



TEXAS TECH
UNIVERSITY

CATALOG

2009
2010

UNDERGRADUATE
GRADUATE



Undergraduate Admission Deadlines

Domestic Admission — Submit application electronically at www.applytexas.org

- **Spring 2010 First-Time Freshman and Transfer**
Deadline to complete application process: November 13, 2009
- **Summer 2010 First-Time Freshman and Transfer**
Deadline to complete application process: May 3, 2010
- **Fall 2010 First-Time Freshman**
Deadline to complete application process: May 3, 2010
- **Fall 2010 Transfer**
Deadline to complete application process: June 1, 2010
- **Spring 2011 First-Time Freshman and Transfer**
Deadline to complete application process: November 12, 2010
- **Summer 2011 First-Time Freshman and Transfer**
Deadline to complete application process: May 2, 2011
- **Fall 2011 First-Time Freshman**
Deadline to complete application process: May 2, 2011
- **Fall 2011 Transfer**
Deadline to complete application process: June 1, 2011

International Admission — Submit application electronically at www.applytexas.org

- **Spring 2010**
Deadline to complete application process: November 2, 2009
- **Summer or Fall 2010**
Deadline to complete application process: April 1, 2010
- **Spring 2011**
Deadline to complete application process: November 1, 2010
- **Summer or Fall 2011**
Deadline to complete application process: April 1, 2011

Former Texas Tech Student Admission
Information and application for re-admission available at www.depts.ttu.edu/formertech

- **Spring 2010**
Deadline to complete application process: December 1, 2009
- **Summer I 2010**
Deadline to complete application process: May 3, 2010
- **Summer II 2010**
Deadline to complete application process: June 1, 2010
- **Fall 2010**
Deadline to complete application process: August 2, 2010
- **Spring 2011**
Deadline to complete application process: December 1, 2010
- **Summer I 2011**
Deadline to complete application process: May 2, 2011
- **Summer II 2011**
Deadline to complete application process: June 1, 2011
- **Fall 2011**
Deadline to complete application process: August 1, 2011

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 2010**
Deadline to complete application process: September 1, 2009
- **Summer 2010**
Deadline to complete application process: February 1, 2010
- **Fall 2010**
Deadline to complete application process: March 1, 2010
- **Applications available at www.gradschool.ttu.edu**



TTU Directory Assistance 806.742.2011

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

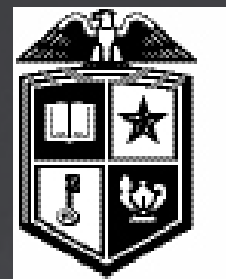
Contact Information

Undergraduate

Office of Undergraduate Recruitment and 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
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www.depts.ttu.edu/officialpublications

**2009
2010**

UNDERGRADUATE
GRADUATE

Mission Statement

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 2009-10 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, beginning with the fall semester and extending through the summer terms. 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 degree program within the university in the academic year of this catalog generally may expect to follow the graduation requirements set forth in this catalog by the relevant college or degree-granting entity. Because the faculty reserves the right to change graduation requirements, students should meet with their academic 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 the following Web site: www.depts.ttu.edu/officialpublications.

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Texas Tech University Statement of Ethical Principles

“DO THE RIGHT THING”

Texas Tech University is committed to the values of mutual respect; cooperation and communication; creativity and innovation; community service and leadership; pursuit of excellence; public accountability; and diversity.

— 2005 Texas Tech University Strategic Plan

Texas Tech University is committed to being an ethical institution. In recognition of the rights and inherent dignity of all members of the Texas Tech University community, the university is committed to supporting the following principles and to protecting those rights guaranteed by the Constitution, the laws of the United States and the State of Texas, and the policies adopted by the Board of Regents. As members of the Texas Tech community, faculty, students, staff, administration, and all stakeholders accept responsibility for abiding by and promoting the ethical principles of the university described below. Although legal behavior and ethical behavior overlap in many areas, they are quite distinct from each other. While we follow legal requirements, an ethical institution goes beyond them to achieve the following values.

Mutual Respect

Texas Tech University is committed to an open and diverse society. Each member of the Texas Tech community has the right to be treated with **respect** and dignity. This right imposes a duty not to infringe upon the rights or personal values of others. Professional relationships among all members of the Texas Tech community deserve attention so that they are not exploited for base motives or personal gain.

Cooperation and Communication

Texas Tech University is committed to the promotion of professional relationships and open channels of **communication** among all individuals. The university will publish and disseminate in a timely manner its values, policies, procedures, and regulations, as well as any other information that is necessary to protect and educate all members of our community. We encourage and provide opportunities for the free and open exchange of ideas both inside and outside the classroom. While the free expression of views in orderly ways is encouraged, personal vilification of individuals has no place in the university environment.

Creativity and Innovation

Texas Tech University is committed to ethical institutional programs that meet the teaching, research, and service objectives of each discipline and department, to policies that are consistent with those objectives, and to a working and learning environment that encourages active participation. Such exemplary environments often challenge existing worldviews, requiring trust in the process of discovery and the acceptance of uncertainty and ambiguity within ethical parameters. The university supports all its members in life-long learning—a process that is both challenging and rewarding—and encourages **creative** and **innovative** means to achieve this goal through both opportunities and incentives.

Community Service and Leadership

Texas Tech University is committed to ethical **leadership** practices at all levels and to our tradition of **community service**, both within the university community and in our relationships with the greater community. We strive for exemplary professional and **community service** through research, creative works, and service programs that extend beyond the university environment. We strive to provide excellent service in a caring and friendly environment and encourage such involvement in the community by all faculty, students, staff, and administration.

Pursuit of Excellence

Texas Tech University is committed to achieving **excellence** in all aspects of its community. We expect this in the expertise and performance of our faculty, staff, and administration, as well as the continuing education of our students. A high standard of professionalism, including opportunities for professional contact and continuous growth, is expected of our faculty, students, staff, and administrators. The university is committed to academic integrity and to the effective and just implementation of a system designed to preserve and protect it. The university intends to be a model of **excellence**, following best practices in its professional work, displaying the highest standards in its scholarly work, and offering venues to showcase national and international examples of achievement.

Public Accountability

Texas Tech University is committed to transparency in governance, personal responsibility, and both individual and organizational integrity. Being responsible requires us to be thoughtful stewards of our resources—**accountable** and respectful to ourselves, to each other, and to the publics we serve. A sense of institutional and public responsibility requires careful reflection on one's ethical obligations and the duty to respect commitments and expectations by acknowledging the context and considering the consequences, both intended and unintended, of any course of action. We promptly and openly identify and disclose conflicts of interest on the part of faculty, staff, students, administration, and the institution as a whole, and we take appropriate steps to either eliminate such conflicts or ensure that they do not compromise our procedures and values. When we make promises, we must keep those promises. We strive to do what is honest and ethical even if no one is watching us or compelling us to “do the right thing.”

Diversity

Texas Tech University is committed to the inherent dignity of all individuals and the celebration of **diversity**. We foster an environment of mutual respect, appreciation, and tolerance for differing values, beliefs, and backgrounds. We encourage the application of ethical practices and policies that ensure that all are welcome on the campus and are extended all of the privileges of academic life. We value its cultural and intellectual **diversity** because it enriches our lives and the community as a whole, promoting access, equity, and excellence.

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, mental or physical disability, or Vietnam Era or Special Disabled Veteran status. 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, mental or physical disability, or Vietnam Era or Special Disabled Veteran status 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 designed 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.

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 for Blind Services

A Texas Department of Assistive and Rehabilitative Services—Division for Blind Services office is located on the Texas Tech University campus. Educational and vocational rehabilitation services are available for blind and visually impaired students. For detailed information concerning DBS services, contact Sue Ann Hansford, VR Counselor, TTU Library, Suite 030, 806.742.2253, or sueann.hansford@dars.state.tx.us.

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 Programs in Hospitality Administration
- American Association of Family and Consumer Sciences
- American Association of Marriage and Family Therapy
- 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
- Texas Board of Nursing
- 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 Accreditation of Healthcare Management Education
- Commission on Collegiate Nursing Education
- 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
- 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 Council on Family Relations
- National Science Teachers Association
- Society for Range Management
- Southern Association of Colleges and Schools
- State Board for Educator Certification
- Supreme Court of Texas
- Technology Accreditation Commission of ABET

2009-2010 Academic Calendar

	FALL '09	SPRING '10	SUMMER I '10	SUMMER II '10
Residence Halls Open for Occupancy	Aug. 23	Jan. 10	May 31	July 5
Registration for New Students	Aug. 25-26	Jan. 12	June 1	July 6
Final Day to Register or Withdraw Without Penalty	Aug. 26	Jan. 12	June 1	July 6
Classes Begin	Aug. 27	Jan. 13	June 2	July 7
Final Day to Declare Pass/Fail Intentions	Nov. 2	March 24	June 22	July 27
Advance Registration for Next Term	Nov. 9-24	April 5-20		
Open Registration Begins	Nov. 25	April 21		
No Exams Except Makeup or Scheduled Lab Exams	Dec. 3-9	April 28-May 4		
Last Day of Classes	Dec. 9	May 4	July 1	Aug. 4
Individual Study Day	Dec. 10	May 5		
Final Examinations	Dec. 11-16	May 6-11	July 2-3	Aug. 5-6
Semester/Term Ends	Dec. 16	May 11	July 3	Aug. 6
Residence Halls Close (with exceptions*)	Dec. 17	May 12	July 4	Aug. 7
Commencement†	Dec. 18-19	May 14-15		Aug. 7
PAYMENTS AND REFUNDS**				
Final Day to Make Full Payment or Payment Arrangements for pre-registration	Aug. 21	Jan. 8	May 28	July 2
Final Day to Drop a Course and Receive a Refund (not applicable to students dropping to 0 hours)	Sept. 14	Jan. 29	June 7	July 12
Final Day to Withdraw and Receive Partial Refund	Sept. 24	Feb. 10		
ADD/DROP (changes in schedule), WITHDRAWAL (dropping all courses)				
Student-Initiated Add on the Web	Aug. 27-Sept. 1	Jan. 13-19	June 2-3	July 7-8
Student-Initiated Drop on the Web	Aug. 27-Sept. 14	Jan. 13-29	June 2-7	July 7-12
Final Day to Drop a Course	Nov. 2	March 24	June 22	July 27
Final Day to Transfer Between Colleges	Nov. 25	April 21	June 22	July 27
Final Day to Withdraw from the University	Dec. 4	April 29	June 29	Aug. 2
DEADLINES RELATED TO GRADUATION				
Graduate School—Final Day to File Statement of Intent to Graduate	Sept. 17	Jan. 29	June 14	
Graduate School—Final Day to File Defense Notification	Oct. 7	March 3	June 9	
Final Day to Order Invitations/Academic Regalia at Bookstore	Oct. 26	March 10	June 18	
Graduate School—Final Day to Defend Thesis/Dissertation	Oct. 28	March 25	July 1	
Graduate School—Final Day to Pay Thesis/Dissertation Fee	Oct. 28	March 25	July 1	
Graduate School—Final Day to Submit Final Defense Reports	Oct. 29	March 26	July 2	
Graduate School—Final Day to Submit Final Draft of Thesis/Dissertation	Nov. 11	April 2		July 6
Graduate School—Final Day to Remove Grades of I or CR	Nov. 20	April 16		July 12
Graduate School—Final Day for Master's Candidates to Submit Comprehensive Exam Reports	Nov. 20	April 21		July 8
Graduate School—Final Day to Submit Final Corrected PDF of Thesis/Dissertation	Nov. 30	April 28		July 27
Final Day for Undergraduate Degree Candidates to Remove I and PR Grades, Complete Final Exams for Correspondence	Dec. 4	April 30	June 29	Aug. 2
HOLIDAYS AND VACATION DAYS				
Labor Day Holiday	Sept. 7			
Student holiday (does not apply to School of Law)	Oct. 12-13			
Thanksgiving Vacation	Nov. 25-29			
Martin Luther King Jr. Day		Jan. 18		
Spring Vacation		March 13-21		
No Classes		April 5		
INTERSESSION, WINTERSESSION AT JUNCTION				
WinterSession Classes at Junction Center Campus	Dec. 26-Jan. 9			
Interession Classes at Junction Center Campus			May 12-27	
FACULTY-RELATED INFORMATION				
Faculty on Duty	Aug. 24	Jan. 11	June 1	July 6
Mid-Semester Grades Due Via Web for Faculty	Oct. 26	March 10		
Web for Faculty Available for Grading	Dec. 11	May 6		
Grades Due for Graduating Students Via Web for Faculty	Dec. 17	May 12		
Final Grades Due Via Web for Faculty	Dec. 21	May 17	July 8	Aug. 11

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

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

† Schedule of commencement ceremonies to be announced.

Regents and Administration

Board of Regents

Officers

Larry K. Anders, Chair

Jerry E. Turner, Vice Chair

Ben W. Lock, Secretary

Christina Martinez, Executive Secretary to the Board of Regents

Regents

Term Expires January 31, 2011

Larry K. Anders Dallas

Mark Griffin Lubbock

Daniel "Dan" T. SernaArlington

Term Expires January 31, 2013

L. Frederick "Rick" Francis El Paso

John Field ScovellDallas

Jerry E. TurnerBlanco

Term Expires January 31, 2015

Mickey L. Long Midland

Nancy Neal Lubbock

John HuffakerAmarillo

Student Regent

Term Expires May 31, 2009

Kelli Stumbo Flower Mound

Administrative Officers

Date following rank indicates year of appointment to Texas Tech.

Office of the Chancellor

Chancellor Kent Hance, Professor of Law, 2006.
B.B.A., 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 and Counsel 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.

Vice Chancellor for Institutional Advancement Kelly Overley, 2003. B.A., Texas Tech, 1992; M.Ed., Texas (El Paso), 1997; Ed.D., 2006.

Vice Chancellor for Technology Commercialization David L. Miller, 2007. B.S., Midwestern, 1993; J.D., Texas Tech, 1996; M.B.A., 2008.

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 Guy Bailey, Professor of English, 2008. B.A., Alabama, 1972; M.A., 1974; Ph.D., Tennessee, 1979.

Provost and Senior Vice President Robert Smith, 2009. B.S., St. John's, 1963; M.S., Michigan, 1964; Ph.D., 1968.

Senior Vice President for Administration and Finance (Interim) Beverly Cotton, 1999. B.B.A., Texas Tech 1983; B.B.A., 1987; M.S., 1996.

Vice President for Research Taylor Eighmy, 2009. B.S., Tufts, 1980; M.S., New Hampshire, 1983; Ph.D., 1986.

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., Pittsburg State, 1987; Ph.D., Kansas, 1991.

Vice President of Institutional Diversity, Equity, and Community Engagement Juan S. Munoz, Associate Professor of Curriculum and Instruction, 2004. B.A., California (Santa Barbara), 1990; M.A., California (Los Angeles), 1994; Ph.D., 2000.

About the University

Campuses

Texas Tech University is the largest institution of the Texas Tech University System. More than 28,000 students attend classes in Lubbock on the 1,839-acre 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 in the Texas Tech University System that includes the School of Medicine, the Anita Thigpen Perry School of Nursing, School of Allied Health Sciences, Graduate School of Biomedical Sciences, the School of Pharmacy, and the Paul L. Foster School of Medicine. The Health Sciences Center has regional campuses in Amarillo, El Paso, the Permian Basin, Dallas, Abilene, and Marble Falls. The Paul L. Foster School of Medicine opens its doors to its first class of students in August 2009. The El Paso campus recently welcomed students from the Perry School of Nursing.

Location

With a population of more than 218,000, 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 more than 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 is the major institution of higher education in 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 914. 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. The College of Outreach and Distance Education was established in 2008.

The Texas State Legislature authorized funds in 1965 for establishing the Texas Tech University School of Law, and the Law School's first dean was appointed in 1966. The first class of 72 students enrolled in 1967. The Law School was approved by the American Bar Association in 1970 and is fully accredited by the Supreme Court of Texas (1968) and the Association of American Law Schools (1969).

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.

Texas Tech was first accredited by the Southern Association of Colleges and Schools in 1928 and has been accredited continuously since that time. Texas Tech University was selected to shelter a Phi Beta Kappa chapter in 2006.

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), Jon Whitmore (2003–2008), and Guy Bailey (2008–present).

Texas Tech University Health Sciences Center was created by the 61st Legislature of the State of Texas in 1969 as a separate university to address problems of health care delivery in rural areas and to develop education programs emphasizing primary care throughout West Texas.

The School of Medicine—the initial operational phase of the Health Sciences Center—admitted its first students in 1972. In 1981 the state legislature funded schools of Nursing and Allied Health. Nursing students were first admitted in August 1982 with Allied Health students admitted in 1983. In the fall of 1996, the School of Pharmacy admitted its first class. The Graduate School of Biomedical Sciences, originally a part of the School of Medicine, became a separate school in 1994 to coordinate the training of biomedical students.

The institution of higher education that became Angelo State University began in 1928, two years after San Angelo citizens, disappointed their city was not selected as the site for Texas Technological College, voted to create San Angelo Junior College. The name was changed to Angelo State College in 1965, the year the institution became a four-year college, and to Angelo State University in 1969. Angelo State awarded its first baccalaureate degrees in 1967 and its first master's degrees in 1972.

Angelo State University consists of a College of Graduate Studies, College of Business, College of Education, College of Liberal and Fine Arts and College of Sciences. Angelo State has an Honors Program and an International Program.

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, 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 enhance state funds in supporting research, establishing scholarships and fellowships, and helping to provide physical facilities and educational materials.

Organizational Structure

A nine-member Board of Regents governs Texas Tech University, Angelo State University and the Texas Tech University Health Sciences Center. The Governor of the State of Texas appoints the Regents to six-year terms. The terms of office of three Regents expire every two years. The governance, 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 each institution in the system. 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 and Senior Vice President for Academic Affairs who oversees the educational programs of the university, a Senior Vice President for Administration and Finance who is responsible for the fiscal operations of the university and the physical plant, a Vice President for Student Affairs who is concerned with the general welfare of the students of the university, and a Vice President for Research who directs the research efforts of the university.

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, Outreach and Distance Education, and Visual and Performing Arts. Each college is administered by a dean and consists of a number of instructional departments or areas.



Photo by Sothy Eng

Academic Programs Leading to a Degree

College of Arts and Sciences			
Anthropology	B.A.	M.A.	
Applied Linguistics		M.A.	
Atmospheric Science		M.S.	
Biochemistry	B.A., B.S.		
Biological Informatics		M.S.	
Biology	B.S.	M.S.	Ph.D.
Cell and Molecular Biology	B.S.		
Chemistry	B.A., B.S.	M.S.	Ph.D.
Classics (Classical Languages)	B.A.	M.A.	
Communication Studies	B.A.	M.A.	
Economics	B.A., B.S.	M.A.	Ph.D.
English	B.A.	M.A.	Ph.D.
Environmental Toxicology		M.S.	Ph.D.
Exercise and Sport Sciences	B.A., B.S.	M.S.	
French	B.A.		
General Studies	B.G.S.		
Geography	B.A.		
Geosciences		M.S.	Ph.D.
Geosciences—Geology	B.A., B.S.		
Geosciences—Geophysics	B.S.		
German	B.A.	M.A.	
Health	B.S.		
History	B.A.	M.A.	Ph.D.
International Economics	B.S.I.E.		
Latin American and Iberian Studies	B.A.		
Mathematics	B.A., B.S.	M.A., M.S.	Ph.D.
Microbiology	B.S.	M.S.	
Philosophy	B.A.	M.A.	
Physics	B.S.	M.S.	Ph.D.
Physics, Applied		M.S.	
Political Science	B.A.	M.A.	Ph.D.
Psychology	B.A.	M.A.	Ph.D.
Psychology—Clinical Psychology			Ph.D.
Psychology—Counseling Psychology		M.A.	Ph.D.
Psychology—Experimental Psychology		M.A.	Ph.D.
Public Administration		M.P.A.	
Romance Languages (French and Spanish)		M.A.	
Russian Language and Area Studies	B.A.		
Social Work	B.A.		
Sociology	B.A.	M.A.	
Spanish	B.A.		Ph.D.
Sports Health [^]		M.S.	
Statistics		M.S.	
Technical Communication	B.A.	M.A.	
Technical Communication and Rhetoric			Ph.D.
Zoology	B.S.	M.S.	Ph.D.

College of Agricultural Sciences and Natural Resources			
Agribusiness (B.S. is joint with Rawls College of Business)	B.S.	M.A.B.	
Agricultural and Applied Economics	B.S.	M.S.	Ph.D.
Agricultural Communications	B.S.	M.S.	
Agricultural Education		M.S.	Ed.D.
Agriculture		M.Ag.	
Agriculture—Interdisciplinary	B.S.		
Animal Science	B.S.	M.S.	Ph.D.
Crop Science		M.S.	
Entomology		M.S.	
Environmental Conservation of Natural Resources	B.S.		
Environmental Crop and Soil Sciences	B.S.		
Fisheries Science		M.S.	Ph.D.
Food Science	B.S.	M.S.	
Horticultural and Turfgrass Sciences	B.S.	M.S.	
Landscape Architecture	B.L.A.	M.L.A.	
Plant and Soil Science			Ph.D.
Plant Biotechnology [^]	B.S.		
Range Management	B.S.		
Range Science		M.S.	Ph.D.
Soil Science		M.S.	
Wildlife and Fisheries Management	B.S.		
Wildlife Science		M.S.	Ph.D.

College of Architecture			
Architecture	B.S.		
Architecture (professional degree)		M.Arch.	
Architecture (postprofessional degree)		M.S.	
Land-Use Planning, Management, and Design (Interdisciplinary)			Ph.D.

Rawls College of Business			
Accounting	B.B.A.	M.S.A.	
Agribusiness (B.S. is joint with College of Agricultural Sciences & Nat. Res.)	B.S.		
Business Administration		M.S.	Ph.D.
Economics	B.B.A.		
Energy Commerce	B.B.A.		
Finance	B.B.A.		
General Business	B.B.A.	M.B.A.	
International Business	B.B.A.	I.M.B.A.	
Management	B.B.A.		
Management Information Systems	B.B.A.		
Marketing	B.B.A.		

[^] Degree being discontinued. Not available for incoming students.

College of Education*

Bilingual Education	M.Ed.	
Counselor Education	M.Ed.	Ph.D.
Curriculum and Instruction	M.Ed.	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	B.S.	M.S.
Multidisciplinary Studies	B.S.	
Secondary Education	M.Ed.	
Special Education	M.Ed.	Ed.D.

* Degree and teacher certification programs are separate programs. Undergraduate majors using the term "education" (e.g., secondary education) are not offered. Students are admitted to one of 10 colleges for a degree program leading to a bachelor's degree. Eligible students at the junior level are admitted to a teacher certification program that culminates with the state-mandated TExES exams. Students must pass all appropriate TExES exams for a Texas teaching certification, but not for the bachelor's degree.

College of Engineering

Chemical Engineering	B.S.	M.S.Ch.E.	Ph.D.
Civil Engineering	B.S.	M.S.C.E.	Ph.D.
Computer Engineering	B.S.		
Computer Science	B.S.	M.S.	Ph.D.
Electrical Engineering	B.S.	M.S.E.E.	Ph.D.
Engineering		M. Engr.	
Engineering Physics	B.S.		
Engineering Technology (Electrical-Electronics, Mechanical, Construction)	B.S.		
Environmental Engineering	B.S.Env.E.	M.Env.E.	
Industrial Engineering	B.S.	M.S.I.E.	Ph.D.
Manufacturing Systems and Engineering		M.S.M.S.E.	
Mechanical Engineering	B.S.	M.S.M.E.	Ph.D.
Petroleum Engineering	B.S.	M.S.P.E.	Ph.D.
Software Engineering		M.S.	
Systems and Engineering Mgmt.		M.S.S.E.M.	Ph.D.

Honors College

Arts and Letters	B.A.
Natural History and Humanities	B.A.

College of Mass Communications

Advertising	B.A.		
Electronic Media and Comm. (Visual Communications or Media Mgmt. and Economics)	B.A.		
Journalism (Broadcasting, News Editorial, Online)	B.A.		
Mass Communications		M.A.	Ph.D.
Photocommunications^	B.A.		
Public Relations	B.A.		

[^] Degree being discontinued. Not available for incoming students.

College of Human Sciences

Apparel Design and Manufacturing	B.S.		
Community, Family and Addiction Services	B.S.		
Environmental Design		M.S.	
Family and Consumer Sciences	B.S.		
Family and Consumer Sciences Education		M.S.	Ph.D.
Hospitality Administration			Ph.D.
Human Development and Family Studies	B.S.	M.S.	Ph.D.
Human Development and Family Studies–Early Education	B.S.		
Interior Design	B.S.		
Interior and Environmental Design			Ph.D.
Marriage and Family Therapy		M.S.	Ph.D.
Nutritional Sciences	B.S.	M.S.	Ph.D.
Personal Financial Planning	B.S.	M.S.	Ph.D.
Restaurant, Hotel, and Institutional Management	B.S.	M.S.	
Retailing	B.S.		

College of Visual and Performing Arts

Art		M.F.A.	
Art Education		M.A.E.	
Art History	B.A.		
Art–Communication Design	B.F.A.		
Art–Visual Studies (teacher certificate)	B.F.A.		
Studio Art	B.F.A.		
Dance	B.A.		
Fine Arts–Art			Ph.D.
Fine Arts–Music			Ph.D.
Fine Arts–Theatre			Ph.D.
General Studies	B.G.S.		
Music	B.A.		
Music (teacher certification)	B.M.		
Music Composition	B.M.	M.M.	D.M.A.
Music Conducting			D.M.A.
Music Education		M.M.Ed.	
Music Pedagogy		M.M.	
Music Performance	B.M.	M.M.	D.M.A.
Music Theory	B.M.	M.M.	
Musicology		M.M.	
Piano Pedagogy			D.M.A.
Theatre Arts	B.A.	M.A.	
Theatre Arts–Acting	B.F.A.		
Theatre Arts–Design / Technology	B.F.A.		
Theatre Arts–Arts Administration		M.F.A.	
Theatre Arts–Design		M.F.A.	
Theatre Arts–Performance and Pedagogy		M.F.A.	
Theatre Arts–Playwriting		M.F.A.	

Dual and Joint Degree Programs

Agribusiness, B.S.
Agricultural and Applied Economics / General Business, B.S.–B.B.A.
Architecture / Civil Engineering, B.S.–B.S.
Chemical Engineering / Computer Science, B.S.–B.S.
Mathematics / Computer Science, B.S.–B.S.
General Business / Architecture, B.S.–B.B.A.
General Business / Architecture, M.B.A.–M.Arch.
General Business / Environmental Toxicology, M.B.A.–M.S.
General Business / Foreign Languages, M.B.A.–M.A.
General Business / Medicine, M.B.A.–M.D.
General Business / Personal Financial Planning, M.B.A.–M.S.
General Business / Pharmacology, M.B.A.–Pharm.D.
Business Administration / Personal Financial Planning, M.S.–M.S.
Law / Accounting (Taxation), J.D.–M.S.A.
Law / Agricultural and Applied Economics, J.D.–M.S.
Law / Biotechnology, J.D.–M.S.
Law / Crop Science / Horticulture / Soil Science / Entomology, J.D.–M.S.
Law / Environmental Toxicology, J.D.–M.S.
Law / General Business, J.D.–M.B.A.
Law / Medicine, J.D.–M.D.
Law / Personal Financial Planning, J.D.–M.S.
Law / Public Administration, J.D.–M.P.A.
Public Administration / Economics, M.P.A.–M.A.

Health Sciences Center

Athletic Training	M.A.T.
Audiology	Au.D.
Biochemistry and Molecular Genetics	M.S. Ph.D.
Biotechnology (Biomedical Track)*	M.S.
Cell and Molecular Biology	M.S. Ph.D.
Clinical Laboratory Science	B.S.
Clinical Practice Management	M.S.C.P.M.
Clinical Services Management	B.S.
Communication Sciences and Disorders	Ph.D.
Medical Microbiology	M.S. Ph.D.
Medicine	M.D.
Molecular Pathology	M.S.
Nursing	B.S.N. M.S.N. D.N.P.
Occupational Therapy	M.O.T.
Pharmaceutical Sciences	M.S. Ph.D.
Pharmacology and Neuroscience	M.S. Ph.D.
Physical Therapy	M.P.T. D.P.T. Sc.D.P.T.
Physician Assistant Studies	M.P.A.S.
Physiology	M.S. Ph.D.
Rehabilitation Counseling	M.R.C.
Speech, Language and Hearing Science	B.S.
Speech-Language Pathology	M.S.

College of Outreach and Distance Education

Agriculture	M.Ag.
Agricultural Education	M.S. Ed.D. ¹
Architecture	B.S. ²
Art Education	M.A.E. ³
Computer Science	M.S. ⁴ Ph.D. ⁴
Crop Science	M.S.
Educational Leadership	M. Ed. ⁶ Ed.D. ⁷
Engineering	M. Engr.
Family and Consumer Science Educ.	M.S. ⁸
General Studies	B.G.S.
Horticultural and Turfgrass Sciences	B.S. M.S.
Human Development and Family Studies (Gerontology emphasis)	M.S. ⁸
Instructional Technology	M.Ed.
Multidisciplinary Science	M.S. ³
Restaurant, Hotel, and Institutional Management	M.S.
Software Engineering	M.S.
Special Education	M.Ed.
Systems and Engineering Management	M.S.S.E.M. Ph.D. ⁵
Technical Communication	M.A.
Technical Communication and Rhetoric	Ph.D.

¹ Joint program with Texas A&M University² Offered only at TTU at El Paso³ Offered only at TTU Center at Junction⁴ Offered only at TTU at Abilene⁵ Offered only at TTU at Amarillo⁶ Must attend TTU at Fredericksburg, TTU at Highland Lakes, or TTU Center at Junction⁷ Must attend one of five off-campus sites⁸ Offered through Great Plains Interactive Distance Education Alliance (GPIDEA)**Interdisciplinary Degrees**

Biotechnology (Applied Sci. Track)*	M.S.
Heritage Management	M.S.
Interdisciplinary Studies	M.A., M.S.
Land-Use Planning, Management, and Design	Ph.D.
Museum Science	M.A.
University Studies	B.A., B.S.
Wind Science and Engineering	Ph.D.

School of Law

Jurisprudence	J.D.
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- Nine dual degree programs combining a law degree and either a graduate or professional degree from within the Texas Tech University System are listed in the left column under the heading "Dual and Joint Degree Programs."

* The Graduate School of Biomedical Sciences at the Texas Tech University Health Sciences Center administers the biomedical track, and the Texas Tech Center for Biotechnology and Genomics administers the applied science track.

Reader's Guide to Catalog

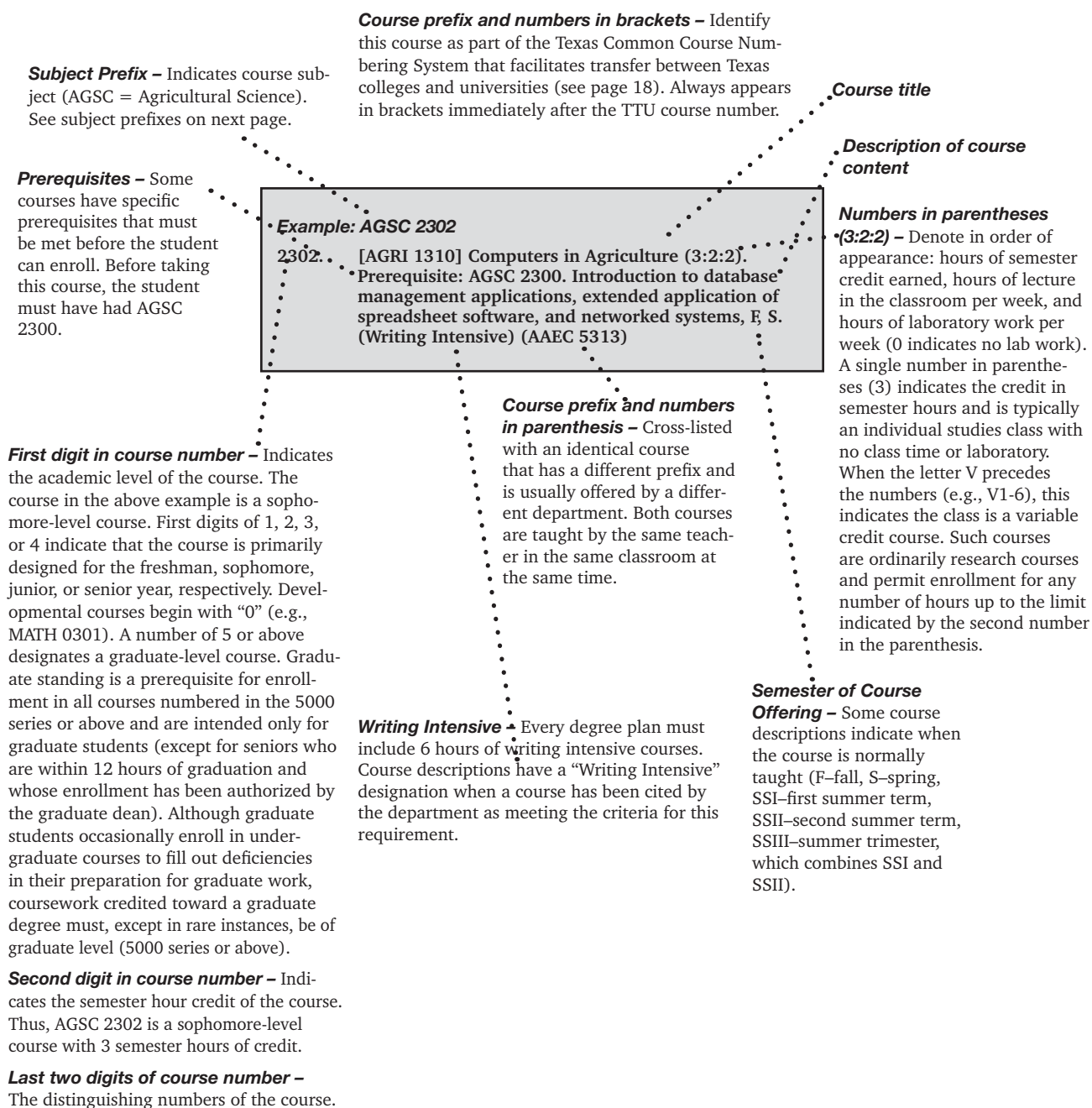
How to Read Catalog Course Descriptions

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 published before each registration period indicates courses that will be available during the upcoming term or semester

and when each class will meet. The class schedule can be found at (www.depts.ttu.edu/officialpublications/ClassSchedule/index.php). 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.



Glossary of Catalog Terms

The following definitions explain many of the academic terms and abbreviations used throughout this catalog.

Academic Year. The traditional annual cycle of academic terms: Fall, Spring, Summer.

Advanced Placement. A test taken to determine a student's level of competency in sequential courses such as mathematics, foreign languages, and chemistry.

Audit. To attend a class regularly without receiving credit. Does not count toward full-time enrollment.

B.S. Bachelor of Science, the baccalaureate degree typically awarded in the sciences, engineering, and health professions.

B.A. Bachelor of Arts, the baccalaureate degree typically awarded in the arts and humanities.

Baccalaureate Degree (Bachelor's). A degree awarded for the successful completion of an approved undergraduate program.

Certificate. A formal document that recognizes academic achievement in a specific discipline—usually as an adjunct to an undergraduate or graduate degree program.

Classification. Academic level (year), such as junior or senior based on hours earned.

College. An academic unit within the university that is headed by a dean, offers instruction, and grants degrees in several areas of study.

Concentration. A specific area of coursework within a major.

Concurrent Enrollment. Simultaneous enrollment in two or more courses, programs, colleges, or universities.

Core Curriculum. Required courses designed to give all graduating students a general knowledge base in the natural and applied sciences, social sciences, mathematics, humanities, visual and performing arts, and tools of language and thought.

Corequisite. A course or other educational requirement that must be completed simultaneously with another course.

Course. A subject offered during a term or semester. Each course is assigned a course level. Courses numbered from 1000 through the 4000 level are undergraduate courses. Courses numbered 5000 or above are graduate or professional level courses.

Course Sequence. The specified order of enrollment for a series of courses.

Credit Hour. Every course taught is designated a total number of credit hours, reflecting approximately the total hours a student spends per week in class.

Cum Laude. Means graduating "with honors." *Magna cum laude* means graduating with "high honors," and *summa cum laude* means "highest honors."

Degree. A title conferred upon one who has successfully completed an approved program of study.

Discipline. A branch of learning or field of study (e.g., mathematics, history, psychology).

Dissertation. A written report of research completed in fulfillment of the requirements for a doctoral degree.

Doctoral Degree (Doctorate). A graduate degree awarded for the completion of an advanced course of study emphasizing research, typically requiring 90 hours of course and research work beyond the bachelor's degree, the completion of an independent research project, and the completion and successful defense of a dissertation.

Drop/Add. The process by which a student changes his or her class schedule by adding a course, dropping a course, or both.

Dual Enrollment. Simultaneous registration at two educational institutions.

Electives. Courses that students may choose to take in contrast to those that are required.

Grade Points. Four points for each credit hour of A, three for each hour of B, two for each hour of C, one for each hour of D, zero for each hour of F.

Grade Point Average (GPA). The current GPA is determined by dividing the total number of grade points acquired during the current semester by the total number of semester hours taken during the semester. The cumulative grade point average is the total number of grade points earned in all courses taken at the university divided by the total number of semester hours. Both the current and cumulative GPAs include grade replacements.

Graduate Student. A student who has already earned a baccalaureate degree, has been admitted into the Graduate School, and is enrolled in advanced courses leading to a master's or doctorate.

Interdisciplinary or Multidisciplinary. A course of study from two or more academic disciplines.

Major. A primary undergraduate or graduate field of specialized study.

Master's Degree. A graduate degree awarded for completing an advanced course of study typically requiring 30 hours of coursework beyond the bachelor's degree.

Matriculation. Enrollment as an admitted, degree-seeking student. A *matriculation number* is a number by which the student is identified. It is assigned by the university.

Minor. An undergraduate or graduate field of specialized study in addition to the primary or major field.

Multicultural Course. A course that counts toward partial fulfillment of bachelor's degree requirements and focuses explicitly on the distinctive subcultures of the United States or on the culture of another society.

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.

Prerequisite. A course or other educational requirement that must be completed successfully prior to registering for another course or before proceeding to more advanced study.

