drug delivery.
5370. **Biotechnology (3:3:0).** An introduction to the area of molecular biology, genomics, and protein chemistry.
5380. **Special Topics in Drug Design—Immunopharmacology (3:3:0).** Principles of disease treatment with focus on the immunological system and new advances in immunotherapy.
5390. **Pharmaceutical Science Research Design and Analysis (3:3:0).** Overview of experimental design implementation and data analysis, including biostatistics for pharmaceutical science investigations.
5440. **Biopharmaceutics (4:4:0).** Prerequisite: DDS3 and kinetics or equivalent. Advanced treatment of the influence of dosage forms, route of administration, and dosage regimen on drug availability and newer technologies for targeting drug delivery to specific organs and cell types.
5610. **General Biochemistry (6:6:0).** Human life processes at the molecular level with emphasis on biochemical homeostasis and control mechanisms.
6000. **Master's Thesis (V1-6).**
7000. **Pharmaceutical Sciences Research (V1-12).**
7101. **Pharmaceutical Sciences Seminar (1:1:0).** Weekly seminar series designed to provide training in research data presentation and analysis.
8000. **Doctoral Dissertation (V1-12).**

Department of Pharmacology and Neuroscience

Faculty

Reid L. Norman, Ph.D., Chairperson

Professors: Lombardini, Norman, Strahlendorf, Syapin, Tenner, Young

Associate Professors: Blanton, Dickerson, Freeman, McMahon, Roghani

Assistant Professors: Frame, Popp

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Pharmacology and Neuroscience
- Doctor of Philosophy in Pharmacology and Neuroscience

The objective is to prepare students for careers in research and teaching. The faculty of the program seeks to foster a creative and productive research atmosphere, to provide encouragement and positive challenge, and to equip students with the intellectual tools they will need to be effective teachers and investigators. Specialized research training is available in the areas of biochemical pharmacology, circadian pharmacology, autonomic pharmacology, cardiovascular pharmacology, neuropharmacology, and molecular pharmacology.

Pharmacology (GPHM)

- 5101, 5201, 5301. **Topics in Pharmacology (1:1:0, 2:2:0, 3:3:0).** Prerequisite: Consent of instructor. Specific areas of pharmacology not normally included in other courses. May be repeated for credit with change in content.
5225. **Techniques in Pharmacological Research (2:2:6).** Prerequisite: Consent of instructor. Standard experimental techniques used in pharmacological research are explored through a series of hands-on laboratory exercises. Numerous techniques common to research in many fields will be introduced.
5303. **Principles of Pharmacology (3:3:0).** Prerequisite: Biochemistry and physiology or consent of instructor. A study of the principles and theories of pharmacokinetics and pharmacodynamics of chemicals in relationship to dose and time. The course will consist of lectures, discussions, and oral presentations of original papers by the class and is oriented for both pharmacology and nonpharmacology majors.
- 5312, 5313. **Medical Pharmacology I and II (3:8:0).** A study of pharmacology with emphasis on mechanisms of drug action, interaction, and therapeutics.
5326. **Pharmacology of the Autonomic Nervous System (3:3:0).** Prerequisite: GBCH 5921, GPHY 5803, GPHM 5613 or equivalent. A conceptual study of drugs which alter the function of the autonomic nervous system. Emphasis will be on mechanisms by which drugs affect transmitter synthesis, release, uptake, and metabolism as well as receptor function.
5336. **Molecular and Cellular Pharmacology (3:3:0).** Prerequisite: Consent of instructor. Course focuses on experimental methods employed in pharmacological research. Topics include expression cloning, photo-affinity labeling, gene microarrays, patch clamp recording, etc. This course will consist of selected topics, lectures, and student discussions.
5337. **Neuropsychopharmacology (3:3:0).** Prerequisite: Consent of instructor. A structured in-depth study of specific topics concerning neurochemical pharmacology, behavioral pharmacology, and neuropsychopharmacology. Topics to be studied will vary each semester. The course will consist of lectures, discussions, and oral presentations of original papers by the class.
6000. **Master's Thesis (V1-6).**
6331. **Principles of Toxicology I (3:3:0).** Prerequisite: Graduate standing in the department or consent of instructor. First half of a two-semester course. Examines the foundations of

toxicological sciences. Covers principles, disposition, and first half of toxicological mechanisms.

6332. Principles of Toxicology II (3:3:0). Prerequisite: GPHM 6331. Second half of a two-semester course. Covers remaining toxicological mechanisms, toxic agents, and applied toxicology.

7000. Research (V1-12).

7101. Pharmacology Seminar (1:1:0). Prerequisite: Consent of instructor. This weekly seminar is designed to provide training in research data presentation and analysis. A required course for pharmacology and neuroscience graduate students, it is taken during the fall and spring semesters. Students present seminars to the entire department. Seminar topics vary but the two primary formats are journal club and presentation of data involving the student's research. Part of the grade is determined by class participation.

8000. Doctoral Dissertation (V1-12).

Department of Physiology

Faculty

Luis Reuss, M.D., Chairperson

Professors: Davies, Janssen, Kurtzman, Laski, Lutherer, Orem, Pressley, Reuss, Strahlendorf

Associate Professors: Escobar, Fowler, Martinez-Zaguilan

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Physiology
- Doctor of Philosophy in Physiology

The program is designed primarily to train persons for careers in biomedical research in medical institutions or industry, but can accommodate those interested in alternative careers in physiology. Faculty research programs are diverse, encompassing the general areas of cellular and systemic physiology. Specific areas include membrane channels and transporters, pH and Ca^{++} homeostasis, excitation-contraction coupling, apoptosis, neuronal protective mechanisms, hypertension, shock, and mechanisms of rhythm generation such as sleep and control of respiratory and cardiovascular function.

Advanced courses in specialized areas are taught under the topics course and are designed to fit a student's specific needs.

Applicants should have a demonstrated interest in research and preferably have identified an area for their dissertation research. All candidates for graduate degrees who hold assistantships must fulfill certain requirements while appointed as assistants.

GPHY 5302 is normally a prerequisite for all courses in or above the 6000 level but may be waived for students in other programs with approval of the instructor. Enrollment in GPHY 5302 is limited to students admitted to degree programs and requires approval by the course director.

Physiology (GPHY)

(To interpret course descriptions, see page 8.)

5302. Human Physiology (3:2:0). This introductory graduate course provides the student with a basic understanding of the organ systems of the human body, including their functions, regulation and interactions. No prerequisites are required.

5350. Laboratory Methods in Physiology (3:0:3). Fundamental principles of physiology are explored through a series of hands-on laboratory exercises. Numerous techniques common to research in many fields will be introduced.

5360. Laboratory Rotations as an Introduction to Modern Physiological Research (3:3:0). Prerequisite: Consent of instructor. Students work in a specific laboratory assisting an ongoing research project or conducting an independent research effort.

5400. General Physiology (4:4:0). An introduction to the physical properties that underlie physiology at the molecular and cellular level. Lecture material will be supplemented by readings from the textbook, as well as discussion of seminal papers. There are no prerequisites; completion of an undergraduate course in physical chemistry or thermodynamics is recommended.

5904. Systems Physiology (9:4:0). An introduction to the organ systems of the body, with emphasis on their regulations and interactions. The course material is presented in the context of a larger medical school course, thus individual lectures, small group conferences, and computer exercises are provided at regular intervals during the semester.

6000. Master's Thesis (V1-6).

6105, 6205, 6305. Topics in Physiology (1:1:0; 2:2:0; 3:3:0). Prerequisite: Consent of instructor. Advanced training in a specialized area of physiology. May be repeated for credit with change in content.

6210. Advanced Cardiovascular Physiology (2:2:0). Prerequisite: consent of instructor. Advanced level coverage of topics in cardiovascular physiology with much material being covered in reviews of the research literature.

6311. Cellular and Molecular Physiology (3:3:0). Prerequisite: GPHY 5302 or consent of instructor. The study of the structure and function of ion channels and transporters, excitation-contraction coupling, and mechanisms of cell damage and death.

6314. Membrane Biophysics (3:3:0). Students are introduced to the mechanisms of ion transport through membrane channels; models of membrane excitability; molecular structures of ion channels and their physiological functions.

6318. Physiology of the Neuron (3:3:0). Prerequisite: Consent of the instructor. A contemporary and comprehensive coverage of the biology of nerve cells.

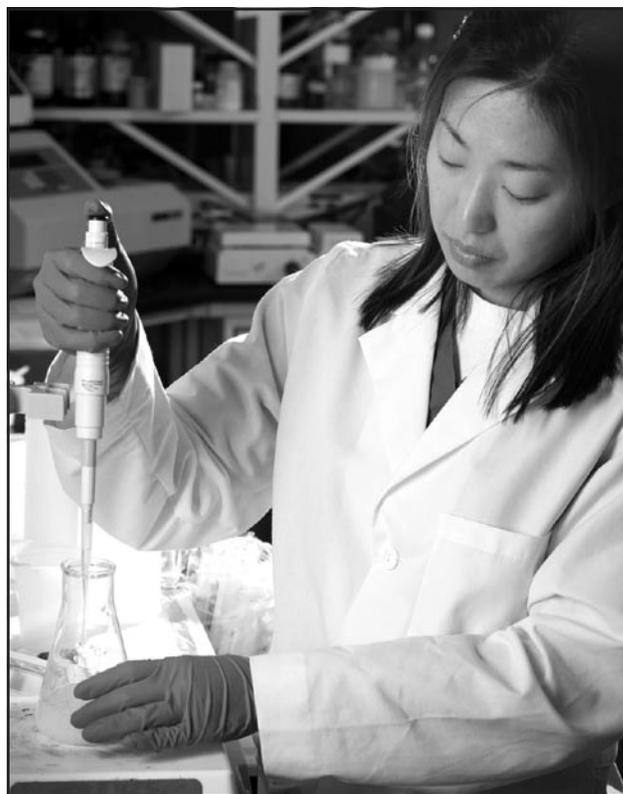
7000. Research (V1-12).

7101. Physiology Seminar (1:1:0). This weekly seminar series provides invited speakers from this and other departments as well as other universities and laboratories with the opportunity to present their current research in some area of physiology.

7102. Readings in Physiology (1:1:0). Students review literature on special topics of research. (Students may be assigned or may select these topics.) May be repeated for credit.

7103. Supervised Teaching in Physiology (1:1:0). Supervised teaching experience including leading laboratory groups and small-group discussions and presenting lectures in some departmental courses (all under faculty supervision).

8000. Doctoral Dissertation (V1-12).



School of Nursing

Alexia Green, Ph.D., Dean

Faculty

Medical Center Hospital Regional Dean Endowed Chair: Sharon Cannon, Ed.D.

Associate Dean for Administrative and Student Affairs: Barbara Johnston, Ph.D.

Associate Dean for Practice and Research Program: Christina Esperat, Ph.D.

Associate Dean of Outcomes Management and Evaluation: Yondell Masten, Ph.D.

CH Foundation Professor: Esperat

Garrison Professor: Owen

Horn Professor: Ketner

Professors: Armstrong, Boswell, Cannon, Decker, Fenton, Green, Johnston, Masten, Valadez, Yoder-Wise

Associate Professors: Allen, Ashcraft, Dadich, Galvan, Merrill, V. Miller, Saunders, Sridaromont, Young

Assistant Professors: Acton, Andersen, Brice, Bridges, Brown, Cherry, Collins, Cookman, Edwards, Esquibel, Francis-Johnson, Hammer, Hanley, Jackson, Lacy, Little, Mitchell-Jones, O'Neal, Palmieri, Schmetter, Thomas, Utterback, Wingate

Instructors: Billings, M. Chavez, R. Chavez, Coates, Curran, Davenport, Gallegos, Gregory, Hernandez, Hust, McMurry, J. Miller, Moore, Thal

About the Program

The School of Nursing is located in the Texas Tech University Health Sciences Center (TTUHSC), which is a legally separate institution from Texas Tech University.

The School of Nursing is an integral part of the Texas Tech University Health Sciences Center and is committed to improving the availability and quality of nursing care. The ultimate goal of the School of Nursing is to prepare nurses who will develop into leaders for the future as they provide competent, compassionate patient care in the rapidly changing healthcare environment. Essential to the attainment of this goal is the development of interdisciplinary approaches created when nursing, medicine, allied health, and pharmacy work together. The faculty and staff of the School of Nursing are committed to excellence in nursing education, research, practice, and service.

The School of Nursing offers a Bachelor of Science in Nursing degree for students who are not licensed as registered nurses and an online RN to B.S.N. degree completion program for students who are licensed as registered nurses. The school also offers an online second degree accelerated B.S.N. program. This program is designed for students with baccalaureate degrees in non-nursing fields, initially targeting recruits from both the Austin/Hill Country and West Texas communities. The program goals are to prepare graduates to provide and direct care to individuals, families, and communities with complex healthcare needs in structured and unstructured settings, to prepare graduates with a professional commitment to nursing excellence for present and emerging healthcare arenas and to provide a foundation for future graduate education in nursing. The school also offers full-time online RN–M.S.N. and B.S.N.–M.S.N. programs focusing on the rural nurse educator. The traditional Master of Science in Nursing degree focuses on such specialties as education, administration, and clinical research management while offering nurse practitioner tracks in family, acute care, pediatrics, and geriatrics. The School of Nursing collaborates

with the School of Nursing at the Texas Woman's University College of Nursing to offer a Ph.D. in Nursing.

Program Accreditation: The School of Nursing is accredited by the Commission on Collegiate Nursing Education (CCNE) and the Board of Nurse Examiners for the State of Texas. The CCNE can be contacted at 1866 Southern Lane, Decatur, Georgia 30033, T 404.679.4500. The Board of Nurse Examiners for the State of Texas can be contacted at P.O. Box 430, Austin, TX 78767-0430, T 512.305.7400.

Undergraduate Program

Bachelor of Science in Nursing. The student may earn the Bachelor of Science in Nursing (B.S.N.) degree at TTUHSC through three tracks: traditional or unlicensed track, licensed RN-B.S.N. track (current RN without B.S.N. degree), or second degree Web-based B.S.N. track (first baccalaureate in another field of study). For each of the three tracks, the program is designed to produce graduates who can achieve the following:

1. Provide patient-centered care for individuals, families, and communities.
2. Work as an effective member of interdisciplinary teams to ensure continuous and safe patient care.
3. Employ evidence-based practice (EBP) by integrating current research with clinical expertise and patient values to provide optimal patient care.
4. Apply quality improvement measures that continually improve health outcomes consistent with current professional knowledge.
5. Utilize informatics to enhance patient safety, manage knowledge and information, make decisions, and communicate more effectively.
6. Provide safe care to individuals, families, and communities through individual performance and system effectiveness.

Traditional Bachelor of Science in Nursing Track

Donna C. Owen, Ph.D., Department Chair Undergraduate Traditional Program

For students who are not licensed registered nurses (traditional student), the baccalaureate degree program offers the opportunity to complete the degree in six consecutive semesters, with admission once each year during the second summer session. All non-nursing course requirements should be completed prior to enrollment in the School of Nursing, and a grade of C or better is required in each course. At the time of application submission, applicants must have completed the Nurse Entrance Test (NET) and a minimum of 40 credit hours of the required non-nursing prerequisite courses, including at least three of the four required science courses.

Application Information. Application for admission to the Bachelor of Science in the traditional undergraduate track is for students who are not currently licensed as registered nurses. Application deadline is February 1 for the next summer semester. Application to the TTUHSC does not guarantee admission. A minimum cumulative grade point average of 2.5 is required to be considered for admission to the School of Nursing. Admission to the program is competitive. Although academic criteria (cumulative GPA, grades earned in science courses, and failed/repeated courses) are the most important factors in admission consideration, additional non-academic information can be considered. Non-academic factors include but are not limited to the following:

- Extracurricular activities
- Work experience
- Diversity of experience, such as study abroad, knowledge of other cultures, proficiency in other languages
- Permanent resident of a TTUHSC service area county
- First generation college student
- English as a second language
- Socioeconomic status
- Prior enrollment at Texas Tech

All applicants will be reviewed in an individual and holistic manner. No single factor will determine a student's admission.

Applicants who receive offers of admission will be required to consent to a criminal background check. A history of criminal conduct or convictions may result in withdrawal of the admission offer. See "Criminal Background Checks" section of the *TTUHSC Student Affairs Handbook* for the School of Nursing policy. The Health Sciences Center policy may be found at HSC OP 10.20.

The Board of Nurse Examiners has identified certain circumstances that may render a potential candidate ineligible for licensure as a registered nurse in the State of Texas. See "Eligibility to Take NCLEX-RN Examination" section of the *School of Nursing Catalog* or access the BNE Web site (www.bne.state.tx.us) for declaratory order information.

General requirements for the traditional B.S.N. track and for the RN to B.S.N. students include the following:

Content Area	TTU Equivalent	Semester Hours
English	ENGL 1301 and 1302	6
Statistics*	MATH 1342 1442, 2342, or 2442	3
Anatomy and Physiology	ZOOL 2403 and 2404	8
Chemistry	CHEM 1305 & 1105 OR 1307 & 1107	4
Microbiology	MBIO 3400	4
Food & Nutrition	F N 1325 OR 1410 OR 3320	3
Visual & Performing Arts		3
Humanities		3
Political Science	POLS 1301 and 2302	6
General Psychology	PSY 1300	3
Introductory Sociology	SOC 1301 OR ANTH 1301 OR 2302	3
U.S. History	HIST 2300 and 2301	6
Life Span Human Development	HDFS 2303	3
TOTAL		55

* Students must complete 3 credit hours of mathematics to meet Core Curriculum requirements. If the student does not take mathematics statistics, then an additional mathematics course must be completed to meet the Core requirement.

Courses can be taken at any accredited community college or institution of higher education that provides comparable courses. Other options are TTU College Level Examination Program (CLEP) or TTU Extended Learning Division.

Bachelor of Science in Nursing Curriculum for Traditional B.S.N. Track

Once students have applied and been accepted to the School of Nursing, they will be able to enroll in nursing courses. Students are classified as full-time students throughout the degree program and must maintain a 2.0 cumulative grade point average to continue in the nursing program.

	Semester Hours
Summer II–1st Semester	
NURS 3206, Introduction to Nursing as a Profession	2
NURS 3420, Health History and Physical Assessment	4
TOTAL	6
Fall–2nd Semester	
NURS 3115, Concepts of Pathophysiology	1
NURS 3313, Care of the Healthy Aging Adult	3
NURS 3314, Nursing Management of Pharm. Therapy I	3
NURS 3500, Fundamentals of the Nursing Profession	5
TOTAL	12
Spring–3rd Semester	
NURS 3216, Integrated Concepts of Pathophysiology	2
NURS 3311, Community Health Nursing	3
NURS 3312, Nursing Care of Families with Children	3
NURS 3530, Medical Surgical Nursing I.....	5
TOTAL	13

Summer–4th Semester

NURS 4403, Nursing Care of the Childbearing Family	4
NURS 4404, Mental Health Nursing	4
TOTAL	8

Fall–5th Semester

NURS 4208, Complex Pharmacological Therapy	2
NURS 4210, The Nurse as a Consumer of Research	2
NURS 4330, Medical Surgical Nursing II Theory	3
NURS 4630, Medical Surgical Nursing II Clinical	6
TOTAL	13

Spring–6th Semester

NURS 4201, Synthesis of Nursing Knowledge	2
NURS 4205, Nursing as a Profession– Seminar II	2
NURS 4405, The Nurse as a Manager	4
NURS 4430, Medical Surgical Nursing III	4
*Nursing Elective	3
TOTAL	15

TOTAL HOURS: 67

* Students must enroll in 3 credit hours of nursing electives

Second Degree Web-Based B.S.N. Program

Cathleen Collins, M.S.N., Acting Department Chair Non-Traditional Undergraduate Programs

Texas Tech Health Sciences Center School of Nursing offers a second degree Web-based accelerated baccalaureate nursing program for students with previous baccalaureate degrees. This program initially targeted recruits from both the Austin/Hill Country and West Texas communities. Program goals are derived from the mission of the School of Nursing as well as the organizing framework for the program. These goals are to prepare graduates for providing and directing care to individuals, families, and communities with complex healthcare needs in structured and unstructured settings; prepare graduates with a professional commitment to nursing excellence for present and emerging healthcare arenas; and provide a foundation for future graduate education in nursing.

All qualified applicants are carefully evaluated individually and holistically. Admission to the second degree nursing program is highly competitive and only the most qualified applicants are selected. Applicants to the second degree with B.S.N. program can seek admission to the School of Nursing through one entry point in the school's curriculum.

NOTE: Application is an online process available at the School of Nursing Web site (www.ttuhs.edu/son). Admission requirements for all campuses should be mailed to the Registrar's Office, School of Nursing Admissions Evaluator, Texas Tech Health Sciences Center, 3601 4th St., MS 8310, Lubbock, TX 79430.

Prerequisite general education required courses for the second degree Web-based B.S.N. track include the following:

	Semester Hours
NURS 3302, Pathophysiology	3
BIOL 2420 or 2421, Microbiology with lab	4
BIOL 2401 and 2402, Anatomy and Physiology I and II	8
PSY 2314, Growth and Development	3
MATH 1342, 1442, 2342 or 2442, Statistics	3
HECO 1322 or BIOL 1322, Food and Nutrition	3
SOC 1301, Sociology	3

The prerequisite for all students with a bachelor's degree in any field of study earned in the State of Texas is 27 semester hours. All general education courses must be completed prior to taking the first nursing course. Additional prerequisites for applicants with a bachelor's degree in another field of study earned outside the State of Texas include 6 hours of U.S. history (HIST 1301 and 1302) and 6 hours of political science (GOVT 2301 and 2302 or 2305 and 2306).

Sample Degree Plan for Second Degree with B.S.N. Track

1st Semester	<i>Semester Hours</i>
NURS 3205, Basic Skills for Nursing Practice: Clin. Comp. I	2
NURS 3906, Foundations for Professional Nursing Practice I	9
NURS 3307, Health Assessment	3
NURS 3308, Pharmacology	3
NURS 3315, Nursing of the Developing Family	3
NURS 3211, Clinical Competence II: Practicum in the Developing Family and Selected Foundation Skills	2
TOTAL	22
2nd Semester	
NURS 3911, Chronic Care Nursing	9
NURS 4312, Child Health Nursing	3
NURS 4314, Mental Health Nursing	3
NURS 4214, Nursing Research	2
NURS 4216, Clinical Competence III: Practicum, Mental Healthcare, and Child Healthcare	2
TOTAL	19
3rd Semester	
NURS 4316, Health Promotion Teaching in Nursing	3
NURS 4317 CL, Community Nursing	3
NURS 4318, Management and Leadership in Nursing	3
NURS 4919 CL, Acute Care Nursing	9
NURS 4219 CL, Nursing Integration: Clin. Comp. IV: Integ. Nurs. ...	2
TOTAL	20



Registered Nurse–Bachelor of Science in Nursing Track

Students who are licensed as RNs can apply to the RN to B.S.N. track to further their education beyond the diploma or associate's degree level. Nurses with a B.S.N. are in higher demand because of their broader education, critical information, futuristic experiences, and leadership skills. Additionally, baccalaureate education provides a natural progression to graduate nursing education and advanced roles such as nursing faculty, nurse practitioners, and nursing managers. Texas Tech University Health Sciences Center School of Nursing offers an exciting baccalaureate degree program that enables nurses to meet healthcare challenges. These courses are accessible on the Web, allowing students to access academic education by computer at work or at home.

This degree requires 123 credit hours, including the following: 55-58 credits of general education requirements, 30 credits of RN-B.S.N. course sequence, and 38 advanced placement credit hours (basic nursing program). The program length is two semesters for a full-time student. Enrollment can begin in the fall, spring, and summer semesters. Degree plans are individualized.

After students receive an admission letter, they will be asked to submit a portfolio to validate their nursing experience. Then the student and the RN-B.S.N. coordinator will review the information and discuss an individualized degree plan. The portfolio is a collection of the student's nursing experiences and assists with advanced placement decisions, selection of a nursing elective, and possible substitution of graduate courses for some undergraduate courses.

The following example illustrates a sample full-time curriculum for fall students. The spring enrollment sequence will vary slightly.

Registered Nurse–Bachelor of Science in Nursing Curriculum for Licensed Students

1st Semester	<i>Semester Hours</i>
NURS 4380, Nature of Nursing Theory	3
NURS 4381, Issues and Trends in Nursing	3
NURS 4382, Aspects of Nursing Research	3
NURS 4384 (CL), Nursing Management I	3
or NURS 4385 (CL), Nursing Management II	
NURS 4388 Client and Peer Teaching	3
2nd Semester	
NURS 4383, Legal and Ethical Issues for RNs	3
NURS 4386 (CL), Leadership in Nursing	3
NURS 4387 (CL), Community Health Practice	3
NURS 4389, Pharmacology Across the Life Span	3
NURS 4390 (CL), Baccalaureate Nursing Practice	3
TOTAL	30

Registered nurse applicants are accepted from the entire state of Texas. Out-of-state RN applicants are accepted and can call the department for further information to facilitate enrollment.

NOTE: Applying to the School of Nursing is an online process. An application is available at www.ttuhsu.edu/son. Admission requirements for all campuses should be mailed to the Registrar's Office, School of Nursing Admissions Evaluator, Texas Tech University Health Sciences Center, 3601 4th St., MS 8310, Lubbock, TX 79430-8310.

Graduate Program / School of Nursing

Barbara Cherry, D.N.Sc.
Department Chair of Leadership Studies

Emily Merrill, M.S.N.
Department Chair of Nurse Practitioner Studies

The purpose of the Master of Science in Nursing program is to prepare the graduate to practice nursing within an expanded role. In synthesizing a clinical and functional focus, the graduate assumes an encompassing perspective of practice, service, research, and education. The graduate in an expanded role is prepared to:

- Provide patient-centered care in the master's-prepared nursing role.
- Work in interdisciplinary teams to address the needs of patients using master's-prepared nursing role skills.
- Employ evidence-based practice (EBP) by integrating the best research evidence into the master's-prepared nursing role.
- Apply quality improvement as a master's-prepared nurse.
- Utilize informatics in the master's-prepared nursing role to reduce errors, manage knowledge and information, make decisions, and communicate effectively.
- Integrate best practices in implementation of master's-prepared nursing roles to ensure safety and risk reduction for patients and populations.

Graduates acquire expertise to meet these objectives in all components of the graduate program, including the collaborative program with the College of Nursing and Health Sciences at the University of Texas at Tyler through Web-based technologies and HealthNet, a two-way interactive video system that links the campuses. The TTUHSC School of Nursing graduate program offers numerous opportunities for students to pursue a master's degree that meets their career plans. The M.S.N. program is offered at the Lubbock, Odessa, Hill Country (Fredericksburg/Kerrville, Marble Falls/Highland Lakes), and UT Tyler campuses.

Students who have not completed the Bachelor of Science in Nursing (B.S.N.) and are registered nurses may elect to complete the Registered Nurse to Master of Science in Nursing online program. It is a full-time fast-track program focusing on the rural nurse educator. The student who has completed the B.S.N. can elect to complete the B.S.N.–M.S.N. full-time online program focusing on the rural nurse educator. The rural nurse educator program prepares graduates to seek a position as a nurse educator and to sit for Academic Nurse Educator Certification when eligible.

Students also can elect to obtain a Master of Science in Nursing with a clinical focus in gerontics or community health and a functional track of education or administration. The graduate is prepared to assume a leadership position in education or administration. A sub-focus of nursing administration is the clinical research management track, offered as an M.S.N., post-master's certificate, or nondegree certificate. The clinical research management program prepares the graduate to manage clinical research trials in a variety of research settings. Graduates will have an in-depth knowledge of the regulatory guidelines and know how these guidelines apply to various research projects and clinical trials. The M.S.N.–nurse practitioner and post-master's certificate programs are offered in several specialty areas, such as family, acute care, geriatrics, and pediatrics. The M.S.N. family nurse practitioner and post-master's family nurse practitioner programs

prepare graduates to assume a primary care provider role in rural agencies and other healthcare settings in underserved areas. The M.S.N. acute care nurse practitioner and post-master's certificate programs prepare graduates to provide culturally sensitive, comprehensive care for adults with common episodic and chronic health problems managed across the continuum of acute care centers. The acute care nurse practitioner assumes responsibility for promoting, maintaining, and restoring health to adults who are acutely or critically ill. Emphasis includes identification of health risks, promotion of wellness, and diagnostics and management of acute and critical illnesses. The M.S.N. geriatric nurse practitioner and post-master's programs prepare graduates to assume a role as a primary healthcare provider dedicated to improving the health of the elderly. Geriatric nurse practitioners serve the elderly and their families in an extensive range of practice settings. The services of geriatric nurse practitioners focus on health maintenance and disease processes that are specific to the elderly. The M.S.N. pediatric nurse practitioner and post-master's programs prepare graduates to assume a role as a primary healthcare provider dedicated to improving children's health. Pediatric nurse practitioners serve children and families in an extensive range of practice settings providing for well and ill children of all ages. Some of the services of pediatric nurse practitioners include well-child examinations, routine developmental screenings, diagnoses and treatment of common childhood illnesses, childhood immunizations, school physicals, and health maintenance care.

Upon completion of course requirements, graduates of the master's and post-master's programs are eligible to sit for the following:

- National Certification Board of Pediatric Nurse Practitioners (PNCB) Exam (PNP)
- American Nurses Credentialing Center (ANCC) Exam (ACNP, GNP, FNP, PNP)
- American Academy of Nurse Practitioners Certification Exam (FNP)
- Society of Clinical Research Associates (SoCRA) Exam (CRM)
- National League for Nursing Nurse Educator Exam (CNE)

Application Information. The minimum requirements for all applicants to the graduate master's nursing programs are the following:

- Valid RN license in the State of Texas.
- Baccalaureate nursing degree from a nationally accredited college or university.
- Successful completion of an undergraduate research and statistics course.
- Minimum 3.0 GPA or better (on a 4.0 scale) in undergraduate upper-division nursing courses and all graduate level work.
- Essay
- Three references
- BLS (M.S.N.) or ACLS (PM–FNP/GNP/ACNP), PALS–PNP

In addition to the above, applicants to the post-master's program must have a M.S.N. degree from a nationally accredited college or university.

Although academic criteria are the most important factors in admission consideration, additional information considered for

(Continued on next page)

all applicants includes but is not limited to consent to a criminal background check, demographic data, diverse work and life experiences, and unique attributes that would contribute to the profession of nursing.

For further information call 800.851.8240, visit online at www.ttuhscc.edu/son or email songrad@ttuhscc.edu/son.

NOTE: Application is an online process available at the School of Nursing Web site www.ttuhscc.edu/son. Admission requirements for all campuses should be mailed to the Lubbock campus: Registrar's Office, School of Nursing Admissions Evaluator, Texas Tech University Health Sciences Center, 3601 4th St., MS 8310, Lubbock, TX 79430-8310.