Probation, Academic. Any undergraduate with less than a 2.0 cumulative Texas Tech GPA will be placed on academic probation (see Undergraduate Academics catalog section).

Residency. Classification of students as Texas residents or non-Texas residents for tuition purposes.

Semester. A standard academic term referring to one-half or about 16 weeks of the academic year (e.g., fall or spring semester).

Semester Hour. Unit of measure for credit purposes.

Seminar. A small group of students studying a subject under direction of a faculty member. Although practices vary, students may do original research and exchange results through informal lectures, reports, and discussions.

Subject Prefix. An abbreviation used with a course number to indicate an academic subject area (see next page).

Suspension, Academic. Student is not permitted to take classes and is ineligible to participate in any extracurricular activities (see Undergraduate Academics catalog section).

Texas Common Course Numbering System (TCCNS). A statewide course numbering system for lower-division courses to facilitate transferring courses among institutions of higher education by promoting consistency in course designation and identification.

Thesis. A written report of research or creative activity completed in partial fulfillment of the requirements of a course or degree.

Track. A detailed semester-by-semester plan for graduation.

Transcript. A written report of a student's academic work. Official transcripts must bear the seal of the university.

Transfer Credit. Coursework completed at another institution that is accepted at Texas Tech University and which may be applicable toward a specific major, minor or degree.

Withdraw. To drop *all* courses for a given term. Should not be confused with "dropping" a course.

Writing Intensive. A course designation indicating that the student will be writing often and will be asked to rewrite based on an instructor's critique. Every degree plan must include 6 hours of writing intensive courses.

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

Resources and Facilities

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 typescript volumes—and its support services for researchers are unique. The Archive of Turkish Oral Narrative Web site (www.aton.ttu.edu) offers a comprehensive view of Turkish culture. Transcriptions and translations of the narrative are accessible through a “Guides” link. Researchers can find a wide array of both popular and arcane Turkish music on the Web site. Popular folklore, epic narratives, and video and photographic images of famous Turkish landmarks are also available online.

For additional information, 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 events are held at the R.P. “Bob” Fuller Track Complex, and soccer events are held at the John Walker Soccer Complex. 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 Starbucks coffee.

The bookstore accepts personal checks, major credit cards, and TechExpress. Store hours are 7:30 a.m. to 5 p.m. weekdays.

Contact information: <http://texastech.bkstore.com>, 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), managed by the Office of the Chief Information Officer (CIO), provides a wide range of computing resources, services, and support for students, faculty, and staff in support of the university's educa-

tional and research mission. 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, videoconference facilities, and IT consulting. As part of the Safe Computing Practices Campaign (www.safecomputing.ttu.edu), the Office of the CIO hosts educational events each month and other educational resources to raise IT security awareness in the Texas Tech community.

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 manages www.ttu.edu and other university Web sites. Technology Support also manages five remote student computing 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 806.742.HELP).

Telecommunications (www.net.ttu.edu) architects and manages the Texas Tech data and video network, TTUnet, secure wireless network access, 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, Texas Tech 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.

Application Development and Support designs and manages selected academic applications for the university and assists in protecting applications (internal and external) using appropriate authentication and security measures. For additional information, contact the Office of the Chief Information Officer.

Institutional Research and Information Management (www.irs.ttu.edu) provides precise statistical and management information to internal and external customers. This information includes statistics on students, faculty, semester credit hours, and course evaluations.

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

- **Communication Services** (www.itsc.ttu.edu) assists those needing a new telephone (office or cellular), an additional telephone line, or voice mail; provides service for a telephone that is not working; and provides on-campus directory assistance. For any of these needs, contact Communications Services at 806.742.2000.
- **Information Systems** (www.depts.ttu.edu/itis) supports the Banner ERP system for Texas Tech and 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 (TOSM)** (www.tosm.ttu.edu) staff members are available to answer questions concerning server administration, management, or support. TOSM also offers data back-up services to the university community. TOSM provides a production grade data center to house servers and data. For additional information, contact the data center at 806.742.2900.

Fiber and Biopolymer Research Institute

The Fiber and Biopolymer Research Institute (FBRI) does research, development and service work on fibers and other biological based polymers. Special expertise is provided in cotton. Activities span from molecular/structural analysis to physical testing and evaluation to specialty finishes and nanocoatings. The Institute occupies 110,000 square feet of space in a building located at the East Research Center, 1001 East Loop 289. It is equipped to transform raw fibers into finished textile products.

Major research funding comes from the National Science Foundation, the U.S. Department of Agriculture, the Texas Department of Agriculture, the Texas Emerging Technology Fund, Cotton Incorporated, the Plains Cotton Improvement Committee, and various private sources. Approximately thirty distinct research projects are conducted annually, covering diverse issues such as improved plant breeding, the maturation of cotton fibers, textile processing performance, development of new instrumentation, and imparting special functionality to textile products with novel finishes.

The FBRI is part of the Department of Plant and Soil Science in the College of Agricultural Sciences and Natural Resources. It is the preeminent national resource for testing and evaluation of cotton fiber properties that are being developed by public and private plant breeders. Collaborative work is done with the cotton production and ginning sectors and with textile manufacturing sectors.

The FBRI is an integral part of Texas Tech's academic programs, used by the Colleges of Engineering and Human Sciences in addition to the College of Agricultural Sciences and Natural Resources, for advanced degree programs and special problems courses. Several graduate level courses are taught through the Department of Plant and Soil Science, the Department of Industrial Engineering, and the Department of Agricultural and Applied Economics. A fibers and textiles graduate certificate program (also available through the College of Outreach and Distance Education) is offered within the Department of Plant and Soil Science. Professional education activities include the Texas International Cotton School for which information can be found at www.texasinternationalcottonschool.com.

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 from around the country.

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 second-floor 3D Animation Lab is open to everyone and offers tutorials and "quick start" guides to 3D art, modeling and animation.

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, 33 pieces of life-size bronze sculpture, and an historical park containing 48 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, along with exhibits and education-based seminars and programs. 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. The NRHC is closed on all major holidays.

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 meetings, 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 Advising and Support” 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 offered by the Graduate School. 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: Dr. A.C. Correa, ICASALS, International Cultural Center, 806.742.2218, www.icasals.ttu.edu

Psychology Clinic

The Psychology Clinic provides short- and long-term counseling and psychotherapy, as well as psychological and vocational assessment to Texas Tech students and staff as well as children and adults in the Lubbock community. The clinic provides training 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

KOHH-FM. Licensed and owned by Texas Tech, KOHH-FM is a classical music and news station that broadcasts on a frequency of 89.1 at 70,000 watts. A professionally staffed division of the Office of the Provost, KOHH-FM operates 24 hours a day, seven days a week, providing service to over 21,000 South Plains listeners within a 75-mile radius of Lubbock. Recognized by the Corporation of Public Broadcasting as a fully operational public radio station, KOHH-FM offers unique programming from National Public Radio, American Public Media, and Public Radio International networks as well as classical music, jazz, local news, feature stories and support for other fine arts and events. While the station is 60 percent listener supported, the additional funding is supplied by grants, underwriting, and limited financial support from Texas Tech. As of spring 2007, KOHH-FM also features Lubbock’s first digital broadcast radio signal using HD radio technology and adding two additional stations to its existing frequency.

KTXT-TV. A noncommercial educational television station, KTXT-TV (Channel 5.1 on HD) 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, engineering facilities and 817-foot antenna-tower are located on the southwestern campus triangle west of Indiana Avenue. The station broadcasts diverse digital programming 24 hours a day, seven days a week. The signal coverage zone encompasses Lubbock and the surrounding area within a 60-mile radius 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 digital programming to satisfy the broadcasting and non-broadcasting needs of the university and surrounding communities.

Much of the 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 informal noncredit courses to broadcast on special schedules as a service to the university and viewers. KTXT-TV’s outreach department offers extensive workshop topics for teachers, parents and caregivers and hosts educational outreach events.

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, an indoor Olympic-size swimming pool, and an outdoor leisure 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 aquatic facility, which adjoins the Student Recreation Center, offers a wide range of water sports and activities to students. The new \$7.5 million outdoor leisure pool located south of the Student Recreation Center opened in June 2009. The pool includes a lazy river, hot tub, bubble benches, wet decks, poolside cafe, drop chute lap lanes, and much more. The aquatic facilities and programs are available to students daily throughout the year.

The clinic and class program includes non-credit 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.

Contact information: 806.749.3749 or www.swco.ttu.edu.

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

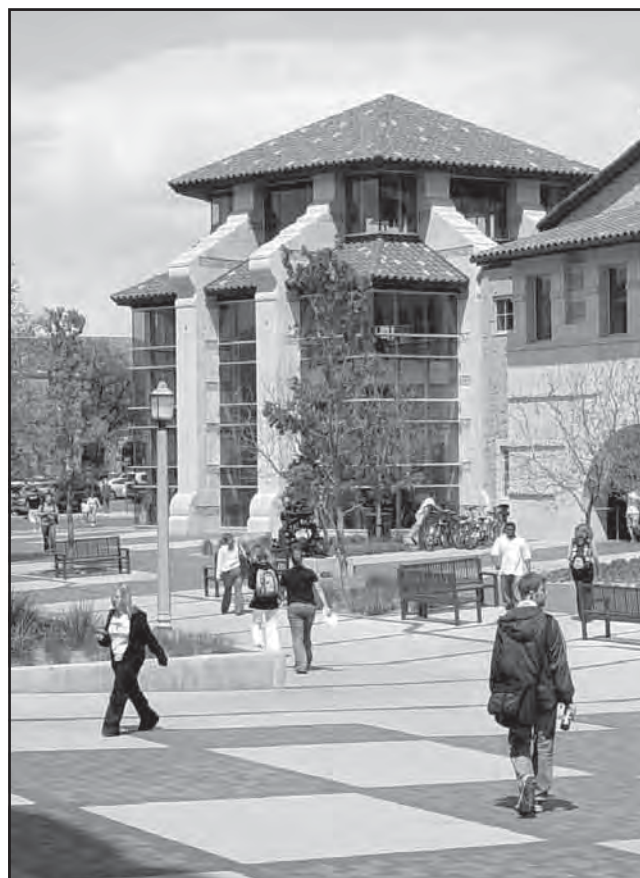
The Student Union Building (SUB) is the community center of campus. Referred to as the *living room* of the university, the SUB has as many as 20,000 students, faculty, staff, alumni, and guests come through its doors daily.

In 2006 the SUB completed a \$45 million renovation and expansion that created one of the finest facilities in the United States. The expansion included 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 & 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. In 2007 the Offices of Student Diversity Relations and Parent and Family Relations were added to the SUB as well. The renovation encompassed 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 University Police Substation, the University ID Center, a branch bank, Sam's Place convenience store, CopyTech copy center, Texas Technology Computer Store & Service Center, the Union Bistro, Cold Corner, 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.



Susan Polgar Institute for Chess Excellence (SPICE)

SPICE was established at commencement in May of 2007. Its motto is "Academic Excellence through Chess." Its mission is to promote chess as a vehicle for enriching education; to serve as a global center for chess research, education and development; to support and promote competitive chess at the college level; and to recruit outstanding undergraduate and graduate students to the university and the Health Sciences Center.

Former Women's Chess World Champion Grandmaster Susan Polgar and FIDE Master Paul Truong head up the SPICE group. Both also serve as coaches for the Knight Raiders chess team.

In collaboration with the university chess club, the Knight Raiders, SPICE offers a variety of services and opportunities related to chess, including: regular meetings, tournaments (both rated and unrated), after-school programs, classes, workshops for teachers and chess camps for kids.

In collaboration with the academic faculty in such diverse areas as computer science, mathematics, English, psychology and education, SPICE seeks to conduct research in the areas of computer programming, cognitive development, and education.

SPICE resources include chess sets, chess clocks, demonstration boards, chess game analysis programs, tournament management programs, and Monroi(c) devices to relay chess games live on the Internet. Many of these resources are shared with the Knight Raiders.

Contact Information: 806.742.7040; SPICE@ttu.edu; www.spice.ttu.edu. The offices of SPICE are located in the Tech Plaza, Suite 304-B.

Texas Tech Farm at Pantex

The College of Agricultural Sciences and Natural Resources operates an agricultural 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, seven 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 54 officers and 36 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/.

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 gener-

ation 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 plays or to work on production crews.

University Parking Services

All vehicles parked on campus are required to display a valid Texas Tech parking permit in the commuter lots on weekdays 7:30 a.m. to 5:30 p.m. and in the residence hall parking lots 24 hours a day from Monday at 7:30 a.m. through Friday at 5:30 p.m.

By using "My Parking Account" on the parking services Web site (www.parking.ttu.edu), viewers can access and update account information, register motor vehicles, purchase a permit, and explore other ways to simplify their on-campus parking experience. The Web site also provides maps, citation appeals, rules and regulations, and other useful information.

A free on-campus Motorist Assistance Program is available 24-hours a day for anyone who runs out of gas, needs a battery boost or a car door unlocked, or has a flat tire. Call 742-MAPP.

To contact University Parking Services, call 742-PARK or visit Room 145 of the Administrative Support Center, 2903 4th Street, from 7:30 a.m. to 8 p.m. Monday through Friday.

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 includes a dynamic oral history project, 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 approximately 3 million pages of materials, all of which are accessible free of charge through the Internet. These online materials include more than 400,000 documents; 100,000 photographs and slides; and thousands of maps, audio recordings, oral history interviews, films, and more. The Vietnam Archive adds approximately 200,000 new pages of digital material online each year.

In addition to the Vietnam Archive and its component projects, the Vietnam Center also administers a number of special projects and events, including scholarships for Texas Tech students, annual conferences and symposia, and numerous other projects and publications. The Vietnam Center Web site is www.vietnam.ttu.edu.

Admission to the University

Ethan Logan, Managing Director

Office of Undergraduate Recruitment and 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 ApplyTexas Application (formerly Texas Common Application) for Admission to Four-Year Institutions. 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. Please see the inside front cover of this catalog for 2009-2010 admission deadlines.

Residency Status Determination

For rules governing the determination of residency status as defined by the Texas Higher Education Coordinating Board, see www.collegefortexans.com or [http://info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=21&sch=B&rl=Y](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=21&sch=B&rl=Y)

Admission Requirements

Applicants are 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. Students are expected to be academically prepared to succeed; therefore, academic performance, standardized test scores, and educational preparation are specifically considered. Additional factors may be considered in determining the applicant's eligibility for admission during a holistic review that includes but is not limited to the student's extra-curricular activities, leadership experiences, special talents, awards, and employment experiences.

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.

First-Time Freshman Admission

Applicants must complete the following:

1. File a freshman application and pay an application fee of \$50. The ApplyTexas Application (formerly Texas Common Application) is available at www.applytexas.org. 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, students may submit verification or documentation of need for a fee waiver along with the 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.

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.

2. Have an official high school transcript showing class rank sent directly to the Office of Recruiting and Admissions. Senior courses in progress must be provided on the transcript, a grade report, or listed on the ApplyTexas 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.
4. 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 or ACT scores and must meet freshman assured admission requirements.

In addition to current university requirements for admission, applicants for the spring 2010 semester and thereafter also must have either of the following:

1. Successfully completed the curriculum requirements for the recommended or advanced high school program or its equivalent; or
2. Satisfied ACT's College Readiness Benchmarks on the ACT assessment applicable to the applicant or earned on the SAT assessment a score of at least 1,500 out of 2,400 or the equivalent.

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.

Homeschooled Students. The admission requirements for students who have been homeschooled are the same as for students who have attended traditional public or private schools. A transcript with all coursework, completed and in progress, is required with the application, test score, and application fee or waiver.

Early High School Graduates. Students graduating early from high school must submit all application materials and verification of early graduation. A letter from a high school counselor or an indication on the official transcript is acceptable for verification. Early graduates are required to meet regular freshman requirements. An essay explaining the purpose or reason for early graduation is helpful.

Admission Review

Students are expected to be academically prepared to succeed; therefore, academic performance, standardized test scores, and educational preparation are specifically considered. 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 essay topic A, B or C on the ApplyTexas Application and up to three letters of recommendation are strongly encouraged for students who do not meet the assured admission requirements.

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 percent)	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 students who hold competitive scholarships awarded by an official Texas Tech scholarship committee.

Admission Alternatives

Freshman applicants who have been denied admission for the summer or fall semester are eligible to participate in alternative programs. Visit www.gototexastech.com for details.

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 ApplyTexas Application (formerly Texas Common Application) is available at www.applytexas.org. 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, students may submit verification or documentation of need for a fee waiver along with the 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. 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.

Assured Admission

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 2.5 cumulative GPA.
2. Complete 24 or more semester hours of transferable college work beyond high school graduation and have a 2.25 cumulative 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 or ACT scores and must meet freshman assured admission requirements.
4. Transfer applicants with 45 or more transferable hours must choose a major.
5. The university reserves the right to modify its admission requirements to manage enrollment in high-demand areas.
6. Transfer students choosing the Rawls College of Business Administration must have a cumulative 2.75 GPA; College of Architecture, 3.0 cumulative GPA; Human Development and Family Studies, 2.5 cumulative GPA; Mechanical Engineering, 2.5 cumulative GPA; Petroleum Engineering, 2.5 cumulative GPA and 30 transferable credit hours; Interior Design, 3.0 cumulative GPA; and Community, Family and Addiction Services, 2.5 cumulative 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 Recruiting and 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 for 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
ANTH 2401	ANTH 2301 + 2100
ARAB 1311	CMLL 1301
ARAB 1312	CMLL 1302
ARAB 1411	CMLL 1301
ARAB 1412	CMLL 1302
ARAB 1511	ARAB 1501
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 2501
ARCH 1404	ARCH 2502
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
ARTS 1413	ART 1309
BCIS 1305	ISQS 2340
BCIS 1405	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

TCCNS..... TTU Equivalent

BIOL 2401	ZOOL 2403
BIOL 2402	ZOOL 2404
BIOL 2406	BIOL 1305 + 1113
BUSI 1301	BA 1101
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
COMM 1307	MCOM 1300
COMM 1318	PHOT 2310
COMM 2302	JOUR 2300
COMM 2311	JOUR 2310
COMM 2366	THA 2304
COSC 1300	CS 1300
COSC 1301	CS 1305
COSC 1309	CS 1305
COSC 1315	CS 1305
COSC 1319	CS 2350
COSC 1320	CS 1411
COSC 1330	CS 1305
COSC 1336	CS 1411
COSC 1337	CS 1412
COSC 1400	CS 1300
COSC 1401	CS 1305
COSC 1419	CS 2350
COSC 1436	CS 1411
COSC 1437	CS 1412
COSC 2315	CS 2413
COSC 2319	CS 2350
COSC 2325	CS 2350
COSC 2336	CS 2413
COSC 2415	CS 2413
COSC 2419	CS 2350
COSC 2425	CS 2350
COSC 2436	CS 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

TCCNS..... TTU Equivalent

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	THA 2101
DRAM 1241	THA 2101
DRAM 1310	THA 2303
DRAM 1322	THA 1302
DRAM 1341	THA 2101
DRAM 1351	THA 2302
DRAM 1352	THA 2312
DRAM 2336	THA 1301
DRAM 2366	THA 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
ENGL 2307	ENGL 2351
ENGL 2308	ENGL 2351
ENGL 2311	ENGL 2311
ENGR 1204	EGR 1206
ENGR 1307	CTEC 2301
ENGR 2301	CE 2301
ENGR 2304	CS 1305
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 2303
GEOL 2310	GPH 2333
GEOL 2409	GEOL 2303
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

TCCNS..... TTU Equivalent

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.....	NS 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
KORE 1311.....	CMLL 1301
KORE 1312.....	CMLL 1302
KORE 1411.....	CMLL 1301
KORE 1412.....	CMLL 1302
KORE 1511.....	CMLL 1501
KORE 1512.....	CMLL 1502
KORE 2311.....	CMLL 2301
KORE 2312.....	CMLL 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
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

TCCNS..... TTU Equivalent

MUSI 1181.....	MUAP 1123
MUSI 1182.....	MUAP 1124
MUSI 1183.....	MUAP 1113
MUSI 1216.....	MUTH 1103
MUSI 1217.....	MUTH 1104
MUSI 1286.....	MUCP 1201
MUSI 1304.....	MUSI 2301
MUSI 1306.....	MUHL 1308
MUSI 1307.....	MUHL 1308
MUSI 1308.....	MUHL 1308
MUSI 1311.....	MUTH 1303
MUSI 1312.....	MUTH 1304
MUSI 1316.....	MUTH 1103
MUSI 1317.....	MUTH 1104
MUSI 1386.....	MUCP 1201
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 2216.....	MUTH 2103
MUSI 2217.....	MUTH 2104
MUSI 2311.....	MUTH 2303
MUSI 2312.....	MUTH 2304
PHED 1151.....	PFW 1141
PHED 1152.....	PFW 1141
PHED 1153.....	PFW 1140
PHED 1164.....	ESS 1301
PHED 1238.....	ESS 1301
PHED 1251.....	PFW 1141
PHED 1252.....	PFW 1141
PHED 1301.....	ESS 1301
PHED 1304.....	HLTH 1300
PHED 1305.....	HLTH 1300
PHED 1338.....	PFW 1112
PHED 2155.....	PFW 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
RUSS 1511.....	RUSN 1501
RUSS 1512.....	RUSN 1502
RUSS 2311.....	RUSN 2301
RUSS 2312.....	RUSN 2302
SGNL 1301.....	ASL 1301
SGNL 1302.....	ASL 1302
SGNL 1401.....	ASL 1301

TCCNS..... TTU Equivalent

SGNL 1402.....	ASL 1302
SGNL 1501.....	ASL 1301
SGNL 1502.....	ASL 1302
SGNL 2301.....	ASL 2301
SGNL 2302.....	ASL 2302
SOCI 1301.....	SOC 1301
SOCI 1306.....	SOC 1320
SOCI 2301.....	SOC 2331; WS 2331
SOCI 2306.....	HLTH 1305
SOCW 2361.....	SW 2301
SOCW 2362.....	SW 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 1411.....	CMLL 1301
VIET 1412.....	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 Recruiting and 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 secondary school transcripts, 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.

Students who do not meet the admission requirements stated in the catalog may request that their credentials be reviewed in a holistic manner to determine other factors affecting the admission decision.

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; ielts@ieltsintl.org, or 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 \$26,804 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 \$421.67 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 \$75 (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. International students who do not meet the application deadline for the term in which they are applying will have their application moved to the next term.

Admission Requirements for Former Texas Tech Students

Application materials and deadlines for former Texas Tech students are available at www.gototexastech.com. 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 should do so *at the time of application or within the first semester of enrollment* and must otherwise meet current freshman or transfer admissions requirements. State residents may apply for admission to Texas public univer-

sities 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) is divided into two areas: compliance and liability. Compliance relates to the student's responsibility to comply with the state regulation requiring proof of having attained basic skills in reading, writing, and mathematics. Liability focuses on those students who have taken a skills test but failed to attain minimum scores in one or more basic skills.

Compliance. 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 214 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 online at www.reg.ttu.edu. For THEA test registration or to take a practice THEA test, go to www.thea.nesinc.com. To ask questions about your status with respect to the Texas Success Initiative, contact the TSI Compliance Office at 806.742.1183, ext. 248.

Liability. Students who have tested but not attained the minimum scores in one or more sections of the basic skills test are required to obtain TSI advising before registration and enroll continuously in formal skills development through the TSI Developmental Skills Program, 72 Holden Hall, 806.742.3242. The TSI Skills Development Program seeks to improve student readiness for successful completion of college-level work. Students must complete their prescribed developmental sequence successfully before being declared "College Ready" in any sequence. To be cleared from TSI requirements in reading, writing, or mathematics, students must complete their prescribed developmental reading, writing, or mathematics courses with a grade of C or better in each course. If passing scores are attained on retake of the THEA, Accuplacer, Compass, or Asset test, TSI requirements have been satisfied. Otherwise, the student is not declared "College Ready" until developmental courses are complete with a grade of C or better.

Texas Success Initiative (TSI)

Reading

0201. **Developmental Reading II (3).** The objective of developmental reading is to expand the vocabulary, increase vocabulary development, use critical reasoning, and help students correct academic deficiencies and improve readiness for successful completion of college-level work in reading. Not applicable toward general degree requirements in any degree program.
0301. **Developmental Reading III (3).** Students should develop effective reading and studying skills while being exposed to well-written contemporary material from eminent authors. Students should be encouraged to be involved personally in the reading process by receiving information they will find useful and interesting in developing themselves as persons and learners. Not applicable toward general degree requirements in any degree program.

Writing

- 0203. Developmental Writing II (3).** Reinforces writing skills necessary for successful completion of college coursework. More specifically, five particular writing issues will be emphasized: rhetorical concerns of audience and purpose; unity, focus, and development; effective organization; effective sentences; grammar and usage. Not applicable toward general degree requirements in any degree program.
- 0303. Developmental Writing III (3).** 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 must successfully complete this course before registration in ENGL 1301. Not applicable toward general degree requirements in any degree program.

Math

- 0102. Developmental Math I (3).** A tutorial type course that basically reviews the concepts from high school and goes over the information in order for the student to recall past math courses.
- 0202. Developmental Math II (3).** A developmental mathematics pre-algebra course that teaches algebraic equations, the use of mathematic formulas, combining like terms, solving for monomials and polynomials, graphing ordered pairs, graphing linear equations, the substitution method, solving inequalities, raising to a power, square and cube roots, factoring, quadratic equation, and completing the square. Not applicable toward general degree requirements in any degree program.
- 0302. Developmental Math III.** A developmental mathematics intermediate algebra course that teaches students to solve quadratic equations, graph equations, work with exponential and logarithmic functions, conic sections, and sequence series. Not applicable toward general degree requirements in any degree program.

Red Raider Orientation

Red Raider Orientation (RRO) is a mandatory program designed to provide all incoming students an opportunity to meet with an academic advisor, register for classes, gather information about Texas Tech programs and services, and learn the history and traditions of the university. All new freshmen and transfer students are required to attend RRO. Sessions are held in January, April, May, June, July, and August. For more information call 806.742.5433, see the Web site www.redraiderorientation.ttu.edu, or send and email to redraiderorientation@ttu.edu.

Special Programs

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 Recruiting and 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 Recruiting and 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.

Students at Texas Tech University may attempt credit by examination for degree credit during their freshman, sophomore, junior, and senior years. 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 Office of the Registrar. All students in the College of Arts and Sciences should see page 130 for the college's regulations regarding credit by exam, including lead time required for graduation processing and for foreign language exams. Students classified as seniors in colleges other than Arts and Sciences should plan to attempt credit by examination prior to the semester of graduation. Seniors must notify their academic dean's office prior to attempting credit by examination and provide proof of notification upon registering for an exam at Academic Testing Services.

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 Red Raider 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 Office of the Registrar 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. Students classified as seniors should plan to attempt credit by examination prior to the semester of graduation. Seniors must notify their academic dean's office prior to attempting credit by examination and provide proof of notification upon registering for an exam at Academic Testing Services.

4. 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.

5. Matriculated students seeking credit by examination in foreign languages *not* offered through the CLEP program or through Texas Tech's Foreign Language Placement exam program are required to work with Academic Testing Services to test via the 16-point exam given by the Foreign Language Proficiency Testing Service of the New York University School of Continuing and Professional Studies. If the language to be tested is not available through Texas Tech or NYU, the student must work through Academic Testing Services to locate another accredited university distance program. Credit by examination through other institutions' distance education programs often takes a minimum of two long semesters for scores to be reported to Texas Tech, and all language score reports subsequently must be evaluated by the Department of Classical and Modern Languages to determine credit awarded. It is the student's responsibility to plan in advance, in consultation with the appropriate academic dean's office, for scores to arrive and evaluation credit to be applied to the transcript in time to meet individual deadlines.

6. 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.

7. College Level Examination Program (CLEP) tests cannot be repeated before six months have passed.

8. 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 seven separate programs by which a student may earn course credit by examination:

- Specified Collee Board achievement tests.
- AP Examinations that are a part of the College Board Advanced Placement Program available in a limited number of secondary schools.
- Specified subject examinations of the College Level Examination Program (CLEP).
- Departmental examinations prepared, administered, and scored by faculty members who teach the related course.
- The International Baccalaureate (IB) diploma and/or examinations, dependent upon departmental evaluation.
- SAT and ACT scores for which designated credit is awarded for English.

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 test scores be sent to the university. **To view tables summarizing the minimum scores needed on select standardized tests, refer to www.depts.ttu.edu/testing/uce.php.** Information concerning each of the testing programs is provided below.

Credit for College Board Achievement Tests (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 a high school counselor; or contact Academic Testing Services, Texas Tech University, Box 45002, Lubbock, Texas 79409-5002, 806.742.3671.

Credit for Advanced Placement (AP) Examinations. The Advanced Placement Examination is the standardized final exam for a course offered in participating secondary schools. 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 designated high schools. AP scores are reported to the university in July.

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 Red Raider 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 a high school counselor or principal; www.collegeboard.com; or Academic Testing Services, Texas Tech University, Box 45002, Lubbock, TX 79409-5002, 806.742.3671.

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.

Credit for International Baccalaureate (IB) Examinations and/or Diploma. 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.



Admission Requirements for Specific Colleges

Undergraduates who are accepted for admission to Texas Tech University will be enrolled in one of the 10 colleges listed below (students participating in programs through the College of Outreach and Distance Education must be admitted to the college that offers the program). In addition to the admission requirements for enrollment in the university, these colleges may have admission requirements that must be met before acceptance. Admission requirements for these 10 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 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

- First-time freshmen 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 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 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 and petroleum engineering.
- For admission into mechanical engineering or petroleum engineering, freshmen must meet assured admission requirements. Students not meeting assured admission requirements but wanting to pursue a degree in engineering will be admitted to engineering undecided. Once a student has earned at least a 2.5 GPA in at least 15 hours, mechanical engineering or petroleum engineering can be declared as a major.
- Transfer students who wish to major in mechanical engineering or petroleum engineering must present a 2.5 GPA. The GPA criteria for petroleum engineering majors will change to 3.0 in the 2011-2012 catalog year.

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 GPA.
- For admission into the human development and family studies program and community, family, and addiction services, freshmen must meet assured admission requirements and transfer students must have a 2.5 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 college for the first time will be admitted as general mass communication students. To declare a major, a student must have a 2.75 GPA 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 theatre arts or dance will be admitted to theatre and dance undeclared. Dance majors and minors must audition with the appropriate faculty for acceptance to the program. Entrance to the B.F.A. theatre arts program is by audition and interview, normally at the end of the sophomore year.

Registration

Bobbie Latham, 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 Tech ID is used for matriculation and record identification purposes. Disclosure of the social security number for these purposes is voluntary. A social security number is needed for financial aid purposes.

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 Graduate 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

Notice to Graduate Students

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

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 MyTech 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 persons 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; 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 or are totally disabled for purposes of employability according to the disability ratings of the Department of Veterans Affairs, regardless of whether the members are eligible to receive disability benefits from the department, as a result of a service-related injury suffered since January 1, 1946, while on active duty either in the service of this state or the United States.

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 a person who at the time of registration is entitled to receive educational benefits under federal legislation if the value of those benefits received in a semester or other term is equal to or exceeds the value of the exemption for the same semester or other term. If the value of federal benefits received in a semester or other term does not equal or exceed the value of the exemption for the same semester or other term, the person is entitled to receive both the federal benefit and the exemption in the same semester or other term. The combined amount of the federal benefit plus the amount of the exemption received in a semester or other term may not exceed the cost of tuition and fees for that semester or other term.

A person is covered by the exemption if the person's right to benefits under federal legislation is extinguished at the time of the person's registration, except that a person may not receive an exemption from fees under this section if the person's right to benefits under federal legislation is extinguished because the person is in default of repayment of a loan made to the person under a federal program to provide or guarantee loans for educational purposes.

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

Noel Sloan, 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 806.742.5910 | 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 percent 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 percent financial aid).

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

Option 3: Budget Payment Option Plan (not available for summer terms). All charges, including housing and hospitality.

Option 4: Emergency Payment Plan (tuition and fees only).

Traditional 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.

For the fall term, the first installment of 50 percent of all tuition and fees is due by August 1 at the time the student enrolls in the payment option plan. The remaining balance will be due in two equal installments. The second installment is due September 1, the third installment is due October 1. For the spring term the first installment is due January 3, the second installment is due February 1, the third installment is due March 1. 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 to avoid cancellation. Please check your account information via the Web to ensure compliance with the terms of the agreement.

Budget Payment Option Plan (Option 3)

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.

For the fall term, the first installment of 20 percent of all tuition and fees is due by August 1 at the time the student enrolls in the payment option plan. The remaining balance will be due in four equal installments. The second installment is due September 1, the third installment is due October 1, the fourth installment is due November 1, and the fifth and final installment is due December 1. For spring term, the first installment is due January 3, the second installment is due February 1, the third installment is due March 1, the fourth installment is April 1, the fifth and final payment is due May 1. A service charge of \$25 must be paid at the time the student enrolls in the plan in addition to the 20 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 20 percent or greater payment status on the 12th class day to avoid cancellation. Please check your account information via the Web to ensure compliance with the terms of the agreement.

Emergency Pay Plan (Option 4)

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 Texas Tech 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.raiderlink.ttu.edu.

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 five to seven 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.raiderlink.ttu.edu.

Account Information. Tuition and fee information can be obtained at www.raiderlink.ttu.edu. 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 \$30 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

Texas Tech University has partnered with Higher One for the distribution of refunds.

Every student will be sent a Higher One debit card in the mail. Upon receipt of the Higher One debit card, students can go to the Web site www.easysrefundcard.com to set up their refund preference. Students can elect to either have refunds placed on the Higher One debit card or ACH direct deposited to the bank account of their choice. If no refund preference is selected, Higher One will issue a paper check to the student 21 days after the refund is received by Higher One.

The Higher One debit card will be mailed to the address available on the student system. The selection criteria for address will be as follows:

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

It is the student's responsibility to maintain a current address at www.raiderlink.ttu.edu.

Change in Class Schedule. Any refund as a result of class change will be processed and distributed 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: For a Dropped Course:

1st class day through 4th class day	100%
After the 4th class day	None

Withdrawal—Students withdrawing to zero hours 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: For a Dropped Course

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

Withdrawal—Students withdrawing to zero hours 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 and 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 the site [http://info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=21&sch=B&rl=Y](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=21&sch=B&rl=Y)

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:** Per laboratory section fee to cover the cost of laboratory materials and supplies.
- **Information Technology Fee:** Per semester credit hour fee. Funds the 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 Agricultural 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 bicycle, bus, parking, shuttle, and taxi services.
- **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 Recruiting and Admissions, Office of the Registrar, Student Business Services and New Student Relations.
- **Application Fee:** Varied fee charged for applications from prospective students.
- **Red Raider 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 semester fee assessed to each international student.
- **Education Abroad Fee:** A flat fee to support the Study Abroad Program.
- **International Student Fee:** A semester 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 nonresident 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.

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.

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 percent 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 percent 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: Nonresident 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

301 West Hall | Box 45011 | Lubbock, TX 79409-5011
T 806.742.3681 | F 806.742.0880
finaid.advisor@ttu.edu | www.financialaid.ttu.edu

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
- TEACH Grant
- 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.scholarships.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 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 \$2,500 to \$12,700 per year. Contact the Texas Tech Scholarship Office at www.scholarships.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 the Office of Student Financial Aid Web site www.scholarships.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, but financial opportunities are also available through the Graduate School. Many departments support graduate students through teaching assistantships and research assistantships, both of which must be requested from the student's department. Some departments also offer tuition scholarships. To enhance assistantship stipends, the Graduate School coordinates the AT&T Chancellor's Fellowship to aid departments in attracting new graduate students to Texas Tech. Competitive Graduate Dean's Summer Research Awards are also available to assist students completing their dissertations. 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.

Students must be accepted by the Graduate School and complete an application for assistance before departments can act on requests for fellowships and assistantships or make Chancellor's Fellowship nominations. Most application deadlines are in the spring prior to the academic year of the award. Applications and detailed information are available at www.depts.ttu.edu/gradschool/scholarships.

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

Sam Bennett, Ed.D., Assistant Vice President for Student Affairs, Managing Director, Hospitality Services

114 Doak Hall | Box 41141 | Lubbock, TX 79409-1141
T 806.742.6666 | F 806.742.1336
hospitality@ttu.edu | www.hospitality.ttu.edu

Sean Duggan, Managing Director University Student Housing

108 Doak Hall | Box 41141 | Lubbock, TX 79409-1141
T 806.742.2661 | F 806.742.2696
housing@ttu.edu | www.housing.ttu.edu

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, Freshman Interest Groups, and Learning Communities) 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 and Carpenter/Wells Complex 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.

On-Campus Housing Requirement

In support of the Strategic Plan of Texas Tech University, the university requires students to live in the university residence halls if there are vacancies. Institutional research suggests that students who live on campus are significantly more inclined to remain in college and achieve higher GPAs in comparison to students living off campus. Compliance with the university housing policy is a condition of enrollment, as set forth in the *Student Handbook* and the academic catalog and approved by the Board of Regents.

Requests for exemptions from the on-campus housing requirement must be submitted to the office of University Student Housing 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 office of University Student Housing in Doak Hall. Subject to verification and authorization by University Student Housing, students who meet one or more of the following criteria may be given permission to live off campus:

1. A student is residing and continues to reside in the established primary residence of her/his parents (or legal guardian) if it is within a 60-mile radius of Texas Tech University. The parents must have established their primary Lubbock-area residency at least six months prior to the request for an exemption. In order for the exemption request to be considered, legal guardianship must have been established by a court of law at least one year prior to the request.
2. A student presents sufficient evidence of an extreme financial hardship condition based on guidelines similar to those required for financial aid.
3. A student is married or has dependent children living with the student.
4. A student is 21 years of age or over on or before the first day of classes of the initial semester of enrollment.
5. A student has successfully completed 30 or more semester hours of academic credit prior to the student's enrollment or re-enrollment. Credit earned by exam (Advanced Placement, CLEP, ACT, SAT) and hours received from concurrent high school credit are not considered.
6. A student is awarded a university scholarship/sponsorship that is managed by a university department or college and includes the equivalence of the current academic school year's room, dining plan, tuition, fees, and textbooks (as estimated by the Student Financial Aid Office). Upon prior approval from the managing department or college, the student may request to be exempted from living on campus. The managing department or college must provide verification in writing to University Student Housing prior to the student's enrollment and/or re-enrollment to the university.
7. A student is enrolled in the Graduate School or Law School.
8. A student has served in active military service, as verified by a discharge certificate (DD214).
9. A student presents sufficient evidence of an extreme medical condition, as documented by her/his treating physician for which on-campus accommodations cannot be made.
10. A student presents sufficient and satisfactory evidence of 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 on-campus housing 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 dining plan fees, or probation, as determined by 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 on-campus housing 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 update any incorrect information regarding place of residence with the Office of the Registrar.