Collaborative Programs

College of Nursing and Health Sciences, University of Texas at Tyler. Students at this collaborative site can obtain a M.S.N. or a post-master's specializing in family nurse practitioner, acute care nurse practitioner, geriatric nurse practitioner, and pediatric nurse practitioner.

Texas Woman's University. A Ph.D. in Nursing is offered in collaboration with Texas Woman's University College of Nursing (TWU). The Ph.D. degree is awarded by TWU in accordance with program policies of the Graduate School and the College of Nursing. There are three sites for doctoral course offerings: Denton, Houston, and Lubbock. The doctoral program in nursing prepares leaders and scholars who will make a significant contribution to the nursing profession in the discovery, integration, application, and dissemination of knowledge.

Opportunities for Involvement in Student Organizations

Graduate Dean's Advisory Council. Graduate students serve in an advisory role. The primary purpose is to maintain open communication among students, administration, faculty, and staff.

Mentoring Advanced Practice Students (MAPS). This organization's primary purpose is to provide new graduate students an opportunity to network with a knowledgeable colleague already in the program.

Professional Associations. Students with high academic achievements may become members of Sigma Theta Tau, the International Honor Society for Nursing, and Phi Kappa Phi, an interdisciplinary society.

Undergraduate Dean's Advisory Council. Students serve in an advisory role on this council. The primary purpose is to maintain open communication among students, administration, faculty, and staff.

Texas Nursing Students' Association (TNSA). TTUHS School of Nursing claims one of the most active TNSA chapters in the state. The chapter has won numerous awards and honors.

TTUHS Student Senate. This organization's primary purpose is to allow students from all HSC schools to have a voice in events and policies affecting student life.

Nursing (NURS) Courses

For all courses offered in the School of Nursing, the list of nursing courses is organized by course number, using the credit hour as the unit of measure and the Texas Higher Education Coordinating Board Credit/Contact Hour (*Texas Higher Education Coordinating*

Board Workforce Education Course Manual, Chapter four, Page 9, Table 4-2. Credit/Contact Hour Combinations for SCH/WEEM and Local Need Courses) criteria as follows:

- One credit hour per course represents 16-48 contact hours per semester
 - 0-1 lecture/didactic hours per week and
 - 0-3 lab contact hours per week
- Two credit hour course represents 32-80 contact hours per semester
 - 0-2 lecture/didactic contact hours per week and
 - 0-4 lab contact hours per week
- Three credit hour course represents 48-96 contact hours per semester
 - 2-3 lecture/didactic contact hours per week and
 - 0-4 lab contact hours per week
- Four credit hour course represents 80-128 contact hours per semester
 - 2-3 lecture/didactic contact hours per week and
 - 2-6 lab contact hours per week
- Five credit hour course represents 96-144 contact hours per semester
 - 3-5 lecture/didactic contact hours per week and
 - 0-6 lab contact hours per week

(To interpret course descriptions, see page 8.)

Undergraduate Courses

Undergraduate and graduate courses are delivered via traditional, Web-enhanced (combination of face-to-face and online), and Web-based (completely online) methodologies. Traditional course methodology is indicated by T, Web-enhanced by WE, and Web-based by WB.

3030. **Independent Study in Nursing (V1-6 WE).** Topic and objectives of study are mutually agreed upon by the student and selected faculty member. Independent study agreement formalizes the plan for study and guides evaluation.
3040. **Special Topics in Nursing (V1-6 WE).** Designed to focus on subjects of special interest to groups of students. Repeated for credit as topics vary.
3115. **Concepts of Pathophysiology/ Pathology I (1:1:0 WB).** Study of the physiologic basis of disease for beginning nursing practice. Emphasis on application of pathophysiologic concepts to the recognition of pathologic conditions across life span.
3205. **Basic Skills for Nursing Practice: Clinical Competence I Practicum (2:0:6 WB).** (Second Degree) Prerequisite: Program admission and completion of all required general education courses. This laboratory/clinical experience is an introduction to foundational skills for practice and an overview of the standards for nursing practice. This course focuses on client safety and comfort, mobility and transfer, nutrition, care of the integument and beginning assessment skills.
3206. **Introduction to Nursing as a Profession Seminar I (2:1.75:.75 WE).** An introduction to the healthcare delivery system and the nursing profession. Concepts in the course include: nursing history, nursing theory, nursing philosophy, legal/ethical issues, professional roles, interdisciplinary roles, professional writing, and scholarship.
3211. **Clinical Competence II: Practicum in the Developing Family and Selected Foundational Nursing Skills. (2:0:6 WB).** (Second Degree) Prerequisite: Satisfactory completion of all first semester courses. This laboratory/clinical experience focuses on additional foundational skills for nursing practice. Selected experiences will also include a practicum in obstetric nursing.
3216. **Integrated Concepts of Pathology (2:2:0 WE).** Continued study of pathophysiologic concepts across the life span. Major concepts addressed are alterations in sensory and perception, reproduction, gas exchange, hematology neurological system, musculoskeletal, system, endocrine system, gastrointestinal system, renal system, and cancers.
3302. **Basic Concepts of Pathophysiology: Application in Nursing (3:3:0 WB).** Study of the physiologic basis of disease for beginning nursing practice. Emphasis on application of pathophysiologic concepts to the recognition of pathologic conditions across the life span. (Prerequisite: Previous Bac-

- calaureate Degree and acceptance as a Special Student at TTUHSC SON)
3307. **Health Assessment (3:2:3 WB)**. (Second Degree) Prerequisite: NURS 3205; corequisite: NURS 3906, 3308, 3309, 3315. An introduction to health assessment as a systematic process with emphasis on developing skill in the techniques of assessment and communication across the life span. Includes introductory concepts of data collection, health history, physical examination, communication, documentation of assessment and nursing process.
3308. **Pharmacology (3:3:0 WB)**. P(Second Degree) Prerequisite: NURS 3205; corequisite: NURS 3906, 3307, 3315. Introduction to principles of pharmacology and drug therapy, classifications of drugs, and nursing implications of pharmacotherapeutics, legal, ethical, genetic, and cultural implications of drug therapy are explored as well as life span considerations of drug therapy in the young and old. Dosage calculation and routes of medication administration are included.
3311. **Community Health Nursing (3:1.5:4.5 WE)**. Study of nursing care of populations in the community. Includes the concepts of community health nursing practice, epidemiology, environmental health, and collaboration with other healthcare team members.
3312. **Nursing Care of Families with Children (3:1.5:4.5 WE)**. Assists the student in developing a concept of family-centered care across the life span. Emphasizes application of the nursing process with children and families with developmental, cultural, and family structure variance.
3313. **Care of the Healthy Aging Adult (3:2:3 WE)**. An introduction to concepts of healthy aging with a focus on health promotion, maintenance of functional capacity, normal physiologic changes, and improvement of quality of life through interdisciplinary collaboration.
3314. **Nursing Management of Pharmacological Therapy 1 (3:1:6 WE)**. Introduces the concepts of pharmacotherapeutics and pharmacological treatment of humans experiencing altered states from adaptation through dysfunction to pathological processes.
3315. **Developing Family Nursing (3:3:0 WB)**. (Second Degree) Prerequisite: NURS 3205; corequisite: NURS 3906, 3307, 3308. This course emphasizes nursing concepts related to the childbearing family with emphasis on the neonate and women's health. Family theory, health disparities, and genetics are also explored as a foundation for care delivery. Clinical judgment and reasoning will be required in the application of evidence based nursing care in case studies and clinical simulations.
3341. **Nursing Care of the Patient Experiencing Cardiac Dysrhythmias (3:1.4:4.8 WE)**. This course includes assessment and nursing diagnosis of adult clients experiencing cardiac dysrhythmias. Pathophysiology, therapeutic modalities, patient/family response and nursing implications are emphasized throughout the course.
3357. **Holistic Health Practices in Stress Management (3:3:0 WE)**. This course is an introduction to holistic health in stress management.
3365. **Introduction and Exploration into the Multiple Aspects of Forensic Science (3:3:0 WE)**. Forensic science has multiple, significant procedures and guidelines which contribute to the medicolegal analysis in the criminal justice system. Content addressed includes assessment, intervention, and utilization of community resources; legal issues; and evaluation of forensic evidence.
3366. **Hospice and Palliative Care (3:2.5:1.5 WE)**. This course will utilize readings from sociology, psychology, religion, and medical and nursing sciences as a background for discussing and analyzing therapeutic nursing interventions for care of the terminally ill client.
3367. **Violence in Families (3:2:3 WE)**. Family violence has multiple, significant consequences for victims and members of families in which violence occurs. Concepts of assessment, intervention, utilization of community resources, and evaluation of violence in families are included.
3368. **High Risk Obstetrics in Nursing (3:2.5:1.5 WE)**. This course will explore the scope of high risk pregnancy in which the life or health of the mother or fetus is in jeopardy due to complications that are either unique to pregnancy or are due to disorders that coincide with the pregnancy.
3369. **Community Mental Health Nursing (3:2:3 WE)**. This course will utilize various readings and case studies to explore the psychiatric nurse's role in community healthcare. Clinical experiences will be utilized to examine community-based mental health services for individuals and families living with mental illness.
3371. **Legal and Ethical Issues in Healthcare (3:3:0 WE)**. An interdisciplinary course surveying major legal and ethical issues in the delivery of healthcare.
3374. **Philosophical Issues and Problems in Human Caring (3:3:0 WE)**. Exploration of different avenues of approaching philosophical dilemmas in providing care to clients whose behaviors and value systems are difficult to accept.
3376. **Advanced Cardiac Life Support (3:1:6 WE)**. This course will expand the student's cognitive knowledge and psychomotor skills necessary to provide nursing care to individuals experiencing acute life-threatening physiological dysfunctions.
3420. **Health History and Physical Assessment (4:1:9 WE)**. An introduction to the nursing process with emphasis on therapeutic communication, health history, and physical exam.
3500. **Fundamentals of Nursing Profession (5:2:9 WE)**. An introduction into acute and long-term healthcare systems, health-wellness-illness continuum, health promotion, nursing process, and decision making.
3530. **Medical Surgical Nursing 1 (5:2:9 WE)**. Applies nursing process and critical thinking in the care of persons with altered health states.
3906. **Foundations of Nursing Practice (9:3:6 WB)**. (Second Degree) Prerequisite: NURS 3205, Corequisite: NURS 3307, 3308, 3309, 3315. This course is an introduction to nursing as a systematic process with emphasis on the knowledge, skills and values core to evidence based professional nursing utilizing a framework of clinical judgment and decision making coupled with a management systems approach of macro/micro systems. Emphasis is on human functioning, human diversity, and responses to health and illness. Clinical opportunities in exploration of the foundations of professional practice occur in a variety of acute care settings.
3911. **Chronic Care Nursing (9:2:18 WB)**. (Second Degree) Prerequisite: NURS 3211 and satisfactory completion of NURS 3307 and 3308. Corequisite: NURS 4312, 4313, 4214. This course emphasizes chronic care nursing concepts essential for professional nursing practice in long-term care and medical/surgical environments. Special focus is on the concepts of aging and health promotion and disease prevention as well as illness management. Clinical judgment and reasoning and the integration of therapeutic nursing skills will be required in the application of nursing care in case studies and weekly clinical experiences.
4201. **Synthesis of Nursing Knowledge (2:1:3 WE)**. Provides students with an opportunity to assess and analyze own ability to synthesize concepts of nursing care and apply those concepts in simulations and standardized examinations.
4205. **Nursing as a Profession Seminar II (2:1:3 WE)**. Summarizes the concepts of the profession of nursing with emphasis in nursing leadership. Includes anticipatory socialization to the professional nursing role.
4208. **Complex Pharmacological Therapy (2:1.5:1.5 WE)**. Focuses on pharmacological therapy in complex healthcare situations affecting individuals across the life span. Includes an understanding of medications and alternative therapies for common health disorders and builds on previous pharmacological knowledge.
4210. **The Nurse as a Consumer of Research (2:2:0 WE)**. Addresses basic research concepts and explores the relationship of research to theory and evidence based practice.
4214. **Research (2:2:0 WB)**. (Second Degree) Prerequisite: NURS 3211; corequisite: NURS 3911, 4312, 4314. This course will address the basic research concepts and explore the relationship of research to theory and evidence based practice. The purpose of the course is to develop skills in critical appraisal and summary of the evidence in order to apply best practices in clinical care.
4216. **Clinical Competence III: Practicum in Mental Health Nursing and Child Healthcare (2:0:6 WB)**. (Second Degree) Prerequisite: Satisfactory completion of NURS 3911, 4312, and 4314. This practicum/laboratory experience provides opportunities to care for clients and families in pediatric and mental health settings applying knowledge obtained from the theory courses in mental health and child health nursing.
4219. **Clinical Competence IV: Practicum in Integration of Nursing (2:0:6 WB)**. (Second Degree) Prerequisite: Satisfactory completion of all first, second and third semester courses. This course provides the student with the clinical opportunity to integrate the roles of provider, manager, and member of the profession. Practicum emphasis is on providing comprehensive nursing care to multiple clients in an acute care setting and integra-