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.housing.ttu.edu and follow the instructions provided.

Registered sex offenders and students convicted of any felony are not permitted to live in university-owned housing, which includes the University Residence Halls. Information submitted is subject to verification.

Students entering in the fall semester will have the opportunity to request specific room assignments. This process begins 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.

Because it is necessary to assign new residents to spaces made available when a limited number of students vacate at the end of the fall term, students entering the residence halls for the spring semester may only request a residence hall instead of a specific room. Room assignments for spring applicants will be made to available space based upon the date University Student Housing receives the completed application.

Students should notify University Student Housing 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 fresh, healthy, and convenient dining options and dining plans for the university. Dining Bucks Plans can be used in any of the traditional dining halls, The Market food court at Stangel/Murdough, the Union Plaza food court, Student Union dining outlets, The Fresh Plate food emporium at Bledsoe/Gordon, or Sam's Place Mini-markets.

The five levels of Dining Bucks 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 dining plan rates listed 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 the 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 at discounted rates. 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, The Fresh Plate at Bledsoe/Gordon, and the Student Union food outlets. Students can choose from one of three Commuter Dining Plans and receive a discount when they dine. They also can add their Commuter Dining Plan to their tuition statement.

Room and Dining Plan Rates

Room and dining plan 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 a room and dining plan, contact University Student Housing at 806.742.2661.

Room and dining plan rates are based on a per-person charge and are established by the Texas Tech University Board of Regents. Discounted 12-month room and dining plan rates are available for Carpenter/Wells and Murray. For a complete list of available rates, contact University Student Housing at 806.742.2661.

The following room and dining plan rates have been approved for 2009-10 by the Board of Regents. Rates are subject to change.

Traditional Halls*
Bledsoe, Chitwood, Clement, Coleman, Gates, Horn, Hulén, Knapp, Murdough, Sneed, Stangel, Wall, Weymouth..... \$7,801

Suites
Gordon (2-bedroom)*..... \$8,075
Murray (4-bedroom, nine months)**..... \$9,016

Carpenter/Wells Complex**
3-Bedroom townhouse..... \$8,942
4-Bedroom flat..... \$8,627

* 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

Robert Smith, Ph.D., Provost and Senior Vice President

Office of the Provost | 104 Administration Building
Box 42019 | Lubbock, TX 79409-2019 | T 806.742.2184
F 806.742.1331 | www.depts.ttu.edu/provost

Students are responsible for their academic progress. Students seeking assistance with academic progress or experiencing academic difficulty should consult their academic dean and advisor. For information about Academic Advising and Support, see pages 57-59.

Each undergraduate student accepted for admission will matriculate in one of the university's degree-granting colleges or areas, including the Colleges of Agricultural Sciences and Natural Resources, Architecture, Arts and Sciences, Business, Education, Engineering, Honors, Human Sciences, Mass Communications, Visual and Performing Arts, Outreach and Distance Education, and the Office of the Provost. A student's major subject is the degree program in which he or she is working. A student interested in pursuing a double major or dual degree should contact his or her academic dean and advisor for specific requirements.

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. Requirements for undergraduate degrees are established at three different levels:

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

Students should familiarize themselves with all three sets of requirements that must be fulfilled before the degree is granted. Students should consult their academic dean and advisor whenever any question arises concerning academic status or progress. Matters specifically requiring the dean's approval include the following:

- 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

Students pursuing an interdisciplinary bachelor's degree in University Studies should consult their academic advisor whenever directed by the *Undergraduate and Graduate Catalog* to consult their academic dean.

Uniform Undergraduate Degree Requirements

The Uniform Undergraduate Degree Requirements apply to all Texas Tech undergraduates regardless of their major or college. The requirements have five components:

- General Requirements
- Core Curriculum Requirement
- Multicultural Requirement
- Foreign Language Requirement
- Writing Intensive Requirement

General 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. Texas Tech resident students may apply coursework completed at a distance through the university's College of Outreach and Distance Education (ODE) toward a bachelor's degree with prior approval of their academic dean. Students who have 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 taught under a Texas Tech course number, including distance education courses and those taught at locations other than the Lubbock campus.

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, beginning with the fall semester and extending through the summer terms. 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.

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.

Core Curriculum Requirement

The Core Curriculum is designed to give all graduating students the opportunity to acquire a general knowledge of study areas that traditionally have 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 perform-

ing 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.” **Students should reference college and department degree requirements when choosing Core Curriculum courses.**

A. Communication: 9 hours

Students graduating from Texas Tech University should be able to demonstrate the ability to specify audience and purpose and make appropriate communication choices.

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

ENGL 1301	Essentials of College Rhetoric
ENGL 1302	Advanced College Rhetoric

TCCNS*

ENGL 1301
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 page 48).

2. Oral—Speech: 3 hours

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

TTU Course

CFAS 2300	Communication, Civility and Ethics
CHE 2306	Exposition of Technical Information
COMS 1300	Introduction to Communication Studies
COMS 2300	Public Speaking
COMS 3358	Business and Professional Communication
ENGR 2331	Professional Communication for Engineers
MGT 3373	Managerial Communication

TCCNS

SPCH 1311
SPCH 1315

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.

Students graduating from Texas Tech University should be able to demonstrate the ability to apply quantitative and logical skills to solve problems.

TTU Course

AAEC 3401	Agricultural Statistics
MATH 1300 ^Δ	Contemporary Mathematics
MATH 1320 ^Δ	College Algebra
MATH 1321	Trigonometry
MATH 1330 [†]	Intro to Mathematical Analysis I
MATH 1331	Intro to Mathematical Analysis II

TCCNS

MATH 1332
MATH 1314
MATH 1316
MATH 1324
MATH 1325
MATH 1425

MATH 1351	Calculus I
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MATH 2313
MATH 2413
MATH 2417
MATH 2513
MATH 2517
MATH 2314
MATH 2414
MATH 2419
MATH 2519

MATH 1352	Calculus II
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MATH 1420 ^Δ
MATH 1430 [†]

College Algebra with Review
Introductory Mathematical Analysis with Review
Precalculus
Statistical Methods

MATH 1550
MATH 2300

MATH 2345	Introduction to Statistics with Application to Business
MATH 2350	Calculus III

MATH 2360	Linear Algebra
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MATH 2370	Elementary Analysis I
MATH 2371	Elementary Analysis II
PHIL 2310	Logic
PSY 3400	Statistical Methods

MATH 1414
MATH 2412
MATH 1342
MATH 1442
MATH 2305
MATH 2342
MATH 2442

MATH 2315
MATH 2415
MATH 2318
MATH 2418
MATH 1350

C. Natural Sciences: 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.

Students graduating from Texas Tech University should be able to explain some of the major concepts in the natural sciences and demonstrate an understanding of scientific approaches to problem solving, including ethics.

TTU Course

ANSC 3404	Consumer Selection and Utilization of Meat Products
ANTH 2300	Physical Anthropology
ANTH 2100	Physical Anthropology Laboratory
ASTR 1400	Solar System Astronomy
ASTR 1401	Stellar Astronomy
ATMO 1300	Intro to Atmospheric Science
ATMO 1100	Atmospheric Science Laboratory
BIOL 1305	Ecology and Environmental Problems
BIOL 1113	Environmental Problems Lab

TCCNS

ANTH 2301**
ANTH 2101
HYS 1411
PHYS 1412
GEOL 1347
GEOL 1447
GEOL 1147
GEOL 1447
BIOL 2306
BIOL 2406
ENVR 1301
ENVR 1401
BIOL 2106
BIOL 2406
ENVR 1301
ENVR 1401
BIOL 1411
BIOL 1413
BIOL 1406
BIOL 1407
CHEM 1305
CHEM 1105
CHEM 1306
CHEM 1106
CHEM 1307
CHEM 1107
CHEM 1308
CHEM 1108
CHEM 1307
CHEM 1107
CHEM 1311
CHEM 1111
CHEM 1312
CHEM 1112

* See page 24 for an explanation of TCCNS (Texas Common Course Numbering System).

** Does not include lab course.

^Δ Only one of these three can be used to fulfill Core requirements.

[†] Cannot receive credit for both MATH 1330 and 1430.

GEOG 1401	Physical Geography	GEOG 1301**	Environmental Geology	ENGT 1409
GEOL 1303	Physical Geology	GEOL 1303	GIS in Natural Science and Engineering	
GEOL 1101	Physical Geology Laboratory	GEOL 1103	Alternating and Direct Current Technology	
GEOL 1304	Historical Geology	GEOL 1403	Honors First-Year Seminar in Science	
GEOL 1102	Historical Geology Laboratory	GEOL 1304, GEOL 1404, GEOL 1104, GEOL 1404	Honors Seminar in Sciences	AGRI 2330
GEOL 1350	History of Life		Computer-Aided Drafting for Interior Designers II	
GEOL 1105	History of Life Laboratory		Engineering Analysis	
HONS 2405	Honors Integrated Science I		Manufacturing Engineering I	
HONS 2406	Honors Integrated Science II		Work and Product Safety	HECO 1315
NS 1410	Science of Nutrition		Engineering	
PHYS 1401	Physics for Nonscience Majors	PHYS 1410	Introduction to Production and Operations Management	
PHYS 1403	General Physics I	PHYS 1401	Computational Techniques for Science and Mathematics	
PHYS 1404	General Physics II	PHYS 1402	Introduction to Mechanical Engineering	AGRI 1307 AGRI 1407
PHYS 1406	Physics of Sound and Music		Engineering Thermodynamics I	
PHYS 1408	Principles of Physics I	PHYS 2425	Introduction to Technology for Musicians	
PHYS 2401	Principles of Physics II	PHYS 2426	Introductory Fieldcraft	
PSS 1411	Principles of Horticulture	HORT 1401	Introductory Wildlife	AGRI 1307 AGRI 1407
PSS 2330	Urban Soils	AGRI 1415	The Ecology and Conservation of Natural Resources	
PSS 2130	Urban Soils Laboratory		Freshwater Ecology and Fisheries	
PSS 2401	Introductory Entomology	AGRI 1413	The Diversity of Life	
ZOOL 2402	Human Anatomy and Physiology		Watershed Planning	AGRI 1307 AGRI 1407
ZOOL 2403	Human Anatomy	BIOL 2401	Principles of Food Preparation	
			Engineering Analysis I	
			Technological Application in Personal Financial Planning	
			Engineering Physics Analysis I	AGRI 1307 AGRI 1407
			Agronomic Plant Science	
			Vegetable Crops	
			Propagation Methods	
			Principles and Practices in Soils	AGRI 1307 AGRI 1407
			Technology and Society	
			Principles of Theatrical Lighting	

D. Technology and Applied Science: 3 hours

The objective of the study of the technology and applied science component of a core curriculum is to enable the student to understand how profoundly scientific and technological developments affect society and the environment. Human nutrition, the world's environment, and energy problems are all viewed as critical to one's understanding of and interactions with today's world.

Students graduating from Texas Tech University should be able to demonstrate understanding of how technology and applied science affects society and the environment and to demonstrate understanding of the relationship of ethics and technology.

TTU Course	TCCNS
AGED 4302	Transfer of Agricultural Technology
ANSC 1401	General Animal Science
ANSC 2303	Care and Management of Companion Animals
ART 3362	Technology in the Visual Arts
ATMO 2301	Weather, Climate, and Human Activities
ATMO 3301	General Meteorology
CE 1130	Civil Engineering Seminar I
CE 1305	Engineering Analysis
CHE 1305	Engineering Analysis I
CHEM 3305	Organic Chemistry I
CLAS 3304	Ancient Technology
CS 1300	Computers and Modern Society
CS 1412	Programming Principles II
CTEC 1312	Construction Methods
CTEC 2301	Surveying and Surveys
EE 1305	Introduction to Engineering and Computer Programming
EDIT 2318	Computing and Information Technology
EDIT 3318	Applications of Technology in Education
EMC 3300	Electronic Media and Society
EMC 3310	Introduction to Electronic Media and Communications
FDSC 2300	Principles of Food Technology
FDSC 2302	Elementary Analysis of Foods
FDSC 3303	Food Sanitation
GEOG 3300	Geographic Information Systems
GEOG 3360	Technology and the Human Landscape

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.

Students graduating from Texas Tech University should be able to think critically and demonstrate an understanding of the possibility of multiple interpretations, cultural contexts, and values.

TTU Course	TCCNS
ANTH 3323	Religion and Culture
ANTH 3325	Anthropological Folklore
ANTH 3351	Language and Culture
ARCH 2311	History of World Architecture c. 3000 BC to c. 1600 AD
ASL 3312	Introduction to Deaf Culture and Linguistics
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
COMS 3311	Rhetoric in Western Thought
COMS 3318	Persuasion and Social Movements
ENGL 2305	Introduction to Poetry

ENGL 2306 Introduction to Drama
ENGL 2307 Introduction to Fiction
ENGL 2308 Introduction to Nonfiction
ENGL 2351 Introduction to Creative Writing

ENGL 2388 Introduction to Film Studies
ENGL 2391 Introduction to Critical Writing
ENGR 4392 Engineering Ethics and Its Impact on Society

FREN 3302 Major French Writers
FREN 3390 French Culture
GERM 3301 German Culture and Society
GERM 3304 Introduction to Literature
GERM 3306 Contemporary Germany
GERM 3312 Literature of the Holocaust
GERM 3313 Northern Myths and Legends
HIST 1300 Western Civilization I
HIST 1301 Western Civilization II
HIST 2322 World History to 1500
HIST 2323 World History Since 1500
HIST 3341 Women in European Civilization (WS 3341)*

HIST 4327 Gender, Race, and Class in U.S. Law (WS 4327)*
HIST 4374 Love, Death, and Magic in Europe 1500–1800 (WS 4374)*
HONS 1301 Honors First-Year Seminar in Humanities

HONS 2311 Seminar in International Affairs
HONS 3301 Honors Seminar in Humanities
HUM 2301 The Western Intellectual Tradition I
HUM 2302 The Western Intellectual Tradition II
ITAL 3390 Italian Cinema
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 3341 Philosophy of Literature
PHIL 3342 Philosophy and Film
PHIL 4333 Comparative Epistemology
POLS 3331 Introduction to Political Philosophy (PHIL 3320)*

POLS 3332 Modern Political Theory
POLS 3333 Contemporary Political Theory
PORT 3307 Luso-Brazilian Civilization and Literature

RUSN 3301 Russian Civilization Through Literature in the 19th Century
RUSN 3302 20th Century Russian Civilization Through Literature in Translation

RUSN 3304 Russian Culture
SLAV 3301 The Vampire in East European and Western Culture

SPAN 3306 Intro to Hispanic Life, Culture
SPAN 3307 Intro to Hispanic Literatures
SPAN 3344 Mexican Life and Culture
SPAN 3390 Hispanic Culture and Civilization

ENGL 2307
ENGL 2308

HIST 2311
HIST 2312
HIST 2321
HIST 2322

HUMA 1301
HUMA 1302

PHIL 1301
PHIL 2306
PHIL 1304

SPAN 3391 Hispanic Film in Translation
SPAN 3392 Hispanic Literature in Translation
TURK 3307 Turkish Culture
VPA 3301 Critical Issues in Arts and Culture
WS 2300 Introduction to Women's Studies
WS 3341 Women in European Civilization (HIST 3341)*

WS 4327 Gender, Race, and Class in U.S. Law (HIST 4327)*

WS 4374 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.

Students graduating from Texas Tech University should be able to construct, present, and defend critical and aesthetic judgments of works in the creative arts.

TTU Course

ARCH 1412 Architectural Design Studio I
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
EMC 3308 Visual Communications
HONS 1304 Honors First-Year Sem. in Fine Arts
HONS 2302 European Fine Arts
HONS 2314 Honors Seminar in Intl. Cinema
HONS 3304 Honors Seminar in Fine Arts
LARC 1401 Landscape Architecture
Drawing and Drafting
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 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 in Western Culture

MUHL 3304 History of Jazz
MUHL 3310 History of Rock and Roll
MUSI 2301 Essential Elements of Music
MUTH 1300 Songwriting
SPAN 4392 The Play in Spanish
THA 2301 Introduction to Acting
THA 2302 Principles of Acting I
THA 2303 Theatre Appreciation
THA 2304 Introduction to Cinema

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

MUSI 1306
MUSI 1307

MUSI 1304

DRAM 1351

DRAM 1310
DRAM 2366

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

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.

Students graduating from Texas Tech University should be able to demonstrate the ability to assess critically claims about social issues, human behavior, and diversity in human experiences.

1. U.S. History: 6 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
HIST 3323	History of Women in America (WS 3323)*
WS 3323	History of Women in America (HIST 3323)*

TCCNS

HIST 1301
HIST 1302

Juniors and seniors may fulfill this requirement by completing 6 hours from the following American history courses:

HIST 3313	The Old South
HIST 3314	The South Since the Civil War
HIST 3321	Twentieth Century American West
HIST 3330	The Vietnam War
HIST 3331	History of United States Military Affairs to 1900
HIST 3332	History of United States Military Affairs Since 1900

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

POLS 1301	American Government, Organization
POLS 2302	American Public Policy

TCCNS

GOVT 2301
GOVT 2305
GOVT 2302
GOVT 2306

Students who earn an AP score of 3 or better or a grade of A or B in POLS 1301 may substitute in place of POLS 2302 one of the following upper-level courses:

POLS 3323	Legislation
POLS 3325	Political Parties
POLS 3326	Women in Politics (WS 3326)*
POLS 3327	The American Presidency
POLS 3339	Religion and Politics
POLS 3340	Fiscal Administration
POLS 3341	The Administrative Process
POLS 3346	Public Policy Analysis
POLS 3350	Criminal Process
POLS 3351	The Judicial Process
POLS 3352	Constitutional Law—Powers
POLS 3353	Constitutional Law—Limitations
POLS 3360	United States Foreign Policy
WS 3326	Women in Politics (POLS 3326)*

3. Individual or Group Behavior: 3 hours**TTU Course**

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

TCCNS

AGRI 2317
ANTH 2302
ANTH 2351

ANTH 3305
ANTH 3306

ANTH 3315
ANTH 3371
ARCH 1311
ART 3311
ART 4315
COMS 1301
COMS 2350
COMS 3313
COMS 3331
COMS 3332
COMS 3334

COMS 3353
COMS 3355
COMS 3356
ECO 2301
ECO 2302
ECO 2305
EDEL 2300
EDSE 2300
ESS 3352
ESS 3354
GEOG 2300
GEOG 2351
GEOG 3337
HDFS 2303

HDFS 2322

HDFS 3301

HDFS 3321

HDFS 3322
HDFS 3331
HDFS 3332
HLTH 1305

HLTH 2302

HLTH 3325

HONS 1303

HONS 3303
IE 3301
JOUR 4330
MCOM 1300
NS 4380
PFP 3301
PHIL 3321
PHIL 3331

POLS 3326
POLS 3341
POLS 3351
POLS 3361
POLS 3371
PSY 1300
PSY 2301

SOC 1301
SOC 1320
SOC 2331

SOC 3324
SOC 3325
SOC 3327
SOC 3331

SOC 3332

Anthropological Linguistics
Women in Culture and Society (WS 3306)*
Health, Medicine, and Culture
Peoples of the Southwest
Design, Environment, and Society
Native American Arts
Arts of Pre-Columbian America
Interpersonal Communication
Intro. to Communication Disorders
Persuasion
Nonverbal Communication
Intercultural Communication
Gender and Communication (WS 3312)*
Small Group Communication
Communication in Organizations
Leadership and Communication
Principles of Economics I
Principles of Economics II
Principles of Economics
Schools, Society, and Diversity
Schools, Society, and Diversity
Gender Issues in Sports
Sport in World Cultures
Intro. to Human Geography
Regional Geography of the World
Economic Geography
Life Span Human Development

Partnering: The Development of Intimate Relationships
Theories of Human Development and the Family
Human Sexuality Through Family Life Cycle (WS 3321)*
The Family in the Community
Parenting
Aging in the Family
Human Sexuality (WS 1305)*

Environmental Health and Awareness
Health Concerns in Chemical Dependencies
Honors First-Year Seminar in Social Sciences
Honors Seminar in Social Sciences
Engineering Economic Analysis
Public Opinion and Propaganda
Intro. to Mass Communication
Cultural Aspects of Food
Personal and Family Finances
Philosophy of Law
Philosophy of Social and Human Sciences
Women in Politics (WS 3326)*
The Administrative Process
The Judicial Process
International Politics
Comparative Politics
General Psychology
Child Psychology

Introduction to Sociology
Current Social Problems
The Sociology of Marriage (WS 2331)*
American Minority Problems
Gendered Lives (WS 3325)*
Sociology of Law and Policing
Sociology of the Family (WS 3331)*
Sociology of Bureaucracy

ARCH 1311

SPCH 1318

ECON 2302
ECON 2301

GEOG 1302
GEOG 1303

PSYC 2311
PSYC 2312
PSYC 2314

PSYC 2306
SOCI 2306

COMM 1307

PSYC 2301
PSYC 2308
PSYC 2309
PSYC 2310
SOCI 1301
SOCI 1306
SOCI 2301

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

SOC 3335	Family Violence
SOC 3337	Inequality in America (WS 3337)*
SOC 3368	Sociology of Deviance
SOC 3383	Alcohol, Drugs, and Society
SOC 3393	Development of Sociological Theories
SOC 3394	Contemporary Sociological Theories
SW 2301	Introduction to Social Work
SW 3311	Human Behavior and the Social Environment: Systems
WS 1305	Human Sexuality (HLTH 1305)*
WS 2331	The Sociology of Marriage (SOC 2331)*
WS 3306	Women in Culture and Society (ANTH 3306)*
WS 3312	Gender and Communication (COMS 3334)*
WS 3321	Human Sexuality Through Family Life Cycle (HDFS 3321)*
WS 3325	Gendered Lives (SOC 3325)*
WS 3326	Women in Politics (POLS 3326)*
WS 3331	Sociology of the Family (SOC 3331)*
WS 3337	Inequality in America (SOC 3337)*
WS 4399	Women's Studies Seminar

SOCW 2361

SOCI 2301

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



Multicultural Requirement

In addition to the Core, 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 also can 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. Although the courses below fulfill the university's multicultural requirement, select Honors courses also may be available and may vary by semester.

Students graduating from Texas Tech University should be able to demonstrate awareness and knowledge of distinctive cultures or subcultures, including but not limited to ethnicity, gender, class, political systems, religions, languages, or human geography.

TTU Course

TCCNS*

AAEC 4309	Sustaining Global Ecology, Natural Resources and Economy	
ADM 3312	History and Philosophy of Dress	
AGED 2300	Intro to Agricultural Education	
ANTH 1301	Understanding Multicultural America	
ANTH 2302	Cultural Anthropology	ANTH 2351
ANTH 3325	Anthropological Folklore	
ARCH 2311	History of World Architecture c. 3000 B.C. to c. 1600 A.D.	ARCH 1301
ARCH 4311	Architecture in Nonwestern Societies	
ART 1309	Art Appreciation	ARTS 1301
ART 1310	Art History Survey I	ARTS 1303
ART 2311	Art History Survey II	ARTS 1304
ART 3311	Native American Arts	
ART 4315	The Arts of Pre-Columbian America	
ASL 3312	Introduction to Deaf Culture and Linguistics	
CFAS 2360	Diversity in Community, Family, and Addictive Services	
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	
CLT 4305	Contemporary Theories of Cultural Meaning	
COMS 3311	Rhetoric in Western Thought	
COMS 3332	Intercultural Communication	
DAN 4301	World Dance Forms	
EDEL 2300	Schools, Society, and Diversity	
EDSE 2300	Schools, Society, and Diversity	
ENGL 2371	Language in a Multicultural America	
ENGL 3335	Ancient and Medieval World Literature	
ENGL 3336	Early Modern World Literature	
ENGL 3337	Modern and Contemporary World Literature	
ENGL 3387	Multicultural Literatures of America	
ENGL 3390	Literatures of the Southwest	
ESS 3354	Sport in World Cultures	
FIN 4328	International Finance	
FREN 3390	French Culture	
FREN 4322	Civilisation Française: French Civilization	
GEOG 2300	Introduction to Human Geography	GEOG 1302
GEOG 2351	Regional Geography of the World	GEOG 1303
GEOG 3360	Technology and Human Landscape	
GEOG 3363	Geography of South America	
GERM 3301	German Culture and Society	
GERM 3306	Contemporary Germany	
GERM 3312	Literature of the Holocaust	
GERM 3313	Northern Myths and Legends	
GERM 4305	Readings in German Language and Literature	

* See page 24 for an explanation of TCCNS (Texas Common Course Numbering System).

HDFS 3350	Development in Cross-Cultural Perspective
HIST 2322	World History to 1500
HIST 3306	African American History to 1877
HIST 3307	African American History from 1877 to Present
HIST 3311	Social and Cultural History of the Southwest
HIST 3318	The Plains Indians
HIST 3325	History of Mexican Americans in the U.S.
HIST 3326	History of Native Americans in the U.S.
HIST 3381	Colonial Latin America
HIST 3382	Modern Latin America
HIST 3384	History of Brazil
HIST 3389	The British Empire, 1783 to Present
HIST 3395	Africa: Empires and Civilizations
HIST 3396	Africa: Revolution and Nationalism Since 1800
HIST 3398	The Modern Middle East, 1800 to Present
HONS 2311	Seminar in International Affairs
HONS 2314	Honors Seminar in Intl. Cinema
ID 3382	Period Furnishings I
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	Development of Landscape Architecture
MGT 4375	International Management
MKT 4358	International Marketing
MUHL 2301	History of Music
NS 4380	Cultural Aspects of Food
PHIL 2350	World Religions and Philosophy
PHIL 3301	Classical Greek Philosophy
PHIL 3302	Asian Philosophy
POLS 3361	International Politics
POLS 3364	Comparative Foreign Policy
POLS 3371	Comparative Politics
POLS 3372	Governments of Russia and the Commonwealth of Independent States
POLS 3373	Governments of Western Europe
POLS 3374	Governments of Mexico and the Caribbean
POLS 3375	South American Governments
POLS 3376	Asian Governments and Politics
PSY 3398	Ethnic Minority Psychology
RHIM 3350	Travel and Tourism
RTL 3340	International Retailing
RUSN 3301	Russian Civilization Through Literature in the 19th Century
RUSN 3302	20th Century Russian Civilization Through Literature in Translation
RUSN 3304	Russian Culture
RUSN 4301	The Great Russian Realists: Tolstoy and Dostoevsky
RUSN 4302	Contemporary Russian Literature in Translation
SLAV 3301	The Vampire in East European and Western Culture
SOC 1301	Introduction to Sociology
SOC 3324	American Minority Problems
SPAN 3306	Intro. to Hispanic Life and Culture
SPAN 3344	Mexican Life and Culture
SPAN 3390	Hispanic Culture and Civilization
SPAN 4332	Civilización Hispánica: Hispanic Civilization
SPAN 4335	Internship in Spanish
SPAN 4344	Contemporary Mexico
SPAN 4360	Mexican American Literature
SPAN 4361	Spanish for the Southwest
SW 3331	Social Work with Diverse Populations
THA 3308	History of Theatre I
THA 3309	History of Theatre II
TURK 3307	Turkish Culture

HIST 2321

PHIL 1304

SOCI 1301

Foreign Language Requirement

Students graduating from Texas Tech University should be able to express, negotiate, and interpret meaning in a second language.

Students of French, German, Italian, Portuguese, and Spanish should be able to express, negotiate, and interpret meaning at the intermediate-low level as measured by the American Council of Teaching Foreign Languages Proficiency Guidelines.

Students of Arabic, Chinese, Japanese, and Russian should be able to express, negotiate, and interpret meaning at the novice-high level as measured by the American Council of Teaching Foreign Languages Proficiency Guidelines.

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.

Writing Intensive Requirement

Each degree program will include six hours of writing intensive coursework in the specific area of study. The fundamental objective of a writing intensive course is for students to write often and receive critical review from the course instructor. Students should be required to rewrite, based on the instructor's critique.

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

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 calen-

dar/academic year, achieve a GPA of 2.00 or higher in each semester, and maintain an overall GPA of 2.00 or higher.

All references to a grade point average (GPA) reflect new policy regulations effective January 1, 2009, stipulating that the university will calculate only current and cumulative GPAs. Both calculations will include grade replacements. Unless otherwise stated, all GPA references refer to a cumulative GPA that includes grade replacements.

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 academic probation or continued academic 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 \times .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.

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 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 DW regardless of their progress in the class. The student must initiate the drop by following the procedures listed at raiderlink.ttu.edu. Further information can be obtained at 806.742.3661.

2. Undergraduate Students Entering Fall 2004 and Thereafter

- Students who enrolled in Texas Tech University for the first time during the fall 2004 semester or any subsequent semester through summer 2007 will no longer be limited to only four dropped classes (three for transfer students) but instead will be allowed a total of six dropped courses from all Texas public institutions of higher education attended during their undergraduate academic career, including any course a transfer student has dropped at another Texas public institution of higher education. Students who enrolled in Texas Tech University for the first time in the fall 2007 academic term or any subsequent term will be limited to a total of six dropped courses from all Texas public institutions of higher education attended during their undergraduate academic career, including any course a transfer student has dropped at another Texas public institution of higher education.
- Students may use their limited drops (DG'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 at raiderlink.ttu.edu. Further information can be obtained at 806.742.3661.
- The student-initiated drop period on the Web at the start of the term lies outside these limits in regard to the number of drops.
- After all DG's have been used by a student who entered 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 DG's.
- Students will not be permitted to drop more than six courses unless they can show good cause, including but not limited to a showing of the following:
 - A severe illness or other debilitating condition that affects the student's ability to satisfactorily complete the course.
 - The student's responsibility for the care of a sick, injured or needy person if the provision of that care affects the student's ability to satisfactorily complete the course.
 - The death of a person who is considered to be a member of the student's family or who is otherwise considered to have a sufficiently close relationship to the student that the person's death is considered to be a showing of good cause.
 - The active duty service as a member of the Texas National Guard or the armed forces of the United States of either the student or a person who is considered to be a member of the student's family or who is otherwise considered to have a sufficiently close relationship to the student that the person's active military service is considered to be a showing of good cause.
 - The change of the student's work schedule that is beyond the control of the student and affects the student's ability to satisfactorily complete the course.
 - Students who have dropped the maximum number of courses and believe they have good cause to drop an additional course should petition their academic dean.

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 in a given semester or term 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 with the university. Change of address forms are available in the Office of the Registrar, and changes may be made online at raiderlink.ttu.edu. Students required by the housing residence rules to live on campus may not move off campus during the semester without approval from University Student Housing.

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 problems, including, but not limited to, 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 raiderlink.ttu.edu.

Class Attendance. Responsibility for class attendance rests with the student. Instructors set an attendance policy for each course they teach. The

Drop or Withdrawal Designations

W	Complete withdrawal from the university. A grade of W will be recorded for each class but will not be counted as one of the permitted drops.
DW	Dropping a course by last drop date. Applies only to students who entered Texas Tech before fall 2004 and have no drop limitations.
DG	Dropping a course by last drop date. Applies only to students who entered Texas Tech during fall 2004 or thereafter and are limited to six dropped classes.

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.

In the event of excessive absences, the student must visit the instructor to discuss his or her status in the course. Excessive absences constitute cause for dropping a student from class. 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 designation of either DG or DW (see section on “Dropping a Course”). 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 can be found in the *Student Handbook*.

Absence Due to Religious Observance. A student shall 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 who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.

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 OP 34.12 and the section on “Academic Dishonesty” in the *Code of Student Conduct* for more information.

“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 academic 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 (not to be confused with a drop). 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 available online with OP 34.12 stating the reasons beyond the student's control for granting the I and the conditions to be met to remove the I. All signatures are required on 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.

The grades of DW and DG are regulated by the university's drop policy, which is discussed in detail on pages 49-50.

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.

Non-semester-based courses taken through ODE that are in progress but not completed by the end of a term will be noted on the transcript by PR. Official grades for such courses will appear on the transcript for the term when completed.

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 DW, DG, I, P, CR, and PR are received. In the same manner, the 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.

Undergraduate-level courses, including those taken toward a second bachelor's degree or for graduate leveling purposes, are calculated into the undergraduate GPA.

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. 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.

Grade replacement is for the purpose of adjusting the cumulative grade point average. A notation will indicate the original course that is being replaced. The original grade will remain. A pure GPA without grade replacements will be used for honors designations.

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 unless their academic dean determines that the enrollment is the result of a hardship or other good cause.

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 (see page 2) 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.

Effective January 1, 2009, only current and cumulative GPAs will be calculated. The current and cumulative GPA will include grade replacements. A notation will indicate the original course(s) that is being replaced. The original grade and original academic standing status will remain on the term in which the initial grade was earned.

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 (IS 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 academic 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 DG or DW 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 the College of 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, 116 West Hall.

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. For more detailed information, see "Undergraduate Credit by Exam" in the Admission to the University section of this catalog.

Final Examination Policies. Class-related activities, with the exception of office hours, are prohibited on designated individual study days and during the final examination period (OP 34.10). These dates are set aside for students to prepare for and take scheduled final examinations. During this period, review sessions are not to be scheduled, quizzes are not to be given, and no other class-related activities can be scheduled.

No substantial examinations other than bona fide make-up examinations may be given during the last class week or during the individual study day. Courses in which lab examinations and design studio reviews are normally scheduled the week prior to finals are excluded from this policy. No extracurricular activities of any kind may be

scheduled within the individual study day and the final examination period without written permission of the Provost's Office.

An instructor with a compelling reason to change the time of an examination must obtain written approval from the department chair and/or dean of the college or school in which the course is taught before requesting room accommodations from Academic Support and Facilities Resources (ASFR). A change in the room assignment for a final examination may be made only with the approval of ASFR.

There is no university policy that provides relief to students who have three examinations scheduled the same day. In that situation, students may seek the assistance of the course instructors, department chair, and/or dean of the college.

Contact ASFR at 806.742.3658 with questions, comments, or concerns regarding the final exam schedule.

Graduation Requirements. Graduation requirements include a minimum 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 six permitted drops.

A student who withdraws from the university with a grade of W while taking a residence course may be able to complete the course through the College of Outreach and Distance Education (ODE) if the course is offered. Students should consult their academic dean for requirements.

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 Texas Tech 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 honors 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. Courses taken pass/fail in which a grade of “pass” is earned will be counted toward that half. Graduate-level courses will be counted toward the required half when the bachelor’s degree is earned as part of a 150-hour or accelerated degree. Only grades earned at Texas Tech are counted, and only the cumulative GPA without grade replacements 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 an Honors thesis or project 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 a cumulative 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 cumulative GPA of 2.0. Students who have a cumulative GPA above 2.0 but whose current semester GPA is below 2.0 should seek advice from their academic dean.

2. Academic Probation. A student whose cumulative 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. Freshmen whose semester GPA is below 2.0 in their 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 cumulative GPA is below 2.0 will be placed on “continued academic probation” until the cumulative GPA is 2.0 or higher. Such a student may not enroll for more than 16 hours without prior approval of the academic dean. The student will remain 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 a cumulative 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 cumulative GPA above 2.0. Texas Tech does not suspend students at the end of a summer term. However, summer grades can result in probation, and if the student does not achieve a 2.0 or better cumulative grade point average in the subsequent semester of enrollment, suspension can result.

Students must initiate grade replacements in the Registrar’s Office. A suspended student who attains a cumulative 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. 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 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 a cumulative 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. Three absences in XL 0201 will result in a student being withdrawn from the university. Absences accumulate from the beginning of the semester.

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 readmis-

sion 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 XL: Strategies for Learning

0201. Strategies for Learning (0:3-6:0). 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 or 6 hours a week for seven weeks.



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

The university's Graduate-On-Time Partnership Agreement program (GOT contract) not only helps students save money but also catapults them into a career or graduate/professional program as soon as possible. When students sign and follow the GOT plan, they can save up to one year of college and \$19,118 or more in out-of-pocket expenses.

The GOT partnership agreement is a two-party agreement signed by the student and the Provost of Texas Tech University. The agreement is offered to first-year freshmen to help ensure their college investment will be used as efficiently as possible. First-year students will receive information about the Graduate-On-Time initiative in the academic advising sessions during Red Raider Orientation. Students may sign the GOT partnership agreement during Red Raider Orientation or any time prior to advance registration during the second long semester of their first year of classes (early April for students who enter in the fall).

More than 70 percent of degrees at Texas Tech are designated to take four years with a minimum course load of 15 hours a semester. For students in programs requiring more hours, such as engineering or architecture, a timely graduation could mean 5 to 5.5 years. Dropping courses, retaking classes or registering for less than a full course load will delay graduation. The GOT agreement helps students understand their degree plan, intentionally plan their own graduation timeline, track academic progress, and earn a degree within a time frame that meets the student's goals. Students can save time and money by being more aware of how today's decisions might affect their intended graduation. A list of majors and the number of years and hours required to complete each degree are included on the next page.

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 the following:

- A semester-by-semester plan of course sequencing.
- A timeline 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 partnership agreement, the student agrees to the following conditions:

- Choose a major that qualifies for the GOT partnership.
- Be admitted to a major (or change majors) in time to meet the sequence of required courses in the GOT agreement 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 using the MyTech tab on the Web site www.raiderlink.ttu.edu.
- 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 own academic progress to stay on schedule for graduating on time. This includes filing a degree plan and submitting Intent to Graduate forms 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 partnership agreement 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 partnership agreement 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 the Senior Administrator—University Academic Advising, Room 8 Holden Hall, 806.742.0876.