- tion of the core concepts of the curriculum in preparation for transition from student to professional nurse.
- 4312. Child Health (3:3:0 WB).** (Second Degree) Prerequisite: NURS 3211 and satisfactory completion of all first semester courses; corequisite: NURS 3911, 4314, 4214. This course emphasizes child health and illness nursing concepts essential for professional nursing practice in pediatric acute care and outpatient settings. Growth and development and safety are emphasized. Clinical judgment and reasoning will be required in the application of evidence based nursing care in case studies and clinical simulations.
- 4314. Mental Health Nursing (3:3:0 WB).** (Second Degree) Prerequisite: NURS 3211 and satisfactory completion of all first semester courses; corequisite: NURS 3911, 4312, 4214. Course emphasizes the concepts of human mental health in altered states from adaptation through dysfunction to pathological processes. The focus is the promotion of mental health/optimal function in the care of clients, groups, and families with mental illness.
- 4316. Health Promotion and Education (3:3:0 WB).** (Second Degree) Prerequisite: NURS 4216; corequisite: NURS 4317, 4318, 4919. This course incorporates health promotion and disease prevention concepts for assessment and intervention with clients across the life span. Emphasis is placed on health education planning and teaching principles for support and promotion of clients in the choice for healthy lifestyles.
- 4317. Community Nursing (3:2:3 WB).** (Second Degree) Prerequisite: NURS 4216; corequisite: NURS 4316, 4318, 4919. This course emphasizes public health and community nursing concepts essential for professional nursing practice. Focus is on the concepts of community health nursing practice, epidemiology and disease transmission, comprehensive assessment of risk factors and health problems, program planning and intervention, environmental health, and collaboration with the interdisciplinary team.
- 4318. Management and Leadership in Nursing (3:3:0 WB).** (Second Degree) Prerequisite: NURS 4216; corequisite: NURS 4316, 4317, 4919. This course is designed to provide experiences and critical information for the role of the nurse as a leader and as a manager in nursing. In addition to developing greater personal insight, this course includes opportunities to apply key concepts in relation to leadership roles. As the coordinator of care, the student will have the opportunity to examine complex staffing, delegation organization and health-care delivery system and policy issues for effective management of human and material resources.
- 4330. Medical Surgical Nursing II Theory (3:3:0 WE).** Combines an emphasis on the critical thinking and clinical reasoning/judgment process as a major role in professional nursing practice.
- 4380. Nature of Nursing Theory (3:3:0 WB).** (RN-B.S.N.) Corequisite: NURS 4381. An introduction to the nature of nursing theory. Origins of and strategies for theory development in nursing are examined in terms of importance in guiding the development of the profession as a practice discipline. Nursing theory is analyzed as a foundation for nursing practice and research.
- 4381. Issues and Trends in Nursing (3:3:0 WB).** (RN-B.S.N.) Corequisite: NURS 4380. Focuses on current issues and trends relevant to the professional nursing role on a local, state, national and international level.
- 4382. Aspects of Nursing Research (3:3:0 WB).** (RN-B.S.N.) Prerequisite: NURS 4380, 4381, and 3 hours of undergraduate statistics. Addresses basic research concepts and explores the relationship of research to theory and practice. Prepares the student as a consumer of research in order that relevant findings may be applied to clinical practice.
- 4383. Legal and Ethical Issues for RNs (3:3:0 WB).** (RN-B.S.N.) This course surveys major legal and ethical issues in the delivery of healthcare. It focuses on basic principles and language of legal and ethics in healthcare. It provides a foundation in value development and ethical theories. This course is designed to address the issues confronted by individuals who are actively engaged in the practice of professional nursing.
- 4384. Nursing Management (3:2:3 WB).** (RN-B.S.N.) For RN-B.S.N. students with less than 3 years as an RN or full-time nursing experience or portfolio review. Basic management principles that are inherent in the role of professional nursing practice will be presented.
- 4385. Nursing Management II (3:2:3 WB).** (RN-B.S.N.) For RN-B.S.N. students with three or more years of full-time nursing experience as an RN. Focuses on the mid-manager responsibilities that are inherent in the role of professional nursing practice.
- 4386. Leadership in Nursing (3:2:3 WB).** (RN-B.S.N.) Prerequisite: NURS 4384 or 4385. Leadership concepts related to the management of nursing personnel and healthcare delivery are emphasized.
- 4387. Community Health Practice (3:2:3 WB).** (RN-B.S.N.) This clinical course provides students with the opportunity to apply the nursing process, together with public health, professional nursing and community concepts, scientific methods and critical thinking (judgments and reasoning) to the nursing care groups in a community.
- 4388. Client and Peer Teaching (3:3:0 WB).** (RN-B.S.N.) Teaching focuses on collaboration between the nurse and clients/peers. It includes an assessment of learning needs, the implementation of planned learning experiences, and the evaluation of process and product of teaching. Teaching-learning theories/principles are used as bases for educational planning and intervention.
- 4389. Pharmacology Across the Life Span (3:3:0 WB).** (RN-B.S.N.) This course will build on the foundation resulting from the student's previous nursing educational process. The principles of pharmacology will be applied, in case study format, to non-structured and structured healthcare settings and to individuals across the life span.
- 4390. Baccalaureate Nursing Practice (3:2:3 WB).** (RN-B.S.N.) Prerequisite: Completion of all 438-level courses in RN-B.S.N. plan. Focuses on synthesis of essential concepts in the RN-B.S.N. program, the conceptual framework of the School of Nursing, a conceptual model of nursing, and the Texas BNE competencies for baccalaureate nursing practice.
- 4395. Gateway to Advanced Professional Practice (2:1:6 WB).** This is a transition class for the RN-MSN student focusing on current issues relevant to the professional nursing role and introduction to the nature of nursing theory. Selected local, state, national and international issues impacting the professional nursing role are addressed. Additional, the impact of theory development on the evolving practice of the nursing professional is reviewed and analyzed.
- 4403. Nursing Care of the Childbearing Family (4:2:6 WE).** Focuses on developing skills during the phases of the nursing process in working with all members of the childbearing family unit. Special emphasis on assessment of family unit, cultural differences in the approach to the childbirth experience.
- 4404. Mental Health Nursing (2:2:6 WE).** Concepts of human mental health in altered states from adaptation through dysfunction to pathological processes are included. Focus is on utilization of nursing process in the care of clients, groups, and families with alterations in mental health.
- 4405. The Nurse as a Manager (4:2.5:4.5 WE).** Emphasizes the role of the nurse in beginning management roles as critical elements for nursing's future. Examines the use of selected theoretical role perspectives related to management.
- 4430. Medical-Surgical Nursing III (4:1:9 WE).** Focuses on the role of the professional nurse using selected models of case delivery for the complex client and family.
- 4630. Medical-Surgical Nursing II Clinical (6:0:18 WE).** Combines an emphasis on the critical thinking and clinical reasoning/judgment process as a major role in professional nursing practice with application of nursing process in acute and critical care setting with clients across the life span.
- 4801. Professional Nursing Practice (8:7.5:1.5 WE).** Introduces nursing theories relevant to nursing practice and integrates the concepts of pathophysiology, pharmacology, informatics, nursing process, physical assessment, interdisciplinary holistic care, and critical thinking into professional nursing practice. Includes the influence of multicultural environments.
- 4919. Acute Care Nursing (9:2:21 WB).** (Second Degree) Prerequisite: NURS 4216; corequisite: NURS 4316, 4317, 4318. This course emphasizes acute care nursing concepts essential for professional nursing practice in complex adult medical/surgical environments. Clinical judgment and reasoning and therapeutic nursing skills will be required in the application of evidence based nursing care in case studies and weekly clinical experiences.

Graduate Courses

Graduate courses are delivered via traditional, Web-enhanced (combination of face-to-face and online), and Web-based (completely online) methodologies. Traditional course methodology is indicated by T, Web-enhanced by WE, and Web-based by WB.

5060. **Independent Study (V1-6 T)**. Designed to meet special needs and interests of a student who proposes a specific plan of study. Course varies from 1-6 semester hours and course may be repeated as topic and/or objective of study changes.
5080. **Special Topics (V1-6 WB\WE)**. Designed to focus on subjects of special interest to groups of students. May be repeated for credit as topics vary.
5111. **The Advanced Practice Nurse Role: Foundation for Advanced Practice Nurse (1:1:0 WE)**. A study of the Advanced Practice Nurse (APN) role, including the evolution of the role, current and continuing issues relevant to advanced practice nursing, and clinical practice issues related to health promotion and disease prevention. Course activities include observation, discussion, and analysis of experiences.
5222. **Diagnostic Methods and Procedures for Advanced Practice (2:1:3 WE)**. Designed for students preparing for the Advanced Practice Nursing (APN) role as a nurse practitioner. Selected clinical diagnostic laboratory, imaging tests, and selected procedures practiced by APNs will be presented. Clinical decision making for selecting appropriate tests or procedures, and interpretation of diagnostic test results is addressed. Students will use evidence based research to appropriately gather, interpret and manage objective diagnostic clinical data to manage various health problems across the life span.
5231. **The Nursing Administrator: Standards for Excellence (2:2:0 T)**. Focuses on the standards affecting the nursing administrator and the administrative role. Content relates to the Scope of Practice and Standards for Nurse Administrators, the Magnet Recognition Program criteria and the Baldrige National Quality Program. Traditional role content is viewed in light of these elements of quality.
5242. **Administrative Role Development (2:0:6 T)**. The course emphasizes the practicality of applying quality standards in the nursing administration role. The practicum focuses on the concepts formulated in the prerequisite course.
5300. **Community Health I: Foundations of Community Health Nursing (CL) (3:1:6 WB)**. Prerequisite or corequisite: NURS 5330. Study of the major concepts basic to the development, implementation and evaluation of Community Health. Clinical practice focuses on application of nursing theory, epidemiologic concepts, public policy, program planning and exploration of nursing skills and techniques related to aggregate level health promotion, health maintenance, health restoration and disease prevention.
5301. **Community Health II: Role Design and Implementation (CL) (3:1:6 WB)**. Prerequisite: Successful completion of NURS 5300, NURS 5330, and concurrent enrollment in CDC Epidemiology Module. Study of the nursing role components inherent in community health. Identification of facilitators for and barriers to the implementation of community health in healthcare settings. Clinical practice involves collaboration and implementation of the community health role in selected healthcare settings.
5302. **Community Health Foundation for Advanced Practice (3:1:6 WB)**. Study of the major basic concepts and the nursing role components inherent to community health. Facilitates the transition into the advanced practice community health role. The incorporation of interdisciplinary relationships and/or partnerships into the delivery of community health nursing.
5305. **Rural Health and Cultural Competency CL (3:2:3 WB)**. This course will focus on the concepts important in rural health and cultural competency for the emerging nurse leader. The concept of rurality will be presented not as a dichotomy, but as a continuum; a continuous movement of people and money from remote/rural through suburban to urban/metropolitan. This perspective will emphasize the interaction of communities across the rurality continuum with a focus on the contribution of social, economic, environmental, cultural, historical, and demographic characteristics to healthcare.
5310. **Gerontics I: Foundations of Gerontic Nursing (3:1:6 WB)**. Study of the major concepts essential to the development, implementation and evaluation of quality gerontic care. Clinical practice focuses on application of nursing theory and pathophysiological concepts, and exploration of nursing therapies, skills and techniques associated with the provision of gerontic care.
5311. **Gerontics II: Role Design and Implementation (3:1:6 WB)**. Study of the nursing role components basic to collaboration and provision of gerontic care, including family dynamics related to the extended family and identification of families at risk. Clinical practice focuses on provision of care in a variety of settings.
5314. **Leadership in Education I: Foundations of Nursing Education (3:3:0 WB)**. Prerequisite: NURS 5330. Focuses on the leadership role of the nurse educator by examining the foundational components of the formal teaching/learning process.
5315. **Leadership in Education II: Critical Elements of the Teaching Role (3:2.5:1.5 WB)**. Prerequisite: NURS 5314. The concepts and components of course development, implementation, evaluation, and revision in academic, continuing nursing education, or staff development setting will be emphasized as critical elements of the teaching role.
5316. **Leadership in Education III: Evaluation and Outcomes (3:2.5:5 WB)**. Prerequisite: NURS 5314, 5315. Concepts related to student evaluation, test construction, evaluation of evidence based teaching and evaluation of distance learning/technology will be introduced. Program evaluation, accreditation processes and professional development of faculty will be discussed and analyzed.
5330. **Theories and Therapies (3:3:0 WB\WE)**. Exploration of theories in nursing as a basis for nursing therapies. Analysis of existing theories, theory construction and concept formulation and common specialized therapies such as counseling, touch, and comfort measures.
5333. **Management of Acute and Episodic Conditions in Older Adults (3:1:6 WE)**. Addresses the theoretical and clinical foundation for evidence based management strategies of acute health problems and common syndromes of older adults. Emphasis is on comprehensive assessment, clinical decision-making, and the implementation of scientifically based clinical management plans in collaboration with the healthcare team. The focus is on empowering the older adult to maintain or regain health through the framework of evidenced based care and use of best practices. Under the supervision of faculty and preceptors, clinical experiences occur in a variety of community-based healthcare settings that expose the student to both healthy and frail adult populations.
5334. **Management of Chronic Health Conditions in Older Adults (3:1:6 WE)**. Addresses the theoretical and clinical foundation for evidence-based management strategies of chronic and complex health problems of older adult. Emphasis is placed on the management of older adults with multiple system problems. Clinical practice involves collaboration and implementation of the primary healthcare role in selected healthcare settings.
5340. **Primary Healthcare Practice I: Advanced Assessment, Pathology, and Management (3:1:6 WE)**. Study of major concepts and therapies required in the development, implementation and evaluation of primary healthcare. Clinical practice focuses on application of nursing theory, pathophysiological and epidemiological concepts and exploration of nursing therapies, skills and techniques essential to the provision of primary healthcare.
5341. **Primary Healthcare Practice II: Advanced Role Application (3:1:6 WE)**. Study of nursing role components critical to primary healthcare. Identification of facilitators for and barriers to the implementation of primary healthcare. Clinical practice involves collaboration and implementation of primary healthcare role in selected healthcare settings.
5342. **Advanced Health Assessment (3:1:6 WE)**. Building upon basic physical assessment and history taking knowledge and skills, this course focuses on knowledge and clinical skills required for advanced practice nursing.
5343. **Pharmacotherapeutics for Nurses in Advanced Practice (3:3:0 WB)**. Study of advanced pharmacologic and pharmacokinetics principles of drug categories used by nurses in advanced practice.
5344. **Advanced Practice Role Development: Advanced Cardiac Life Support (3:2:3 WE)**. Expands the student's ability to analyze and provide appropriate care in situations in which individuals are experiencing acute life-threatening physiological dysfunctions from the perspectives of ethics, law, and advanced clinical practice. This course is designed to prepare the student for participation in an Advanced Cardiac Life Support providers' class according to the standards set by the American Heart Association.
5345. **Advanced Practice Nursing: Application of Pathophysiology (3:3:0 WB)**. Study of the physiologic basis of disease for advanced practice nursing. Emphasis on application of pathophysiological concepts to the recognition of pathologic conditions and the management of clients with a variety of health problems across the life span.
5360. **Clinical Research Management I: Introduction to Clinical Research Management (3:3:0 WB)**. Focuses on an overview of clinical research management. Content includes the defining of the core language of clinical trials research, drug and device development, basic steps in the research process, and the design and conduct of all phases of clinical trials.