Undergraduate Majors for GOT Partnership Agreement

Under the conditions of the GOT partnership agreement, 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	
Animal Science	4	
Environmental Conservation of Natural Resources	4	
Environmental Crop and Soil Sciences	4	
Food Science	4	
Horticultural and Turfgrass Sciences	4	
Interdisciplinary Agriculture (Agric. Education)	4	
Landscape Architecture	5 (148 hrs.)	
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 (181 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	4	
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	
Political Science	4	
Psychology	4	
Russian Language and Area Studies	4	
Social Work	4	
Sociology	4	
Spanish	4	
Technical Communication	4	
Zoology	4	
• Business		
Accounting	4	
Agribusiness (joint)	4	
Agric. and Applied Eco./Gen. Business (dual)	4.5 (144 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	4-4.5 (123-129)	
Multidisciplinary Science	4.5 (129 hrs.)	
• Engineering		
Chemical Engineering	4	
Chemical Engineering/Computer Science (dual)	5 (155 hrs.)	
Civil Engineering	4	
Civil Engineering/Architecture (dual)	5.5 (177 hrs.)	
Computer Engineering	4.5 (129 hrs.)	
Computer Science	4	
Electrical Engineering	4.5 (129 hrs.)	
Electrical Engineering/Computer Science (dual)	5 (150 hrs.)	
Engineering Physics	4-4.5 (125-133)	
Engineering Technology with concentrations in 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 (132 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	4	
Early Childhood	4	
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	
• Interdisciplinary Studies		
University Studies	4	
• Mass Communications		
Advertising	4	
Electronic Media and Communications	4	
Journalism with broadcasting, news editorial or online concentrations	4	
Public Relations	4	
• Visual and Performing Arts		
Art History	4	
Communication Design (Art)	4	
Dance	4	
General Studies	4	
Music (Bachelor of Arts)	4	
Music (Teacher Certification)	4.5	
Music Composition	4	
Music Performance	4	
Music Theory	4	
Studio Art	4	
Theatre Arts (Bachelor of Arts)	4	
Theatre Arts with acting or design/technology concentrations	4	
Visual Studies (Art Teacher Certification)	4.5	

* 4-year degree plans = 120 to 128 hours

Teacher certification may include additional requirements and/or hours.

Academic Advising and Support

Academic Advising

Texas Tech University believes in the potential of each student to succeed and values the 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 educate 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.
- Conferring with advisor(s) the impact of circumstances that could influence academic performance (e.g. illness, family situations, work schedules).
- Notifying advisors immediately when receiving a course grade of D or F, when dropping a course, or when withdrawing from the university.
- Exploring and 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.

Texas Tech 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. For students who have chosen a major, departments in each academic college provide academic advisors who specialize in specific majors.

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 Texas Tech 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 is intended to ensure that all Texas Tech faculty, staff, and students experience a rewarding educational and professional climate that will prepare them for success in a pluralistic society. The center focuses on retention activities; training; community engagement; referral services; and collaboration with student affairs and enrollment management, academic departments, and auxiliary units. The objectives of the center include the following:

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 the campus.

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 faculty, staff, and 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, Career Center, college/departmental advising, and PASS).
- 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)
- By expanding programs offered through the Institute for Developmentally Enriched and Advanced Learners (IDEAL).

Contact information: Cross-Cultural Academic Advancement Center, 806.742.8682

TTU DISCOVERY! Program for Exploratory Students

Choosing a major is a big decision, but it doesn't have to be difficult. **DISCOVERY! Major Map** helps students find their direction by identifying their values, skills, interests, and abilities. Once they have identified their direction, students will be ready to determine which academic majors are the best fit for them. By deliberately studying themselves and meeting one-to-one with an academic advisor trained in **DISCOVERY!**, students can narrow their range of academic alternatives and be equipped to pursue their educational and career goals.

The second component of the process is the **DISCOVERY! Academic Physical** that will help students set goals, identify their specific learning style, and create study strategies to promote optimal academic health (success). **DISCOVERY!** helps students find their direction to an amazing university experience, an on-time graduation, and a future career field that will be fulfilling and rewarding.

Students who want to enhance their future also may want to consider two additional opportunities available through **DISCOVERY!**:

- **DISCOVERY! Freshman Interest Group** — Members of **DISCOVERY! FIG** enroll with other exploratory students in a pre-defined set of courses that will help keep their options open while they explore academic majors and career paths.
- **DISCOVERY! Learning Community** — Undecided students in the College of Arts and Sciences have a unique opportunity to live together in a residence hall environment that will help them learn about themselves and their academic options.

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.

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 and printed materials are available in mathematics, 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 retention in the course as well as increase 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 a student's parents earned a four-year (bachelor's) degree, a student can qualify for the Texas Tech University PEGASUS Program. As a PEGASUS member, the student will have access to an advisor who works specifically with First Generation College (FGC) students, a mentor, and an academic advisor who specializes in the student's chosen major. PEGASUS offers many opportunities for community building with events such as FGC socials, study sessions, and community service opportunities. POWER sessions are offered for achievement in scholarship and unprecedented success in the following important areas:

- Transitioning to the university environment
- Securing financial aid
- Improving study skills
- Creating appropriate time and event management skills
- Overcoming personal struggles

FGC PEGASUS Mentors are successful upper-class FGC students who are available for one-to-one relationships with PEGASUS members. Mentors have navigated the challenges of being a first-generation college student, and their friendships and experiences can provide meaningful help and real-world advice on how other FGC students can be successful during their first year of college.

PEGASUS is built around giving back to others. Members 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 FGC students to prepare for and enroll in college.

Beyond the PEGASUS activities, workshops, and service opportunities described above, there are two additional opportunities that further encourage the success of Texas Tech FGC students:

1. FGC Students who are unsure about course selection during their freshman year are encouraged to enroll with other FGC students as part of the PEGASUS Freshman Interest Group (FIG).
2. FGC students who want to live, learn, and grow within a community are encouraged to register for the PEGASUS Learning Community, two residence hall floors designated specifically for entering FGC students. Your peers, programming, and additional access to academic advisors will help you transition to a large university environment that offers many opportunities.

FGC advisors, FGC Mentors, and PEGASUS members engage in accomplishing common goals selected to encourage and complement academic efforts.

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

Study Abroad Program

In today's globalized job market, students who participate in a study abroad program or international internship are more marketable and competitive in almost every field. An overseas educational experience equips students with an international perspective that helps them to function objectively and comfortably in the global marketplace while earning credit towards their degree.

The Study Abroad division of the Office of International Affairs coordinates all study abroad programs for Texas Tech University. Two international Texas Tech centers—one in Seville, Spain and another in Quedlinburg, Germany—offer students the opportunity to take Texas Tech catalog classes and receive direct Texas Tech credit since the centers serve as satellite campuses. Students may elect a concentrated language program (equivalent to four semesters of Spanish or German) or, at the Seville Center, take other courses that meet general education requirements. Students live with host families and are immersed in the language and culture through excursions and day-to-day experiences.

Other study abroad programs available to Texas Tech students range from two weeks to a full academic year. Many academic departments offer their own faculty-led programs during the summer. Study Abroad advisors assist students with choosing a program that best fits their individual needs and provide guidance during the application and orientation process. All Texas Tech students planning to participate in a study abroad program to earn Texas Tech credit need to consult the Office of International Affairs.

Students participating in any Texas Tech study abroad program are eligible to apply for the Study Abroad Competitive Scholarship, funded by the International Education Fee paid by all Texas Tech students. Students also remain eligible for Texas Tech financial aid to help finance their program.

Contact information: Sandra Crosier, Study Abroad Director, International Cultural Center, 806.742.3667, www.studyabroad.ttu.edu.

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: 242 West Hall, www.techniques.ttu.edu, 806.742.1822, 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 the Texas Tech Official Class Ring program, 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 a.m. until 6:45 p.m. Students can access Citibus van shuttle service from 7 p.m. until 1:30 a.m. by calling 806.742.NITE (6483). Students also can ride any Citibus route in Lubbock using their Texas Tech ID.

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 Raider Experience
- Red Raider Orientation
- Transfer Connection
- Greek Life
- Sophomore Year and Off-Campus Initiatives
- Community Engagement
- Leadership Development
- Texas Tech Spirit and Traditions
- Student Emergency and Crisis
- Study Abroad Student Services
- General Student Services

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-98 Health Sciences Center; and the main office at 1802 Texas Tech Parkway (at Knoxville Avenue). ATMs are available 24 hours a day at the main office, the SUB, and the Student Recreation Center.

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 and the Office of Student Diversity Relations. 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 class-work 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; Student Diversity Relations, 024 Student Union, 806.742.5777

Greek Life

Fraternities and sororities have been an active part of university life since 1952 by complementing the academic and cocurricular 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, 806.742.5433, greeklife@ttu.edu, www.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 Ombuds Office, 238 Student Union, 806.742.4791, www.depts.ttu.edu/ombudsman.

Intercollegiate Speech, Debate

The Red Raider debate team historically ranks among the top teams in the nation and emerged out of a field of 234 teams from 87 schools to win the 2008 national championship. Texas Tech has won four other national titles in recent years and state championships in debate, persuasive speaking, and impromptu speaking. Students who meet general eligibility requirements may participate in intramural and intercollegiate debate. 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. Texas Tech teams actively compete in debate 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 Chorus, 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/Euphonium Ensemble, Percussion Ensemble, Steel Drum Bands, Collegium, Celtic Ensemble, and piano accompanying. Each group studies a broad and representative repertoire and maintains an annual public performance calendar. Participation is open to any university student who meets audition requirements.

Office of Parent and Family Relations, Texas Tech Parents Association

Parent and Family Relations, in collaboration with the Texas Tech Parents Association (Tech Parents) promotes each student's learning experience by engaging parents and families as active partners in supporting student success at Texas Tech University. This partnership provides a variety of programs and services to parents, family members, and students. Programs provided include "Road Riders" Safe Travel Parent Network, Raider Relief Fund, Family Weekend, student scholarships, faculty recognition, move-in event for parents and family members, *Parent and Family Guide*, webinars, programs for parents and family members during Red Raider Orientation, toll-free hotline, electronic newsletters and e-lets, and an online forum.

Tech Parents, an incorporated non-profit organization, was established in 1956 to provide a network of parents and family members as well as support programs and services offered in collaboration with parent and Family Relations. Member contributions enable the

awarding of student scholarships annually and program support. To join Tech Parents, please visit www.parent.ttu.edu.

Contact information: 025 Student Union Building; 806.742.3630, toll free 888. 888.7409; fax 806.742.0330; parent@ttu.edu, or www.parent.ttu.edu

Ombuds for Students

Ombuds 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 Ombuds 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 Ombuds 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:** 238 Student Union Building, 806.742.4791, www.depts.ttu.edu/ombudsman.

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 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, then select Red Raider Student Employment Center. To learn more about other forms of financial assistance, see "Student Financial Assistance" in the Finances section of this catalog.

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 (SCC) provides professional psychological services in a beautiful and welcoming environment 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 supervisors.

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/transgender 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 SCC offers a variety of topic-specific groups (e.g., grief support, social coaching, sexual assault survivors) as well as general counseling groups called Understanding Self and Others. These groups focus on coping skills applicable to most concerns. Relationship counseling for students and their partners or family is available during select evening hours as well as the daytime. Cutting-edge biofeedback technology is available in an individual or group format to expand students' stress management techniques. SCC therapists also educate the campus community about strategies for positive mental health through educational 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 who have paid the student services fee. All information is strictly confidential within limits of the law. The SCC is open Monday through Friday, 8 a.m. to 5 p.m. During these times, a walk-in clinic is available to initiate counseling service from 10:30 a.m. until 3:30 p.m. **Contact information:** 201 Student Wellness Center, 806.742.3674, www.depts.ttu.edu/SCC.

Student Government

The Student Government Association (SGA) provides students with opportunities to excel through their participation in leadership activities and university-wide committees. Students can get involved through Freshmen Council, Freshman Leadership Association, 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, 210 Student Wellness Center, 806.743.2843.

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. There is a nominal charge for each physician visit. 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 confidential/anonymous HIV testing; and comprehensive alcohol, tobacco, and other drug assessment, education, and referral.

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, 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 be eligible for services if they are enrolled for the fall semester. 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 health insurance through a plan endorsed by Texas Tech University. Contact Student Health Services at 806.743.2866, ext. 287 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. 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 University Student Housing to provide accurate information for the Jeanne Clery Disclosures of Campus Security Policy and Campus Crimes Statistics 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. The publications are staffed with paid personnel from the student body. The Student Media Committee, a student-faculty-staff committee, selects the student editors 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 "Administrative Holds" in the Undergraduate Academics section of this catalog. Transcripts furnished from other institutions become the property of Texas Tech University.

University Career Services

University Career Services 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 University Career Services 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, students may register at www.careerservices.ttu.edu. To assist students who are undecided about their majors or career plans, University Career Services offers career assessment inventories which include Strong Interest Inventory, MBTI, and Strengths Quest Program.

University Career Services also sponsors various job fairs that include graduate and professional schools, school districts, summer camps, and two large career expos. Resources 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: University Career Services, 150 Wiggins Complex, 806.742.2210

Graduate School

Fred Hartmeister, Ed.D., J.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

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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 at Texas Tech 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 102 master's programs and 58 doctoral programs, outnumbering those available at most other multipurpose universities. Last year the university conferred 1,116 master's degrees and 202 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 56 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 student-designed options, interdisciplinary subjects include comparative literature, ethnic studies, fine arts, forensic science, linguistics, museum science, neuroscience, plant physiology, public administration, sports health, women's studies, and many more.

Administrative Staff

Graduate School

Robert Smith, Ph.D., Provost and Senior Vice President

Fred Hartmeister, Ed.D., J.D., Dean and Professor of Education and Law

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 Degrees

In addition to this list of graduate degrees, many departments offer specializations or concentrations in a variety of subject areas.

• 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.
Animal Science, M.S., Ph.D.
Crop Science, M.S.
Entomology, M.S.
Fisheries Science, M.S., Ph.D.
Food Science, M.S.
Horticultural and Turfgrass Sciences, M.S.
Landscape Architecture, M.L.A.
Plant and Soil Science, Ph.D.
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. (Interdisciplinary)

• Arts and Sciences

Anthropology, M.A.
Applied Linguistics, M.A.
Atmospheric Science, M.S.
Biological Informatics, M.S.
Biology, M.S., Ph.D.
Chemistry, M.S., Ph.D.
Classics (Classical Languages), 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.
Physics–Applied, M.S.
Political Science, M.A., Ph.D.
Psychology, 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.S., Ph.D.
General Business, M.B.A.
International Business, I.M.B.A.

• Education

Bilingual Education, M.Ed.
Counselor Education, M.Ed., Ph.D.
Curriculum and Instruction, M.Ed., 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.
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.
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.
Biochemistry and Molecular Genetics, M.S., Ph.D.
Biotechnology, M.S.
Cell and Molecular Biology, M.S., Ph.D.
Clinical Practice Management, M.S.C.P.M.
Communications Sciences and Disorders, Ph.D.
Medical Microbiology, M.S., Ph.D.
Medicine, M.D.
Molecular Pathology, M.S.
Nursing, M.S.N., D.N.P.
Occupational Therapy, M.O.T.
Pharmaceutical Sciences, M.S., Ph.D.
Pharmacology and Neuroscience, M.S., Ph.D.
Physical Therapy, M.P.T., Sc.D.P.T., D.P.T.
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.
Family and Consumer Sciences Education, M.S., Ph.D.
Hospitality Administration, Ph.D.
Human Development and Family Studies, M.S.
Interior and Environmental Design, Ph.D.
Marriage and Family Therapy, M.S., Ph.D.
Nutritional Sciences, M.S., Ph.D.
Personal Financial Planning, M.S., Ph.D.
Restaurant, Hotel, and Institutional Management, M.S.

• Mass Communications

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

• Outreach and Distance Education

Agricultural Education, M.S., Ed.D.
Agriculture, M.Ag.
Art Education, M.A.E.
Computer Science, M.S., Ph.D.
Crop Science, M.S.
Educational Leadership, M.Ed., Ed.D.

Engineering, M.Engr.
Family and Consumer Sciences Education, M.S.
Horticultural and Turfgrass Sciences, M.S.
Human Development and Family Studies, M.S.
Instructional Technology, M.Ed.
Multidisciplinary Science, M.S.
Restaurant, Hotel, and Institutional Management, M.S.
Software Engineering, M.S.
Special Education, M.Ed.
Systems and Engineering Management, M.S.S.E.M., Ph.D.
Technical Communication, M.A.
Technical Communication and Rhetoric, Ph.D.

• Visual and Performing Arts

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

• Interdisciplinary Programs

Biotechnology, M.S.
Heritage Management, M.S.
Interdisciplinary Studies, M.A., M.S.
Land-Use Planning, Management, and Design, Ph.D.
Museum Science, M.A.
Wind Science and Engineering, Ph.D.

• Dual Degree Programs

General Business/Architecture, M.B.A.–M.Arch.
General Business/Environmental Toxicology, M.B.A.–M.S.
General Business/Foreign Languages, M.B.A.–M.A.
General Business/Medicine, M.B.A.–M.D.
General Business/Personal Financial Planning, M.B.A.–M.S.
General Business/Pharmacology, M.B.A.–Pharm.D.
Business Administration/Personal Financial Planning, M.S.–M.S.
Law/Accounting (Taxation), J.D.–M.S.A.
Law/Agricultural and Applied Economics, J.D.–M.S.
Law/Biotechnology, J.D.–M.S.
Law/Crop Science/Horticulture/Soil Science/Entomology, J.D.–M.S.
Law/Environmental Toxicology, J.D.–M.S.
Law/General Business, J.D.–M.B.A.
Law/Personal Financial Planning, J.D.–M.S.
Law/Public Administration, J.D.–M.P.A.
Public Administration/Economics, M.P.A.–M.A.

* Degree not available to incoming students.

** Texas Tech University Health Sciences Center cooperates with Texas Tech University to offer graduate programs in selected health areas.

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. The graduate student vice president of the Student Government Association also serves as an *ex officio* nonvoting member 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. The Faculty Senate representative serves a one-year term. 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.

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.

- **Rashid Al-Hmoud** (2009), Ph.D., Arts and Sciences
- **Mukaddes Darwish** (2010), Ph.D., Engineering
- **Pat DeLucia** (2009), Ph.D., Social Sciences
- **Clifton Ellis** (2010), Ph.D., Architecture
- **Steve Frazee** (2010), Ph.D., Agricultural Sciences
- **Sean Grass** (2011), Ph.D., Humanities
- **Janice Killian** (2009), Ph.D., Visual and Performing Arts
- **Gopal Lakhani** (2009), Ph.D., Computer Science
- **Aretha Marbley** (2010), Ph.D., Education
- **Miriam Mulsow** (2009), Ph.D., Human Sciences
- **Bill Pasewark** (2011), Ph.D., Business
- **Comfort Pratt** (2009), Ph.D., Education
- **David Weinberg** (2011), Ph.D., Math and Science
- **Kent Wilkinson** (2010), Ph.D., Mass Communications

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 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 and the Psychology Clinic are among programs providing 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. The Center for Public Service in the College of Arts and Sciences and the Institute for Communications Research in the College of Mass Communications provide opportunities for special study and 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 an internationally 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 rapport 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.

University-Recognized Centers and Institutes

In addition to extensive research activity on the part of its individual faculty, the following institutes and centers conduct scholarly work:

Agricultural Sciences and Natural Resources

- CASNR Water Center
- Center for Agricultural Technology Transfer
- Cotton Economics Research Institute
- Fiber and Biopolymer Research Institute
- Fire Ecology Center
- International Center for Food Industry Excellence
- International Cotton Research 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
- The Vietnam Center

Business Administration

- Center for Advanced Analytics and Business Intelligence
- Center for Entrepreneurship and Family Business
- Center for Healthcare Innovation, Education and Research
- Center for Professional Development
- Institute for Banking and Financial Studies
- Institute for Internet Buyer Behavior
- Institute for Leadership Research

Education

- The Burkhart Center for Autism Education and Research
- Center for Research in Leadership and Education
- Center for the 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 Multidisciplinary Research in Transportation
- Center for Pulsed Power and Power Electronics
- Center for Space Sciences
- Murdough Center for Engineering Professionalism
- Nano Tech Center
- National Institute for Engineering Ethics
- Water Resources Center

Human Sciences

- Center for Prevention 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
- 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 Comparative and Experimental Medicine
- 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

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. For rules governing the determination of residency status as defined by the Texas Higher Education Coordinating Board, see the site [http://info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=21&sch=B&rl=Y](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=21&sch=B&rl=Y)

Financial Assistance. Financial opportunities are available through both the Graduate School and graduate academic departments. The Graduate School coordinates and disburses several scholarships and fellowships each year for new and continuing master's, doctoral, full-time and part-time students, including the AT&T Chancellor's Fellowship to aid departments in attracting new graduate students to Texas Tech. The majority of deadlines are in the spring for awards for the upcoming fall and spring semesters. Many departments also support graduate students through scholarships and assistantship positions that must be requested from the specific department. Applications and detailed information are available online at www.depts.ttu.edu/gradschool/scholarships.

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**—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. See "International Student Admissions" on the next page for more detailed information.

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. Students should 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. 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

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**

- 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; do not send cash. 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**—see "Test Scores" in previous section

5. Official GMAT score report (for College of Business Administration and other select programs)—see “Test Scores” in previous section

Contact 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. They may find online applications at the Web site of each department. To contact departments by phone, call Texas Tech directory assistance at 806.742.2011.

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

Texas Tech has been fortunate to attract sizeable 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. \$75 Nonrefundable Application Fee—Acceptable methods of payment are credit card, money order, cashier's check and traveler's check; do not send cash. 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 applicants have not completed their 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. Applicants must send a copy of the biographical page of their passport.

5. 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.

6. Official GRE (or GMAT for College of Business Administration and Other Select Programs) Score Report—see “Test Scores” on previous page

7. 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. 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.

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. The institution code for Texas Tech is 6827.

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. There is no IELTS institution code for Texas Tech University.

8. Ability to Fund Graduate Studies—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.

Submitting Applications. 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
P.O. 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 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. They may find online applications at the Web site of each department. To contact departments by phone, call Texas Tech directory assistance at 806.742.2011.

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, which 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 (OP 64.01) and application fee.

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

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 the 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 a degree program on condition of maintaining a required GPA are automatically on academic notice. Failure to fulfill the conditions stipulated at the time of admissions will result in termination from the program.

Students whose cumulative GPA falls below 3.0 are placed on academic probation and have two consecutive semesters to raise their cumulative GPA to at least 3.0. If their semester GPA drops below 3.0 during the two-semester period, students are subject to suspension. Students placed on suspension are required to remain out of the Graduate School for one semester. Summer sessions and/or trimester count as one semester. In accordance with OP 64.07, any student who has been suspended must appeal to the Graduate School if reinstatement is desired. A student who is suspended twice will not be allowed to return to the Graduate School.

Students may be suspended for unprofessional conduct such as cheating or plagiarism. Any appeal of such action 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 not be granted for courses taken by distance learning at another university. Distance learning completed through Texas Tech's College 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 will **not** be 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 solely for the hours in which the student is enrolled in the final semester.

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 must 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, including the date for filing the "Statement of Intent to Graduate," can be found on the Graduate School Web site (www.gradschool.ttu.edu). 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 teacher 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: They must (1) carry graduate credit, (2) be acceptable to the student's major department, and (3) 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.

Distance Education. A maximum of 6 semester hours of course-work completed through the College of Distance and Outreach Education 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 distance education courses. Graduate credit will not be granted for courses taken by distance education 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 Electronic Thesis/Dissertation (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 Thesis/Dissertation 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 www.depts.ttu.edu/gradschool/current/deadlines.php.

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 at least three months. 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, other than thesis hours (6000-level courses), 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")

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.

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, although grades from transfer courses will 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. No more than 30 semester credit hours of an earned master's degree from another institution may be transferred to the doctoral degree.

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. 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 who is expected to come from outside the academic department, 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 dissertation 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.

Thesis/Dissertation Fee. During the semester of graduation, the candidate will pay Student Business Services a Thesis/Dissertation Fee to cover the cost of electronically storing the official copy (ETD) of the dissertation. This fee is paid only once. The Thesis/Dissertation 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.

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.

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. For information about required courses and contacts see www.depts.ttu.edu/officialpublications/catalog/GradCertificatePrograms.php

Certificate	College/Department
Addictions and the Family	Human Sciences/ Applied and Professional Studies
Created to provide specialized training to mental health providers who work with families and individuals struggling with substance abuse and addictive behaviors.	
Art History, Criticism, and Theory	Visual and Performing Ars/Art
Augments the existing minor in art history at the master's level. It provides a critical and theoretical foundation that is increasingly valuable for professional advancement in art and art-related fields.	
Autism	Education/Educational Psychology and Leadership
Allows students to specialize in the area of autism while developing additional skills in working with children with autism spectrum disorders. The certificate can be undertaken during a master's or post-baccalaureate certification program, or as a stand-alone certificate.	

Certificate	College/Department
Community Design and Development	Architecture
A multidisciplinary program that focuses on the complex realm connecting architecture, urban design, and urban planning at different scales and establishing linkages between theory and practice. The three major areas of interest in the program are community design, urban design and urban planning.	
Crop Protection	Agricultural Sciences and Natural Resources/Plant and Soil Science
With the emergence of transgenic crops, this certificate provides supplementary training and updated credentialing in the development of crop protection chemicals.	
Developmental Literacy	Education/Curriculum and Instruction
Will fill a need in the community for qualified teachers in developmental reading programs, adult basic education, adult literacy programs, alternative high schools, reading intervention programs in traditional high school settings, and GED programs.	
Dual Sensory Impairment	Education/Educational Psychology and Leadership
Closely mirrors CEC standards and Perkins Competencies for Teachers of Learners who are deaf and blind with additional emphasis on best practice assessment. The certificate can be undertaken during a master's or post-baccalaureate certification program, or as a stand-alone certificate.	
Ethics	Arts and Sciences/ Philosophy
A useful credential for people in a wide variety of academic, professional, and commercial roles, including students planning on entering the medical and legal professions, teachers (primary, secondary, and college-level) who offer (or are planning to offer) ethics modules in their classes, members of hospital ethics committees, IRB's, social action committees of churches, ethics watchdog committees within corporations, and professionals who are required to confront ethical questions on a regular basis.	
Fibers and Textiles	Agricultural Sciences and Natural Resources/Plant and Soil Science
Provides professionals an opportunity to understand the meaning and complexity of cotton production and processing and its impact on cotton apparel, home furnishings and industrial cotton products.	
Gerontology	Human Sciences/Human Development and Family Studies
Designed to prepare professionals who are either working directly with older people or are involved in education and research related to older adults. This is an inter-institutional program offered through the Great Plains Interactive Distance Education Alliance (GPIDEA) and tuition is set by the GPIDEA.	

Certificate	College/Department
Healthcare Change Designed to prepare staff, front-line managers, and executive-level leaders focus on healthcare management issues, including quality, safety, efficiency, satisfaction, and cost.	Rawls College of Business/ Health Organization Management and TTUHSC School
Historic Preservation An interdisciplinary program that focuses on the documentation and preservation of historic architecture. The certificate has three major areas of interest: architecture history and theory, preservation, and preservation technology.	Architecture
Horticultural Landscape Management The green industry is one of the largest agricultural industries in Texas. Industry changes in recent years have left many professionals seeking the kind of supplementary training this certificate provides to update their credentials.	Agricultural Sciences and Natural Resources/Plant and Soil Science
Leadership A 12-hour certificate that provides the experienced manager with the opportunity to build and reinforce the interpersonal skills essential to the management role.	Rawls College of Business
Linguistics Provides a meaningful and internally coherent course of study of language and linguistics to match the background, interests, and needs of the individual student.	Arts and Sciences/English
Master Mentor Teacher Designed to prepare experienced teachers to mentor new teachers in instructional strategies, classroom management strategies, and other aspects of daily classroom life, in addition to the policies and procedures specific to individual campuses.	Education/Curriculum and Instruction
Mental Health Counseling Post-master's certificate designed for counseling professionals who wish to expand their training to a specialization in the mental health area.	Education/Educational Psychology and Leadership
Personal Financial Planning Designed to meet the educational requirement for the Certified Financial Planner™ Certification designation.	Human Sciences/ Applied and Professional Studies
Petroleum Engineering Supplements a course of study for the student who possesses an engineering degree other than petroleum engineering. Provides the above-average student with basic education in petroleum engineering.	Engineering/ Petroleum Engineering

Certificate	College/Department
Piano Pedagogy Designed for the professional piano teacher. Assists participants in qualifying as Nationally Certified Teachers of Music through MTNA.	Visual and Performing Arts/Music
Publishing and Editing Student prepares for a career in editing and publishing; develops new workplace skills or supplements existing skills; learns publication production; understands the relationship between publishing history, book history, and literary studies; improves as a literary critic or creative writer; and develops or improves editing skills.	Arts and Sciences/ English
Software Engineering SFor those who do not need or wish to have a full graduate degree in software engineering or computer science. Directed towards working professionals and graduate students in non-computer science majors who are interested in systematic software development.	Engineering/ Computer Science
Soil Management Allows potential soil scientists to obtain the required number of college soils credit hours required by the Natural Resource Conservation Service and have a tangible certificate to indicate that the individual has the requisite education.	Agricultural Sciences and Natural Resources/Plant and Soil Science
Strategic Studies Prepares students to fill the need for officials in all branches of federal government, officers in the armed forces of the United States, and officials in state and local governments to deal with strategic responsibilities.	Arts and Sciences/ Institute for Modern Conflict, Diplomacy, and Reconciliation
Teaching English in International Contexts For any student at Texas Tech enrolled in any graduate program and considering teaching outside the United States.	Arts and Sciences/ Classical and Modern Languages and Literature
Visualization This certificate focuses on the technical art of digital visualization in design, engineering, and science. Three major areas of interest in the program are real-time virtual environments, design and scientific simulation, and digital design representation.	Architecture
Women's Studies Offers a specialist inter-disciplinary sub-field in women's, gender, and identity studies for doctoral and master's degree candidates. It also functions as a stand-alone credential useful for professionals in nursing, social work, law, healthcare management, and the military, as well as in faith-based organizations and the field of education.	Interdisciplinary Studies/ Women's Studies

Interdisciplinary Graduate Degree Opportunities

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; Land-Use Planning, Management, and Design; Latin American and Iberian Studies; Multidisciplinary Science; and Public Administration.**

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 dual-degree 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 (HSC) 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 or to advanced coursework in an academic area of concentration related to a field in biotechnology with a one-semester capstone course. Students may satisfy the research requirement in either of two ways: (1) complete an M.S. thesis, based on research carried out in the laboratory of a participating faculty member, or (2) complete a non-thesis internship in a research laboratory on campus, an industrial research laboratory, a government laboratory, or a not-for-profit foundation laboratory. Students who select a non-thesis option must pass a comprehensive final exam during their fourth semester. Options should be carefully discussed with the director of the center.

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 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 (GBTC 6202). The biomedical track requires a series of lab rotations during the second semester of the first year. 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 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 biochemistry or cell biology and one semester of molecular biology/molecular genetics 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.

Scholarships. A limited number of \$1,000 scholarships will be available at the start of the fall semester for outstanding first-year students. Additional scholarships will be available at the start of the spring semester when a student's performance during the fall semester can be used as part of the evaluation process. Students awarded these competitive scholarships will be eligible to pay tuition at the in-state rate. Applications are available to both Texas residents and non-residents and are evaluated holistically by the Center for Biotechnology and Genomics Scholarship Committee.

J.D.-M.S. in Biotechnology. The dual-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. Students in the dual-degree program cannot take any courses outside the School of Law during their first year. Typically, if all prerequisites are met, both degree programs can be finished in a maximum of four and one-half years, including summer sessions. Separate applications for the J.D. and M.S. portions of the dual degree are required. LSAT scores that are satisfactory for admission to the School of Law will eliminate the requirement that the student take the GRE.

The dual-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 non-law 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

- 5338. Methods in Biotechnology (3:1:6).** Prerequisites: CHEM 3310 or 3311 and CHEM 3314. Methodology for identification and manipulation of genes, for protein expression and purification, and for enzyme assays.
- 5340. Advanced Instrumentation Techniques in Biotechnology (3:2:3).** Prerequisites: BTEC/GBTC 5338 and 6301. Topics include DNA sequencing and amplification, mass spectrometry, liquid-handling robotics, automated chromatography, and protein-ligand interactions and kinetics.

5414. **Advanced Plant Biotechnology (4:3:2).** Prerequisite: Any genetics course. Principles of biotechnology and genetic engineering. Genetic manipulations applied to problems in plant research and agriculture. F, odd years.
6000. **Master's Thesis (V1-6).** (GBTC 6000)
6001. **Biotechnology Internship (V1-9).** Research and training in a university, 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)
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, Fiber and Biopolymer Research Institute; Research Professor, Department of Plant and Soil Science; Adjunct Faculty in Agricultural and Applied Economics

Known internationally for its expertise in cotton, the Fiber and Biopolymer Research Institute (FBRI) focuses on research, education, and technology transfer pertinent to fibers, textiles, and biological based polymers. While it is an integral part of the of the Department of Plant and Soil Science in the College of Agricultural Sciences and Natural Resources, FBRI also collaborates with departments in the Colleges of Engineering, Arts and Sciences, and Human Sciences, offering opportunities to students for special projects and thesis research. In addition, graduate level courses are taught in Plant and Soil Science, Industrial Engineering, and Agricultural and Applied Economics. A fibers and textiles graduate certificate program (also available through the College of Outreach and Distance Education) is offered within the Department of Plant and Soil Science, and a professional training school (Texas International Cotton School) is offered annually.

FBRI is located at the East Research Center, East Loop 289, in a 110,000 square-foot facility that is equipped for molecular/structural analysis of fibers and other biopolymers, textile manufacturing, physical testing and evaluation of fibers and textiles, and specialty finishes and nanocoatings on textiles and other substrates. Major research funding comes from the National Science Foundation, the U.S. Department of Agriculture, the Texas Department of Agriculture, the Texas Emerging Technology Fund, Cotton Incorporated, the Plains Cotton Improvement Committee, and various private sources.

Forensic Science

Coordinators: Clifford Fedler, Associate Dean of the Graduate School; Jim Childers, Health Sciences Center's Institute for Forensic Science

The Texas Tech Graduate School, in connection with the Texas Tech Health Sciences Center's Institute for Forensic Science, offers a master's degree in Interdisciplinary Studies with a concentration in forensic science. Graduates can expect to look for employment in many areas of law enforcement and criminal justice from the local and state level, up to the federal level. More information about the professional opportunities available in forensic science can be found at the Web site for the American Academy of Forensic Sciences (www.aafs.org). The interdisciplinary program has two tracks of study: one for a forensic scientist and one for a forensic examiner. A typical candidate for the forensic scientist program would have an undergraduate background in the sciences with study in programs such as chemistry, biology, or physics. The forensic examiner should have a degree in either a behavioral or social science. Sample courses of study for a forensic scientist or a forensic examiner are available at www.depts.ttu.edu/gradschool/programs/INDSforensicsci.php.

Students in the forensic science program (forensic scientists and forensic examiner tracks) will be required either to write a thesis or report

or complete an internship as part of the requirements for the degree. This 42-hour Master of Science program will also help students obtain selective internships through local and statewide partnerships.

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 admission consideration, 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, HMG1 5323, HMG1 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

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 CS 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 13.)

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.
- 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).**
- 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 cultural 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.

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. Bill VanPatten, Department of Classical and Modern Languages and Literatures. See discussion of graduate linguistics in the interdisciplinary programs listed in the opening section of the College of Arts and Sciences.

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 Pragmatism, 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. Laura M. Calkins, 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 (IS)

(To interpret course descriptions, see page 13.)

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.
- 5350. **Crime Scene Investigation (3:3:0).** Develop a background in issues relevant to forensic science and be exposed to the principles of forensic science by understanding the concepts of identifying, preserving, collecting, and examining the elements that make up the broad base of forensics as it relates to solving criminal- and terrorist-related activity. Discussion of professional and legal ethics will also be included.
- 5351. **Serial Crime (3:3:0).** Develop an understanding of the constructs of deviant behavior and how they relate to criminal activity and the impact that deviant behavior has on victims and society as a whole. Case studies and related research topics in these areas will be covered.
- 6000. **Master's Thesis (V1-6).**
- 7000. **Research (V1-12).**

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. It is administered by the executive director of the museum.

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 13.)

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.

* Indicates required course

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.

5334. Curatorial Methodology (3:3:0). Prerequisite: Consent of instructor. Develop skills for analysis of sources, original research, and scholarly writing within museum context. Students acquire requisite knowledge and skill for professional curatorial practice.

5340.* Museum Collections Documentation (3:1:6). Prerequisite: Consent of instructor. Instructs students about the history, evolution, and current development in the management and organization of museum collections documentation. Includes hands-on experience to create museum collection documentation database.

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).

Risk-Taking Behavior

Coordinator: Dr. Nancy J. Bell, Professor of Human Development and Family Studies (www.hs.ttu.edu/hdfs/risk.htm)

The graduate minor in 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, examining the concept of risk taking from a developmental perspective. Students then choose an additional 12 hours from approved program courses covering substance misuse and vulnerability to chemical dependency, family problems associated with risk taking, deviance, and criminology. At least two of these courses must be outside of the student's home department.

The minor is administered by the Committee on Adolescent and Young Adult Risk-Taking Behavior. The Committee is composed of faculty in Human Development and Family Studies, Applied and Professional Studies, Psychology, and Sociology. The purpose of the committee is to foster collaborative research on risk taking and to serve as a resource for Texas Tech University and the community.

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

ADRS 6315	Systematic Treatments and Addictions (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 HDFS (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)

Wind Science and Engineering

Director: Dr. Andrew Swift, Professor of Civil Engineering and Director of Wind Science and Engineering Research Center (WISE)

Texas Tech University offers a unique multidisciplinary Ph.D. in Wind Science and Engineering. The educational objective of the program is to provide students with the broad education necessary to pursue research and solve problems related to detrimental effects of windstorms (e.g., hurricanes, tornadoes, and thunderstorms) and to learn to take advantage of the beneficial effects of wind

(e.g., wind energy). Each student's core coursework and dissertation research are multidisciplinary. The doctorate requires at least 60 semester hours of graduate studies in addition to a dissertation (requirement of the Graduate School). These 60 hours include seven core courses, field of emphasis courses, and an internship.

- ATMO 5301 Individual Studies in Atmospheric Science (3:3:0)
- CE 5331 Advanced Work in Specific Fields—Wind Power Systems (3)
- CE 5348 Wind Engineering (3:3:0)
- ISQS 5359 Enterprise Risk Management (3)
- CE 5331 Advanced Work in Specific Fields—Leadership in Engineering (3)
- STAT 5384 Statistics for Engineers and Scientists I (3:3:0)
- STAT 5385 Statistics for Engineers and Scientists II (3:3:0)

A master's degree is recommended. Graduate courses completed during a master's degree can be transferred if they are in an emphasis field of study (i.e., atmospheric science, engineering, economics, business administration, or a combination to have an emphasis area in wind energy, wind engineering experiments, economics/risk management, damage imaging, emergency management). The courses to be transferred have to be approved by the program advisor.