- 5361. Clinical Research Management II: Regulatory Affairs (3:3:0 WB).** Focuses on components of the drug and device development process related to regulatory affairs. An overview of structure and function of the FDA and NIH is included. Content provides comprehensive exploration of Investigational Drug Application, New Drug Application and Orphan Drug Applications regulatory statutes, protection of human subject, fundamentals of Good Clinical Practice (GCP), components of the Code of Federal Regulations (CFR), guidance of Office of Human Subjects Protection (OHRP) and International Harmonization Guidelines (ICH).
- 5371. Professional Nursing Issues (3:3:0 WB).** Analysis of role issues confronting the nursing profession. Issues are examined from historical, multidisciplinary, and global perspectives with an emphasis on synthesis of advanced nursing role knowledge at a societal-level focus.
- 5372. Utilizing the Arts in Healthcare (3:3:0 WB).** An introductory study and overview of current and past methods of incorporating the arts into the healthcare setting for patients, families and healthcare staff and professionals. Attention will be paid to cultural and age diversities and education, psychological and physical benefits derived from creative expression.
- 5374. Writing for Publication (3:3:0 WB).** Develops expertise in writing/preparing manuscripts for publication. Special emphasis on choosing journals of manuscript topics, preparing a manuscript according to journal guidelines, and learning to navigate the publication process from inquiry letter to submission of manuscript to peer review and final submission.
- 5375. Nursing Ethics through the Life Span (3:3:0 WB).** Provides an opportunity to examine ethical issues that arise in advanced nursing practice throughout the life span of the client, providing an opportunity to: implement an evidence-based practice; understand the moral significance of nursing; recognize and clarify models of professional relationships; and identify and distinguish between ethical models. Ethical models will be utilized to justify ethical decisions in advanced nursing practice.
- 5376. Best Practices for Safe Healthcare Systems (3:3:0 WB).** This graduate level interdisciplinary course is designed to explore solutions and practices that promote safer patient care and reduce risk in a variety of health care settings.
- 5377. Humanities in Professional Life (3:3:0 T).** Nursing as a humanistic discipline is an elective course designed to provide opportunities for analyzing the humanistic aspects of nursing as a primary function of modern nursing practice for the master's prepared and advanced practice prepared nurse. The humanistic aspects of nursing have been described as follows in the Affirmation of Commitment, often recited at commencements: We believe that the nature and purpose of nursing encompasses a multifaceted approach to human need. We further believe in nursing as a professional discipline, involving clinical practice, and as a humanistic field where nurse and client share in the wonder, pain, and awe of human existence.
- 5378. Primary Health Care for Women (3:1.5:1.5 WE).** Prerequisite: NURS 5342 or consent of instructor. Presents the theoretical and clinical basis for advanced practice nursing management of the woman who is essentially well or who has non-acute health problems. Emphasis is on the integration of primary health care screening, preventive health care, and health care promotion. Selected health problems common to women across the age continuum are addressed.
- 5379. Clinical Nutrition for Professional Practice (3:2.5:5 WB).** Study of clinical nutrition issues useful in professional nursing practice. Nutrition issues related to disease prevention and treatment across the life span will be explored using an interdisciplinary approach. (Pre-requisites: Graduate Standing)
- 5380. Pediatric Primary Health Care I (3:1:6 WE).** Prerequisite: NURS 5301, 5311, 5330, 5342, 5343, 5345, 5344 or ACLS. Designed to develop theoretical and research-based knowledge of child health issues and well-child assessment of infants, children, and adolescents in the context of family and cultures, the course develops advanced practice skills in comprehensive assessment, as well as, management strategies reflecting current nursing and medical knowledge and practice.
- 5381. Pediatric Primary Health Care II (3:1:6 WE).** Prerequisite: NURS 5380. Designed to further develop theoretical and research-based knowledge of diagnosis, treatment, and evaluation of pediatric patients with acute and chronic health problems, the course develops advanced practice skills and comprehensive assessment and management strategies reflecting evidence-based nursing/medical knowledge and practice.
- 5386. Finance and Budgeting for Nurse Leaders (3:3:0 WB).** Designed to provide graduate students with information and skills for developing budgets and managing financial issues in health care facilities, clinics, independent practice or a nursing unit.
- 5391. Principles of Advanced Research (3:3:0 WB).** Course addresses components of the research process including the scientific method in quantitative and qualitative research design.
- 5392. Application of Advanced Research (3:2:3 WB).** Examines relationship of research to outcome measures in practice, education, and administrative role.
- 5450. Acute Care Nurse Practitioner Concepts and Diagnostic Skills I: Adult (4:2:6 WE).** Designed to develop a beginning theoretical and research based knowledge of diagnosis, treatment, and evaluation of adults with acute and chronic health problems. Emphasis will be placed on applying this knowledge to the management of patients with disorders of selected body systems. Clinical activities focus on enhancing history and physical skills, delineating differential diagnoses, and learning initial clinical management of clients experiencing acute and chronic health problems. Basic role components of the Acute Care Nurse Practitioner will be introduced.
- 5462. Clinical Research Management III: Application to Clinical Trials (4:4:0 WB).** This course examines key aspects of implementation of a clinical trail. The necessary skills for a successful Clinical Research Associate and/or Study Site Coordinator are examined. Management of clinical trials from perspectives of the study sponsor and study site is discussed. A major focus is on the business components of implementing a clinical trial including communication and team building. Site and time management systems will be introduced and used. Content also includes clinical research associate skills, adverse event reporting and clinical audits
- 5551. Acute Care Nurse Practitioner Concepts and Diagnostic Skills II: Adult (5:2:9 WE).** Designed to build on major components critical to the knowledge of diagnosis, treatment, and evaluation of adults with acute and chronic health problems. Clinical practice focuses on research-based decision-making process in close collaboration with preceptors.
- 6000. Thesis (V1-6 T).** A planned process of scholarly inquiry, which implements a quantitative or qualitative design and contributes to nursing's body of knowledge.
- 6030. Leadership in Education IV: Role and Practicum (3:5:8 WB).** Prerequisite: NURS 5314, 5315, and 5316. Immersion in all leadership aspects of the faculty role in an academic, CE, or staff development setting with guidance of a preceptor.
- 6040. Clinical Research Management Practicum (5:0:15 WB).** This Provides the opportunity for a clinical immersion in activities concerned with management of clinical research.
- 6050. Acute Care Nurse Practitioner IV: Role and Practicum (6:1:15 WE).** Emphasizes clinical practice. Clinical activities allow for immersion in advanced role. Function and responsibility of selected topics of the advanced practice role are addressed.
- 6060. Nursing Practicum (3:0:18 WE) (6:0:36 WE).** A clinically focused practicum for individuals pursuing expectations beyond basic graduate degree requirements. Variable credit 3 or 6 hours. Nurse Practitioner students are required to complete the majority of practicum in underserved areas.
- 6071. Supervised Teaching (V1-3 T).** Directed teaching in students' major area under close supervision of one or more faculty.
- 6080. Pediatric Nursing Practitioner Practicum (3:0:18 WE) (6:0:36 WE).** Prerequisite: NURS 5341 and successful completion of required clinical and functional courses. A clinically-focused practicum for individuals pursuing expectations beyond basic graduate degree requirements. Variable credit of 3 to 6 hours. Pediatric nurse practitioner students are required to complete the majority of practicum in underserved areas.
- 6090. Gerontological Nurse Practitioner Practicum (3:0:18 WE) (6:0:36 WE).** A synthesizing, practical experience in development and implementation of the role of the advanced practice nurse. Emphasis is on role development along with the refinement of critical reasoning, skill development, and resource allocation. Under the guidance of a preceptor, students practice in a clinical setting to provide primary care to older adults.
- 6221. Administrative Role Development: The Nurse Administrator as Leader (2:2:0 T).** Online seminar in contemporary issues in administrative circles. Explores issues from various professional, client, legal, ethical, policy and societal perspectives. Emphasizes leadership development.
- 7370. The Quality Imperative (3:3:0 WE).** Course provides an opportunity for doctoral students to study cutting edge issues in quality improvement and risk management in nursing.

Faculty Directory

Horn Professorships

(Date following departmental affiliation indicates calendar year of Horn Professorship appointment.)

Magne Kristiansen, Electrical Engineering, 1977
Robert J. Baker, Biological Sciences, 1979
William J. Conover, Information Systems and Quantitative Sciences, 1981
Shelby D. Hunt, Marketing, 1983
James G. Hunt, Management, 1984
Janet W. Pérez, Classical and Modern Languages and Literatures, 1986
David B. Knaff, Chemistry and Biochemistry, 1987
Richard A. Bartsch, Chemistry and Biochemistry, 1988
Mary Jeanne Van Appledorn, Music, 1989
Allan J. Kuethe, History, 1990
Clyde F. Martin, Mathematics and Statistics, 1991
Kishor C. Mehta, Civil Engineering, 1991
Purnendu K. Dasgupta, Chemistry and Biochemistry, 1992
Sankar Chatterjee, Museum Science and Geosciences, 1994
Clyde Hendrick, Psychology, 1996
Kenneth Ketner, Institute for Studies in Pragmaticism, 1999
Daniel Benson, Law, 2000
Stefan Estreicher, Physics, 2000
Henryk Temkin, Electrical Engineering, 2000
Frits Ruymgaart, Mathematics and Statistics, 2001
William Westney, Music, 2001
Peter Westfall, Information Systems and Quantitative Sciences, 2002
Loretta Bradley, Educational Psychology, 2003
Wijesuriya Dayawansa, Mathematics and Statistics, 2003
Hafid Gafaiti, Classical and Modern Languages and Literatures, 2004
Vivien Allen, Plant and Soil Science, 2005
Susan Hendrick, Psychology, 2005
Greg McKenna, Chemical Engineering, 2005
Sunanda Mitra, Electrical and Computer Engineering, 2005
Marilyn Phelan, Law, 2005
Michael Galyean, Animal and Food Sciences, 2006
James Watkins, Architecture, 2006
William R. Casto, Law, 2007
Eileen Johnson, Museum Science, 2007
W. David Nes, Chemistry and Biochemistry, 2007

Teaching Faculty

(Date following departmental affiliation indicates calendar year of Horn Professorship appointment.)

A

Abidi, Noureddine, Research Assistant Professor of Plant and Soil Science, 2006. B.S., University of Med I (Morocco), 1991; M.S., 1992; Ph.D., Montpellier II (France), 1996.
Abbruscato, Thomas J., Associate Professor and Graduate Program Advisor of Pharmaceutical Sciences, 2000. B.S., Arizona, 1992; Ph.D., 1997.
Acosta-Martinez, Veronica, Adjunct Faculty in Plant and Soil Science and Biological Sciences, 2002. B.S., Puerto Rico, 1994; M.S., Purdue, 1997; Ph.D., Iowa State, 2000.
Acton, Cindy, Assistant Professor of Nursing, 2000. B.S.N., West Texas State, 1983; M.S.N., West Texas A&M, 1997.
Adair, Aaron, Assistant Professor of Theatre and Dance, 2005. B.M., Southeastern Oklahoma State, 1993; B.A., 1995; M.A., Texas A&M, 1998; Ph.D., Texas (Dallas), 2005.
Adams, Charlie, Associate Professor of Restaurant, Hotel, and Institutional Management, 1997. B.G.S., Texas Tech, 1987; B.S., 1988; M.S., 1990; Ph.D., 1997.
Adams, Gretchen, Assistant Professor of History, 2002. B.A., Oregon, 1994; M.A., 1996; Ph.D., New Hampshire, 2001.
Adisoemarta, Paulus S., Assistant Professor of Petroleum Engineering, 1999. B.S., Bandung Inst. of Tech. (Indonesia), 1987; M.S., Texas, 1995; Ph.D., Texas Tech, 1999.
Agnello, Mary Frances, Associate Professor of Curriculum and Instruction, 2004. B.A., Texas 1976; M.Ed., Ph.D., Texas A&M, 1998.
Aguirre-Muñoz, Zenaida, Associate Professor of Curriculum and Instruction, 2004. B.A., California (Santa Barbara), 1992; Ph.D., California (Los Angeles), 2000.
Ahsan, Fakhrul, Assistant Professor of Pharmaceutical Sciences, 2001. B.S., Dhaka (Bangladesh), 1990; M.S., 1992; Ph.D., Madrid (Spain), 1999.
Akchurin, Nural, Associate Professor of Physics and Engineering Physics, 2000. B.A., Vassar Coll., 1982; Ph.D., Iowa, 1990.
Akers, Cynthia L., Associate Professor of Agricultural Education and Communications, 1997. B.S., Texas Tech, 1991; M.S., 1992; Ed.D., 2000.
Akins-Tillett, Future, Assistant Professor of Art, 2005. B.A., Texas Tech, 1972; M.F.A., 1977.
Akram, Majid H., Associate Professor of Engineering Technology, 1999. B.S.C.E., Military Coll. of Engineering (Pakistan), 1983; M.S.C.E., West Virginia, 1992; Ph.D., 1995.
Akrofi, Amma K., Assistant Professor of Curriculum and Instruction, 2002. B.A., Ghana, 1972; Ed.D., Texas Tech, 2002.
Alayyan, Sudqi, Associate Professor of Engineering Technology, 1984. B.S., Texas Tech, 1977; M.S., West Texas A&M, 1993.
Albin, Robert Custer, Professor of Animal and Food Sciences, 1964. B.S., Texas Tech, 1961; M.S., 1962; Ph.D., Nebraska, 1965.
Alexander, Karen L., Assistant Professor of Family and Consumer Sciences Education, 2005. B.S., Ohio State, 1991; M.S., 1997; Ph.D., 2000.
Alford, Kwamè, Assistant Professor of History, 2000. B.S., Morgan State, 1979; M.A., 1994; Ph.D., Missouri (Columbia), 1998.
Al-Hmoud, Rashid, Associate Professor of Economics, 2000. B.Sc., Jordan, 1991; M.S., Texas Tech, 1992; Ph.D., 1994.
Allen, Deloran M., Adjunct Faculty in Animal and Food Sciences, 2004. B.S., Kansas State, 1961; M.S., Idaho, 1963; Ph.D., Michigan State, 1966.
Allen, Edward J., Professor of Mathematics and Statistics, 1985. B.S., Wisconsin-Madison, 1971; M.S., 1972; Ph.D., Tennessee, 1983.
Allen, Linda Joy Svoboda, Professor of Mathematics and Statistics, 1985. B.A., Coll. of St. Scholastica, 1975; M.S., 1978; Ph.D., Tennessee, 1981.
Allen, Patricia, Associate Professor of Nursing and Associate Dean, 2004. B.S.N., Old Dominion, 1976; M.S.N., Catholic U. of America, 1980; Ed.D., Florida International, 1994.
Allen, Randy D., Professor of Biological Sciences and Plant and Soil Sciences, 1989. B.S., Southwestern Union Coll., 1978; M.S., Texas (Arlington), 1981; Ph.D., Texas A&M, 1986.
Allen, Roberta S., Instructor in Accounting, 1999. B.S., Coll. of Charleston, 1991; M.S.A., Texas Tech, 1996.
Allen, Susan, Assistant Professor of Political Science, 2005. B.S., Guilford Coll., 1998; M.A., Emory, 2004; Ph.D., 2004.
Allen, Vivien G., Thornton Chair and Horn Professor of Plant and Soil Science, 1995. B.S., Tennessee (Martin), 1962; M.S., Louisiana State, 1973; Ph.D., 1979.
Altenberg, Guillermo, Associate Professor of Physiology, 2007. B.A., National School, Buenos Aires, (Argentina), 1976; M.D., U. of Buenos Aires (Argentina), 1983; Ph.D., 1987.
Alvarado, Christine, Assistant Professor of Animal and Food Sciences, 2001. B.S., Texas A&M, 1994; M.S., 1997; Ph.D., 2001.
Amor, Cherif M., Associate Professor of Interior Design, 2000. B.Arch., Constantine (Algeria), 1984; M.Phil., New Castle upon Tyne (U.K.), 1987; Ph.D., Missouri (Columbia), 2000.
Andersen, Per, Assistant Professor of Computer Science, 2003. B.Eng., Carleton (Canada), 1980; M.S., Texas Tech, 1997; Ph.D., 2002.
Andersen, Susan, Assistant Professor of Nursing, 2000. B.S.N., Lubbock Christian, 1994; M.S.N., F.N.P., Texas Tech HSC, 1997; Ph.D., Texas (Health Science Center), 2003.