Additional courses are required by the Graduate School to fulfill requirements of 60 credit hours and are chosen by the students, depending on their area of research emphasis. Some of the courses available to fulfill the requirements are as follows:

- ATMO 5353 Meteorologic Field Experiments (3:3:0)
- ATMO 5317 Wind Storm Hazards (3:3:0)
- ATMO 5301 Meteorology for Wind Energy (3:3:0)
- CE 5341 Wind Engineering Laboratory (3:2:3)
- IE 5320 Systems Theory (3:3:0)
- ECO 5320 Managerial Economics (3:3:0)
- FIN 5320 Financial Management Concepts (3:3:0)
- GEOL 5428 GIS in Natural Science and Engineering (4:3:3)
- MATH 5334 Numerical Analysis I (3:3:0)
- MATH 5335 Numerical Analysis II (3:3:0)
- PUAD 5352 Public Policy Analysis (3:3:0)
- STAT 5378 Stochastic Processes (3:3:0)
- Any other course that can help for research as approved by student's advisor

Coursework for students is tailored with the advice and consent of their graduate advisor to provide background for multidisciplinary dissertation research. Course descriptions are given under each departmental listing of courses.

Students are also required to complete a summer, 6-credit hours of summer off-campus external internship at an academic institution, in a governmental or private laboratory, or with a private company. Opportunities are available to complete this internship requirement abroad.

Students pursue multidisciplinary research under the guidance of the chair or co-chairs of their advisory committees. Graduate faculty members from at least two disciplines will be represented on each student's advisory committee. Research must be multidisciplinary and can include a combination of engineering, atmospheric sciences, economics, physical sciences, and mathematics. Field/lab experiments, analytical research, or numerical simulations are examples of acceptable dissertation research.

Students must complete a qualifying examination to be admitted to candidacy for the Ph.D. degree. The qualifying examination questions are based on a dissertation proposal, which is provided to the advisory committee by the student prior to the qualifying examination. Additionally, students must submit at least one paper based on their dissertation research to a peer-reviewed journal prior to graduation.

Financial support in the form of scholarships, assistantships, and fellowships is available to qualified students. **See the WISE Research Center Web site (www.wind.ttu.edu) for more details of the degree program and ongoing research topics.**

School of Law

Walter B. Huffman, J.D., Dean

1802 Hartford Ave. | Lubbock, TX 79409-0004
T 806.742.3793 | F 806.742.4014
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 to 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 dual degrees or a certificate program:

- J.D. / Doctor of Medicine
- 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
- J.D. / Business Law Certificate Program
- J.D. / Health Law 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 September 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 Dean for Academic Affairs: Cochran

Associate Dean for Law Library and Computing: Torres

Associate Dean for Student Affairs and Diversity: Lewis

Assistant Dean for Academic Success Programs: Jarmon

Assistant Dean for Administration and Finance: Ramos

Assistant Dean for Admissions: Cook

Assistant Dean for Career Services: Doss

Assistant Dean for Continuing Legal Education and Special Events: Fletcher

Director of Advocacy Programs: R. Sherwin

Director of Career Services: Payne

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 Military Law and Policy: Rosen

Director of Center for Water Law and Policy: Eckstein

Director of Criminal Justice Clinic (Defense Section): Metze

Director of Criminal Justice Clinic (Prosecution Section):

Roque-Jackson

Director of Health Care and Bioethics Mediation Clinic: Fortney

Director of Health Law Program: Bard

Director of Innocence Project: Blackburn

Director of Low-Income Tax Clinic: James

Deputy Director of Center for Biodefense, Law, and Public Policy: B. Sherwin

Foundation Professor of Commercial Law: Krahmer

Horn Professors: Benson, Casto, Fortney

Alvin R. Allison Professor of Law: Bard

Charles Thornton Professor of Law: Shannon

George Herman Mahon Professor of Law: Camp

George McCleskey Professor of Water Law: Eckstein

George R. Killam Jr. Chair of Criminal Law: Loewy

Governor Preston E. Smith Regents Professor of Law: Beyer

J. Hadley Edgar Professor of Law: Weninger

Maddox Professor of Law: Cochran

Robert H. Bean Professor of Law: Sutton

W. Frank Newton Professor of Law: Huffman

Professors: Bard, Camp, Gonzalez, Graham, Hance, Hatfield, James, Laughlin, Myhra, Pawlowic, Ramírez, Rosen, Soonpaa, Spain, Torres

Associate Professors: Lewis, Ross, Watts

Assistant Professor: Kwon

Legal Practice Professor: Jones

Associate Legal Practice Professors: Dillon, Phillips

Assistant Legal Practice Professors: Horn, Humphrey

Lecturer: Jarmon

Adjunct Faculty: Baker, Benson, Blackburn, Bubany, Clements, Conboy, Courville, Eissinger, Hensley, Kime-Goodwin, Medina, Phelan, Roque-Jackson, Stafford, Strange, Terrell

All-University and Preprofessional Programs

All-University Programs

Center for Undergraduate Research

The Center for Undergraduate Research (CUR) collaborates with students, faculty, and campus partners to develop innovative programs and activities to enhance undergraduate research initiatives at Texas Tech University and beyond. CUR provides direction and support for undergraduate students interested in conducting research with a faculty mentor. The center hosts educational workshops throughout the academic year targeted at organizing, conducting, and presenting research; preparing students for graduate school; and preparing students for graduate admission testing.

In alignment with the university mission, CUR is committed to the advancement of knowledge, fosters intellectual and personal development, and stimulates meaningful research and service for both faculty and students.

Contact information: 341 Administration Building, 806.742.1095, www.undergraduateresearch.ttu.edu.

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 University Career Services 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 Modern Conflict, Diplomacy, and Reconciliation

The Institute for Modern Conflict, Diplomacy, and Reconciliation (MCDR) is an archive-based research facility focusing on America in the world from 1950 to the present. The institute coordinates a program of preservation of archival materials and artifacts related to the Vietnam War and the post-Vietnam War era. In addition to encouraging the study of all aspects of the American Vietnam experience, the institute also focuses on post-Vietnam conflicts, including the global war on terror, and places emphasis on projects and interactions that further the process of international reconciliation.

MCDR coordinates the activities of the Vietnam Center and Archive (see page 21), the Center for War and Diplomacy in the Post-Vietnam War Era, the Department of Aerospace Studies (see page 91), and the

Department of Military Science (see page 93). The institute also offers courses that are required for a Graduate Certificate in Strategic Studies. This 15-hour certificate prepares students to fill the need for officials in all branches of federal government, for officers in the armed forces of the United States, and for officials in state and local governments to deal with strategic responsibilities.

Contact information: Dr. Dennis Patterson, 806.742.4081, dennis.patterson@ttu.edu, www.imcdr.ttu.edu.

Modern Conflict, Diplomacy, and Reconciliation (MCDR)

- 5300. Foundations of Strategic Studies (3:3:0).** An introductory course in strategic thought, taught thematically using historical case studies to reinforce the process and environment of strategy in conflict resolution.
- 5306. National Security and Intelligence in Post 9/11 World (3:3:0).** Covers the structure of the American intelligence community since World War I and changes in response to 9/11 and pre-war intelligence assessments of Iraq.
- 5307. Seminar in Strategic Studies (3:3:0).** This capstone course for the Certificate in Strategic Studies utilizes guest lecturers and culminates in the writing of a research paper based on specific student interests.

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)

Interdisciplinary Studies courses support students in the transition to and from university life. Entering freshmen may select IS 1100, freshman student athletes take both IS 1100 and IS 1200, and graduating seniors may choose IS 4100.

"Tech Transition: The Freshman Seminar" is designed to smooth the transition of students from high school to the university. The one-hour Interdisciplinary Studies course (IS 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 (IS)

- 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: IS 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: Laura Heinz, 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.

University Studies

A bachelor's degree in University Studies provides students a unique course of study in three distinct areas of study, each of which may be offered in different colleges across the university. By pursuing either a Bachelor of Arts or a Bachelor of Science in University Studies, students have the flexibility to choose a broad field of specialization that combines three areas of study referred to as "concentrations." This combination of courses may not be available through existing degree programs. For example, a student might focus on a specialization in environmental journalism with concentrations in journalism, plant and soil science, and environmental toxicology.

Coursework in a University Studies degree must total a minimum of 120 semester hours. Prerequisites for courses selected in the areas of concentration must be completed and, depending on the concentration, may not count toward the 18-hour minimum per area of concentration. A total of 40 upper-division hours is required for the degree, with at least 6 hours of upper-division coursework required in each area of concentration. The concentration areas must combine in such a way that they provide an integrated or thematic specialization without significantly replicating any existing departmental major. Students must be in good academic standing to apply for the major.

Students interested in a University Studies degree must begin the process by contacting the University Studies degree advisor in the

Office of the Provost to organize a course of study that meets existing university and degree standards as outlined by the Bachelors of University Studies Faculty Advisory Committee.

Each student will develop a degree plan with the assistance of the degree advisor in the Office of the Provost and, whenever possible, a faculty advisor. The plan will consist of (1) a cover form, (2) a statement of educational goals, (3) a listing of all courses completed and/or in progress, and (4) a listing of all intended or enrolled courses related to the degree and major.

The University Studies program is administered by the Office of the Provost. The degree administrator serves as the liaison between student, degree advisor, and the Faculty Advisory Committee. The degree administrator is the final authority for degree plan approval and modification.

University Studies Specializations. When students in the University Studies program choose three concentrations, they are formulating a coherent specialization of interest that is unavailable elsewhere in the university as an organized program of study. Although the areas already exist as separate programs within the university, they have never been combined and studied as a unit. Occasionally a new area of study will evolve that is so interdisciplinary in nature that it has no departmental home other than the University Studies program. The first of these programs to exist solely as a University Studies specialization is the **Bachelor of Science in University Studies with a Wind Energy Specialization**. This multidisciplinary specialization provides a broad education in the complex field of wind energy as a step toward developing a renewable energy work force.

The director of the Wind Science and Engineering Research Center administers the wind energy specialization under supervision from the Provost's Office. This bachelor's degree is science and calculus based and requires students to take prescribed Wind Energy (WE) courses, general education requirements, a summer industrial internship, and courses in two focus areas (18 hours each) related to wind energy. Some of the focus areas are energy commerce, atmospheric sciences, electrical-electronic technology, construction technology, mechanical technology, landscape architecture, international business, and natural resource management. Additional elective courses can be taken to satisfy the 120-hour degree program.

To inquire about the wind energy specialization, contact Dr. Kishor Mehta, Horn Professor of Civil Engineering, 806.742.3479. For further information about the University Studies degree, contact Dr. Juan S. Munoz, Associate Vice Provost, 806.742.2184.

Wind Energy (WE)

- 1200. Introduction to Wind Energy (2:2:0).** Provides a basic understanding of the wind energy industry and discusses the basic meteorology of wind, extraction of energy from wind, wind plant development, and the environmental and ecological impact of wind energy plants.
- 2300. Social Impacts of Wind Energy (3:3:0).** Provides an in-depth look at environmental, economic, national security, health benefits, and issues of wind energy vs. traditional fuels.

Women's Studies

The university offers a minor in Women's Studies. Goals of the minor include encouraging students to reinterpret concepts of gender and gendered identities in different social, cultural, and political contexts.

The Women's Studies Program is administered by the Director of Women's Studies. A minor consists of 18 hours of courses as approved by the director. Three of these courses must be Introduction to Women's Studies (WS 2300), Feminist Thought and Theories (WS 4310), and Women's Studies Seminar (WS 4399). Courses counted toward a major field of study will not count toward completion of the Women's Studies minor. Many courses without a WS prefix may be used toward completion of the minor at the discretion of the director.

Women's Studies (WS)**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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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 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. **[SOC 2301] The Sociology of Marriage (3:3:0)**. History, present status, and current problems of the marriage institution. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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. Fulfills Core Social and Behavioral Sciences – U.S. History requirement. (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement **or** Political Science requirement (with restrictions). (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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. Fulfills Core Humanities requirement. (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: 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: 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. Fulfills Core Humanities requirement. (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. Fulfills Core Humanities requirement. (Writing Intensive) (HIST 4374)
4399. **Women's Studies Seminar (3:3:0)**. Prerequisite: WS 2300, junior standing, or consent of instructor. Specialized exploration of key gender(ed) issues and topics. Content varies. May be repeated with consent of the Director of Women's Studies. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (Writing Intensive)

Graduate Courses

5000. **Practicum in Women's Studies (V1-6)**. Prerequisite: Consent of instructor and the Director of Women's Studies. Practical experience in 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 up to three times for credit with consent of the director.
5310. **Feminist Thought and Theories (3:3:0)**. An in-depth examination of important theoretical writings and perspectives in women's, gender, and identity studies, including the contributions of feminist theory and analysis to traditional disciplines.
5340. **Special Topics in Women's Studies (3:3:0)**. Focused and rigorous examination of selected topics. May be repeated with consent of the director.
5360. **Foundations of Women's Studies (3:3:0)**. Interdisciplinary study of fundamental concepts and issues in gender and identity studies and contemporary scholarship, including the complexities introduced by cross-sectional study of race, sexual orientation, and class distinctions, tensions, and alliances.

Preprofessional Programs**Prelaw Studies**

Students who are interested in attending law school should begin preparing long before graduation. 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, graduates of law 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 educations
- Prepare for and practice taking the LSAT exam
- Prepare and submit law school application packets

Prospective law students need a four-year bachelor's degree in the academic discipline of their choice. 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 TTU Prelaw Program works with students to strengthen and streamline their candidacy as a law school applicant. Students can consider two routes in choosing a major:

1. Undeclared/Exploratory Students (PLAW)

Students initially can be designated as a PLAW student in the College of Arts and Sciences. Using the Advising Center DISCOVERY! tools, they can determine what major best suits their goals, values, and personal objectives. This plan will allow students the freedom to explore academic majors while staying on track in preparing for law school.

2. Declared Major Students

The TTU Prelaw Program will partner with a student and the academic advisor who specializes in the student's declared major. This combined guidance will support the student's pursuit of undergraduate success and help in preparing for that person's transition to law school.



Students may want to consider enrolling with other TTU Prelaw Program students as part of the **Prelaw Freshman Interest Group**. In addition, they can live in the **Prelaw Learning Community**, which is two residence hall floors designated specifically for prelaw students.

The Texas Tech University School of Law offers four early admission programs for qualified students:

• 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 any 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 Honors College, and the Texas Tech University School of Law allows exceptional, qualified applicants with a minimum of 100 semester hours of baccalaureate study in the College of Arts and Sciences to seek and receive acceptance to the Law School. The student's first year of law school will count toward completion of a minor in their four-year undergraduate degree at Texas Tech.

• 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 Pre-Professional Health Careers Office maintains a collection of related information on various health careers. **Contact information:** Pre-Professional Health Careers Office, 340A Chemistry Building, 806.742.3078.

Individual advising regarding preparing students for admission to professional health schools is done by advisors in the Pre-Professional 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 Pre-Professional 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 Pre-Professional 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 chemistry, 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 dental school's 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.

Pre medicine

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's Web site.

Students should plan to complete a baccalaureate degree in the field of their choice before entering medical school.

Pre optometry

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 comparative animal 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 or analytical geometry, or precalculus and 3 semester hours of calculus; 3 semester hours of statistical methods; 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's 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.

Pre pharmacy

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. The Pharmacy College Admission Test is required for admission to the professional schools.

Allied Health Sciences

Some allied health professional schools require bachelor degrees, and other professional programs require sixty to ninety hours of college-level courses prior to entrance into the professional school. Application deadlines vary, but applications are usually submitted six to twelve months prior to planned entrance. Additionally, some allied health sciences professional programs require an admission test. Upon completion of the professional allied health sciences program, students are awarded degrees. Admission requirements for allied health sciences programs vary, and admission requirements change; therefore students should consult the Web sites of the schools of allied health sciences.

Schools of allied health sciences include clinical laboratory science, speech language and hearing sciences, occupational therapy, physical therapy, and physician assistant studies.

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.



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 Institute for Modern Conflict, Diplomacy, and Reconciliation. 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 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 (39th 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 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. 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 four years on active duty if in a non-flying career field, 10 years upon completion of undergraduate pilot training, or six 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

Lt. Col. Douglas M. Crabb, Chairperson

Professor: Lt. Col. Crabb

Assistant Professors: Capt. Rose, Capt. Toney

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.

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.

ROTC–Air Force

Air Force ROTC Det 820
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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 organiza-

tional 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 \$450 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 Maxwell Air Force Base. Students in the program participate in 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, career orientation, survival training, base functions and the 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.

AERS 820 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. (Writing Intensive)
- 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. (Writing Intensive)
- 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. (Writing Intensive)

Department of Military Science

Lt. Col. Robert Buscher, Chairperson

Professor: Lt. Col. Buscher

Assistant Professors: Maj. Dula, Maj. Herrera, Capt. Hulse, Capt. Johnson

Instructors: Master Sgt. Bowman, Sgt. 1st Class King, Master Sgt. 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 commis-

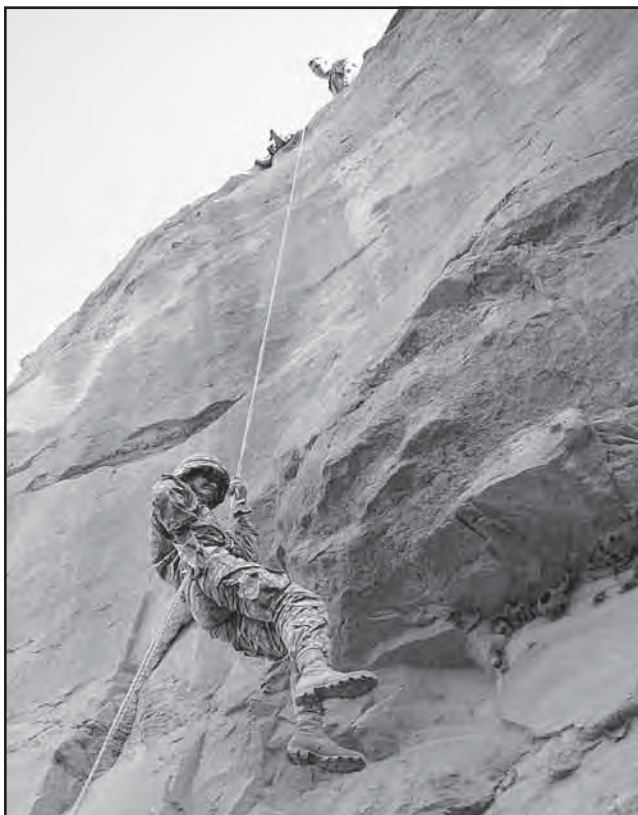
ROTC-Army

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<http://armyrotc.ba.ttu.edu>

sioned 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 officer-ship. 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 two to two and one-half 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 five-week period.

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 three weeks; however, a few positions may be available for extended training (five 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

John M. Burns, Ph.D., Dean

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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 Center 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, environmental crop and soil sciences, horticultural and turfgrass sciences, 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 Admission to the University. 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 Admission to the University section of this catalog.

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.

Course Descriptions

Course descriptions for various specializations within the college can be found in the catalog sections for each department. Those courses that are common to many disciplines and have an AGSC prefix can be reviewed below.

Agricultural Science (AGSC)

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. (AAEC 5313) 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. (Writing Intensive)
- 5303. Ecology of Grazing Lands Systems (3:3:0).** A field oriented course on ecology, management, and research in forage-livestock 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 communications, 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.

Texas Tech recently became a member of the Peace Corps Master's International Program (PCMI) allowing students to earn graduate degrees in the agricultural and natural resource sciences while serving as Peace Corps volunteers abroad.

- **Master of Agribusiness** is designed to meet the growing need for agribusiness professionals with advanced conceptual and quantitative training. The degree program provides a unique blend of analytical and business capability from both the Department of Agricultural and Applied Economics and the Rawls College of Business.
- **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

Eduardo Segarra, Ph.D., Chairperson

Professors: Hudson, P. Johnson, Knight, Misra, Segarra

Associate Professors: Elam, Farmer, Lyford, Malaga

Assistant Professors: Belasco, Benson, Chidmi, J. Johnson, Murova, Rahman, Wang

Instructors: Middleton

Adjunct Faculty: Ethridge, 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 Coop-

erative 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 nondepartmental 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.

Accelerated Bachelor's-to-Master's (ABM) Degrees. Exceptional undergraduate agricultural and applied economics majors who wish to complete an ABM degree in a timely manner may apply for admission into one of three accelerated degree programs:

- Bachelor of Science in Agricultural and Applied Economics and Master of Agribusiness
- Bachelor of Science and Master of Science in Agricultural and Applied Economics, thesis option
- Bachelor of Science and Master of Science in Agricultural and Applied Economics, nonthesis option

Admission to these programs allows students to count 9 dual hours of undergraduate coursework toward these degrees. Application should be made during the first semester of the junior year following procedures available from graduate program coordinators in the department.

Agricultural and Applied Economics (AAEC)

(To interpret course descriptions, see page 13.)

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. Fulfills Core Social and Behavioral Sciences—Individual or Group Behavior requirement. 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 or ECO 2301 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 AAEC 2305 and MATH 1330 or ECO 2301 and MATH 1320 or ECO 2301 and MATH 1330 with grade of C or better. 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 ECO 2301. 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).** Prerequisites: AAEC 2305 and MATH 1331 or ECO 2301 and MATH 1331 with grade of C or better and junior standing. Basic economic principles with applications to agricultural pricing problems and resource allocations. F, S, SS.

Graduate Program / Agricultural and Applied Economics

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 adminis-

tered 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.

Dual M.S.–J.D. Degree Program

The School of Law and the Graduate School of Texas Tech University offer a dual 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 dual 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 dual 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.

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. Fulfills Core Curriculum mathematics requirement (in conjunction with a mathematics course). 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, instructor permission. Topics may vary. May be repeated twice for credit. F, S, SS.
4301. **Special Problems in Applied Economic Analysis (3)**. Prerequisite: Instructor approval. Individual instruction in analysis of a research problem. May be repeated with the approval of the department. S.
4302. **Statistical Methods in Agricultural Research (3:3:0)**. Prerequisite: AAEC 3401 and MATH 1331 or MATH 2300 or MATH 2345 with grade of C or higher. 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. (AAEC 5315) 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.
4309. **Sustaining Global Ecology, Natural Resources and Economy (3:3:0)**. Challenges to global markets and environment across diverse systems and histories. Fulfills multicultural requirement. F.
4312. **Applied Optimization Methods (3:3:0)**. Prerequisite: AAEC 3315. 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.
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. (AAEC 5318) S.
4317. **Commodity Futures Trading and Analysis (3:3:0)**. Prerequisites: AAEC 2305 or ECO 2301 with grade of C or better and junior standing. History and characteristics of commodity futures markets, hedging and speculation, and use of futures as a management tool. (AAEC 5317) F, S.
4320. **Agribusiness Law (3:3:0)**. Prerequisite: AAEC 2305 or ECO 2301 with grade of C or better and junior standing. Federal regulatory programs, market orders, Packers and Stockyards Act, bankruptcy. Administrative, environmental, antitrust law, Uniform Commercial Code, in an agribusiness context. (AAEC 5320) F.

Graduate Courses

5000. **Professional Internship (V1-6)**. Prerequisite: Instructor permission. 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)**. Prerequisite: Instructor permission. 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. (AAEC 6302) 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 econo-

metric 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. 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)**. Prerequisites: AGSC 2300 and permission of instructor. Use of microcomputers, software, and design of software for agricultural business and research purposes. Not open to majors. (AGSC 2301) 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. Non-majors only.
5315. **Property Appraisal (3:3:0)**. Prerequisites: AAEC 2305 and a 2000-level ENGL course with grade of C or higher. Factors governing land prices, valuation. Appraisal for use, sale, lending, condemnation, estate settlement, taxation. (AAEC 4303). 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)**. Prerequisites: AAEC 2305 or ECO 2301 with grade of C or higher. Mechanics of futures trading, history and functions of futures market. Role of futures and options markets in managing risks. (AAEC 4317) F, S.
5318. **Finance and the Agribusiness Sector (3:3:0)**. Prerequisites: AAEC 3302 or FIN 3320 with grade of C or higher. Applications of financial theory for the agribusiness sector. Risk, capital structure, business structure, investment analysis. (AAEC 4316) S.
5320. **Agribusiness Law (3:3:0)**. Prerequisites: AAEC 2305 or ECO 2301 with grade of C or higher. Federal regulatory programs, market orders, bankruptcy. Administrative, environmental, antitrust law, Uniform Commercial Code in agricultural context. (AAEC 4320) 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)**. Prerequisite: Instructor permission. 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. (AAEC 5302) 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, previous or concurrent enrollment in a higher education teaching methods course, instructor permission. Supervised teaching at the university level.
8000. **Doctor's Dissertation (V1-12)**.

Bachelor of Science in Agribusiness

The Bachelor of Science in Agribusiness is a joint degree program administered by the College of Agricultural Sciences and Natural Resources and the Rawls College of Business.

FIRST YEAR

Fall		Spring	
Lab. Science*	4	Lab. Science*	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, Intro. Math. Analysis I	3	MATH 1331, Intro. Math. Analysis II	3
POLS 1301, American Govt., Org.	3	AAEC 2305, Fund. Ag. Appl. Economics	3
Ag. Elective^	3	Ag. Elective^	3
TOTAL	16	TOTAL	16

SECOND YEAR

Fall		Spring	
ECO 2302, Principles of Economics II	3	AGSC 2301, Computers in Ag. II	3
HIST 2300, History of U.S. to 1877	3	AAEC 3401, Agricultural Statistics	4
ACCT 2300, Financial Accounting	3	HIST 2301, History of U.S. Since 1877	3
Sophomore English†	3	ACCT 2301, Managerial Accounting	3
POLS 2302, American Public Policy	3	Visual & Performing Arts**	3
TOTAL	15	TOTAL	16

THIRD YEAR

Fall		Spring	
AAEC 3315, Agr. Price Theory	3	AAEC 3100, Seminar	1
or ECO 3312, Intermediate Eco. Theory		ECO 3311, Intermediate Macroeco.	3
FIN 3320, Financial Management	3	AGBS Group 2#	3
MGT 3373, Managerial Communications	3	FIN 3323, Intro. Mkts. and Financial Inst.	3
MKT 3350, Intro. to Marketing	3	MGT 3370, Organization and Mgt.	3
BLAW 3391, Business Law I	3	ISQS 3344, Intro to Prod. Ops. Mgt.	3
TOTAL	15	TOTAL	16

FOURTH YEAR

Fall		Spring	
AGSC 4300, Research Methodology	3	AAEC 4301, Problems Appl. Eco. Analysis	3
AGBS Group 1#	3	AAEC 4316, Agr. Financial Analysis	3
MGT 4380, Strategic Mgt. or AAEC 4315, Agribusiness Mgt.	3	AAEC 4302, Stat. Methods or AAEC 4312, Appl. Opt. Methods	3
MKT 4358, International Marketing	3	FIN 4328, International Finance	3
MGT 4375, International Management	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.

^ Select ag. electives 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, BA 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 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, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, Intro. Math. Analysis I	3	MATH 1331, Intro. Math. Analysis II	3
POLS 1301, American Govt., Org.	3	AAEC 2305, Fund. Ag. Appl. Economics	3
Ag. Elective	3	AGSC 2301, Computers in Agr. II	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
ECO 2302, Principles of Economics II	3	AAEC 3301, Agribusiness Marketing	3
POLS 2302, American Public Policy	3	AAEC 3302, Agribusiness 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, Agricultural Price Theory	3	ACCT 2301, Managerial Accounting	3
AAEC 3304, Farm & Ranch Bus. Mgt.	3	ECO 3311, Intermediate Macroecon.	3
ACCT 2300, Financial Accounting	3	AAEC 3401, Agricultural Statistics	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. Methods	3	Electives	9
or AAEC 4302, Stat. Methods		TOTAL	15
Electives	6		
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 sciences 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 BA, 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 BA or ECO, such as BA 3301, 3303, 3304, or 3305, ECO 3320. (To take BA 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, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, Intro. Math. Analysis I	3	MATH 1331, Intro. Math. Analysis II	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
Ag. Elective††	3	AGSC 2301, Computers in Agr. II	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
ECO 2302, Principles of Economics II	3	AAEC 3301, Agribusiness Marketing	3
AGSC 3301, Ag. Leadership Principles	3	AAEC 3401, Agricultural Statistics	4
ENGL 2311, Technical Writing	3	HIST 2301, History of U.S. Since 1877	3
ACCT 2300, Elementary Acct. I	3	ACCT 2301, Managerial Accounting	3
AAEC 2305, Fund. Ag. Appl. Economics	3	Sophomore English**	3
HIST 2300, History of U.S. to 1877	3	Elective	2
TOTAL	18	TOTAL	18
SUMMER			
FIN 3320, Financial Management	3	MKT 3350, Intro. to Marketing	3
MGT 3373, Managerial Communication	3	MGT 3370, Organization and Mgt.	3
TOTAL	6	TOTAL	6
THIRD YEAR			
Fall		Spring	
ISQS 3344, Intro to Prod. Ops. Mgt.	3	AAEC 3100, Seminar	1
AAEC 3315, Agr. Price Theory	3	AAEC 3304, Farm & Ranch Mgt.	3
BLAW 3391, Business Law I	3	ECO 3311, Intermediate Macroecon.	3
FIN 3323, Intro. Mkts. and Financial Inst.	3	FIN 4328, International Fin.	3
MGT 4375, International Mgt.	3	MKT 4358, International Marketing	3
TOTAL	15	AAEC 4316, Agr. Financial Analysis	3
		TOTAL	16
FOURTH YEAR			
Fall		Spring	
Upper Level BA Elective	3	AAEC 4301, Problems Appl. Eco. Analysis	3
AGSC 4300, Research Methods	3	AAEC 4302, Stat. Methods	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, BA, 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 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.

Department of Agricultural Education and Communications

Steven Frazee, Ph.D., Chairperson

Professors: Briers, Doerfert, Dooley, Elliot, Frazee, Larke, Lawver, Lindner, Murphy, Shinn

Associate Professors: Akers, Boleman, Boyd, Brashears, Cummings, Elbert, Harlin, Rutherford, Vestal, Wingenbach

Assistant Professors: Burris, Irlbeck, Meyers, Murphrey, Ritz (Visiting), Ulmer

Adjunct Faculty: Alexander, Dromgoole, Matthies-Hanson

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 educational leadership, 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 Science 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, telecom-

munications, 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 13.)

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. Fulfills multicultural requirement.
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.

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 6 hours of thesis research, or 36 hours of approved 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.

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.
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.
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.
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.
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.
4000. **Internship (V1-12).**
4001. **Agricultural Education Problems (V1-3).** Prerequisite: Approval of department chairperson. Individual investigation related to agricultural education or leadership. 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. Fulfills Core Technology and Applied Science requirement. F.
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. (Writing Intensive)
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.
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)
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).**
7005. **Professional Internship (V1-6).** An on-the-job supervised experience program conducted in the area of the student's specialization. May be repeated for credit
7100. **Graduate Seminar (1).** Group study and discussion of current developments in agricultural behavioral sciences. 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 13.)

Undergraduate Courses

Graduate Courses

5001. **Contemporary Issues in Agricultural and Extension Education (V1-6).** 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.
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.
2301. **Introduction to Agricultural Communications (3:3:0).** An overview of information systems and media associated with the agricultural industry.
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 (3:1:4).** 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.
4300. **Web Design in Agricultural Sciences and Natural Resources (3:1:4).** BPrerequisite: ACOM 2305. Promote basic understanding of Web design principles and experiential 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

Interdisciplinary Agriculture Curriculum Agricultural Leadership Track

FIRST YEAR			
Fall		Spring	
Lab Science*	4	PSS 1321, Agronomic Plant Science or	
ENGL 1301, Essentials of Coll. Rhetoric	3	PSS 1411, Prin. of Horticulture	3-4
MATH 1320, College Algebra	3	ENGL 1302, Adv. College Rhetoric	3
ANSC 1401, Gen. Animal Science	4	HIST 2300, History of U.S. to 1877	3
TOTAL	14	CHEM 1305, Essentials of Chem. I	3
		CHEM 1105, Exp. Gen. Chem. I (lab)	1
		MATH 2300, Statistical Methods	3
		TOTAL	16-17
SECOND YEAR			
Fall		Spring	
ACOM 2301, Intro. to Ag. Comm.	3	COMS 2300, Public Speaking	3
AGSC 3301, Principles of Ag. Leadership	3	PSS Elective	3-4
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
HIST 2301, History of U.S. Since 1877	3	AGED 2302, Technology Use in Teaching	3
ANSC Elective	3	AAEC 2305, Fund. Ag. & Appl. Economics	3
TOTAL	15	TOTAL	15-16
THIRD YEAR			
Fall		Spring	
AGED 2300, Intro. to Ag. Ed.	3	AAEC Elective	3
ACOM 2302, Scientific Communications	3	Advanced ACOM Electives	6
AGED 3315, Personal Leadership	3	AGED 3314, Team Leadership	3
Visual and Performing Arts*	3	Advanced AGED Elective	3
Humanities*	3	TOTAL	15
TOTAL	15		
FOURTH YEAR			
Fall		Spring	
Scientific Ag. Elective	4	AGED 4000, Internship	10
Advanced AGED Elective	3	AGED 4309, Cont. Issues in Ag. Leadership	3
AGED 4302, Transfer of Ag. Technology	3	TOTAL	13
AGED 4308, Org. Leadership	3		
Advanced Scientific Ag. Elective	3		
TOTAL	16		

Minimum hours required for graduation—120

*Choose from Core Curriculum requirements.

Interdisciplinary Agriculture Curriculum Agricultural Leadership Animal Science Minor Track

FIRST YEAR			
Fall		Spring	
HIST 2300, Hist of U.S. to 1877	3	PSS 1321, Agronomic Plant Science or	3-4
ENGL 1301, Ess. College Rhetoric	3	PSS 1411, Principles of Horticulture	
MATH 1320, College Algebra	3	ENGL 1302, Ad. College Rhetoric	3
ANSC 1401, Gen. Animal Science	4	CHEM 1305, Chemistry and Society	3
TOTAL	13	CHEM 1105, Exp. Gen. Chem. I (lab)	1
		MATH 2300, Statistical Methods	3
		Visual & Performing Arts*	3
		TOTAL	16-17
SECOND YEAR			
Fall		Spring	
ACOM 2301, Intro. to Ag. Comm.	3	COMS 2300, Public Speaking	3
AGSC 3301, Principles of Ag. Leadership	3	ANSC 3305, Applied Animal Nutrition	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
HIST 2301, History of U.S. Since 1877	3	AGED 2302, Technology Use in Teaching	3
PSS Elective	3-4	AAEC 2305, Fund. Ag. & Appl. Economics	3
TOTAL	15-16	TOTAL	15
THIRD YEAR			
Fall		Spring	
AGED 2300, Intro. to Ag. Education	3	AAEC Elective	3
ACOM 2302, Scientific Communications	3	Advanced ACOM Electives	6
AGED 3315, Personal Leadership	3	AGED 3314, Team Leadership	3
ANSC 3404, Consumer Sel. Meat	4	Advanced AGED Elective	3
Humanities*	3	TOTAL	15
TOTAL	16		
FOURTH YEAR			
Fall		Spring	
ANSC Elective (Production Course)^	4	AGED 4000, Internship	10
ANSC Elective	3	AGED 4309, Cont. Issues in Ag. Leadership	3
AGED 4302, Transfer of Ag. Technology	3	TOTAL	13
AGED 4308, Org. Leadership	3		
Advanced AGED Elective	3		
TOTAL	16		

* Choose from Core Curriculum requirements.

^ Elective must include one of the following production courses: ANSC 4401, 4402, 4406, or 4407.

Interdisciplinary Agriculture Curriculum Agricultural Leadership Agronomy Minor Track

FIRST YEAR			
Fall		Spring	
HIST 2300, Hist of U.S. to 1877	3	PSS 1321, Agronomic Plant Science	3
ENGL 1301, Ess. College Rhetoric	3	Visual & Performing Arts*	3
MATH 1320, College Algebra	3	ENGL 1302, Ad. College Rhetoric	3
ANSC 1401, Gen. Animal Science	4	CHEM 1305, Chemistry and Society	3
TOTAL	13	CHEM 1105, Exp. Gen. Chem. I (lab)	1
		MATH 2300, Statistical Methods	3
		TOTAL	16-17
SECOND YEAR			
Fall		Spring	
ACOM 2301, Intro. to Ag. Comm.	3	COMS 2300, Public Speaking	3
AGSC 3301, Principles of Ag. Leadership	3	PSS 2432, Prin. & Practice of Soils	4
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
HIST 2301, History of U.S. Since 1877	3	AGED 2302, Technology Use in Teaching	3
PSS 2401, Intro. Entomology	4	AAEC 2305, Fund. Ag. & Appl. Economics	3
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
AGED 2300, Intro. to Ag. Education	3	AAEC Elective	3
ACOM 2302, Scientific Communications	3	Advanced ACOM Electives	6
AGED 3315, Personal Leadership	3	AGED 3314, Team Leadership	3
ANSC Elective	3	Advanced AGED Elective	3
Humanities*	3	TOTAL	15
TOTAL	15		
FOURTH YEAR			
Fall		Spring	
Advanced PSS Elective	7	AGED 4000, Internship	10
AGED 4302, Transfer of Ag. Technology	3	AGED 4309, Cont. Issues in Ag. Leadership	3
AGED 4308, Org. Leadership	3	TOTAL	13
Advanced AGED Elective	3		
TOTAL	16		

Minimum hours required for graduation—120. Students must fulfill the university multicultural requirement.