- Anderson, Amy Brisco**, Associate Professor of Music, 1995. B.M., North Texas, 1978; M.M., 1982.
- Anderson, Christopher M.**, Assistant Professor of Music, 2003. B.M.E., Abilene Christian, 1995; M.M., Northwestern, 1996.
- Anderson, Connie A.**, Assistant Professor of Curriculum and Instruction, 2001. B.S., Northeastern State, 1973; M.Ed., 1975; Ed.D., Oklahoma State, 1998.
- Anderson, Dianne**, Instructor in Managerial Communications, 1998. B.S., Brigham Young, 1963; M.S., 1964.
- Anderson, Edward E.**, Professor of Mechanical Engineering and Associate Director, Teaching, Learning, and Technology Center, 1986. B.S.M.E., Iowa State, 1964; M.S.M.E., 1966; Ph.D., Purdue, 1972; Reg. Prof. Engr. (Iowa).
- Anderson, Mark**, Instructor in Architecture, 2003. B.Arch., Texas Tech, 1976.
- Anderson, Rachel**, Instructor in Apparel Design and Manufacturing, 2004. B.S., Texas Tech, 1992.
- Anderson, Todd A.**, Associate Professor of Environmental Toxicology, 1997. B.S., Peru State Coll., 1986; M.S., Tennessee, 1988; Ph.D., 1991.
- Aoyama, Katsura**, Assistant Professor of Speech, Language, and Hearing Sciences, 2002. B.A., Kansai (Japan), 1995; M.A., Hawaii, 1997; Ph.D., 2000.
- Aranha, Joseph Leslie**, Associate Professor of Architecture, 1981. B.Arch., Indian Inst. of Tech. (India), 1978; M.Arch., Iowa State, 1981; Reg. Arch. (India).
- Armstrong, Myrna L.**, Professor of Nursing, 1994. Diploma, Walther Memorial Hospital, 1963; B.S.N., De Paul, 1969; M.S., 1972; Ed.D., East Texas State, 1986.
- Arnett, Dennis B.**, Assistant Professor of Marketing, 2000. B.A., Occidental Coll., 1986; M.A., United States International, 1992; Ph.D., Texas Tech, 1998.
- Arnold, Kimberlie**, Clinical Instructor in Speech, Language, and Hearing Sciences, 2006. B.S., Texas, 1991; M.A., 1992.
- Arnold, Sue**, Associate Professor of Music, 1971. B.A., Campbell Coll., 1969; M.M., Illinois, 1971.
- Arsuffi, Thomas L.**, Adjunct Faculty in Biological Sciences and Natural Resources Management, 2005. B.S., Kent State, 1974; M.S., 1977; Ph.D., New Mexico State, 1984.
- Arumugam, Thiruma**, Assistant Professor of Pharmaceutical Sciences, 2007. B.M.S., Sydney (Australia), 1999; Ph.D., 2003.
- Ashby-Martin, Christina M.**, Assistant Professor of Honors, 1998. B.F.A., New Mexico, 1984; M.A., California (Riverside), 1987; Ph.D., Bowling Green State, 1998.
- Ashcraft, Alyce**, Associate Professor of Nursing, 2001. B.S.N., Texas Woman's, 1980; M.S.N., Texas (Arlington), 1984; Ph.D., Texas, 2001.
- Atanassov, Momchil**, Instructor in Biological Sciences, 2004. M.S., Sofia (Bulgaria), 1996; Ph.D., Texas Tech, 2002.
- Atcheson, Judith Rae**, Visiting Assistant Professor of Curriculum and Instruction, 2002. B.A., Denver, 1966; M.Ed., Missouri; Ed.S., 1988; Ed.D., Texas Tech, 1992.
- Auld, Dick**, Rockwell Professor of Plant and Soil Science, 1991. B.S., New Mexico State, 1970; M.S., 1973; Ph.D., Montana State, 1976.
- Aulisa, Eugenio**, Assistant Professor of Mathematics and Statistics, 2007. M.S., U. of Bologna, 2001; Ph.D., 2005.
- Aycock, Wendell Marshall**, Professor of English and Comparative Literature; Coordinator of Interdisciplinary Studies; and Associate Dean, Graduate School, 1969. B.A., Texas Tech, 1962; M.A., 1965; Ph.D., South Carolina, 1969.
- B**
- Baake, Kenneth R.**, Associate Professor of English, 2000. B.A., Maryland, 1978; M.S., Texas (El Paso), 1995; Ph.D., New Mexico State, 2000.
- Bae, Sungwon**, Assistant Professor of Health, Exercise, and Sport Sciences, 2006. B.S., Yeungnam (Korea), 1994; M.S.A., Ohio, 1998; Ph.D., Florida State, 2004.
- Baehr, Craig M.**, Associate Professor of English, 2002. B.A., New Mexico, 1992; M.A., 1995; Ph.D., 2002.
- Bagwell, Dorothy Caroline**, Associate Professor of Personal Financial Planning, 2000. B.S., Louisiana State, 1989; M.S., Texas Woman's, 1996; Ph.D., Virginia Tech, 2000.
- Baker, C. Richard "Dick,"** Adjunct Faculty in Law, 1994. B.S., New Mexico, 1967; J.D., Baylor, 1973. Admitted to practice in Texas, New Mexico, U.S. District Court for the District of New Mexico, U.S. District Court for the Northern District of Texas, U.S. Court of Appeals for the Tenth Circuit, U.S. Court of Appeals for the Fifth Circuit.
- Baker, Mary Catherine**, Associate Professor of Electrical and Computer Engineering and Engineering Physics, 1989. B.S., Texas Tech, 1983; M.S., 1985; Ph.D., Texas (Arlington), 1988.
- Baker, Mathew T.**, Chairperson and Professor of Agricultural Education and Communications, 2000. B.S., Texas Tech, 1979; M.Ed., 1986; Ph.D., Ohio State, 1990.
- Baker, Robert James**, Horn Professor of Biological Sciences and Heritage Management and Director, Natural Science Research Laboratory, 1967. B.S., Arkansas (Monticello), 1963; M.S., Oklahoma State, 1965; Ph.D., Arizona, 1967.
- Balduccini, Marcello**, Instructor in Computer Science, 2006. Laurea, Universita degli Studi di Milano (Italy), 1998; Ph.D., Texas Tech, 2005.
- Ballard, Warren B. Jr.**, Bricker Chair of Natural Resources Management, 1998. B.S., New Mexico State, 1969; M.S., Kansas State, 1971; Ph.D., Arizona, 1993.
- Ballenger, William L.**, Professor of Music and Director, School of Music, 2004. B.M., Iowa, 1973; M.A., Northeast Missouri State, 1980.
- Banda, Devender**, Assistant Professor of Educational Psychology and Leadership, 2005. B.M.R., Osmania (India), 1990; M.A., Annamalia (India), 1992; M.S., Penn State, 2002; Ph.D., 2004.
- Barbato, Lucia**, Instructor in Geography, 2000. B.A., California State, 1984; M.A., California (Los Angeles), 1988.
- Barber, Gail G.**, Professor of Music, 1966. B.M., Eastman School of Music, 1959; M.D. (M.A.), 1996.
- Bard, Jennifer S.**, Professor of Law and Adjunct Associate Professor, Department of Neuropsychiatry (Health Sciences Center), 2003. B.A., Wellesley, 1983; J.D., Yale, 1987; M.P.H., Connecticut, 1997. Admitted to practice in New York, Connecticut, Massachusetts, District of Columbia, and before the U.S. Supreme Court, Ninth Circuit Court of Appeals, Southern District of New York, Eastern District of New York, and District of Connecticut.
- Barhorst, Alan A.**, Professor of Mechanical Engineering, 1991. B.S., Texas A&M, 1984; M.S., 1989; Ph.D., 1991; Reg. Prof. Engr. (Texas).
- Barkdull, John**, Associate Professor of Political Science, 1993. B.A., Alaska, 1984; M.A., Wisconsin, 1986; Ph.D., 1993.
- Barker, Thomas T.**, Professor of English, 1982. B.A., Texas, 1971; M.A., 1973; Ph.D., 1980.
- Barko, James**, Instructor in Restaurant, Hotel, and Institutional Management, 2000. M.Div., Toronto (Canada), 1989; Rel. Ed., Regis Coll, 1990; M.B.A., Wayland, 2007.
- Barnard, Roger W.**, Professor of Mathematics and Statistics, 1973. B.S., Kent State, 1965; M.S., 1968; Ph.D., Maryland, 1971.
- Barnes, Calvin Glenn**, Professor of Geosciences, 1982. B.S., Nebraska (Lincoln), 1975; M.S., Oregon, 1978; Ph.D., 1982.
- Barnes-Burroughs, Kathryn**, Associate Professor of Music, 2004. B.M. Alaska, 1985; M.M., New Orleans, 1988; D.M.A., Houston, 2000.
- Barnhill, Robert E.**, Instructor in Personal Financial Planning, 1988. B.B.A., Texas Tech, 1976; M.B.A., 1980; J.D., 1980.
- Barrick, James E.**, Chairperson and Professor of Geosciences, 1980. B.S., Ohio State, 1973; M.S., Iowa, 1975; Ph.D., 1978.
- Bartsch, Richard Allen**, Horn Professor of Chemistry and Biochemistry, 1974. B.A., Oregon State, 1962; M.S., 1963; Ph.D., Brown, 1967.
- Basu, Sukanta**, Assistant Professor of Atmospheric Science, 2005. B.Tech., Indian Inst. of Tech. (India), 1998; M.S., Windsor (Canada), 2000; Ph.D., Minnesota, 2004.
- Bauer, George**, Visiting Assistant Professor of Art, 2002. B.F.A., Academy of Arts, 1984; M.A., Charles (Czech Republic), 1972. M.A., West Texas State, 1988; M.F.A., 1988; Ph.D., Texas Tech, 2002.
- Baugh, Scott L.**, Assistant Professor of English, 2002. B.A., Texas (Arlington), 1994; M.A., Texas Tech, 1996; Ph.D., Oklahoma State, 2001.
- Baughman, Todd**, Adjunct Faculty in Plant and Soil Science, 2000. B.S., Oklahoma State, 1989; M.S., 1992; Ph.D., Mississippi State, 1994.
- Bauguess, Scott**, Assistant Professor of Finance, 2004. B.S., Arizona State, 1992; M.S., 1995; M.B.A., 1999; Ph.D., 2004.
- Beale, Elmus G.**, Associate Professor of Cell Biology and Biochemistry, 1993; B.S., Oklahoma State, 1970; Ph.D., Baylor (Coll. of Medicine), 1977.

- Beard, Laura Jean**, Associate Professor of Classical and Modern Languages and Literatures, 1995. B.A., Carleton Coll., 1984; M.A., Johns Hopkins, 1989; Ph.D., 1994.
- Becker, Klaus**, Associate Professor of Economics, 1989. Volkswirt (Grad.), U. Hamburg (Germany), 1978; M.A., Kansas, 1980; Ph.D., 1987.
- Bednarz, Craig W.**, Associate Professor of Plant and Soil Science, 2006. B.S., Texas Tech, 1989; M.S., 1991; Ph.D., Arkansas, 1995.
- Behrens, Kazuko Y.**, Assistant Professor of Human Development and Family Studies, 2005. M.A., Cornell, 1987; M.A., San Francisco State, 1999; Ph.D., California (Berkeley), 2005.
- Bell, Gary M.**, Professor of History and Dean, Honors College, 1993. B.A., Brigham Young, 1966; M.A., 1968; Ph.D., California (Los Angeles), 1974.
- Bell, Nancy J.**, Professor of Human Development and Family Studies, 1974. B.A., Allegheny Coll., 1963; M.A., Northern Illinois, 1971; Ph.D., Northwestern, 1973.
- Benavides, Alfredo**, Professor of Curriculum and Instruction, 2002. B.A., Texas A&I, 1970; M.A., Michigan State, 1972; Ph.D., 1978.
- Bennett, Harold R.**, Professor of Mathematics and Statistics, 1968. B.S., Idaho State, 1963; M.A., Arizona State, 1965; Ph.D., 1968.
- Benson, Daniel H.**, Adjunct Professor of Law and Former Horn Professor of Law, 1973. B.A., Texas, 1958; J.D., 1961; M.A. Texas Tech, 1974; Admitted to practice in the District of Columbia and Texas.
- Berg, Colleen**, Lecturer in Mechanical Engineering, 2006. B.S., Lehigh, 1986; M.S., Texas Tech, 2006.
- Berg, Jordan M.**, Professor of Mechanical Engineering, 1996. B.S.E., Princeton, 1981; M.S.E., 1984; M.S., Drexel, 1992; Ph.D., 1992.
- Berger, Maxmilian**, Lecturer in Computer Science, 2004. Dipl. Comp. Sci., Technische U. (Germany), 2003.
- Bernussi, Ayrton A.**, Assistant Professor of Electrical and Computer Engineering, 2004. B.A., U. Estadual de Campinas (Brazil), 1981; M.Sc., 1984, Ph.D., 1990.
- Berry, Michael**, Assistant Professor of Music, 2004. B.M., Temple, 1998; M.M., 2000; Ph.D., City U. of New York, 2006.
- Bert, Norman A.**, Professor of Theatre and Dance, 1995. B.A., Upland Coll., 1964; B.D., Assoc. Mennonite Biblical Seminary, 1967; M.A., Kansas State, 1972; Ph.D., Indiana, 1975.
- Beusterien, John**, Associate Professor of Classical and Modern Languages and Literatures, 2005. B.A., Michigan, 1987; M.A., 1991; M.A., Wisconsin, 1993; Ph.D., 1997.
- Beruvides, Mario G.**, Professor of Industrial Engineering, 1994. B.S., Miami, 1981; M.S., 1988; Ph.D., Virginia Tech, 1993; Reg. Prof. Engr. (Texas).
- Beyer, Gerry W.**, Governor Preston E. Smith Regents Professor of Law, 2005. B.A., Eastern Michigan, 1976; J.D., Ohio State, 1979; LL.M., Illinois, 1983; J.S.D., 1990. Admitted to practice in Texas and before the U.S. Court of Appeals for the Armed Forces and the U.S. Supreme Court.
- Bhattacharya, Sukalyan**, Assistant Professor of Mechanical Engineering, 2005. B.M.E., Jadavpur (India), 1997; M.S., Connecticut, 2000; Ph.D., Yale, 2005.
- Bichard, Shannon**, Assistant Professor of Advertising, 2002. B.A., Central Florida, 1995; M.A., 1997; Ph.D., Florida, 2001.
- Bickel, Ulrich**, Professor of Pharmaceutical Sciences, 1999. Doctor of Medicine, Ulm (Germany), 1985.
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Zdenek, Sean, Assistant Professor of English, 2003. B.A., California (Berkeley), 1994; M.A., California State, 1998; Ph.D., Carnegie Mellon, 2001.

Zhang, Hong, Associate Professor of Biological Sciences, 1995. Sc.B., Sichuan (China), 1982; Ph.D., Michigan State, 1989.

Zhang, Hong-Chao, Professor of Industrial Engineering, 1990. B.S., China, 1976; M.S., Denmark, 1986; Ph.D., Technical U. of Denmark, 1989; Reg. Prof. Engr. (Texas).

Zhang, Kai, Assistant Professor of Biological Sciences, 2006. B.S., Peking U. (China), 1996; Ph.D., Catholic U. of America, 2000.

Zhang, Ming, Assistant Professor of Speech, Language, and Hearing Sciences, 2001; M.D., Shanghai Medical U. II (China), 1980; Advanced M.D., 1988; M.S., 1988; Ph.D., Iowa, 1995.

Zhang, Weiwu, Assistant Professor of Public Relations, 2007. B.A., Nanjing Normal (China), 1989; M.A., Cleveland State, 1996; Ph.D., Wisconsin, 2000.

Zhang, Yuan-Li, Assistant Professor of Computer Science, 2004. B.E., East-China Inst. of Tech., 1990; M.S., Nanjing (China), 1996; Ph.D., National U. of Singapore, 2003.

Zhuang, Yu, Associate Professor of Computer Science, 2001. B.S., Zhejiang (China), 1990; M.S., Louisiana State, 1995; M.S., 1998; Ph.D., 2000.

Ziaja, Malgorzata B., Associate Professor of Petroleum Engineering, 2006. B.S., U. of Mining and Metallurgy (Poland), 1973; M.S., 1974; Ph.D., 1982.

Zieher, Klaus W., Associate Professor of Electrical and Computer Engineering, 1986. Dipl. Phys., Tübingen (Germany), 1966; M.Sc., Washington (Seattle), 1969; Dr.rer.nat., Karlsruhe (Germany), 1974.

Zimmerman, Craig, Instructor in Biological Sciences, 2004. B.S., Louisiana State, 1983; M.S., Georgia, 1987; Ph.D., Tennessee, 2002.

Zobeck, Ted M., Adjunct Faculty in Plant and Soil Science, 1992. B.S., Michigan, 1973; M.S., Michigan State, 1976; Ph.D., New Mexico State, 1980.

Zuo, Delong, Assistant Professor of Civil and Environmental Engineering, 2006. B.S.C.E., Chongqing Jiaotong (China), 1996; M.S.S.E., 1999; M.C.S.E., John Jopkins, 2003; Ph.D., 2005.

Zupancic, Laura, Clinical Instructor in Speech, Language, and Hearing Sciences, 2005. B.S., Texas Tech HSC, 2000; M.S., 2002.

Zupancic, Steven, Assistant Professor of Speech, Language, and Hearing Sciences, 2006. B.S. Easter New Mexico, 1999; Au.D. Texas Tech HSC, 2003.

Zvonkovic, Anisa, Professor of Human Development and Family Studies and Chairperson, Human Development and Family Studies, 2005. B.A., Virginia, 1981; M.S., Penn State, 1983; Ph.D., 1987.

Emeritus Faculty and Administrative Officers

A

Abernathy, John, Professor of Plant and Soil Science and Dean, College of Agricultural Sciences and Natural Resources, Emeritus, 1998-2004.

Adamcik, Joe Alfred, Associate Professor of Chemistry and Biochemistry, Emeritus, 1957-1988.

Ainsworth, Charles Leonard, Professor of Educational Psychology and Leadership and Vice Provost For Academic Affairs, Emeritus, 1967-1995.

Allen, Archie Cornelious, Associate Professor of Biological Sciences, Emeritus, 1963-1986.

Allen, Bonnie, Rockwell Professor of Plant and Soil Sciences, Emeritus, 1969-2004.

Amir-Moez, Ali Reza, Professor of Mathematics and Statistics, Emeritus, 1965-1988.

Andersen, Carl, Associate Professor of Human Development and Family Studies, Emeritus, 1965-2002.

Anderson, Lane Kent, Ernst and Young Professor of Accounting, Emeritus, 1978-2005.

Anderson, John Arthur, Professor of Chemistry and Biochemistry, Emeritus, 1961-1993.

Anderson, Robert Henry, Professor of Educational Psychology and Leadership and Dean of Education, Emeritus, 1973-1983.

Anderson, Robert Paul, Professor of Psychology, Emeritus, 1955-1986.

Anderson, Ronald M., Professor of Mathematics and Statistics and Dean of the Graduate School, Emeritus, 1965-2004.

Archer, James Elson, Professor of Computer Science, Emeritus, 1968-1991.

Arnold, Marion Denson, Professor of Petroleum Engineering, Emeritus, 1984-1998.

Arterburn, Joyce, Assistant Professor of Health, Exercise, and Sport Sciences, Emeritus, 1963-2004.

Ashby, Clifford Charles, Professor of Theatre and Dance, Emeritus, 1963-1989.

Ashdown, Donald, Professor of Plant and Soil Science, Emeritus, 1952-1984.

Askins, Billy Earl, Professor and Chairperson of Curriculum and Instruction, Emeritus, 1967-2002.

Ater, Elizabeth Carolyn, Associate Professor of Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1969-1996.

Austin, Larry Morton, Professor of Business Administration, Emeritus, 1976-1996.

Averill, Edward Wilson, Professor of Philosophy, Emeritus, 1980-2002.

Ayoub, Mohamed Mohamed, Horn Professor of Industrial Engineering, Emeritus, 1961-2002.

B

Bacon, Thomas Ivey, Associate Professor of Classical and Modern Languages and Literatures, Emeritus, 1964-1977.

Barber, James Joseph, Professor of Music, Emeritus, 1966-1995.

Barrick, Nolan Ellmore, Kleinschmidt Professor of Architecture, Emeritus, 1953-1979.

Barton, Richard Fleming, Professor of Management, Emeritus, 1967-1990.

Bearden, Keith, Professor of Music, Emeritus, 1980-2003.

Beckner, Weldon Earnest, Professor of Educational Psychology and Leadership, Emeritus, 1965-1992.

Bell, Jean Camille Graves, Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1963-1985.

Bennett, William, Professor of Agronomy and Associate Dean, College of Agricultural Sciences and Natural Resources, Emeritus, 1979-2004.

Bensberg, Gerard Joseph, Professor of Educational Psychology and Leadership, Emeritus, 1971-1990.

Bethea, Robert Morrison, Professor of Chemical Engineering, Emeritus, 1966-1998.

Biggers, Julian Lawson Jr., Professor of Educational Psychology and Leadership, Emeritus, 1966-1992.

Blakeley, Brian Layton, Professor of History, Emeritus, 1970-1999.

Bliese, John Ross Edward, Professor of Communication Studies, Emeritus, 1986-2002.
Bogle, James, Professor of Music, Emeritus, 1976-2005.
Bowlin, Oswald, Professor of Finance, Emeritus, 1968-2005.
Bradford, John Ross, Professor of Chemical Engineering and Dean of Engineering, Emeritus, 1943-1993.
Bravo, Roberto, Associate Professor of Classical and Modern Languages and Literatures, Emeritus, 1975-2004.
Bravoco, Ralph R., Associate Professor of Information Systems and Quantitative Sciences, Emeritus, 1982-2005.
Brewer, Charles William, Associate Professor of English, Emeritus, 1972-1996.
Brittin, Anthony Norman, Professor of Music, Emeritus, 1963-2002.
Brittin, Helen, Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1966-2005.
Brogniez, Raymond Hector, Associate Professor of Architecture, Emeritus, 1965-1979.
Burnett, John, Associate Professor of Political Science, Emeritus, 1968-2005.
Burns, Jane Offutt, Professor of Accounting, Emeritus, 1986-1997.
Burns, John Mitchell, Provost and Professor of Biological Sciences, Emeritus, 1969-2006.
Buster, Edna Walker, Associate Professor of Clothing and Textiles, Emeritus, 1927-1955.
Butler, Charles Edward, Associate Professor of Economics, Emeritus, 1971-1991.
Butler, Lester G., Associate Professor of Curriculum and Instruction, Emeritus, 1974-2002.

C

Camp, Earl D., Professor of Biological Sciences, Emeritus, 1945-1985.
Campbell, Robert Gordon, Associate Professor of Anthropology, Emeritus, 1969-1993.
Carper, Herbert Jackson Jr., Professor of Mechanical Engineering, Emeritus, 1978-1997.
Carter, Ralph Marlin, Associate Professor of Educational Psychology and Leadership, Emeritus, 1971-1991.
Caskey, Owen Laverne, Professor of Educational Psychology and Leadership, Emeritus, 1947-1983.
Cebull, Stanley Edward, Professor of Geosciences, Emeritus, 1969-1999.
Geniza, Sherry, Associate Professor of English, Emeritus, 1991-1994.
Chamberlain, Valerie Meyer, Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1971-1985.
Chandler, Charles Ray, Associate Professor of Sociology, Anthropology and Social Work, Emeritus, 1966-2000.
Christian, Aubry Duane, Associate Professor of Curriculum and Instruction, Emeritus, 1971-1994.
Cluff, E. Dale, Professor of Educational Psychology and Leadership and Dean of Libraries, Emeritus, 1982-2001.
Cobb, John William, Professor of Health, Exercise, and Sport Sciences, Emeritus, 1977-1993.
Cogan, Dennis Clark, Professor of Psychology, Emeritus, 1968-2005.
Cornett, Joe D., Professor of Educational Psychology and Leadership, Emeritus, 1968-1997.
Coulter, Murray Whitfield, Associate Professor of Biological Sciences, Emeritus, 1964-1998.
Craig, John Paul, Professor of Electrical and Computer Engineering, Emeritus, 1957-1989.
Cravens, Sydney Paul, Associate Professor of Classical and Modern Languages and Literatures, Emeritus, 1972-2002.
Crider, John Richard, Associate Professor of English, Emeritus, 1966-1996.
Cummins, David Charles, Professor of Law, Emeritus, 1970-2000.
Curl, Samuel Everett, Professor of Animal and Food Sciences and Dean, College of Agricultural Sciences and Natural Resources, Emeritus, 1961-1997.
Cutter, Paul Frederick, Professor of Music, Emeritus, 1968-2000.

D

Das Gupta, Kamalaksha, Professor of Physics, Emeritus, 1966-1985.
Davenport, Monty E., Professor of Mechanical Engineering and Vice President for Operations, Emeritus, 1956-1998.
Davidson, Claude Monroe, Professor of Geography, Emeritus, 1969-1998.

Davies, Lewis James Sr., Associate Professor of Sociology, Emeritus, 1962-1986.
Davis, Dale Waverly, Associate Professor of English, Emeritus, 1968-1999.
Davis, Kenneth Waldron, Professor of English, Emeritus, 1960-1994.
Deahl, Robert Waldo, Professor of Music, Emeritus, 1966-1994.
Deethardt, John Fred Jr., Professor of Communications Studies, Emeritus, 1968-1989.
Dietz, Donald Thaddeus, Professor of Classical and Modern Languages and Literatures, Emeritus, 1978-1993.
Dixon, Kenneth, Professor of Art, Emeritus, 1977-2005.
Downes, John Dixon, Professor of Plant and Soil Science, Emeritus, 1970-1984.
Drew, Leslie, Professor of Biological Sciences, Emeritus, 1977-2000.
Dudek, Richard Albert, Horn Professor of Industrial Engineering, Emeritus, 1958-1988.
Dunn, Roy Sylvan, Associate Professor of Sociology, Emeritus, 1956-1977.
Dunne, Patrick M., Associate Professor of Business Administration, Emeritus 1975-2006.
Duran, Benjamin Sanchez, Professor of Mathematics and Statistics, Emeritus, 1971-2002.
Durland, Donald Lewis, Professor of Art, Emeritus, 1969-1996.
Dvoracek, Marvin John, Associate Professor of Civil Engineering, Emeritus, 1962-1994.

E

Eddleman, Floyd Eugene, Professor of English, Emeritus, 1958-1990.
Edgar, James Hadley Jr., Robert H. Bean Professor of Law, Emeritus, 1971-1991.
Edwards, Wildring Sherrod, Associate Professor of Human Development and Family Studies, Emeritus, 1962-1984.
Eggenberger, Ulrich Lewis, Professor of Agricultural Education and Communications, Emeritus, 1961-1993.
Elliot, Arthur Mcauley, Professor of Biological Sciences, Emeritus, 1961-1995.
Ewalt, Robert H., Associate Professor of Educational Psychology and Leadership and Vice President for Student Affairs, Emeritus, 1973-2000.

F

Felty, Billy Weldon, Associate Professor of Architecture, Emeritus, 1958-1994.
Filgo, Dorothy Jane, Associate Professor of Educational Psychology and Leadership, Emeritus, 1960-1986.
Finco, Aldo, Professor of Classical and Modern Languages and Literatures, Emeritus, 1968-2005.
Fleming, Patrice Margaret Catlin, Professor of Educational Psychology and Leadership, Emeritus, 1967-1978.
Flynn, George Quitman, Professor of History, Emeritus, 1974-1999.
Foerster, Eugene Paul, Associate Professor of Civil Engineering, Emeritus, 1969-1987.
Follows, Arthur Gail, Associate Professor of Music, Emeritus, 1967-1996.
Fowler, Stanley Earl, Professor of Human Development and Family Studies, Emeritus, 1970-1991.
Fox, Elizabeth, Associate Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1982-2002.
Freeman, Billy Gervice, Associate Professor of Agricultural and Applied Economics, Emeritus, 1973-1997.
Funk, Verne James, Professor of Art, Emeritus, 1977-1997.

G

Gately, Mary Sue, Professor of Accounting, Emeritus, 1981-1998.
George, Edward V., Professor of Classical and Modern Languages and Literatures, Emeritus, 1971-2006.
Gerlach, Mary Agnes, Associate Professor of Clothing and Textiles, Emeritus, 1955-1982.
Gettel, Georgette Elizabeth, Associate Professor of Music, Emeritus, 1963-2000.
Gibbons, Hugh, Professor of Art, Emeritus, 1965-2005.
Gilbert, Beverly Brian, Associate Professor of English, Emeritus, 1961-1993.
Gillas, John Arthur, Horn Professor of Music, Emeritus, 1971-2002.
Gilliam, John Charles, Professor of Economics, Emeritus, 1962-1992.
Glenn, Edna Smith, Associate Professor of Art, Emeritus, 1968-1987.

George, Edward V., Professor of Classical and Modern Languages and Literatures, Emeritus, 1971-2006.

Goebel, Ulrich, Professor of Classical and Modern Languages and Literatures, Emeritus, 1979-2001.

Goss, James A., Professor of Anthropology, Emeritus, 1978-2000.

Graves, James Wilton, Professor of Agricultural and Applied Economics, Emeritus, 1961-1998.

Greer, Hiram Varner, Associate Professor of Art, Emeritus, 1963-1982.

Grub, Walter, Professor of Civil Engineering, Emeritus, 1966-1985.

Guerrant, William Barnett Jr., Professor of Chemistry and Biochemistry, Emeritus, 1968-1984.

Gustafson, Donald Lloyd, Professor of Computer Science, Emeritus, 1971-1999.

Gustafson, William, Professor of Mathematics and Statistics, Emeritus, 1977-2004.

H

Hagler, Marion Otho, Horn Professor of Electrical and Computer Engineering and Associate Dean, College of Engineering, Emeritus, 1967-2000.

Hanna, James Walter, Associate Professor of Art, Emeritus, 1968-2001.

Hanna, Paul Dean Jr., Professor of Art, Emeritus, 1960-1993.

Harden, Margarette Leggitt, Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1967-1992.

Harman, James, Associate Professor of Chemistry and Biochemistry, Emeritus, 1989-2005.

Harper, James William, Associate Professor of History, Emeritus, 1967-2002.

Hartwell, William, Associate Professor of Music, Emeritus, 1974-2005.

Havens, Murray Clark, Professor of Political Science, Emeritus, 1973-1997.

Hayes, Robert Ames, Professor of History, Emeritus, 1968-1998.

Hickerson, Nancy Parrott, Professor of Anthropology, Emeritus, 1972-1999.

Higdon, David Leon, Horn Professor of English, Emeritus, 1971-2001.

Hildebrand, Shelby Keith, Professor of Mathematics and Statistics, Emeritus, 1963-1997.

Horridge, Patricia, Professor of Interior Design, Emeritus, 1977-2004.

Houck, Marilyn, Associate Professor of Biological Sciences, Emeritus, 1992-2004.

Howze, James Dean, Professor of Art, Emeritus, 1958-1992.

Hsia, Hower J., Professor of Mass Communications, Emeritus, 1970-1992.

Hudson, Frank Alden, Professor of Animal and Food Sciences, Emeritus, 1960-1988.

J

Jackson, Raymond Carl, Horn Professor of Biological Sciences, Emeritus, 1971-1997.

Jobe, Evan Kermit, Associate Professor of Philosophy, Emeritus, 1976-1991.

John Stinespring, Associate Professor of Art, Emeritus, 1990-2004.

Johnson, Melvin Hamilton, Associate Professor of Architecture, Emeritus, 1980-1994.

Jones, U. V., Professor of Law, Emeritus, 1966-1980.

Jonish, James E., Professor of Economics, Emeritus, 1973-1998.

Jordan, Duane Paul, Associate Professor of Mechanical Engineering, Emeritus, 1964-2002.

K

Kellogg, Charles, Associate Professor of Mathematics and Statistics, Emeritus, 1971-2004.

Kellogg, Virginia Katherine, Professor of Music, Emeritus, 1963-1993.

Kelsey, Clyde E. Jr., Professor of Educational Psychology and Leadership, Emeritus, 1972-1987.

Kenney, Earl Eugene, Professor of Music, Emeritus, 1957-1982.

Kireilis, Ramon Walter, Professor of Health, Exercise, and Sport Sciences, Emeritus, 1950-1979.

Koeller, Shirley Ann, Associate Professor of Curriculum and Instruction, Emeritus, 1978-1996.

Kramer, Bruce M., Maddox Professor of Law, Emeritus, 1974-2007.