* 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 Science	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1320, College Algebra	3	HIST 2300, History of U.S. to 1877	3
ANSC 1401, Gen. Animal Science	4	CHEM 1305, Essentials of Chem. I	3
TOTAL	14	CHEM 1105, Exp. Gen. Chem. I (lab)	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. Economics	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
HIST 2301, History of U.S. Since 1877	3	Ag. Elective	3
AGSM 2303, Welding & Metalwork	3	Vis. & Perf. Arts.†	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
AGED 2300, Intro. to Ag. Ed.	3	ANSC 3305, Appl. Animal Nutrition	3
PSS 2432, Principles & Practices of Soil	4	AGSM 3303, Engine Theory	3
PSS 1411, Principles of Horticulture	4	AGED 3313, Mgt. of SAEs	3
ANSC 3402, Animal Genetics or	4	ENGL 2307, Intro. to Fiction	3
PSS 3421, Principles of Genetics		Advanced Ag. Elective	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
EDSE 4322, Diversity Learn. Envir.	3	AGED 4304, Methods of Teaching 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>	
Natural Science †	4	Basic Ag. Elective	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1320, College Algebra	3	HIST 2300, History of U.S. to 1877	3
ACOM 2301, Intro. Ag. Communications	3	AAEC 2305, Fund. Ag. Appl. Economics	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
Natural Science†	4	POLS 1301, American Govt., Org.	3
ACOM 2302, Sci. Communications	3	ADV 3310, Principles of Advertising	3
HIST 2301, History of U.S. Since 1877	3	AGED 2300, Intro to Ag. Education	3
Humanities Elective*	3	Basic Ag. Elective	3
TOTAL	16	TOTAL	15

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	Advanced Ag. Elective	3
PR 3310, Principles of Public Relations	3	Specialized Elective	6
Advanced Ag. Elective	3	PHOT 2310, Basic Photography	3
EMC 3300, Elec. Media & Society	3	TOTAL	15
TOTAL	15		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ACOM 3301, Video Production In Ag.	3	Specialized Elective	3
Specialized Elective	3	Advanced Ag. Elective	6
Visual & Performing Arts Elective*	3	ACOM 4310, Dev. of Ag. Publications	3
Advanced Ag. Elective	3	ACOM 4300, Web Design for Ag.	3
ACOM 4100, Seminar 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.

† Choose from Core Curriculum requirements, Category C.

** Must pass GSP before enrolling in JOUR 2310

Specialization Areas: (12 Hours)

Electronic Media – JOUR 3314, EMC 3380, 3370 or 3360, 4320

Print Media – JOUR 3312, 3316, 3380, 4370

Public Relations/Marketing – PR 3312, MCOM 3380, AAEC 3301, 3305

writing, editing, and layout in producing agricultural publications. Emphasis upon computer software applications in agricultural publishing. (Writing Intensive)

Graduate Courses

- 5201. Contemporary Issues in Agricultural Communication (2:2:0).** Group study and discussion of current issues in agricultural communications. Actual topics will vary based on developments within the agriculture industry and agricultural communications profession.
- 5302. Knowledge Management in Agricultural and Natural Resources (3:3:0).** A comprehensive, systematic examination of the information assets of an agricultural organization and how they are identified, captured, organized, integrated, mined, retrieved and shared.
- 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.
- 5304. Risk and Crisis Communications in Agriculture and Natural Resources (3:3:0).** Examines potential risk and crisis communications scenarios in agriculture and the relevant theories, models, and processes to address these types of situations effectively.
- 5306. Foundations of Agricultural Communications (3:3:0).** Explore historical foundations and selected philosophical concepts and philosophers and evaluate their influence upon agricultural communications.
- 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.
- 7100. Graduate Seminar (1:1:0).** Group study and discussion of current developments in agricultural communications.

Agricultural Leadership (AGLS)

(To interpret course descriptions, see page 13.)

Graduate Course

- 5304. Theoretical Foundations of Leadership (3:3:0).** Theory of motivation, behavior, leadership styles, power, influence, charisma, and the historical context of leadership in the agriculture industry. S

Agricultural Systems Management (AGSM)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 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.

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

Kevin R. Pond, Ph.D., Chairperson

Horn Professor and Thornton Chair: Galyean

Gordon W. Davis Regent's Chair: Johnson

San Antonio Livestock Exposition Chair: M. Miller

Professors: Brashears, McGlone, Pond, Prien, Thompson

Associate Professors: Alvarado, Brady, C. Brooks, Jackson, R. Miller, Takhar

Assistant Professors: Ballou, Rathmann, Starkey, Sutherland, Wilson

Instructors: T. Brooks, C. Guay, K. Guay

Adjunct Faculty: Allen, Beckett, Binkley, Blodgett, Brown, Carroll, Cole, Davis, Dowd, Hentges, Kubricht, Loneragan, Lyte, MacDonald, McAdams, Shome, Wheeler, Wu

About the Program

This department supervises the following degree programs and certificate:

- 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
- Undergraduate Equine Science Certificate

The department also participates in the interdepartmental program leading to the Master of Agriculture degree and 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 a department advisor.

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 and the Equine Science Certificate Program.

Students must earn a grade of C or better in all animal science courses required for graduation. In addition, students are required to take a 3-hour internship or a 3-hour research experience to fulfill graduation requirements. All electives are subject to departmental approval.

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.

All students are required to take a 3-hour internship or 3-hour research experience to fulfill graduation requirements.

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 1401, 3301; BIOL 1402; CHEM 1307, 1107, 1308, 1108, 3305, 3105, 3306, 3106, 3311, 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

Equine Science Certificate Program

The department offers an undergraduate Equine Science Certificate to provide hands-on training and in-depth equine classes to enhance a student's opportunity for a competitive career within the horse industry. Students may select from one of four options: science, industry, equine-assisted therapy, and a general option.

Students must complete 13 hours of the following required core curriculum and earn a minimum grade of C in each class: ANSC 3303, 4402, 2305 or 3301, and 2304. In addition, students must take 6 credit hours in courses offered within each of the four options listed below. A maximum of 6 of the 19 credit hours may be transferred from another institution.

Science Option (Select 6 or 7 credits): ANSC 3401, 4000, 4001, 4306

Industry Option (Select 6 credits): ANSC 3204, 3304, 3310, 3312, 3313, 4000

Equine-Assisted Therapy Option (Select 6 credits): ANSC 3309, 3314, 4305

General Option: Customize curriculum from at least 6 credit hours available in the other options.

Animal Science (ANSC)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

1401. [AGRI 1419] **General Animal Science (4:3:2).** The application of basic scientific principles to the efficient production of domestic animals. Students must enroll in lecture, lab, and discussion concurrently. Fulfills Core Technology and Applied Science requirement. F, S.
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.
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

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 coordinator. 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.

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. Fulfills Core Technology and Applied Science requirement. F.
- 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.
- 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.
- 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.
- 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).** Practical application of the science of equine behavior to training young ranch horses. Emphasis on training, communication, and progressive learning of ranch skills. S, F.
- 3305. **Applied Animal Nutrition (3:3:0).** Prerequisite: ANSC 1401 and CHEM 1305 or 1307. 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.
- 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. **Clinical Veterinary Science (3:2:3).** Prerequisite: ANSC 2202 and 2306. Clinical course working with various animal species. Course provides practical applications in various disciplines of veterinary medicine. S.
- 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.
- 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. S.
- 3311. **Domestic Animal Behavior and Welfare (3:2:2).** Prerequisite: ANSC 1401 or BIOL 1402. Behavioral principles and applications of behavioral concepts in domesticated animals. Introduction to the principles and concepts of animal behavior and welfare in domesticated animals. S.
- 3312. **Horsemanship I: General Horsemanship (3:3:2).** Fundamentals of horse care and riding with an emphasis on practical experience.
- 3313. **Horsemanship II: Ranch Horse Techniques (3:2:2).** Prerequisite: Consent of instructor. Riding intensive class for advanced riders. Train horses to compete in working cattle, reining, ranch trail, and ranch pleasure. Provide own horse. S.
- 3314. **Introduction to Equine-Assisted Psychotherapy (3:2:2).** An introduction to therapeutic intervention using horses to address behavioral, relational, and emotional issues for clients. F.
- 3316. **Animal Growth and Development (3:3:0).** A comprehensive course in the basic principles and concepts of livestock growth and development. F, SSI.
- 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.

Bachelor of Science in Food Science Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
BIOL 1401, 1402, or 1403 (BIOL 1401 or 1402 req. for Industry)	4	AAEC 2305, Fund. Ag. & Appl. Eco.	3
ENGL 1301, Essentials of Coll. Rhetoric	3	CHEM 1308, Principles of Chem. II	3
MATH 1330 or 1351 (Math 1320 or 1330 req. for Industry)	3	CHEM 1108, Principles of Chem. II (Lab.)	1
CHEM 1307, Principles of Chem. I	3	ENGL 1302, Advanced College Rhetoric	3
CHEM 1107, Principles of Chem. I (Lab.)	1	ANSC 1401, General Animal Science	4
TOTAL	14	TOTAL	14
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
CHEM 3305, Org. Chem.	3	Approved Electives**	3
CHEM 3105, Organic Chemistry Lab I (CHEM 2303, 2103 may be used or Industry Emphasis)	1	FDSC 2302, Elem. Analysis of Foods	3
MATH 1331 or 1352 (MATH 1321 or 1331 req. for Industry)	3	HIST 2301, History of U.S. Since 1877	3
FDSC 2300, Principles of Food Tech.	3	Humanities/Multicultural*	3
COMS 2300, Public Speaking	3	ENGL 2311, Technical Writing	3
HIST 2300, History of U.S. to 1877	3	TOTAL	15
TOTAL	16		
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
POLS 1301, American Govt., Org.	3	Approved Elective**	6
NS 3340 or ANSC 3301	3	POLS 2302, American Public Policy	3
FDSC 3100, Food Tech. Seminar	1	FDSC 3301, Food Microbiology or	3
FDSC 3302, Adv. Food Analysis	3	FDSC 3303, Food Sanitation or	3
MBIO 3400, Microbiology	4	FDSC 3309, Food Safety	3
Approved Elective**	3	TOTAL	15
TOTAL	17		
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
FDSC 4303 or FDSC 3302	3	FDSC 4306, Dairy Products Mfg.	3
FDSC 4304, Field Studies	3	FDSC 3305, Prin. Food Engineering	3
AAEC 3401 or MATH 2300	3-4	Approved Elective**	4
Visual & Performing Arts*	3	Free Elective	3-4
Approved Elective**	3	TOTAL	13-14
TOTAL	15-16		

Minimum hours required for graduation—120

* Choose from Core Curriculum requirements.

** Students will select an emphasis listed below according to their area of interest:

Science: 19 of the 23 hours of electives must be selected from CHEM 3306, 3106, 3341, 3141 and PHYS 1403, 7-8 hours of approved science electives.**Industry:** 19 of the 23 hours of electives must be selected from BA 3302 or Adv. CHEM, FDSC 3304, ANSC 3403, and 9 hours of approved departmental electives.

- 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. Fulfills Core Natural Sciences requirement. F, S, SSI.
- 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 or consent of instructor. Anatomy and physiology of reproductive organs, palpation, insemination techniques,

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			
<i>Fall</i>		<i>Spring</i>	
BIOL 1402, Biology of Animals	4	CHEM 1308, Principles of Chem. II	3
CHEM 1307, Principles of Chem. I	3	CHEM 1108, Principles of Chem. II (Lab.)	1
CHEM 1107, Principles of Chem. I (Lab.)	1	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	MATH 1351 or 2300	3
MATH 1321, Trigonometry	3	COMS 2300, Public Speaking	3
ANSC 1401, General Animal Science	4	TOTAL	13
TOTAL	18		
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
CHEM 3305, Organic Chemistry	3	CHEM 3306, Organic Chemistry	3
CHEM 3105, Organic Chemistry Lab I	1	CHEM 3106, Organic Chemistry Lab II	1
ENGL 2311 or ACOM 2302	3	PHYS 1404, General Physics II	4
PHYS 1403, General Physics I	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			
<i>Fall</i>		<i>Spring</i>	
ANSC 3301, Principles of Nutrition	3	POLS 2302, American Public Policy	3
CHEM 3311, Biological Chemistry I	3	Electives	7
MBIO 3401, Principles of Microbiology	4	English Literature	3
POLS 1301, American Govt. Org.	3	CHEM 3312 or 3314	3
TOTAL	13	TOTAL	16

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. S.
- 4306. Equine Feeding and Exercise Management (3:3:0).** Prerequisite: ANSC 2305 or consent of instructor. Students will investigate exercise physiology concepts and nutritional requirements related to the feeding and care of horses.
- 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. (Writing Intensive)
- 4404. Processed and Cured Meat Science (4:3:3).** Introduction to manufactured meat products and muscle ingredients, processing technologies, storage conditions, and stability of cured muscle foods. F.

Bachelor of Science in Animal Science Curriculum

FIRST YEAR			
Fall		Spring	
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. I (Lab.)	1	CHEM 1108, Principles of Chem. II (Lab.)	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1321, Trigonometry	3	ANSC 2301, Livestock & Meat Eval. I	3
TOTAL	14	MATH 2300, Statistical Methods	3
		TOTAL	16
SECOND YEAR			
Fall		Spring	
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
BIOL 1402, Biology of Animals	4	HIST 2300, History of U.S. to 1877	3
ENGL 2311, Technical Writing	3	CHEM 3306, Organic Chemistry	3
or ACOM 2302		CHEM 3106, Organic Chemistry Lab II	1
CHEM 3305, Organic Chemistry	3	Humanities/Multicultural*	3
CHEM 3105, Organic Chemistry Lab I	1	ANSC 2306, Prin. of Physio. Dom. Ani.	3
FDSC 2300, Principles of Food Tech.	3	TOTAL	16
ANSC 2202, Prin. Anat. Dom. Animals	2		
TOTAL	19		
THIRD YEAR			
Fall		Spring	
ANSC 3401, Reproductive Physiology	4	HIST 2301, History of U.S. Since 1877	3
ANSC 3301, Principles of Nutrition	3	ANSC 4000, Internship	3
COMS 2300, Public Speaking	3	ANSC 3307, Feeds & Feeding	3
ANSC 3402, Animal Genetics	4	ANSC 3403, Sel./Care/Proc./Cook. Meats	4
Fine Arts/Multicultural*	3	TOTAL	13
TOTAL	17		
FOURTH YEAR			
Fall		Spring	
Production Elective	4	Production Electives	8
Elective	1	MBIO 3401 or FDSC 3309	3-4
Approved Electives†	6	Electives	6
ANSC 3100, Animal Science 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, ZOOL 2405, 3401, 4304, 4306, 4312, 4409, PHYS 1403, 1404, CHEM 3310, 3311, 3312, 3402, plus other approved courses.

Animal Production Curriculum

FIRST YEAR			
Fall		Spring	
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3
CHEM 1305, Chemistry and Society I	3	CHEM 1306, Chemistry and Society II	3
CHEM 1105, Exp. Gen. Chem. I (lab)	1	CHEM 1106, Exp. Gen. Chem. I (lab)	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1320, College Algebra	3	ANSC 2301, Livestock & Meat Eval. I	3
TOTAL	14	MATH 1321, Trigonometry	3
		TOTAL	16
SECOND YEAR			
Fall		Spring	
FDSC 2300, Principles of Food Tech.	3	ANSC 2306, Prin. of Physio. Dom. Ani.	3
POLS 1301, American Govt., Org.	3	HIST 2300, History of U.S. to 1877	3
ENGL 2311, Technical Writing	3	BIOL 1402, Biology of Animals	4
or ACOM 2302		POLS 2302, American Public Policy	3
CHEM 2303 Intro Organic Chem	3	TOTAL	13
CHEM 2103, Intro Organic Chem Lab	1		
Fine Arts/Multicultural*	3		
ANSC 2202, Prin. Anat. Dom. Ani.	2		
TOTAL	18		
THIRD YEAR			
Fall		Spring	
ANSC 3401, Repro. Physiol.	4	HIST 2301, History of U.S. Since 1877	3
ANSC 3301, Principles Nutrition	3	ANSC 3306, Animal Diseases	3
Humanities/Multicultural*	3	ANSC 3307, Feeds & Feeding	3
COMS 2300, Public Speaking	3	ANSC 4000, Internship	3
ANSC 3402, Animal Genetics	4	ANSC 3403, Sel./Care/Proc./Cook. Meats	4
TOTAL	17	TOTAL	16
FOURTH YEAR			
Fall		Spring	
Production Elective	4	Production Electives	8
ANSC 3100, Animal Science 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.

Animal Business Curriculum

FIRST YEAR			
Fall		Spring	
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3
CHEM 1305, Chem. and Society I	3	CHEM 1306, Chem. and Soc. II	3
CHEM 1105, Exp. Gen. Chem. I (lab)	1	CHEM 1106, Exp. Gen. Chem. I (lab)	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, Intro. to Math Analysis	3	ANSC 2301, Livestock & Meat Eval. I	3
TOTAL	14	MATH 2300, Statistical Methods	3
		TOTAL	16
SECOND YEAR			
Fall		Spring	
AAEC 3301, Agribusiness Mkt.	3	POLS 1301, American Govt., Org.	3
ANSC 2202, Prin. Anat. Dom. Animals	2	HIST 2300, History of U.S. to 1877	3
ENGL 2311, Technical Writing	3	ANSC 2306, Prin. of Physio. Dom. Ani.	3
or ACOM 2302		AAEC 3302, Ag. Finance	3
CHEM 2303, Intro Organic Chem	3	ACCT 2300, Financial Accounting	3
CHEM 2103, Intro Organic Chem Lab	1	TOTAL	15
FDSC 2300, Principles of Food Tech.	3		
TOTAL	15		
THIRD YEAR			
Fall		Spring	
ANSC 3401, Reproduction Physiol.	4	HIST 2301, History of U.S. Since 1877	3
ANSC 3301, Principles of Nutrition	3	Approved Electives†	3
AAEC 3304, Farm & Ranch Mgt.	3	ANSC 3307, Feeds & Feeding	3
COMS 2300, Public Speaking	3	POLS 2302, American Public Policy	3
ANSC 3402, Animal Genetics	4	ANSC 3403, Sel./Care/Proc./Cook. Meats	4
TOTAL	17	TOTAL	16
FOURTH YEAR			
Fall		Spring	
Production Elective	4	Production Electives	8
ANSC 3100, Animal Science Seminar	1	Fine Arts/ Multicultural	3
AAEC 3303, 3305, 4303, 4317, or 4320	3	Electives	3
BLAW 3391, Business Law I	3	ANSC 4000, Internship	3
or AAEC 4320, Agribusiness Law	3	TOTAL	17
Humanities/Multicultural*	3		
TOTAL	14		

Minimum hours required for graduation—124

* Choose from Core Curriculum requirements.

Meat Science Curriculum

FIRST YEAR			
Fall		Spring	
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3
CHEM 1305, Chem. and Society I	3	CHEM 1306, Chem. and Soc. II	3
CHEM 1105, Exp. Gen. Chem. I (lab)	1	CHEM 1106, Exp. Gen. Chem. I (lab)	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, Intro. Math Analysis	3	ANSC 2301, Livestock & Meat Eval. I	3
TOTAL	14	MATH 2300, Contemporary Math.	3
		TOTAL	16
SECOND YEAR			
Fall		Spring	
POLS 1301, American Govt., Org.	3	FDSC 2302, Elem. Ana. of Foods	3
Humanities/Multicultural*	3	HIST 2300, History of U.S. to 1877	3
ENGL 2311, Technical Writing	3	BIOL 1402, Biology of Animals	4
or ACOM 2302		COMS 2300, Public Speaking	3
CHEM 2303, Intro. Organic Chem	3	ANSC 2306, Prin. of Physio. Dom. Ani.	3
CHEM 2103, Intro Organic Chem Lab	1	TOTAL	16
FDSC 2300, Principles of Food Tech.	3		
ANSC 2202, Prin. Anat. Dom. Ani.	2		
TOTAL	18		
THIRD YEAR			
Fall		Spring	
ANSC 3401, Repro. Physiol.	4	HIST 2301, History of U.S. Since 1877	3
ANSC 3301, Principles of Nutrition	3	ANSC 4400, Meat Science	4
ANSC 3402, Animal Genetics	4	ANSC 4000, Internship	3
POLS 2302, American Public Policy	3	ANSC 3100, Animal Science Seminar	1
MBIO 3400, Microbiology	4	ANSC 3403, Sel./Care/Proc./Cook. Meats	4
TOTAL	18	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Production Elective	8	FDSC 3301, Food Microbiology	3
(Select 2 from ANSC 4401, 4403, 4406)		FDSC 4303, Food Chemistry	3
ANSC 4404, Processed & Cured Meats	3	FDSC 3303 or 3309	3
or 4407, Poultry Prod	4	FDSC 4306, Dairy Products	3
Fine Arts/Multicultural*	3	Approved Electives†	4
TOTAL	15	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.

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. (Writing Intensive)
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.
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.
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.
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.
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.
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. F.
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. S.
5317. **Agricultural Systems Modeling (3:3:0)**. An introductory modeling course for biological and agricultural systems. No special mathematical or programming skills needed. F.
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. F, S.
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. F.
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. F.
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 13.)

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. Fulfills Core Technology and Applied Science requirement. 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. Fulfills Core Technology and Applied Science requirement. S.
3100. **Food Science 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. Fulfills Core Technology and Applied Science requirement. 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. S.
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.
4001. **Food Science 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. Substantial writing required. F, odd years.
4304. **Field Studies in Food Processing and Handling (3:1:4)**. Visits to food processing and handling facilities and discussions of operations. F.
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
5307. **Topics in Food Science (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

Alon Kvashny, Ed.D., Chairperson

Professor: Kvashny

Associate Professors: Billing, Hamed, Klein, Mills

Instructors: Benoit (Visiting), Nelson, Sullivan (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 13.)

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. F, S.
1401. **Landscape Architecture Drawing and Drafting (4:1:6)**. Introduction to drafting equipment, drafting and drawing. Construction of one-point and two-point perspective, shade and shadow, elements of visual composition. Fulfills Core Visual and Performing Arts requirement. 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 modeling and digitized graphics 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.

Landscape Architecture Curriculum

FIRST YEAR				
Fall		Spring		
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3	
MATH 1320, Coll. Algebra	3	MATH 1321, Trig.	3	
HIST 2300, History of U.S. to 1877	3	BIOL 1305, Ecological & Environ. Prob.	3	
LARC 1401, LA Drawing & Drafting	4	BIOL 1113, Environ. Problems Lab.	1	
LARC 1302, Introduction to LA	3	LARC 1402, LA Graphics	4	
TOTAL	16	TOTAL	14	
SECOND YEAR				
Fall		Spring		
HIST 2301, U.S. History Since 1877	3	PSS 1411, Principles of Horticulture	4	
CTEC 2301, Surveying & Surveys	3	LARC 2402, LA Design Process	4	
PSS 2330, Urban Soils	3	LARC, 2100, LA Portfolio Preparation	1	
LARC 2401, Basic Design in LA	4	AAEC 2305, Fund. Ag. Appl. Economics or	3	
LARC 2308, Comp. Aided Design in LA	3	Ind. or Group Behavior	3	
TOTAL	16	LARC 2309, Advanced CAD in LA	3	
		TOTAL	15	
THIRD YEAR				
Fall		Spring		
LARC 3302, Development of LA	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, Geographic Info. Systems	3	COMS 2300, Public Speaking	3	
LARC 4401, Urban Design	4	LARC 4402, Regional Plan & Design	4	
LARC 4404, LA Materials & Details	4	Directed Electives	6	
LARC 4302, Environmental Planning	3	LARC 4100, Seminar	1	
TOTAL	14	TOTAL	14	
FIFTH YEAR				
Fall		Spring		
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3	
NRM 4403, Aerial Photo Interpretation	4	LARC 4507, LA Senior 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.

- 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 relationship to nature. Geographical, historical, and cultural context of major movements in landscape architecture. Fulfills multicultural and Core Humanities requirements. F. (Writing Intensive)
- 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.

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.

- 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. (Writing Intensive)
- 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.
- 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 Natural Resources Management

Philip S. Gipson, Ph.D., Chairperson

Horn Professor and Bricker Chair: Ballard

Professors: Britton, Fish, Gipson, Patino, Wester

Associate Professors: Boal, Dabbert, Perry, Taylor, Villalobos, Wallace

Assistant Professors: Cox, Griffis-Kyle, Rideout-Hanzak, Rogowski

Adjunct Faculty: Arsuffi, Breck, Childress, Coldren, DeMaso,

Drawe, Haukos, Krausman, LeVering, McLendon, Pence, Peterson,

Pope, 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; Student Association for Fire Ecology; the Texas Tech Chapter of The Society of Conservation Biology; 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.

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).

Wildlife and Fisheries Management Curriculum**WILDLIFE MANAGEMENT TRACK**

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, Intro. Math. Analysis I or MATH 1350, Analytical Geometry	3	MATH 1331, Intro. Math. Analysis II or MATH 1351, Calculus I	3
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. I (Lab.)	1	CHEM 1108, Principles of Chem. II (Lab.)	1
NRM 2301, Introductory Wildlife	3	NRM 2302, Ecology & Conserv.	3
NRM 4100, Seminar	1	or NRM 2307, Diversity of Life	
TOTAL	14	HIST 2300, History of U.S. to 1877	3
		TOTAL	16

SECOND YEAR			
Fall		Spring	
BIOL 1403, Biology I	4	BIOL 1404, Biology II	4
NRM 2406, Wildlife Anat. & Physiology or ZOOL 3405, Vert. Struct. & Dev.	4	NRM 2305, Freshwater Ecology and Fish. BIOL 3416, Genetics or	4
NRM 3501, Rng/Forest/Wet/Plant Ident.	5	PSS 3421, Principles of Genetics	
CHEM 2303, Intro Organic Chem	3	NRM 3308, Quant. Methods in NR	3
CHEM 2103, Intro Organic Chem Lab	1	TOTAL	14
TOTAL	17		

THIRD YEAR			
Fall		Spring	
NRM 3302, Range Plant Ecology	3	NRM 3304, Principles of Range Mgt. or NRM 4401, Fisheries Mgt.	3-4
AAEC 2305, Fund. Ag. Appl. Economics	3	or NRM 3307 Prin. of Conserv. Science	
Required Elective**	3	NRM 4407, Wildlife Inv. Techniques	4
POLS 1301, American Govt., Org.	3	Required Elective**	3
PSS 2432, Principles & Practices of Soil	4	POLS 2302, American Public Policy	3
TOTAL	16	TOTAL	13-14

FOURTH YEAR			
Fall		Spring	
Required Electives**	6	NRM 4303, Range. Analysis Plan. or NRM 4314, Watershed Planning	3
COMS 2300, Public Speaking	3	or NRM 4320, Nat. Res. Policy	
Visual & Performing Arts*	3	NRM 4408, Wildlife Pop. Dynamics	4
ENGL 2311, Technical Writing	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	15	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 4406, 4408, 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.

Natural Resources Management (NRM)**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. Fulfills Core Technology and Applied Science requirement. 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. Fulfills Core Technology and Applied Science requirement. 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. Fulfills Core Technology and Applied Science requirement. F, S.

Wildlife and Fisheries Management Curriculum**FISHERIES MANAGEMENT TRACK**

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, Intro. Math. Analysis I or MATH 1350, Analytical Geometry	3	MATH 1331, Intro. Math. Analysis II or MATH 1351, Calculus I	3
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. I (Lab.)	1	CHEM 1108, Principles of Chem. II (Lab.)	1
NRM 2301, Introductory Wildlife	3	NRM 2302, Ecology & Conserv. or	3
NRM 4100, Seminar	1	NRM 2307, Diversity of Life	
TOTAL	14	HIST 2300, History of U.S. to 1877	3
		TOTAL	16

SECOND YEAR			
Fall		Spring	
BIOL 1403, Biology I	4	BIOL 1404, Biology II	4
NRM 2406, Wildlife Anat. & Physiology or PSS 2401, Intro. Entomology	4	BIOL 3416, Genetics or PSS 3421, Principles of Genetics	4
NRM 2305, Freshwater Ecology and Fish.	3	PSS 2432, Principles & Prac. Soils or	3-4
POLS 1301, American Govt., Org.	3	NRM 4314, Watershed Planning	
CHEM 2303, Intro Organic Chem	3	or PHYS 1403, General Physics I or GEOL 1303, Physical Geology	
CHEM 2103, Intro Organic Chem Lab	1	AAEC 2305, Fund. Ag. Appl. Economics	3
TOTAL	18	TOTAL	14-15

THIRD YEAR			
Fall		Spring	
NRM 4330, Aquaculture	3	NRM 4335, Fisheries Science	3
BOT 3401, Plant Phys. or	3-4	NRM 3308, Quant. Methods in NR or AAEC 3401, Ag. Statistics	3-4
PSS 3307, Insect Ana. & Phys. or ANSC 2401, Ana. Phys. Dom.		ZOOL 4310, Intro. Ichthyology	3
HIST 2301, History of U.S. Since 1877	3	NRM 4320, Nat. Res. Policy or	3
POLS 2302, American Public Policy	3	PHIL 3325, Environmental Ethics or AGSC 3301, Ag. Lead. Principles	
Elective^	3	Elective**	3
TOTAL	15-16	TOTAL	15-16

FOURTH YEAR			
Fall		Spring	
NRM 4407, Wildlife Inv. Techniques or ZOOL 4308, Ornithology or BIOL 4301, Herpetology or ZOOL 4407, Nat. History of Vertebrates	3-4	Humanities-Multicultural*	3
NRM 4401, Fisheries Mgt.	4	NRM 4408, Wildlife Pop. Dynamics or BIOL 3309, Principles of Ecology or BIOL 4310, Community Ecology or NRM 3307, Prin. of Conserv. Sci.	3-4
COMS 2300, Public Speaking	3	ENGL 2311, Technical Writing	3
Visual & Performing Arts*	3	AAEC 4302, Stat. Methods	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 CE 3371, 3171, ZOOL 3406, GEOL 3322.

^ Introductory botany course is suggested (NRM 3501, BOT 3403, 3404, 4302).

2307. **Diversity of Life (3:3:0)**. Principles of evolution, genetics, and biodiversity as related to conservation and management of natural resources at scales ranging from genes to the biosphere. Fulfills Core Technology and Applied Science requirement. F.
2406. **Wildlife Anatomy and Physiology (4:3:3)**. Corequisite: non-credit lab. A systematic study of the body systems of wild animals emphasizing functional anatomy and physiology and their ecological implications.
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)**. 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)**. A survey of the theory and practices of conservation biology. Emphasis is placed on methods used to maintain plant and animal biodiversity. S.

Environmental Conservation of Natural Resources

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, Intro. Math. Analysis I or MATH 1350, Analytical Geometry	3	POLS 1301, American Govt., Org.	3
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. I (Lab.)	1	CHEM 1108, Principles of Chem. II (Lab.)	1
NRM 2301, Introductory Wildlife	3	NRM 2302, Ecology & Conserv.	3
NRM 4100, Seminar	1	HIST 2300, History of U.S. to 1877	3
TOTAL	14	TOTAL	16
SECOND YEAR			
Fall		Spring	
BIOL 1403, Biology I	4	BIOL 1404, Biology II	4
AAEC 2305, Fund. Ag. Appl. Economics.	3	NRM 2307, Diversity of Life	3
NRM 3501, Range, Forest & Wetland	5	COMS 2300, Public Speaking	3
POLS 2302, American Public Policy	3	Specialized Elective††	3
TOTAL	15	Physical Science Elective**	4
		TOTAL	17
THIRD YEAR			
Fall		Spring	
NRM 3302, Range Plant Ecology	3	AAEC 3401, Agricultural Statistics	4
BIOL 3309, Principles of Ecology	3	HIST 3327, Survey American Env. Hist.	3
NRM 4314, Watershed Planning	3	NRM 3304, Principles of Range Mgt.	3
Specialized Elective††	6	BIOL 3416, Genetics	4
TOTAL	15	or PSS 3421, Principles of Genetics	
		Specialized Elective††	3
		TOTAL	17
FOURTH YEAR			
Fall		Spring	
NRM 3307, Prin. Conserv. Science	3	NRM 4407, Wildlife Invest. Techniques	4
Specialized Electives††	6	NRM 4315, Spatial Analysis in NRM or GEOG 3300, Geographic Info Systems	3
NRM 3201, Vegetation Inven. & Analysis	2	NRM 4408, Wildlife Pop. Dynamics	3-4
Humanities-Multicultural*	3	or NRM 4304, Fire Ecology & Mgt.	
Visual & Performing Arts*	3	or NRM 4309, Habitat Mgt.	
TOTAL	17	or NRM 4401, Fisheries Mgt.	
		ENGL 2311, Technical Writing	3
		TOTAL	13-14

Minimum hours required for graduation—124

* Choose from Core Curriculum requirements.

** 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).

- 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).** Prerequisite: ANSC 3501. Planning, implementing and evaluating prescribed fires.
- 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.
- 3401. Plant Physiology (4:3:1).** Prerequisite: BIOL 1403 and 1404; one semester of organic chemistry. Covers aspects of physiological processes, morphological development, and nutritional qualities in vascular plants. (BOT 3401)
- 3501. Range, Forest, Wetland Plants, and Plant Identification (5:3:4).** Native and naturalized forage plants of the U.S.; 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.

Range Management Curriculum

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, Intro. Math. Analysis I or MATH 1350, Analytical Geometry	3	MATH 1331, Intro. Math. Analysis II or MATH 1351, Calculus I	3
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. I (Lab.)	1	CHEM 1108, Principles of Chem. II (Lab.)	1
NRM 2301, Introductory Wildlife	3	NRM 2302, Ecology & Conserv.	3
NRM 4100, Seminar	1	TOTAL	13
TOTAL	14		
SECOND YEAR			
Fall		Spring	
BIOL 1403, Biology I	4	BIOL 1404, Biology II	4
AAEC 2305, Fund. Ag. Appl. Economics	3	NRM 3501, Range, Forest & Wetland	5
POLS 1301, American Govt., Org.	3	PSS 2432, Principles & Practices of Soil	4
CHEM 2303, Intro Organic Chem	3	BOT 3401, Plant Physiology	4
CHEM 2103, Intro Organic Chem Lab	1	TOTAL	17
TOTAL	14		
THIRD YEAR			
Fall		Spring	
NRM 3302, Range Plant Ecology	3	NRM 3304, Principles of Range Mgt.	3
NRM 3201, Vegetation Inven. & Analysis	2	COMS 2300, Public Speaking	3
HIST 2300, History of U.S. to 1877	3	AAEC 3401, Ag. Statistics	4
PSS 4332, Soil Classification	3	HIST 2301, History of U.S. Since 1877	3
PSS 3321, Forage & Pasture Crops	3	Required Elective**	3
ANSC 3301, Principles of Nutrition	3	TOTAL	16
TOTAL	17		
FOURTH YEAR			
Fall		Spring	
NRM 4302, Range Improvements	3	NRM 4303, Rangeland Analysis & Plan.	3
NRM 4304, Fire Ecology & Management	3	POLS 2302, American Public Policy	3
NRM 4309, Range-Wildlife Habitat Mgt.	3	NRM 4314, Watershed Planning	3
Humanities - Multicultural*	3	ANSC 4403, Beef Production or	
Required Elective**	3	ANSC 4406, Sheep & Goat Prod. or	
TOTAL	15	ANSC 3302, Livestock Production	3-4
		Visual & Performing Arts*	3
		TOTAL	15-16

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.

- 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.
- 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 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).** 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.
- 4306. Upland Game Ecology (3:2:3).** Prerequisite: NRM 2301 and ZOOL 4408, 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.
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. Fulfills Core Technology and Applied Science requirement. 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, 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 ZOO 4410. 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)**. 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 or NRM 3308 or MATH 2300. 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.
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.
5313. **Advanced Big Game Ecology and Management (3:3:0)**. 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)**. 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. 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)**. 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)**. Prerequisite: CHEM 1308 and BIOL 1404. 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, or 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).** 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).**

Department of Plant and Soil Science

Thomas L. Thompson, Ph.D., Chairperson

Bayer CropScience Regents Endowed Professor: Wilkins

B.L. Allen Chair: Hudnall

J.A. Love Chair: Thompson

Leidigh Professor: Zartman

Piper Professor: Hopper

Rockwell Professor: Auld

Thornton Chair and Horn Professor: V. Allen

Professors: Bednarz, Bronson, Dotray, Hellman, Maas, Thorvilson

Associate Professors: Burow, Hequet, McKenney, Montague, Parajulee, Wright, Xu

Assistant Professors: Henry, Moore-Kucera, Nansen, Sharma, Trela, Woodward

Research Professor: Ethridge

Research Assistant Professor: Abidi

Instructors: Bates, Light

Adjunct Faculty: Acosta-Martinez, Allen, Arioli, Baughman, Boman, Bouton, Brashears, Burke, Burow, Calhoun, Cantrell, Dever, Franks, French-Monar, Gannaway, Gitz, Hopkins, Keeling, Lascano, Mahan, Mauget, Maunder, McMichael, Payton, Peterson, Porter, Rosenow, Rush, Schubert, Sheetz, Stout, Trolinder, Trostle, Upchurch, Velten, Wallace, Wanjura, Wheeler, Zobeck

About the Program

This department supervises the following degree programs and certificates:

- Bachelor of Science in Environmental Crop and Soil Sciences
- Bachelor of Science in Horticultural and Turfgrass Sciences
- Master of Science in Crop Science
- Master of Science in Entomology
- Master of Science in Horticultural and Turfgrass Sciences
- Master of Science in Soil Science
- Doctor of Philosophy in Plant and Soil Science
- Graduate Certificate in Crop Protection
- Graduate Certificate in Fibers and Textiles
- Graduate Certificate in Horticultural Landscape Management
- Graduate Certificate in Soil Management

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

The department offers majors in environmental crop and soil sciences and horticultural and turfgrass sciences. These areas of study are built on a foundation of the basic biological and physical sciences. Students will learn to use their knowledge to focus on the use of plants for food, fiber, fuel, and the aesthetic good of humankind; the sustainable use of resources in plant production; and the critical functions of soils in the environment.

Environmental crop and soil sciences includes the study of soils, plant genetics and breeding, biotechnology, molecular biology, plant physiology and biochemistry, weed and pest control, and crop management as applied to the sustainable production of field crops. Students also study how to use and manage soils wisely in both natural and human-affected environments.

Horticultural and turfgrass sciences emphasizes the application of science to the growing and use of edible plants (fruits, nuts, and vegetables), ornamental plants (annual and perennial flowers and woody plants), and turfgrasses. Students focus on the challenges and practices of genetics and breeding, propagation, biotechnology, production, management, handling and storage, marketing, and use of horticultural plants and turfgrass. 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.

Students taught in the Department of Plant and Soil Science are educated to meet the challenges of sustainable production of plants for food, fiber, fuel, and aesthetic beauty while preserving 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 environmental crop and soil sciences and horticultural and turfgrass sciences 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.

Graduate Program / Plant and Soil Science

The department offers Master of Science degrees in crop science, entomology, horticulture and soil science and the Doctor of Philosophy degree in plant and soil science. 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's Programs

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.

Doctoral Program

The department offers the Doctor of Philosophy in Plant and Soil Science with specializations in crop protection, crop science, fibers and biopolymers, horticulture, and soil science. The specialization should be chosen at the time of the preliminary examination. 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

Graduate Certificate Programs

Crop Protection. The 12-hour Graduate Certificate in Crop Protection provides supplementary training and updated credentialing in the development of crop protection chemicals. Contact: Dr. Peter Dotray, 806.742.2837, peter.dotray@ttu.edu

Fibers and Textiles. The 12-hour Graduate Certificate in Fibers and Textiles provides professionals an opportunity to understand the meaning and complexity of cotton production and processing and its impact on cotton apparel, home furnishings, and industrial cotton products. Contact: Dr. Eric Hequet, 806.742.5333 Ext. 224, eric.hequet@ttu.edu

Horticultural Landscape Management. The 12-hour Graduate Certificate in Horticultural Landscape Management addresses a need in the green industry, which is one of the largest agricultural industries in Texas, to help professionals update their credentials. Industry changes in recent years have left many professionals seeking the kind of supplementary training this certificate provides. Contact: Dr. Cynthia McKenney, 806.742.2854, cynthia.mckenney@ttu.edu

Soil Management. The 12-hour Graduate Certificate in Soil Management allows potential soil scientists to obtain the required number of college credit hours in soil courses required by the Natural Resource Conservation Service and have a tangible certificate to indicate they have the requisite education. Contact: Dr. Richard Zartman, 806.742.1626, richard.zartman@ttu.edu

Plant and Soil Science (PSS)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 1100. **Freshman and Transfer Student Seminar (1:1:0).** Exposure to scientific disciplines, time management strategies, various learning styles, support services, employment opportunities, and social organizations within the Department of Plant and Soil Science.
- 1311. **Winemaking Worldwide (3:3:0).** Overview of the world history of alcoholic beverages with a primary focus on wine, viticulture, and winemaking.
- 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. Fulfills Core Technology and Applied Science requirement.
- 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 Core Natural Sciences requirement.
- 2114. **Wine Production Introduction Lab (1:0:3).** Prerequisites: PSS 1311, BIOL 1403. An overview of wine production technical

laboratory aspects with an emphasis on prefermentation processes, options and strategies, and fermentation management.

- 2130. **Urban Soils Laboratory (1:0:2).** Prerequisite: Concurrent or subsequent to PSS 2330. Discussion and practical experience with soils in the urban environment. Partially fulfills Core Natural Sciences requirement.
- 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.
- 2305. **Forensic Entomology (3:2:2).** Prerequisite: Consent of instructor. Collecting, rearing, and identifying in-sects found on dead mammals. Calculation of post-mortem interval is especially important in investigations of homicide
- 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 Core Technology and Applied Science 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. Fulfills Core Technology and Applied Science requirement. (Writing Intensive)

Environmental Crop and Soil Sciences**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
PSS 1321, Agronomic Plant Science	3	Free Elective	3
MATH 1320, Coll. Algebra or	3	MATH 1321, Trigonometry or	3
PSS 1100, Freshman/Transfer Seminar	1	Option Electives**	3
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. I (Lab.)	1	CHEM 1108, Principles of Chem. II (Lab.)	1
TOTAL	14	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 2303, Intro Organic Chem or CHEM 3305, Organic Chem. I	3	HIST 2301, History of U.S. Since 1877	3
CHEM 2103, Intro Organic Chem Lab or CHEM 3105, Chem. Lab.	1	PSS 2401, Introductory Entomology	4
HIST 2300, History of U.S. to 1877	3	ENGL 2311, Technical Writing	3
PSS 2432, Principles & Practices of Soil	4	or ENGL 3365, Pro. Report Writing	6
BIOL 1401, Biology of Plants+	4	Option Elective**	6
TOTAL	15	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
Option Electives**	6	AAEC 3401, Ag. Statistics	4
POLS 1301, American Govt., Org	3	POLS 2302, American Public Policy.	3
Free Elective	3	Free Elective	3
AAEC 2305, Fund. Ag. Appl. Economics	3	Option Elective**	6
ECO 2301, Principles of Economics	3	TOTAL	16
TOTAL	15		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
PSS 4100, Seminar	1	COMS 2300, Public Speaking	3
Free Electives	3	Visual & Perf. Arts/Multi. or Humanities*	3
Humanities/Multi. or Visual & Perf. Arts*	3	Option Elective**	7
Option Elective**	6-9	Free Elective	0-3
TOTAL	13-16	TOTAL	13-16

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.

+ Crop Biotechnology option requires student to take BIOL 1403 instead of BIOL 1401.

Crop Biotechnology: 34 hours from BIOL 1404, 3320/3120, BOT 4304, CHEM 331, 3312, 3313, PSS 3323, 3421, 4321 and 4415; Select additional 5 hours from PSS 3321, 3322, 3324, 4000, 4301, 4305, 4425 or CHEM 3141; Select 9 hours of free electives.

Crop Protection: 28 hours from PSS 3323, 3421, 4301, 4305, 4335, 4421, 4425 and MBIO 3400; Select additional 8 hours from PSS 3309, 3321, 3322, 3324, 4000, 4321, 4325, 4336, 4337 or 4415; Select 12 hours of free electives.

Cropping Systems Management: Select 23 hours from PSS 3322, 3323, 4305, 4325, 4335, 4421 and 4425; Select additional 12 hours from PSS 3309, 3321, 3324, 3421, 4000, 4301, 4321, 4332, 4415 or 4336; Select 13 hours of free electives

Environmental Soil and Water Science: Select 23 hours from GEOL 1303, MBIO 3400, PSS 4131, 4330, 4332, 4335, 4336 and 4337; Select additional 11 hours from GEOG 3300, 3301, 4302, GEOL 3323, NRM 4314, PSS 3309, 3321, 3322, 4000 or 4325; Select 14 hours of free electives

Forages and Grazing Systems: Select 27 hours from ANSC 1401, 3305, PSS 3321, 3323, 4325, 4335, 4421 and 4425; Select additional 9 hours from ANSC 3307, NRM 3201, 3303, PSS 3322, 3324, 4000, 4301, 4305, 4321 or 4336; Select 12 hours of free electives.

Horticultural and Turfgrass Sciences Curriculum**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
PSS 1411, Principles of Horticulture	4	AAEC 2305, Fund. Ag. Appl. Economics	3
CHEM 1307, Principles of Chem. I	3	or ECO 2301, Principles of Economics	3
CHEM 1107, Principles of Chem. I (lab.)	1	BIOL 1401, Biol. of Plants	4
ENGL 1301, Essentials of Coll. Rhetoric	3	CHEM 1308, Principles of Chem. II	3
POLS 1301, American Govt., Org.	3	CHEM 1108, Principles of Chem. II (lab.)	1
PSS 1100, Freshman/Transfer Seminar	1	ENGL 1302, Advanced College Rhetoric	3
TOTAL	15	TOTAL	14

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
ENGL 2311, Technical Writing	3	PSS 2312, Propagation Methods	3
PSS 2401, Intro. Entomology	4	MATH 1330, Intro. to Math. Analysis	3
PSS 2313, Herbaceous Plants	3	PSS 2302, American Public Policy	3
MATH 1320, College Algebra	3	Vis & Perf. Arts/Multi. or Humanities*	3
TOTAL	16	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
PSS 3318, Woody Plants	3	PSS 3421, Genetics	4
Specialized Elective^	4	COMS 2300, Public Speaking	3
Humanities/Multi. or Vis & Perf. Arts*	3	PSS 2432, Prin. & Practices in Soils	4
PSS 3323, Crop Physiology	3	Specialized Elective**	2
Directed Electives**	3	PSS 4314, 4411, or 4415+	3-4
TOTAL	16	TOTAL	16-17

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
PSS 4425, Ag. Plant Pathology	4	Free Electives	2-3
PSS 4100, Seminar	1	Specialized Elective**	9
Specialized Elective^	6	Directed Elective**	3
Free Electives	2	TOTAL	14-15
TOTAL	13		

Minimum hours required for graduation—120 (Students must fulfill the university multicultural requirement).

* Choose from Core Curriculum requirements.

** Directed Electives - Students will select 6 hours from PSS or AAEC, AGSM, BA, CHEM, BIOL, BOT, MBIO, NRM

^ Students will select specialized electives from one of the options listed below according to their area of interest:

+ Biotechnology option requires student to choose PSS 4415.

Biotechnology: 21 hours from PSS 2311, 3309, 3324, 4000, 4001, 4305, 4316, 4321, 4421 or CHEM 2103 and 2303.

Environmental: 21 hours from PSS 3309, 3324, 4000, 4001, 4305, 4313, 4421, NRM 203 or 3307.

Plant Protection: 21 hours from PSS 2311, 3309, 3324, 4000, 4001, 4301, 4305, 4313, 4335, 4337 or 4421.

Science: 21 hours from PSS 2210, 2311, 3309, 3317, 4000, 4001, 4301, 4313 or 4325.

Turf: 21 hours from PSS 3309, 3324, 4000, 4001, 4301, 4316, 4325, 4335 or 4421.

Viticulture and Enology: 21 hours to include 9 hours from PSS 1311, 2114, 4111, 4416. 12 hours from PSS 4000, 4001, 4301, 4305, 4325, 4330, 4335, 4336, 4421 or CHEM 2103, 2303. The 6 hours of Directed Electives from MBIO 3400 or FDSC 3301 and PSS 4310. Students who choose this option will also take PSS 2314 and 3310 in place of PSS 2313 and 3318.

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.

2314. Wine Production Introduction (3:3:0). Prerequisites: PSS 1311, BIOL 1403. An overview of wine production technical aspects with an emphasis on prefermentation processes, options and strategies, and fermentation management.

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 2330 and PSS 2432. Partially fulfills Core Natural Sciences requirement.

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. Fulfills Core Natural Sciences requirement.

2432. Principles and Practices in Soils (4:3:2). Prerequisite: CHEM 1305 or 1307 and CHEM 1105 or 1107. Formation and composition, physical and chemical properties, hydraulic and thermal relationships of soil. Role of soil in ecosystems. Fulfills Core Technology and Applied Science requirement. Credit not given for PSS 2330 and PSS 2432. (Writing Intensive)

3309. Introduction to Turfgrass Science (3:2:3). Prerequisite: PSS 1411. An overview of turfgrass selection, growth, adaptation and management. Specialized practices relative to home lawns, athletic fields, golf courses, and utility turfs.

3310. Viticulture I: Principles of Viticulture (3:3:0). Prerequisite: PSS 1411. Introduction to grapevine history, biology, physiology, and principles and practices of vineyard management.

3317. Interior Plants (3:2:3). Prerequisite: PSS 1411. 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.
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)**. PSS 1321 or 1411 and BIOL 1401 or 1403. 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)**. Utilization of writing and oral presentation skills. Continued enhancement of education skills and adherence to professional ethics.
4111. **Winemaking Worldwide Lab (1:0:3)**. Prerequisite: 21 years old or older. Sensorial introduction to wines and spirits of the world through tasting various regional wine and spirit types in relationship to an assortment of food pairings.
4301. **Agricultural Compounds (3:3:0)**. Prerequisite: PSS 2401; CHEM 2103, 2303; and consent of instructor. 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.
4310. **Viticulture II: Grape Production (3:2:2)**. Prerequisite: PSS 3310. Advanced studies of grape production and management practices in commercial vineyards.
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.
4317. **Golf Course Construction (3:3:0)**. Prerequisite: PSS 3309. Phases of golf course construction with emphasis on how construction decisions impact future management practices and concerns.
4318. **Turf Pest Management (3:2:3)**. Provides background of the major turfgrass pests and their control with special emphasis on integrated pest management.
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)**. Evaluation of the primary irrigation systems used in crop production, soil-plant interactions affecting water supply, and methods of monitoring soil and plant water status.
4330. **Environmental Soil Chemistry (3:3:0)**. Prerequisite: PSS 2432. 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.
4331. **Soil Microbial Ecology (3:3:0)**. Prerequisite: Introductory biology or microbiology, or consent of instructor. Introduction to soil organisms. **Includes interactions between organisms, processes, and their ecological functions.**
4332. **Soil Classification (3:2:3)**. Prerequisite: Approval of instructor for nonagriculture majors. Soil profile morphology. Classification systems with emphasis on the taxonomic system of the United States.
4335. **Soil and Plant Nutrient Management (3:3:0)**. Prerequisite: PSS 2432. Nutrient availability as influenced by soil properties, modern methods of nutrient management, and tools for maximizing nutrient use efficiency.
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. **Greenhouse Crop Production (4:3:3)**. Prerequisite: PSS 1411. Greenhouse construction, heating, cooling, growing media, pest management, nutrition, fertility, growth regulation, irrigation, post-harvest handling, marketing of greenhouse crops. Required field trips.
4415. **Plant Biotechnology (4:3:2)**. Prerequisite: PSS 3421. The study of plant biotechnology with emphasis on industry topics such as research, marketability, product development, and regulatory and intellectual property issues. (Writing Intensive)
4416. **Winemaking Quality Control and Analysis (4:3:2)**. Prerequisites: CHEM 1307, 1308, 1107, 1108; PSS 1311, 2314; FDSC 3301 or MBIO 3400 (may be taken concurrently). Quality control and analysis for winemaking.
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.
4426. **Introduction to Genomics (4:3:1)**. Prerequisite: Consent of instructor. Focuses on genome structure and function of model systems with emphasis on studying the regulation of gene expression and the transcriptome.

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 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.
5301. **Advanced Genetics (3:3:0)**. Prerequisite: PSS 3421 or BIOL 3416. Examines the complex principles and applications of modern genetics.
5303. **Host Plant Resistance to Arthropod Pests (3:3:0)**. Applied coevolution aspects of plant-insect interactions. Covers developmental, physiological and behavioral aspects of arthropod-plant interactions.
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.
5312. **Vineyard Management (3:2:2)**. Prerequisite: PSS 3310 or consent of instructor. Application of advanced knowledge of viticultural principles to the management of commercial vineyards.
5314. **Advanced Turf Pest Management (3:2:3)**. Prerequisite: PSS 3309 or consent of instructor. Examines the biology and ecology of major turfgrass pests to develop best management practices for various turf environments.

5315. **Aspects of Golf Course Construction (3:3:0)**. Prerequisite: PSS 3309 or consent of instructor. Provides an in-depth account of the golf course construction sequence from site selection through the grow-in process.
5316. **Advanced Arboriculture (3:3:0)**. Prerequisite: PSS 1411. 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)**. Prerequisite: PSS 3309. An advanced course in turfgrass science including turf physiology, nutrition, insects, diseases, and weed control.
5319. **Advanced Interiorscaping (3:2:2)**. Prerequisite: PSS 1411. 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)**. Prerequisite: PSS 3421. 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)**. Prerequisite: PSS 3321. Ecological and nutritional principles of livestock grazing are established. Mineral cycling, antitoxicity 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)**. Prerequisite: PSS 2432. 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. **Advanced Plant Nutrient Management (3:3:0)**. Prerequisite: PSS 2432. Evaluation and application of theory to plant nutrient management; a study of nutrient needs and nutrient reactions in soil; and predicting nutrient need and response.
5332. **Pedology (3:3:0)**. Prerequisite: PSS 2432. 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)**. Prerequisite: PSS 2432. 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. **Structure and Functionalization of Cotton Fibers (3:3:0)**. Fundamental understanding of the structure of cotton fibers and their characterization. Presents techniques used to functionalize the cotton fabric to create "smart" textiles.
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.
5373. **Biopolymers and Bioproducts (3:3:0)**. Prerequisite: CHEM 4310 or instructor consent. Focuses on the chemistry of biopolymers and their transformation to bio-based products.
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 Greenhouse Crop Production (4:3:3)**. Prerequisite: Consent of instructor. Greenhouse construction, heating, cooling, growing media, pest management, nutrition, fertility, growth regulation, irrigation, post-harvest handling, marketing greenhouse crops. Required field trips.
5416. **Advanced Winemaking (4:3:2)**. Prerequisites: CHEM 1107, 1108, 1307, 1308, ; PSS 1311, 2314; FDSC 3301 or MBIO 3400 (may be taken concurrently). Advanced winemaking quality control and analysis.
5421. **Genetically Modified Crops (4:3:2)**. Prerequisite: PSS 3421 or BIOL 3416. Course in genetics. This course will examine the contemporary methods and genetic principles of plant biotechnology and the commercialization of genetically modified plants.
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. Not open to students who have taken PSS 4425.
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.
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. Applications of soil chemical, physical, and biological principles to environmental issues.
6424. **Structural Genomics of Plants and Animals (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.
6432. **Advanced Soil Microbial Ecology (4:3:2)**. Prerequisite: Introductory biology or microbiology or instructor permission. Study of soil biota, emphasizing soil microorganisms' ecology, physiology, and biochemical functions.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

College of Architecture

Andrew Vernooy, M.D.S., Dean

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Horn Professor: Watkins

Professors: Aranha, Loudon, Peters, Vernooy, J.E. White, J.P. White

Associate Professors: Buelinckx, Davis, Driskill, Ellis, Flueckiger, Haq, Hill, Jaddo, Markovich, Neiman, Perl, Pongratz, Rex, Shacklette, Smith, Torres-McDonald

Assistant Professors: Al Ajlouni, Gomez, Park, Taylor, Tsubaki, Zugay

Instructors: Campbell, Chinn, Fairbetter, Faulk, Key, Martin, Perbellini, Powell, Schellhase, Stoll

Degree Programs

The College of Architecture offers programs leading to the following degrees and certificates:

- 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
- Graduate Certificate in Community Design and Development
- Graduate Certificate in Historic Preservation
- Graduate Certificate in Visualization

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

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 preprofes-

sional 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.

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. This also prepares students to continue into the master's degree program to obtain an accredited professional degree.

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.

Concurrent Enrollment. 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 to 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.

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.

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 dean.

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.

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. A grade of C is equivalent in the college 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 Undergraduate Academic section of this catalog gives information regarding academic status. Students on academic probation or academic suspension should familiarize themselves with these regulations. Only one semester of probation is allowed at the graduate level 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.

Off-Campus Programs. Each undergraduate student will complete the final undergraduate architectural design studio with a choice of international study abroad programs. These programs are organized by the College of Architecture and led by College of Architecture faculty. They are located in several different locations, including Europe, Canada, Mexico, and Central America.

Students seeking a Master of Architecture degree are required to have a practicum experience documented by the Intern Development Program administered by the National Council of Architect-

tural Registration Boards (NCARB). This requirement may be met with participation in the Practicum + Studio Program, Residency Program, or other documented practicum experience as approved by the associate dean for academics.

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 (Preprofessional Program)

General Architecture Program. Only courses with a minimum grade of C or better will be accepted into the architecture program.

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
MATH 1321 or 1550	3	PHYS 1403, Gen. Physics w/lab	4
Core Curriculum (see below)	3	PHIL 2310, Logic	3
Core Curriculum (see below)	3	Core Curriculum (see below)	3
TOTAL	15	TOTAL	17

Preprofessional Program. Competitive placement based on comprehensive review including student portfolio, written essay, GPA, statement of intent, and successful completion of PHYS 1403.

SUMMER	
Core Curriculum—Nat'l or Phys. (below)	4
Core Curriculum (see below)	3
TOTAL	7

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

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	3	ARCH Elective	3
TOTAL	17	TOTAL	17

URBANISM	
ARCH 4601, Arch. Design Studio VI ^{^^}	6

Fall: COLLABORATION	
ARCH 4341, Media Elective	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	2300/3358	

[^] Diversity elective course offerings are available on the architecture Web site (www.arch.ttu.edu)

^{^^} Optional courses are ARCH 4365 and 4366 for the Bachelor of Science degree (Preprofessional Program). ARCH 4601 is a prerequisite for ARCH 5901.

† Choose from Core Curriculum requirements.

†† Or approved substitution

Dual-Degree Curriculum: Bachelor of Science in Architecture and Bachelor of Science in Civil Engineering

General Architecture Program. Only courses with a minimum grade of C or better will be accepted for architecture 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
CE 1130, Civil Engr. Seminar I	1	PHYS 1408, Prin. Physics I w/lab	4
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
HIST 2300, History of U.S. to 1877	3	CE 1305, Engr. Analysis I	3
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
TOTAL	16	TOTAL	20
SUMMER			
MATH 2350, Calculus III	3	MATH 3350, Higher Math for Engr.	3
HIST 2301, History of U.S. Since 1877	3	PHYS 2401, Prin. Physics II w/lab	3-4
TOTAL	6	or EE 3301, General EE	
		TOTAL	6-7

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, statement of intent, GPA, and successful completion of PHYS 1408.

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
CE 2301, Statics	3	CE 3303, Mechanics of Solids	3
CE 2101, Const. Materials Lab	1	CE 3103, Mechanics of Solids Lab.	1
POLS 1301, American Govt. Org.	3	IE 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 2300/3358 or E 2331 or	3
TOTAL	7	PETR 3308*	
		TOTAL	7

THIRD YEAR

Fall: BUILDING ENCLOSURE		Spring: BUILDING SYSTEMS	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
CE 3321, Intro. Geotech. Engr.	3	ARCH 3352, Building Information	3
CE 3121, Geotech. Engr. Lab	1	ARCH 2355, Environmental Systems	3
CE 3440, Structural Analysis I	4	CTEC 2301, Surveying	3
Diversity Elective	3	CE 3305, Mechanics of Fluids	3
TOTAL	16	TOTAL	17

FOURTH YEAR

Fall		Spring	
CE 3341, Prin. of Structural Design	3	CE 4343, Design of Concrete Struc.	3
CE 3309, Environ. Engr.	3	CE 4340, Structural Analysis II **	3
CE 3171, Environ. Eng. Lab. I	1	CE 4342, Design of Steel Struc.	3
CE 3354, Engr. Hydrology	3	CE 3372, Water Systems Design	3
CE 3302, Dynamics	3	ARCH 3314, Contemporary Issues in Arch	3
ARCH elective	3	TOTAL	15
TOTAL	16		

SUMMER I and II

URBANISM	
ARCH 4601, Arch. Design Studio VI^	6

FIFTH YEAR

Fall: COLLABORATION	
ARCH 4363, Arch. Theory	3
CE 4330, Design Engr. Systems	3
CE 4361, Transport. Engr.	3
IE 3301 or ME 2322	3
TOTAL	12

Total Hours—181 (180)

* COMS elective choices for **civil engineering students** only are IE 2331 or PETR 3308.

** CE 4340 and 4342 offered during spring semesters only.

† Or approved substitution

^ Optional courses are ARCH 4365 and 4366 for the Bachelor of Science degree (Preprofessional Program). ARCH 4601 is a prerequisite for ARCH 5604/5605.

Dual-Degree Curriculum: Bachelor of Science in Architecture and Bachelor of Business Administration (General Business)

General Architecture Program. Only courses with a minimum grade of C or better will be accepted for the architecture program. Must complete lower-division business core requirements and have at least 2.75 GPA to take junior/senior-level business courses. **All business administration students must maintain a 2.75 GPA to continue enrollment in business courses at Texas Tech.**

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	PHIL 2310, Logic	3
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
MATH 1321, Trigonometry	3	PHYS 1403, Gen. Physics w/lab	4
TOTAL	15	TOTAL	17

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, GPA, statement of intent, and successful completion of PHYS 1403.

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

POLS 2302, American Public Policy^	3	Natural Lab Science †	4
MGT 3370, Org. and Mgt.	3	MKT 3350, Intro. to Marketing	3
TOTAL	6	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 and a diversity elective.

+ Must be a junior- or senior-level economics course except for ECO 3323 or 4332.

^ Or approved substitution.

Graduate Program / Architecture

The College of Architecture awards three graduate degrees:

- **Master of Architecture**—The M.Arch is a professional degree accredited by the National Architectural Accrediting Board. The college has an agreement with the Rawls College of Business allowing students to seek a dual Master of Architecture (M.Arch) / Master of Business Administration (M.B.A.) degree.
- **Master of Science in Architecture**—The M.S. in Architecture is considered a post-professional research-based academic degree.
- **Doctor of Philosophy in Land-Use Planning, Management, and Design**—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.

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 the "Transfer Courses" section on the previous page.

Off-Campus Programs. Students seeking a Master of Architecture degree are required to have a practicum experience documented by the Intern Development Program administered by the National Council of Architectural Registration Boards (NCARB). This requirement may be met with participation in the Practicum + Studio Program, Residency Program, or other documented practicum experience as approved by the associate dean for academics.

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 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.

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.

Master of Architecture (Accredited Professional Degree)

Mandatory Accreditation Statement. The National Architectural Accrediting Board (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. The 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 preprofessional 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 discussed on the next page.

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 as well as write and defend a thesis (6 hours).

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.

Each candidate for the Master of Science in Architecture degree must file for admission into one of the three certificate programs discussed on the next page. 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

(Continued on next page)

Graduate Program / Architecture (continued from page 125)

assistantships, and graduate part-time instructor positions available for graduate students.

Graduate 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. A certificate requires that the student take 15 hours of specified coursework in one of three programs: Community Design and 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. Students who wish to apply for acceptance into a certificate program should talk to an academic advisor within the college.

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 students at the leading edge of inquiry into visualization. Students are encouraged to explore the use of visualization in environmental design, design communication, science, product production, fabrication, simulation, modeling/simulation, and entertainment. The VIZ coursework prepares students 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 students 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 multidisciplinary 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 5501, 5502 or 5503 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)**
- ARCH 5301 Special Problems in Architecture (3)**
- 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)**

Master of Architecture (Professional Program)

General Architecture Program. Requires 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
MATH 1321 or 1550	3	PHYS 1403, Gen. Physics w/lab	4
Core Curriculum (see below)	3	PHIL 2310, Logic	3
Core Curriculum (see below)	3	Core Curriculum (see below)	3
TOTAL	15	TOTAL	17

Preprofessional Program. Competitive placement based on comprehensive review including student portfolio, written essay, GPA, and statement of intent.

SUMMER

Core Curriculum—Nat'l or Phys. (below)	4	Core Curriculum—Nat'l or Phys. (below)	3
Core Curriculum (see below)	3	Core Curriculum (see below)	3
TOTAL	7	TOTAL	6

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	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: (Professional Level)**	
ARCH 4341, Media Elective	3	ARCH 5901, Comprehensive Studio	9
ARCH 4363, Arch. Theory	3	ARCH 5365, Arch. Res. Methods	3
ARCH 4354, Integrative Systems	3	TOTAL	12
Elective	3		
TOTAL	12		

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. Please check the university catalog or college Web site for admission criteria. In all graduate courses, no grade below a C will be accepted. A 3.0 GPA is required each semester, and a 3.0 GPA is required to graduate.

FIFTH YEAR

Fall: MASTER DESIGN STUDY (Professional Level**)		Spring: MASTER DESIGN STUDY (Professional Level**)	
ARCH 5501, Adv. Arch. Design Studio	5	ARCH 5502, Adv. Arch. Design Studio	5
ARCH 5392, Professional Practice	3	ARCH 5334, Adv. Studies in Const. Tech.	3
ARCH Elective	3	ARCH elective	3
TOTAL	11	TOTAL	11

SIXTH YEAR

Fall (Professional Level**)	
ARCH 5503, dv. Arch. Design Studio	5
Elective	3
TOTAL	8

Minimum hours required for graduation—173

† Choose from Core Curriculum list in the Bachelor of Science in Architecture curriculum table on page 121.

[^] Diversity elective course offerings available on the architecture Web site (www.arch.ttu.edu).

++ Optional courses ARCH 4365 and 4366 for the Bachelor of Science degree (preprofessional program) and/or ARCH 4601. ARCH 4601 is a prerequisite for ARCH 5901.

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 architecture 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
MATH 1321 or 1550	3	PHYS 1403, Gen. Physics w/lab	4
Core Curriculum (see below)	3	PHIL 2310, Logic	3
Core Curriculum (see below)	3	Core Curriculum (see below)	3
TOTAL	15	TOTAL	17

Preprofessional Program. Competitive placement based on comprehensive review, including student portfolio, written essay, GPA, and statement of intent

SUMMER

Core Curriculum—Nat'l or Phys. (below)	4	Core Curriculum—Nat'l or Phys. (below)	3
Core Curriculum (see below)	3	Core Curriculum (see below)	3
TOTAL	7	TOTAL	6

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	3	ARCH Elective	3
TOTAL	17	TOTAL	17

SUMMER I and II

URBANISM	
ARCH 4601, Arch. Design Studio VI*	6

FOURTH YEAR

Fall		Spring: Preprofessional Program**	
ARCH 4341, Media Elective	3	ARCH 5901, Comprehensive Studio	9
ARCH 4363, Arch. Theory	3	ARCH 5334, Adv. Studies in Const. Tech.	3
ARCH 4354, Integrative Systems	3	ARCH 5365, Arch. Res. Methods	3
Elective	3	TOTAL	15
TOTAL	12		

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 3.0 GPA is required each semester, and a 3.0 GPA is required to graduate.

SUMMER**

MGT 5391, Strategic and Global Mgmt.	3	ISQS 5345, Statistical Concepts	3
ACCT 5301, Fin. & Manag. Accounting	3	FIN 5219, Financial Mgmt. Tools	2
TOTAL	6	TOTAL	5

FIFTH YEAR

Fall (Professional Level**)		Spring (Professional Level**)	
ARCH 5501, Adv. Arch. Design Studio	5	ARCH 5502, Adv. Arch. Design Studio	5
MKT 5360, Marketing Concepts/Strat.	3	MGT 5371, Manag. Org. Behav. & Des	3
FIN 5320, Financial Mgmt. I	3	.MGT 5372, Leadership & Team-Building	3
TOTAL	11	TOTAL	11

SUMMER**

ISQS 5230, Managerial Dec. Theory	2	ISQS 5343, Oper. Mgmt. & Mgmt. Sci	3
ISQS 5231, Info. Tech. for Managers	2	ECO 5310, Dom. & Global Business	3
BLAW 5290, Legal, Reg., & Ethical Environ.	2	BA 5199, MBA Capstone	1
TOTAL	6	TOTAL	7

SIXTH YEAR

Fall	
ARCH 5503, Adv. Arch. Design Studio	5
ARCH 5392, Professional Practice	3
ARCH Elective	3
TOTAL	11

SOME MBA COURSES MAY BE DELAYED TO THE FALL SEMESTER.

Total Hours—203

In all business administration graduate courses, at least 3 hours credit with a grade of "A" above a 3.0 GPA is required to receive the M.B.A. degree. See the Rawls College of Business section of the catalog for information on lower-division requirements.

† Choose from Core Curriculum list in the Bachelor of Science in Architecture curriculum table.

[^] Diversity elective offerings available on the architecture Web site (www.arch.ttu.edu).

* Prerequisite for ARCH 5901.

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 5503, Adv. Arch. Design Studio	5	ARCH Elective*	6
ARCH 6000, Master's Thesis	3	ARCH 6000, Master's Thesis	3
ARCH 6000, Master's Thesis	1	TOTAL	9
TOTAL	9		
Total Program Hours—38			

Total Program Hours—38

Most degree plans will require at least 6 hours of research.
Must complete 6 hours of elective courses. Suggested elective courses
(additional courses must be approved by the thesis chair and/or committee):

ARCH 5301, Spec. Problems in Arch*	ANTH 5341, Method & Theory in Archeology
ARCH 5311, Spec. Prob. in Arch. History*	or ANTH 5343, Topics in Anthro. Archeology
ARCH 7000, Research*	HIST 5303, Oral History Methodology
MUSM 5327, Collection Management	HIST 5304, Historical Methods
ARCH 5343, 3-D Computer Anim. & Imaging	

* Limited to one 3-hr. elective to be taken from these courses as part of the required curriculum

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. Students who enter the program will complete 131 credit hours, including 66 hours at EPCC and 65 hours at the College of Architecture at Texas Tech in El Paso or from the College of Outreach and Distance Education at Texas Tech (ODE). After admission to the university as a transfer student, students 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 3341, Digital Media II	3
ARCH 3350, Arch. Construction II	3	ARCH 3352, Building Information Tech.	3
ARCH 4311, Arch. in Nonwestern Soc.	3	ARCH 3355, Arch. Construction III	3
ARCH 4365, Arch. Project Mgmt.	3	General Elective	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 4341, Media Elective	3
ARCH 3373, Environ. Analysis/Site Plan.	3	ARCH 4363, Theory in Arch.	3
ARCH 3314, Contemporary Issues in Arch.	3	General Elective	3
TOTAL	13	TOTAL	12

Total Program Hours—66 (EPCC) + 65 (TTU) = 131

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
ARCH 5301, Special Problems in Arch	3	ARCH 5503, Adv. Arch. Design Studio	5
ARCH 5384, Comm. Design and Dev.	3	ARCH 5102, Graduate Colloquium	1
ARCH 5102, Graduate Colloquium	1	ARCH 7000, Research	1
TOTAL	10	TOTAL	10
SECOND YEAR			
Fall		Spring	
ARCH 5301, Spec. Problems in Arch*	3	ARCH 6000, Master's Thesis	6
ARCH 7000, Research	3	Elective	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 6000, Master's Thesis	3
ARCH 7000, Research	3	ARCH 5345, Design Vis. Studio	3
Elective	3	Elective	3
TOTAL	9	TOTAL	9

Total Program Hours—38



Architecture (ARCH)

(To interpret course descriptions, see page 13.)

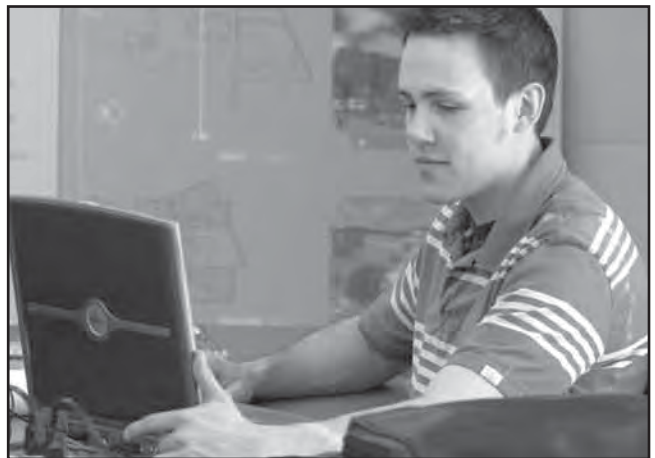
Undergraduate Courses

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. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement. 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 (4:4:2)**. Introduction to the principles and methods used at various stages of design analysis and synthesis processes. Skill developments in the abstraction, transformation, and composition of two- and three-dimensional design. Fulfills Core Visual and Performing Arts requirement. 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. Fulfills multicultural requirement. Fulfills Core Humanities requirement.
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.
2355. **Architectural Environmental Systems (3:3:0)**. Introduction to thermal design; daylighting; analysis of mechanical, electrical, and plumbing systems; and acoustical design. F.
- 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 to present. (Writing Intensive)
3341. **Digital Media II (3:3:2)**. 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 (3:3:2)**. 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 (3:3:4)**. 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 (3:3:2)**. 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)**. 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 (V1-6)**. 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. Fulfills multicultural requirement.
4341. **Media Elective (3:3:2)**. Analog or digital media options chosen from approved list.
4354. **Integrative Systems (3:3:2)**. 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.
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. (Writing Intensive)
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.
- 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. El Paso only. (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.
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.
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.
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 to 1900 (3:3:0).** A survey of American architecture from the Pre-Colombian 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.
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.
5334. **Advanced Studies in Construction Technology (3:3:2).** Prerequisite: ARCH 3355. Approved technology elective dealing with the advanced study of technical building methods and means.
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 (3:3:2).** 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.
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.
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.
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.
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.
5501. **Advanced Architectural Design Studio (5:0:10).** Topical studio that explores design, theoretical and/or technological issues that affect current architectural thought and practice.
5502. **Advanced Architectural Design Studio (5:0:10).** Topical studio that explores design and theoretical and/or technological issues that affect current architectural thought and practice.
5503. **Advanced Architectural Design Studio (5:0:10).** Topical studio that explores design, theoretical, and/or technological issues that affect current architectural thought and practice.
5622. **Preservation Studio (6:0:12).** Research on current preservation issues. Individual projects required.
5901. **Comprehensive Design Studio (9:0:18).** Design of a comprehensive architectural project based on a building program and site that includes an understanding of structural and environmental systems, building assemblies, and principles of sustainability.
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

Lawrence E. Schovanec, Ph.D.
Interim Dean

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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. Students on probation or suspension may not take correspondence courses. A 2.00 Texas Tech University GPA is required.

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. Students at Texas Tech University may attempt credit by examination for degree credit during their freshman, sophomore, junior, and senior years. 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 Office of the Registrar, which in the case of Arts and Sciences degrees is generally

two semesters prior to the semester of graduation. Arts and Sciences degrees require fulfillment of two years of foreign language, rather than one year, and generally require that Arts and Sciences students who wish to attempt credit by examination for degree credit in foreign language do so before the end of their sophomore year. This ensures that these students will have time to complete their foreign language requirement within four years if they do not succeed in earning credit by examination. Seniors must receive written permission from their academic dean's office prior to attempting credit by examination and provide proof of notification upon registering for an exam at Academic Testing Services.

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 fulfillment 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 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 applied to a degree program must be completed with Texas Tech enrollments. Credit

for courses (other than Texas Tech) taken without prior written 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 of coursework from Texas Tech, of which 24 semester hours should be in the major. 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. Students may not enroll in correspondence courses while pursuing a second degree.

Undergraduate Degree Programs

General Degree Requirements

Requirements for the Bachelor of Arts (B.A.) degree 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 the Bachelor of Arts 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 Admission to the University 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 sophomore literature courses from ENGL 2305, 2306, 2307, 2308, 2351, 2388, or 2391. However, ENGL 2311 or CLAS 1310 may be used as equivalents to fulfill 3 hours of this requirement.

Oral Communication 3

Courses must be selected from the Core Curriculum options.

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, whose language of instruction was 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

MATH 1300, 1320, 1321, 1330, 1331, 1351, 1352, 1420, 1430, 1550, 2300, 2345, 2350, 2360, 2370, or 2371. Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply. PHIL 2310 may be used to satisfy 3 hours of this requirement. The following courses may not be used to fulfill this requirement: AAEC 3401, IE 3341, MUTH 3303, PSY 3400, and SOC 3391.

Natural Sciences 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. Courses must be selected from the list of Core Curriculum options.

Technology and Applied Science 3

Courses must be selected from the list of Core Curriculum options.

Individual or Group Behavior 6

Courses must be selected from the list of Core Curriculum options.

American History 6

Courses must be selected from the list of Core Curriculum options.