Kreneck, Lynwood, Professor of Art, Emeritus, 1966-2005.

Krieg, Daniel, Leidigh Professor of Plant and Soil Science, Emeritus, 1970-2005.

Krile, Thomas, Professor of Electrical and Computer Engineering, Emeritus, 1981-2005.

Kuhnley, Lyle Carlton, Associate Professor of Biological Sciences, Emeritus, 1959-1981.

Kyre, Martin Theodore Jr., Associate Professor of Political Science, Emeritus, 1963-1990.

L

Lamb, Mina Marie Wolf, Margaret W. Weeks Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1940-1975.

Land, Carlon Sanford, Professor of Petroleum Engineering, Emeritus, 1983-1992.

Langford, Thomas Alexander, Professor of English and Dean, Graduate School, Emeritus, 1961-2001.

Lawrence, James, Professor of Mechanical Engineering, Emeritus, 1062-2004.

Lewis, Truman Orville, Professor of Mathematics and Statistics, Emeritus, 1966-1994.

Little Soldier, Leona Mitchell, Professor of Educational Psychology and Leadership, Emeritus, 1969-1998.

Locke, Bill J., Professor of Psychology, Emeritus, 1969-1996.

Lockhart, Billy Clarence, Professor of Art, Emeritus, 1955-1987.

Logan, Martha Morrow, Associate Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1969-1985.

Long, Robert Allen, Professor of Animal and Food Sciences, Emeritus, 1976-1991.

Longworth, Donald Sherman, Professor of Human Development and Family Studies, Emeritus, 1966-1982.

Lowe, George, Professor of Sociology, Emeritus, 1978-2004.

M

Manley, Max Wayland, Associate Professor of Educational Psychology and Leadership, Emeritus, 1970-1992.

Marlett, William Robert, Associate Professor of Landscape Architecture, Emeritus, 1968-1995.

Marple, Annette Wilson, Associate Professor of Law, Emeritus, 1973-1992.

Marple, Hugo Dixon, Professor of Music, Emeritus, 1969-1985.

Martin, Robert Edward, Associate Professor of Mechanical Engineering, Emeritus, 1949-1985.

Martin, Ruth Evelyn, Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1986-1999.

Marx, John, Associate Professor of Chemistry and Biochemistry, Emeritus, 1968-2005.

Mason, Danny Raymond, Associate Professor of Health, Exercise, and Sport Sciences, Emeritus, 1964-2000.

Matches, Arthur Gerald, Thornton Distinguished Professor of Plant and Soil Science, Emeritus, 1981-1994.

Mathis, Kary, Thompson Professor and Chairperson in Agricultural and Applied Economics, and Director, ICASALS, Emeritus, 1985-2004.

Matthews, Jerry, Associate Professor of Sociology, Anthropology, and Social Work, Emeritus, 1972-2005.

Mattson, Bruce Douglas, Professor of Educational Psychology and Leadership, Emeritus, 1965-1983.

Maxwell, Henry James, Professor of Classical and Modern Languages and Literatures, Emeritus, 1963-1989.

Maxwell, Richard Wayne, Associate Professor of Law, Emeritus, 1975-1991.

Maynard, Judson Dana, Professor of Music, Emeritus, 1961-1992.

McCarty, Darrell Keith, Professor of Music, Emeritus, 1953-1988.

McCullen, Joseph Thomas Jr., Professor of English, Emeritus, 1949-1980.

McDonald, Walter Robert, Horn Professor of English, Emeritus, 1971-2002.

McGowan, Richard Allen, Associate Professor of Music, Emeritus, 1969-1994.

McIntyre, Martin Hugh, Professor of Health, Exercise, and Sport Sciences, Emeritus, 1976-1994.

McLaughlin, Thomas Graham, Professor of Mathematics and Statistics, Emeritus, 1973-2002.

McNally, James Faber, Associate Professor of Health, Exercise, and Sport Sciences, Emeritus, 1952-1989.

McPherson, Clara Mueller, Associate Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1947-1986.

McPherson, Clinton Marsud, Associate Professor of Chemistry and Biochemistry, Emeritus, 1956-1984.

McVay, Ted, Professor of Classical and Modern Languages and Literatures, Emeritus, 1989-2005.

Mecham, John Stephen, Professor of Biological Sciences, Emeritus, 1965-1992.

Mehaffie, Shamus, Professor of Educational Psychology and Leadership, Emeritus, 1971-1990.

Mezack Michael III, Associate Professor of Educational Psychology and Leadership, Emeritus, 1975-1996.

Miller, John David, Associate Professor of Mathematics and Statistics, Emeritus, 1968-1996.

Mires, Raymond William, Professor of Physics, Emeritus, 1957-1991.

Mitchell, Robert Wetsel, Professor of Biological Sciences, Emeritus, 1965-1991.

Mitra, Arunkumar, Associate Professor of Mathematics and Statistics, Emeritus, 1967-2000.

Mittler, Gene Allen, Professor of Art, Emeritus, 1982-1995.

Montgomery, Evelyn Ina, Professor of Anthropology, Emeritus, 1964-1979.

Moon, Marvin Lee, Associate Professor of Art, Emeritus, 1973-1996.

Moore, Diana, Associate Professor of Theatre and Dance, Emeritus, 1971-2000.

Morrow, Carmyn Hula, Associate Professor of Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1972-1993.

Mross, Joanna, Professor of Architecture, Emeritus, 1980-2005.

Musiak, Thomas Alec, Professor of Landscape Architecture and Chairperson, Emeritus, 1988-2000.

N

Nagle, Levi Marshall Jr., Professor of Educational Psychology and Leadership, Emeritus, 1959-1978.

Nelson, Otto Millard, Associate Professor of History and Associate Dean, College of Arts & Sciences, Emeritus, 1965-2000.

Nevius, John R., Professor of Educational Psychology and Leadership, Emeritus, 1974-1995.

Newcomb, Benjamin Havelock, Professor of History, Emeritus, 1964-2000.

O

O'Bar, Mary Tom Riley, Professor of Human Development and Family Studies, Emeritus, 1972-2000.

O'Hair, Edgar, Professor of Electrical and Computer Engineering, Emeritus, 1981-2002.

Oberhelman, Harley Dean, Horn Professor of Classical and Modern Languages and Literatures, Emeritus, 1958-1995.

Oberleas, Donald, Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1985-1998.

Oldham, William J. B., Professor of Computer Science, Emeritus, 1987-2002.

Owens, Mary Lydia Seymour, Professor of Health, Exercise, and Sport Sciences, Emeritus, 1969-1999.

Owens, Thomas Richard, Associate Professor of Agricultural and Applied Economics, Emeritus, 1966-1999.

P

Parker, Harry, Professor of Chemical Engineering, Emeritus, 1970-2004.

Pasewark, William Robert, Professor of Educational Psychology and Leadership, Emeritus, 1956-1982.

Patterson, William Taylor, Professor of Classical and Modern Languages and Literatures, Emeritus, 1961-1995.

Payne, Henry David III, Associate Professor of Music, Emeritus, 1967-2002.

Pearson, Neale J., Professor of Political Science, Emeritus, 1969-1996.

Peterson, Arlin, Professor of Educational Psychology and Leadership, Emeritus, 1972-2001.

Peterson, Richard Lewis, Professor of Finance, Emeritus, 1982-1999.

Pettit, Russell Dean, Associate Professor of Natural Resources Management, Emeritus, 1969-1989.

Phillips, Sherman Alfred Jr., Associate Professor of Plant and Soil Science, Emeritus, 1982-2002.

Pillow, Fannie Ernestine, Associate Professor of Educational Psychology and Leadership, Emeritus, 1965-1976.

Pinder, Robert Henry, Associate Professor of Human Development and Family Studies, Emeritus, 1971-1994.

Platten, Marvin Roger, Associate Professor of Curriculum and Instruction, Emeritus, 1971-1993.

Preston, Rodney Leroy, Horn Professor of Animal and Food Sciences and Thornton Distinguished Chair, Emeritus, 1982-1996.

Proctor, Vernon Willard, Professor of Biological Sciences, Emeritus, 1956-1992.

Q

Queen, John William, Associate Professor of Art, Emeritus, 1960-1991.

Quilliam, William Reed Jr., George Herman Mahon Professor of Law, Emeritus, 1966-1995.

R

Ramsey, Jerry Dwain, Professor of Industrial Engineering, Emeritus, 1965-2003.

Randle, Helen Caldwell, Associate Professor of Human Development and Family Studies, Emeritus, 1965-1977.

Randolph, Paul, Professor of Business Administration, Emeritus, 1983-2005.

Ransdell, Joseph Morton, Associate Professor of Philosophy, Emeritus, 1974-2000.

Ray, Joseph Bland Bob, Professor of Psychology, Emeritus, 1963-1990.

Reavis, Charles Augustus, Professor of Educational Psychology and Leadership, Emeritus, 1976-2002.

Rebstock, Charles Wesley, Associate Professor of Educational Psychology and Leadership, Emeritus, 1966-1982.

Reeves, Corwin C. Jr., Professor of Geosciences, Emeritus, 1957-1995.

Reid, Maryanne, Associate Professor of Educational Psychology and Leadership, Emeritus, 1963-1995.

Roberts, Dayton Young, Professor of Educational Psychology and Leadership, Emeritus, 1973-1990.

Roberts, Larry Spurgeon, Professor of Biological Sciences, Emeritus, 1979-1990.

Rogers, John Robert, Professor of Educational Psychology and Leadership, Emeritus, 1970-1980.

Rogers, Ruth Marie, Professor of Health, Exercise, and Sport Sciences, Emeritus, 1971-1989.

Ronshausen, Nina Lorraine, Associate Professor of Educational Psychology and Leadership, Emeritus, 1975-1996.

Rooker, Robert Alan, Associate Professor of Mass Communications, Emeritus, 1963-1990.

Rooze, Gene Edward, Professor of Curriculum and Instruction, Emeritus, 1969-1996.

Ross, Billy Irvan, Professor of Mass Communications, Emeritus, 1970-1988.

Rouse, Robert Lyle, Professor of Economics and Business Administration, Emeritus, 1950-1985.

Rude, Carolyn, Professor of English, Emeritus, 1982-2005.

Rude, Donald, Professor of English, Emeritus, 1972-2005.

S

Schaefer, Roger Carl, Associate Professor of Political Science, Emeritus, 1975-2002.

Schettler, Theodore William, Associate Professor of Music, Emeritus, 1968-1983.

Schmidly, David James, Professor of Biological Sciences and President, Emeritus, 1996-2002.

Schoen, Rodric Bruce, Charles B. Thornton Professor of Law, Emeritus, 1971-1999.

Shaw, Patrick Wilbert, Professor of English, Emeritus, 1972-2002.

Shine, Henry, Professor of Chemistry and Biochemistry, Emeritus, 1954-2000.

Shurbet, Deskin Hunt Jr., Professor of Geosciences, Emeritus, 1956-1994.

Shurbet, Gerald Lynn, Associate Professor of Mathematics and Statistics, Emeritus, 1956-1987.

Skillern, Frank, George W. McCleskey Professor of Water Law, Emeritus, 1972-2004.

Skoog, Gerald Duane, Horn Professor of Curriculum and Instruction and Dean, College of Education, Emeritus, 1969-2004.

Smith, Roland Edgar, Professor of Political Science, Emeritus, 1968-1986.
Sorensen, George Wendell III, Professor of Theatre and Dance, Emeritus, 1976-1996.
Stem, Carl Herbert, Dean of Business Administration, Emeritus, 1975-1997.
Stephen, Francis B., Professor of Art, Emeritus, 1967-1983.
Street, Betty Ann, Associate Professor of Art, Emeritus, 1967-1995.

T

Tanner, Donald Ray, Professor of Music, Emeritus, 1977-2001.
Tarwater, J. Dalton, Professor of Mathematics and Statistics, Emeritus, 1968-2002.
Tereshkovich, George, Professor of Plant and Soil Science, Emeritus, 1968-1995.
Thomas, Henry Coffman, Professor of Physics, Emeritus, 1958-1984.
Thomas, Orlan Earl, Associate Professor of Music, Emeritus, 1967-2002.
Thompson, Arthur Dudley, Professor of Architecture, Emeritus, 1959-1997.
Thompson, Virginia Mahaley, Associate Professor of Architecture, Emeritus, 1964-1997.
Thornhill, Ashton, Associate Professor of Mass Communications, Emeritus, 1980-2005.
Timmons, Myra Bounds, Associate Professor of Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1961-1995.
Tock, Richard, Professor of Chemical Engineering, Emeritus, 1974-2004.
Tolley, Richard Earl, Professor of Music, Emeritus, 1959-1991.
Traylor, Idris, Associate Professor of History; Executive Director, Office of International Affairs; and Director, International Cultural Center, Emeritus, 1966-2005.
Tribble, Leland Floyd, Professor of Animal and Food Sciences, Emeritus, 1967-1989.
Troub, Roger M., Professor of Economics, Emeritus, 1967-1997.
Turner, Fred Donavon, Associate Professor of Music, Emeritus, 1971-2002.

U

Ulich, Willie Lee, Professor of Civil Engineering, Emeritus, 1961-1984.
Urban, Lloyd, Professor of Civil Engineering, Emeritus, 1968-2004.

V

Vines, Darrell Lee, Professor of Electrical and Computer Engineering, Emeritus, 1962-2000.

W

Wages, Jack Douglas, Professor of English, Emeritus, 1968-1999.
Wagner, Betty Sue Malone, Associate Professor of Human Development and Family Studies, Emeritus, 1969-1994.
Wagner, Fred Philip Jr., Associate Professor of Engineering Technology, Emeritus, 1967-1994.
Walker, Harry Stuart, Associate Professor of Economics, Emeritus, 1953-1986.
Walkup, John Frank, Horn Professor of Electrical and Computer Engineering, Emeritus, 1971-1998.
Wallace, Dorothy Estelle Hays, Professor of Human Development and Family Studies, Emeritus, 1959-1975.
Weaver, Richard Alden, Professor of Theatre and Dance, Emeritus, 1972-1996.
Webb, Holmes Andrew, Professor of Educational Psychology and Leadership, Emeritus, 1960-1970.
Weiner, Leonard Harold, Associate Professor of Computer Science, Emeritus, 1976-1990.
White, Gary Elbert, Professor of Accounting, Emeritus, 1979-1999.
White, John Thomas, Associate Professor of Mathematics and Statistics, Emeritus, 1965-2002.
Whitehead, Carlton J., Professor of Management, Emeritus, 1965-2003.
Wilde, Richard Edward, Professor of Chemistry and Biochemistry, Emeritus, 1963-1995.
Williams, Ira Lawson, Professor of Civil Engineering, Emeritus, 1952-1974.

Williams, Peggy Jean, Associate Professor of Health, Exercise, and Sport Sciences, Emeritus, 1962-1993.
Williamson, Horace Hampton, Associate Professor of Architecture, Emeritus, 1973-1986.
Willis-Aarnio, Peggy, Professor of Theatre and Dance, Emeritus, 1972-2003.
Wilson, Margaret Eileen, Professor of Health, Exercise, and Sport Sciences, Emeritus, 1965-1990.
Winkler, Herald Warren, Professor of Petroleum Engineering, Emeritus, 1970-1985.
Wittman, John, Professor of Economics, Emeritus, 1960-1990.
Woodson, Eleanor Mary, Associate Professor of Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1970-1987.

Y

Yang, Shiang Ping, Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1969-1988.

Z

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Zukauckas, Edward William Jr., Associate Professor of Plant and Soil Science, Emeritus, 1952-1984.

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