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

Courses must be selected from the list of Core Curriculum options.

Visual and Performing Arts 6

Courses must be selected from the list of Core Curriculum options.

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 PFW 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 PFW course that corresponds to their varsity sport. A maximum of 1 credit hour per academic year per sport may be earned in this manner.

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 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. Please note that one requirement of the B.G.S. is that at least two of the three areas of concentration must be within Arts and Sciences. 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 “Middle Eastern Studies” with concentrations made up of minors in history, political sciences, and Arabic. Or one might specialize in “Hispanic 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 biol-

ogy, 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 College 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 of conversation or grammar 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 Bachelor of Science 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:

Semester Hours

English	12
Oral Communication	3
Foreign Language	11-16
Mathematics and Logical Reasoning	6
Political Science and History	12
Natural Sciences	8
Technology and Applied Science	3
Individual or Group Behavior	3
Humanities	3
3 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
3 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. Some majors require specific minors.	
Adjunct Requirements	As required
Requirements determined by the major department as essential to supplement the major.	
Total for Degree	(min.) 120

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. degree 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. Require-

ments 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
3 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
3 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, 3333, 4331, 4332, and three 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 3344, FREN 3390, 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, 3368, 3371, 3372, 3373, 3374, 3375, 3376, 3378.	
Elective Courses	0-9
Total for Degree	(min.) 120

* 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: www.prelaw.ttu.edu, www.honr.ttu.edu, and www.law.ttu.edu/prospective/specialprograms/honors3/.

Interdisciplinary Programs

Actuarial Science

The interdisciplinary minor in actuarial science builds a foundation for students interested in a profession that provides advice and solutions for business and societal problems involving economic risk. To secure an entry-level position, a prospective actuary is expected to have passed on average two to three society (CAS/SOA) exams, as well as have acquired validation through education experience (VEE) credits in three areas: applied statistical methods, corporate finance, and economics. The varied courses in this interdisciplinary minor prepare students for most of these entry requirements. The suggested courses for the minor are any six of the following (boldface courses are required): MATH 2356, 4342, 4343; FIN 3320, 3322, 4329; and ECO 3311, 3312 (or AAEC 3315). **Contact information:** Dr. Alexandre Trindade, Department of Mathematics and Statistics, 806.742.2566, alex.trindade@ttu.edu.

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. Jason Wasserman, 162 Holden Hall, 806.742.2401 ext. 233, F 806.742.1088, jason.wasserman@ttu.edu

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, CLT 4300, 4305, 4317, ENGL 3337, 3384, 3389, GERM 4312, HUM 2301, 2302, SLAV 3301, and WS 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 (CLT)

- 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. Fulfills multicultural requirement.
- 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, EMC 4370, 4375, and THA 4303 (may be repeated for credit). The 9 hours in analysis will include EMC 3345, THA 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

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.

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.

Master's Degree Program

Majors in classical humanities, English, French, German, and Spanish with specializations in comparative literature are available at the master's level. 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 (CLT) 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.

Doctoral Program

At the doctoral level, majors are offered in English and Spanish with specializations in comparative literature. Specialization involves a minimum of six courses, including at least two in comparative literature (CLT) 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 (CLT)

- 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).**

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. 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

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, 806.742.3145, 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.

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, SW 3311, 3312.

Contact information: Dr. Charlotte Dunham, Department of Sociology, Anthropology, and Social Work, 806.742.2401 ext. 226, charlotte.dunham@ttu.edu

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" on page 133.

Courses in General Studies (GST)

- 2001. General Studies Abroad (V1-12).** Individual studies in interdisciplinary, international, and multicultural experiences.
- 4000. Internship in General Studies (V1-12).** Supervised internship with government, profit, and nonprofit offices and agencies including primarily congressional and legislative offices in Washington, D.C. and Austin, Texas. Open to all undergraduate students at Texas Tech.

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, RWFM 4315, or GEOL 4332; and (3) GEOG 3335, RWFM 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, Department of Classical and Modern Languages and Literatures, Box 42071, 256 Foreign Languages, 806.742.1562, julian.perez@ttu.edu; Dr. Cynthia Sorrensen, 806.742.2201; CMLL Advising Center, 806.742.3145 ext. 227

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. Fulfills multicultural requirement. Fulfills Core Humanities requirement.
- 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. Fulfills multicultural requirement. Fulfills Core Humanities requirement.
- 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. Fulfills multicultural requirement. Fulfills Core Humanities requirement.

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; 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. 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

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, Box 42071, 256 Foreign Languages, 806.742.1562, julian.perez@ttu.edu; Dr. Cynthia Sorrensen, 806.742.2201; CMLL Advising Center, 806.742.3145 ext. 227

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.

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	Directed Studies (3:3:0)
HIST 5355	Studies in Colonial Latin American History (3:3:0)
HIST 5356	Studies in National Latin American History (3:3:0)
POLS 5371	Area Studies in Comparative Politics (3:3:0) (when course deals with Latin America or Iberia)
PORT 7000	Research (V1-12)
SPAN 5345	History of the Spanish Language (3:3:0)
SPAN 5347	Language Development (3:3:0) (offered in Mexico)
SPAN 5348	Culture and Literature (3:3:0) (offered in Mexico)
SPAN 5354	Hispanic Literary Concepts (3:3:0)
SPAN 5355	Seminar in Hispanic Literature (3:3:0)
SPAN 5361	Medieval Literature (3:3:0)
SPAN 5362	Golden Age Literature (3:3:0)
SPAN 5364	Nineteenth-Century Spanish Literature (3:3:0)
SPAN 5366	Twentieth-Century Spanish Prose (3:3:0)
SPAN 5368	Twentieth-Century Spanish Theatre and Poetry (3:3:0)
SPAN 5370	Colonial Spanish American Literature (3:3:0)
SPAN 5374	Nineteenth-Century Spanish American Literature (3:3:0)
SPAN 5375	Modernism (3:3:0)
SPAN 5376	Twentieth-Century Spanish American Prose (3:3:0)
SPAN 5378	Twentieth-Century Spanish American Theatre and Poetry (3:3:0)
SPAN 5381	Hispanic Literature of the Southwest (3:3:0)

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 departments 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).**

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, GERM 4301, LAT 4302, SPAN 4303, 4305

Group C — EDBL 3337, ENGL 3372, 4373, LING 4311

Group D — ANTH 3351, COMS 3332, EDBL 3334, EDLL 3352, ENGL 2371, 4300, 4371, 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.

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. **For further information**

contact 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

John C. Zak, Ph.D., Chairperson

Horn Professor: Baker

Professors: Bilimoria, Bradley, Carr, Chesser, Densmore, Heintz, Holaday, Patino, Phillips, M. San Francisco, Smith, Strauss, Tissue, Wilde, Zak, H. Zhang

Associate Professors: Cannon, Collie, Deslippe, Diamond-Tissue, Dini, Gollahon, Held, Jeter, McGinley, McIntyre, Reilly, Rice, Rock, Rosenheimer, Schmidt

Assistant Professors: Bernal (visiting), Kingston, Rodgers, Salazar-Bravo, Schwilk, Xie, K. Zhang

Instructors: Belinsky, Carty, Hamilton, Pan

Adjunct Faculty: Acosta-Martinez, Arsuffi, Fokar, Lyte, Owen, Parajulee, Payton, Rodriguez, S. San Francisco, Tripathy

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 3403, 3406, 4410, 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 both CHEM 3311 and 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, and either 3310 or both 3311 and 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.
- Requires a chemistry minor, including either CHEM 3310 or both CHEM 3311 and 3312.

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. Students are urged to take organic chemistry during their second year of study, and those 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 calculus (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.

Substitutions may be permitted for the majors and adjuncts with departmental authorization.

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, ZOOL 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 ZOOL 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 ZOOL 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; ZOOL 2403 or 3405; ZOOL 3406 or 4407.
- At least one of BIOL 3309, 3307, 4305, or ZOOL 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.

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 13.)

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.

Graduate Program

The master's and doctoral programs include specializations in the areas of animal physiology, 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.

Biology (BIOL)

(To interpret course descriptions, see page 13.)

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. Partially fulfills Core Natural Sciences requirement.
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. Partially fulfills the lecture component of the Core 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.
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. Fulfills Core Natural Sciences requirement. 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. Fulfills Core Natural Sciences requirement.
1403. [BIOL 1406] **Biology I (4:3:3)**. Enrollment as a freshman requires a minimum composite SAT reading plus math total 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. Fulfills Core Natural Sciences requirement. (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. Fulfills Core Natural Sciences requirement. (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)**. 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)**. 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)**. 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: BIOL 3416. A synthesis of animal and plant development, stressing the basic principles of molecular, cellular, and organismic development.
3303. **Tropical Marine Biology (3:3:3)**. This course introduces students to the ecology and diversity of tropical marine communities.
3304. **Human Genetics (3:3:0)**. Prerequisite: BIOL 3416. 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, or 1401, or 1402, or 1404. An examination of ecological systems emphasizing populations, communities, and ecosystems.
3310. **Experimental Cell Biology (3:1:6)**. Prerequisite: Prior or concurrent enrollment in BIOL 3320 or consent of instructor. 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)**. 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)**. 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 up to three times for different course content.
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. 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: BIOL 3309 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. 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. 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. 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 3416 or equivalent course in genetics. 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 or consent of instructor. 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.

- 5407. Advanced Population Biology (4:3:3).** Prerequisite: BIOL 3301, 3303, or equivalent. Introduction to the genetics and 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).** Prerequisite: Consent of instructor. 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).** 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 13.)

Undergraduate Courses

- 3401. Plant Physiology (4:3:3).** Prerequisites: CHEM 3305 and BIOL 1401 or BIOL 1403, 1404. The physiology of plants with an emphasis on relationships of structure to function in vascular plants. (Writing Intensive) (NRM 3401)
- 3403. Comparative Morphology of Plants (4:3:3).** Prerequisites: BIOL 1403 and BIOL 1404 or equivalent. 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)
- 4302. Field Botany (3:0:6).** Prerequisite: BOT 3404 or consent of instructor. Focuses on a thorough knowledge of and familiarity with the flora of West Texas and adjacent areas 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.
4409. **Plant Development (4:3:2)**. Prerequisite: BIOL 1403 and 1404. Integration of positional, environmental, hormonal, and genetic regulation of plant development; emphasis on model species and comparisons to animals. Alternate years.

Graduate Courses

5401. **Advanced Plant Physiology (4:3:3)**. Organic chemistry or biochemistry and BIOL 1403 and 1404 or equivalent. 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.
5404. **Advanced Taxonomy of the Vascular Plants (4:3:3)**. A survey of the diversity of vascular plants (emphasis on angiosperms) and the methodology of their classification. Lecture emphasizes modern approaches to systematics; lab emphasizes identification and collection techniques.
6302. **Advanced Field Botany (3:1:6)**. 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)**. Prerequisites: BIOL 1403 and 1404, BIOL 3304, and 3320 or equivalent. Molecular mechanisms regulating plant metabolism. Intensive reading of current literature is required. Alternate years.
6409. **Advanced Plant Development (4:3:2)**. Molecular and cellular analysis of plant development with emphasis on experimental approaches. Alternate years.

Microbiology (MBIO)

(To interpret course descriptions, see page 13.)

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. A molecular approach. (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 procaryotes.
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; MBIO 4402 recommended. A detailed study of pathogenic microorganisms. Laboratory discussion of medical case studies. (Writing Intensive)
4406. **The Genetics of Microorganisms (4:3:3)**. Prerequisite: 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: CHEM 3305 and CHEM 3306 or equivalent. 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: BIOL 3309, or MBIO 3401, or equivalent; or consent of instructor. 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 5401 with a grade of C or higher; 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 3401, or 5301, or equivalent; 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 (V1-6)**.
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 13.)

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. Fulfills Core Natural Sciences requirement.
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. Fulfills Core Natural Sciences requirement.
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: BIOL 1403 and 1404, CHEM 1307. 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)**. Prerequisites: BIOL 1402 or BIOL 1404. 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. Structure, life history, and evolution of the invertebrates.

Department of Chemistry and Biochemistry

Dominick J. Casadonte Jr., Ph.D., Chairperson

Horn Professors: Bartsch, Knaff, Nes

Piper Professor: Casadonte

Welch Professor: Hase

Professors: Birney, Gellene, Korzeniewski, G. Li, Poirier, Quitevis

Associate Professors: Morales, Niwayama, Paré, Shaw, Shelly, Thompson, Whittlesey

Assistant Professors: Blake, Bradley, Fuertes, Hope-Weeks, Krempner, Mayer, Pappas, Shi, Weber

Instructors: Hanna, Mason, Zhang

Adjunct Faculty: Dasgupta, Liu, 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

Graduate Courses

4304. **General Endocrinology (3:3:0).** Prerequisite: BIOL 3320. Hormones as chemical coordinators of bodily functions.
4312. **Animal Behavior (3:3:0).** Prerequisite: BIOL 1404 or 3309. 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).** Prerequisites: BIOL 1402 or BIOL 1404. Study of the classification, natural history, and ecology of mammals.
4407. **Natural History of the Vertebrates (4:3:3).** Prerequisites: BIOL 1401 and 1402 or BIOL 1403 and 1404. Evolutionary relationships, identification, and ecology of vertebrates. Local fauna emphasized.
4408. **General Ornithology (4:3:3).** Prerequisite: BIOL 1402 or 1404 or consent of instructor. 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, or 3309. Diversity, evolutionary relationships, ecology, and anatomy of fishes. (Writing Intensive)

5304. **Comparative Endocrinology (3:3:0).** Prerequisite: ZOOL 3405, 3416, BIOL 1404, or equivalent. Hormones as chemical coordinators of bodily functions. 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).** 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.
5402. **Advanced Mammalogy (4:3:3).** Studies of recent advances in mammalogy. For students who have not taken ZOOL 4406. F.
5408. **Advanced Ornithology (4:3:3).** Prerequisite: Consent of instructor. Selected topics including avian systematics, migration, physiology, ecology, and comparative behavior. S.
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 4407.
5409. **Comparative Physiology for Advanced Students (4:3:3).** Prerequisite: ZOOL 3405 or 3406; BIOL 3416; 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 3416 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.
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.

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, 3310, and 4 hours to be chosen from 3000, 3308, 3108, 4300, 4302, 4309, 4105, 4310, 4314, 4114	
MATH	6 hours
1351, 1352	
PHYS	8 hours
1403 and 1404 or 1408 and 2401	
English	12 hours
American History	6 hours
POLS	6 hours
1301, 2302	
Social and Behavioral Sciences	6 hours
Humanities	6 hours
Oral Communication	3 hours
Visual and Performing Arts	6 hours
Foreign Language	11-16 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, 1100, 3305, 3306, 3105, 3106, 3311, 3312, 3313, 3314, 3341, 3141, 4311, and 4 hours to be chosen from 3000, 4300, 4314, and 4114	
BIOL	15 hours
1403, 1404, 3320, 3416	
MATH	6 hours
1351, 1352	
PHYS	8 hours
1403 and 1404 or 1408 and 2401	
English	12 hours

American History	6 hours
POLS	6 hours
1301, 2302	
Social and Behavioral Sciences	6 hours
Humanities	6 hours
Oral Communication	3 hours
Visual and Performing Arts	6 hours
Foreign Language	11-16 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 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 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 13.)

Undergraduate Courses

1100. **Introduction to Biochemistry Research (1:1:0).** A structured seminar series on contemporary biochemical research topics. May not be repeated for credit.
1101. **Chemistry Bridge Course (1:1:0).** A one-week pre-semester intensive review of high school chemistry offered to students scoring low passing or high failing grades on the Chemistry Placement Examination.
1105. **[CHEM 1105, 1405] Experimental General Chemistry I (Laboratory) (1:0:3).** Corequisite: CHEM 1305. Designed to introduce the student to a variety of laboratory techniques and to complement the lecture course CHEM 1305. Partially fulfills Core Natural Sciences requirement.
1106. **[CHEM 1107, 1407] Experimental General Chemistry II (Laboratory) (1:0:3).** Corequisite: CHEM 1306. Partially fulfills Core Natural Sciences requirement.

Graduate Program / Chemistry and Biochemistry

Students seeking advanced degrees must take the diagnostic examination in their area of specialization and in two other non-specialty areas after arrival in early spring or fall. These examinations are based on the undergraduate curriculum and are also offered in late spring. Students who fail the diagnostic examination in their specialty area will be given a second and final opportunity to pass this examination. Those students whose academic background emphasizes biochemistry may opt for a series of three biological chemistry examinations rather than taking exams in two non-specialty areas.

Master's Program. 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.

Doctoral Program. 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. 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.

Chemistry Curriculum, B.A. Degree

FALL		SPRING	
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. Lab. I	1	CHEM 1108, Principles of Chem. Lab. II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced 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

FALL		SPRING	
CHEM 3305, Organic Chem. I	3	CHEM 3306, Organic Chem. II	3
CHEM 3105, Organic Chem. Lab. I	1	CHEM 3106, Organic Chem. Lab. II	1
POLS 1301, American Govt., Org.	3	Political Science†	3
Humanities Elective†	3	Social/Behavioral Science Elective†	3
PHYS 1408, Principles of Physics I**	4	PHYS 2401, Principles of Physics II**	4
English†	3	Minor	3-4
TOTAL	17	TOTAL	17-18

FALL		SPRING	
CHEM 3301, Descriptive Inorg. Chem.	3	CHEM 3341, Analytical Chemistry	3
CHEM 3307, Physical Chem. I	3	CHEM 3141, Analytical Chemistry Lab.	1
CHEM 3107, Physical 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		

FALL		SPRING	
CHEM 3310, Molecular Biochemistry	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, 4309, or 4314 and the remaining hours from CHEM 3000, 3308, 4105, 4114, 4302, or 4310.

Chemistry Curriculum, B.S. Degree

FALL		SPRING	
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. Lab. I	1	CHEM 1108, Principles Chem. Lab. II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced 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

FALL		SPRING	
CHEM 3305, Organic Chem. I	3	CHEM 3306, Organic Chem. II	3
CHEM 3105, Organic Chem. Lab. I	1	CHEM 3106, Organic Chem. Lab. II	1
CHEM 3301, Descriptive Inorg. Chem.	3	CHEM 3351, Analytical Chemistry	3
MATH 2350, Calculus III	3	CHEM 3251, Analytical Chem. Lab.	2
PHYS 1408, Principles of Physics I	4	PHYS 2401, Principles of Physics II	4
English†	3	Minor	3-4
TOTAL	17	TOTAL	16-17

FALL		SPRING	
CHEM 3201, Adv. Organic Chem. Lab.	2	CHEM 3308, Physical Chem. II	3
CHEM 3307, Physical Chem. I	3	CHEM 3108, Physical Chem. Lab. II	1
CHEM 3107, Physical Chem. Lab. I	1	Advanced Elective+	4
Foreign Language†	5	Foreign Language†	5
POLS 1301, American Govt., Org.	3	Political Science†	3
Minor	3-4	TOTAL	16
TOTAL	17-18		

FALL		SPRING	
CHEM 3310, Molecular Biochemistry	3	CHEM 4309, Inorganic Chem. II	3
Minor	3	CHEM 4105, Inorganic Chem. Lab	1
English†	3	Multicultural Elective†	3
Advanced Elective^	3-6	Social or Behavioral Science Elective†	3
Foreign Language	3	Advanced Elective^	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.

1107. [CHEM 1111, 1411] **Principles of Chemistry I (Laboratory) (1:0:3)**. Corequisite: CHEM 1307. Introduction to a wide variety of experimental techniques. Partially fulfills Core Natural Sciences requirement.
1108. [CHEM 1112, 1412] **Principles of Chemistry II (Laboratory) (1:0:3)**. Corequisite: CHEM 1308. A continuation of CHEM 1107, which serves as a prerequisite for all advanced laboratory courses in chemistry. Partially fulfills Core Natural Sciences requirement.
1110. **Teaching Methods in Chemistry (1:1:0)**. Corequisite: CHEM 1307. Prepares undergraduate students to be student assistants for first-year chemistry courses. Topics include chemistry content, pedagogy, classroom dynamics, and pedagogical content knowledge. Does not satisfy any requirements of a B.A. or B.S. in chemistry or biochemistry degree or a chemistry minor.
1301. **Introductory Chemistry (3:3:0)**. Prerequisite: Score of 0 or greater on the Chemistry Placement Exam. Basic vocabulary, concepts, and problem-solving skills required for CHEM 1307 and 1308. 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 partially fulfills the Core Natural Sciences

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. Partially fulfills Core Natural Sciences requirement.
1307. [CHEM 1311, 1411] **Principles of Chemistry I (3:3:0)**. Prerequisite: CHEM 1301 or a score of 50 or better 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. Partially fulfills Core Natural Sciences requirement.
1308. [CHEM 1312, 1412] **Principles of Chemistry II (3:3:0)**. Prerequisite: CHEM 1307. 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. Partially fulfills Core Natural Sciences requirement.
2103. [CHEM 1419] **Introductory Organic Chemistry Laboratory (1:0:3)**. Prerequisites: CHEM 1106 or 1108. Introductory

Biochemistry Curriculum, B.A. Degree

FIRST YEAR			
Fall		Spring	
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. Lab. I	1	CHEM 1108, Principles of Chem. Lab. II	1
BIOL 1403, Biology I**	4	BIOL 1404, Biology II**	4
ENGL 1301 Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced 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, Organic Chem. I	3	CHEM 3306, Organic Chem. II	3
CHEM 3105, Organic Chem. Lab. I	1	CHEM 3106, Organic Chem. Lab. II	1
CHEM 2100, Intro. Biochem. Research	1	Social or Behavioral Science Elective†	3
Foreign Language†	5	PHYS 2401, Principles of Physics II***	4
PHYS 1408, Principles of Physics I***	4	Foreign Language†	5
Visual/Performing Arts Elective†	3	TOTAL	16
TOTAL	17		

THIRD YEAR			
Fall		Spring	
CHEM 3311, Biological Chem. I	3	CHEM 3312, Biological Chem. II	3
BIOL 3416, Genetics	4	CHEM 3313, Biological Chem. Lab	3
English†	3	CHEM 3314, Biological Chem. III	3
Foreign Language†	3	Foreign Language†	3
POLS 1301, American Govt., Org.	3	CHEM 3341, Analytical Chem.	3
TOTAL	16	CHEM 3141, Analytical Chem. Lab	1
		TOTAL	16

FOURTH YEAR			
Fall		Spring	
CHEM 4311, Physical Chem. Biol. Sci.	3	English†	3
BIOL 3320, Cell Biology	3	Humanities Elective†	3
Advanced Elective^	4	Visual or Performing Arts Elective†	3
Social or 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 hours of advanced electives. Choose CHEM 4300 and CHEM 3000 (1), or CHEM 4314 and CHEM 4114.

Biochemistry Curriculum, B.S. Degree

FIRST YEAR			
Fall		Spring	
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107 Principles of Chem. Lab. I	1	CHEM 1108 Principles of Chem. Lab. II	1
BIOL 1403, Biology I**	4	BIOL 1404, Biology II**	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced 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, Organic Chem. I	3	CHEM 3306, Organic Chem. II	3
CHEM 3105, Organic Chem. Lab. I	1	CHEM 3106, Organic Chem. Lab. II	1
CHEM 2100, Intro. Biochem. Research	1	CHEM 3351, Analytical Chemistry	3
BIOL 3416, Genetics	4	CHEM 3251, Analytical Chem. Lab.	2
PHYS 1408, Principles of Physics I	4	PHYS 2401, Principles of Physics II	4
Foreign Language†	5	Foreign Language†	5
TOTAL	18	TOTAL	18

THIRD YEAR			
Fall		Spring	
CHEM 3311, Biological Chem. I	3	CHEM 3312, Biological Chem. II	3
MBIO 3401, Principles of Microbiology	4	CHEM 3313, Biological Chem. Lab	3
English†	3	CHEM 3314, Biological Chem. III	3
Foreign Language†	3	Foreign Language†	3
POLS 1301, American Govt., Org.	3	Political Science†	3
TOTAL	16	TOTAL	15

FOURTH YEAR			
Fall		Spring	
CHEM 4311, Physical Chem. for Biol. Sci.	3	CHEM 4312, Physical 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		

* 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, ZOOL 3405.

- organic laboratory techniques for students in agriculture and human sciences.
2303. **[CHEM 1419] 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).** 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: CHEM 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)
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. Fulfills Core Technology and Applied Science requirement.
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).** Prerequisites: CHEM 1308, MATH 1352, and PHYS 1404 or 2401. The study of gases, thermodynamics, chemical and phase equilibria, solutions, and statistical mechanics.
3308. **Physical Chemistry II (3:3:0).** Prerequisite: CHEM 3307 or CHE 3322. The study of kinetic theory, chemical kinetics, electrochemistry, transport properties, surface chemistry, and quantum chemistry.
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).** Prerequisites: CHEM 3306 and BIOL 1404, or BIOL 1401 and 1402. 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).** Prerequisites: CHEM 1308 and 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 (V1-6).** A structured independent studies course under the guidance of a faculty member. May be repeated for credit.
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.
4300. **Senior Research (3:0:8).** Prerequisite: Senior standing. 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).** Prerequisites: CHEM 3306 and 3307. Organic chemistry at an advanced level. Emphasis on developments in theoretical organic chemistry.
4309. **Advanced Inorganic Chemistry (3:3:0).** Prerequisites: 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).** Prerequisites: CHEM 3306 and 4311, or CHEM 3307 or CHE 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).** Prerequisites: CHEM 1308, 3311, MATH 1352, and PHYS 1404 or 2401. 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).** Prerequisites: 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).** Prerequisites: CHEM 3341 or 3351, and CHEM 3307 or 4311. Lecture course covering theories and application of instrumental chemical analysis methods. (Writing Intensive)

Graduate Courses

5010. **Individual Studies in Chemistry (V1-6).** 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).** Required of all graduate students majoring in chemistry.
5301. **Advanced Inorganic Chemistry I (3:3:0).** Prerequisite: Consent of instructor. Principles of coordination chemistry. Structure, bonding, properties, and reactions of complex compounds.
5302. **Advanced Inorganic Chemistry II (3:3:0).** Prerequisite: Consent of instructor. 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: Consent of instructor. An introduction to the chemistry of macromolecules, including the synthesis, structures, properties and applications of polymers.
5314. **Advanced Analytical Chemistry (3:3:0).** Prerequisite: Consent of instructor. 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: Consent of instructor. 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: Consent of instructor. Principles and methods of synthesis of organic compounds.
5323. **Modern Principles of Organic Chemistry I (3:3:0).** Prerequisite: Consent of instructor. 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: Consent of instructor. 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: Consent of instructor. 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: Consent of instructor. 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: Consent of instructor. 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: Consent of instructor. 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: Consent of instructor. 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: Consent of instructor. Chemical and physical properties of proteins. Primary and conformational structure determination.
5334. **Principles of Biochemistry (3:3:0)**. Prerequisite: Consent of instructor. 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: Consent of instructor. Biophysical methods and approaches to the study of structure-function relationships in biopolymers.
5336. **Lipids (3:3:0)**. Prerequisite: Consent of instructor. 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: Consent of instructor. Structure, mode of action, and kinetics of enzymes.
5339. **Nucleic Acids (3:3:0)**. Prerequisite: Consent of instructor. Eukaryotic and prokaryotic DNA cloning strategies, DNA sequence analysis and manipulation, and recombinant DNA expression.
5342. **Introduction to Quantum Chemistry (3:3:0)**. Prerequisite: Consent of instructor. Introduction to quantum mechanics, spectroscopy, and the electronic structures of atoms and molecules.
5343. **Quantum Chemistry (3:3:0)**. Prerequisite: Consent of instructor. The application of non-relativistic wave mechanics to problems of chemical structure and reactivity.
5345. **Molecular Spectroscopy (3:3:0)**. Prerequisite: Consent of instructor. 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: Consent of instructor. Equilibrium and non-equilibrium systems including ensembles, density matrices, and time-correlation functions.
5349. **Physical Chemistry Principles for Biological Sciences (3:3:0)**. Prerequisite: Consent of instructor. 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)**. Prerequisite: Consent of instructor. An integrated course including dimensional analysis, nomenclature, stoichiometry, atomic and molecular structure and geometry, quantum mechanics, periodic properties, thermochemistry, states of matter, and solution chemistry.
5361. **Conceptual Chemistry for Teachers II (3:3:0)**. Prerequisite: Consent of instructor. A continuation of CHEM 5360, covering equilibrium; acid-base chemistry; solubility; kinetics; electrochemistry; nuclear chemistry; and introductory organic chemistry, biochemistry, and polymer 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

Frederick Suppe, Ph.D., Chairperson

Horn and Qualia Chair: J. Pérez

Horn and Qualia Professor: Gafaiti

Horn Professor: Larmour

Professors: Christiansen, A.J. Pérez, G. Pérez, Suppe, VanPatten, Wood

Associate Professors: Beard, Beusterien, Farley, Fry, Gorsuch, Grair, Holland, Ladeira, Qualin, Stratton, Zamora

Assistant Professors: Bains, Banta (Visiting), Borst, Cole, Collopy, Corbett, Elola, Grenvitz-Jones, Griffie, Lavigne, Pereira-Muro, Price, Surliuga, Weinlich

Instructors: Meier, Merchant, Thrasher

Adjunct Faculty: Le

About the Program

This department supervises the following degree programs and certificate:

- 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
- Graduate Certificate in Teaching English in International Contexts

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.

The department also operates the Texas Tech Quedlinburg, Germany Center and provides all language instruction at the Texas Tech Seville, Spain Center. It also runs the International Teaching Assistant Workshop for international students each summer. The Intensive English Program (IEP) provides non-credit English languages to prepare students for eventual admission to a college or university.

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 selected from classics (CLAS), Greek (GRK), or Latin (LAT) at the 1502 level and above. Six hours of 4000-level classics courses must be included within the 30 hours. Classics students pursuing teacher certification must select 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 language or area. All minors must complete at least 6 hours at the upper level in their respective languages. Students minoring in French, German, Latin, Portuguese, Russian, and Spanish must complete 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). Students may not complete all 9 hours of their upper-level requirement in one semester. 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 study abroad, and many take this opportunity to enhance their language skills. Resident semester abroad programs are available in Seville, Spain and Quedlinburg, Germany. The department operates summer programs in Seville, Spain; Quedlinburg, Germany; San Luis Potosi, Mexico; Montpellier, France; and, in alternate years, Salvador, Brazil, and Russia. Students enrolled in Arabic, Chinese, French, Italian, Japanese, Portuguese, and Russian have other opportunities 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 FREN 3390; GERM 3312, 3313; ITAL 3315, 3390; SPAN 3390, 3391, 3392; and RUSN 3301, 3302, 3304, 4301, 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 enrollment in higher-numbered courses. For example, 2302 or its equivalent is a prerequisite for enrolling in a junior-level course, and completion of at least three hours at the junior level is a prerequisite for enrolling in a senior-level course.

Upper-level 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 as part of the teaching field, preferably before their student teaching. 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. Depending on the student's college, the hours will count towards languages or other humanities requirements 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.

Students at Texas Tech University may attempt credit by examination for degree credit during their freshman, sophomore, junior, and senior years. 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 Office of the Registrar, which in the case of Arts and Sciences degrees is generally two semesters prior to the semester of graduation. Arts and Sciences degrees require fulfillment of two years of foreign language, rather than one year, and generally require that Arts and Sciences students who wish to attempt credit by examination for degree credit in foreign language do so before the end of their sophomore year. This ensures that these students will have time to complete their foreign language requirement within four years if they do not succeed in earning credit by examination. Seniors must notify their academic dean's office prior to attempting credit by examination and provide proof of notification upon registering for an exam at Academic Testing Services.

Graduate Program / Classical and Modern Languages and Literatures

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.

Master's Program

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. Candidates for the M.A. degree in this department must demonstrate a reading knowledge of a second foreign language. Oral and written comprehensive examinations are required. The department offers a 150-hour dual B.A.–M.A. option for outstanding students.

M.A. in Romance Languages. 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 6-hour minor. For Spanish and French, areas of interest include literature, comparative literature, linguistics, civilization and/or culture.

M.A. in Applied Linguistics. Applicants for the M.A. degree in applied linguistics may complete 30 hours of graduate courses and a thesis or 36 hours of coursework. 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.

M.A. in Classics. Applicants for the M.A. degree in classics may complete 30 hours of graduate courses and a thesis or 36 hours of coursework. 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. Areas of emphasis for classics include literature, language, gender, and art history.

M.A. in German. Applicants for the M.A. degree German may complete 30 hours of graduate courses and a thesis or 36 hours of coursework. Areas of interest include literature, comparative literature, linguistics, civilization and/or culture.

Dual Degree Program. This department participates in the dual M.B.A.–M.A. degree program. See a full description under the Rawls College of Business section of this catalog.

Minors. Graduate minors for the M.A. degree are available in applied linguistics, classics, English as a second language, German, Greek, Latin, Portuguese, Russian, and Romance languages.

Doctoral Program

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 they 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.

Graduate Certificate Program

The Graduate Certificate in Teaching English in International Contexts is an advanced certificate available to Texas Tech students who are enrolled in any graduate program and considering teaching outside the United States. Students may begin taking graduate courses for the certificate during their last semester of undergraduate study if they have a GPA of 3.0 or above and are within 12 hours of graduation. For additional information, contact Dr. Greta Gorsuch, certificate advisor, at greta.gorsuch@ttu.edu.

American Sign Language (ASL)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 1301, 1302. [SGNL 1301, 1302, 1401, 1402, 1501, 1502] **Beginning Course in American Sign Language I and II (3:3:1 each).** Prerequisite: ASL 1301 for 1302. 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; 2301 is prerequisite for 2302. 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. Fulfills multicultural and Core Humanities requirements.

4300. **Individual Studies in ASL (3).** Prerequisite: ASL 2302 or consent of instructor. Independent study in American Sign Language under the guidance of a faculty member. May be repeated for credit up to 9 hours with consent of instructor.

Arabic (ARAB)

Undergraduate Courses

- 1501, 1502. [ARAB 1511, 1512] **Beginning Course in Arabic I and II (5:5:1 each).** Prerequisite: ARAB 1501 for 1502. Introduction and development of the four language skills in Arabic. Listening comprehension, speaking, reading, and writing.
- 2301, 2302. [ARAB 2311, 2312] **Second Course in Arabic I and II (3:3:0 each).** Prerequisite: ARAB 1501 and 1502; ARAB 2301 for 2302. Reading, cultural background, grammar review, conversation and composition.
4300. **Individual Studies in Arabic (3).** Prerequisite: ARAB 2302 or consent of instructor. 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)**. Prerequisite: 1501 for 1502. 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 1502 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 consent of instructor. Contents will vary to meet the needs of the student. May be repeated for credit once 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. Fulfills Core Humanities requirement.
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. Fulfills multicultural requirement. Fulfills Core Humanities requirement.
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. Fulfills Core Technology and Applied Science requirement.
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. Fulfills multicultural requirement. Fulfills Core Humanities requirement.
3330. **The World of Rome (3:3:0)**. Examination of the literature and/or art and archeology of ancient Rome in its cultural context. Fulfills multicultural requirement. Fulfills Core Humanities requirement.
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. Fulfills multicultural requirement. Fulfills Core Humanities requirement.
4300. **Research in Classics (3)**. Prerequisite: Consent of instructor. Undergraduate research in classics under direction of instructor. May be repeated once 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 once 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 once 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 once 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. [ARAB 1311, 1312, 1411, 1412; CZEC 1311, 1312; KORE 1311, 1312, 1411, 1412; VIET 1311, 1312, 1411, 1412] **Individual Studies in Modern Languages I, II (3 each)**. Prerequisite: 1301 for 1302. Introduction and development of skills in a modern language, including listening comprehension, speaking, reading, and writing.
- 1501, 1502. [CZEC 1511, 1512; KORE 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; KORE 2311, 2312; VIET 2311, 2312] **Individual Studies in Modern Languages III, IV (3 each)**. Prerequisite: for 2301, CMLL 1302; for 2302, CMLL 2301. 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 consent of instructor. Independent study in modern language under the guidance of a faculty member. May be repeated once 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. May be repeated once.
5305. **Academic Listening Skills (3:3:0)**. Teaches listening, note-taking, interrogative and verbal skills to students who are non-native speakers of English. May be repeated once.
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)**. Prerequisite: for 1501, permission of department; for 1502, FREN 1501.
1507. **Comprehensive French Review First Year (5:5:1)**. Prerequisite: Two years of high school French or permission of department. A comprehensive one-semester review.
- 2301, 2302. [FREN 2311, 2312] **A Second Course in French I, II (3:3:0 each)**. Prerequisite: For 2301, FREN 1502 or 1507; for 2302, FREN 2301. Readings, cultural background, conversation, and composition.
3302. **Major French Writers (3:3:0)**. Prerequisite: FREN 2301 and 2302. A survey of major French writers. Fulfills Core Humanities requirement. (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. 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. Fulfills multicultural and Core Humanities requirements.
4100. **Advanced Individual Problems in French (1)**. Prerequisite: consent of instructor. Contents will vary to meet the needs of student. May be repeated for credit up to 6 hours with the consent of the instructor.
4300. **Individual Problems in French (3)**. Prerequisite: consent of instructor. Contents will vary to meet the needs of students. May be repeated for credit up to 12 hours with the consent of the instructor. Independent work under the guidance of a staff member.
4302. **Advanced Grammar and Composition (3:3:0)**. Prerequisite: FREN 3304. 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)**. Prerequisite: FREN 3303 or 3304. Oral and written French, with special attention to idiomatic expressions currently in use in business and technical fields.
4306. **French Phonetics and Diction (3:3:0)**. Theory and practice of the principles of French pronunciation and intonation. Individual laboratory exercises.
4315. **The French Short Story (3:3:0)**. Prerequisite: FREN 3302. Traces the development of the French short story from Voltaire's *Candide* to Boris Vian's *Les Lurettes Furrées*. 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 3302. May be repeated once for credit with consent of instructor. Conducted in French. (Writing Intensive)
4322. **Civilisation Française: French Civilization (3:3:0)**. Prerequisite: FREN 3302 or 3304. 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. Fulfills multicultural requirement. (Writing Intensive)
4345. **History of the French Language (3:3:0)**. The historical, linguistic, and literary evolution of French from its Latin origins to the present day.

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 once 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 once 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 once 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 once 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 once 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.
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 once 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)**. Prerequisite: for 1501, permission of department; for 1502, GERM 1501. Oral practice, elementary reading, and grammar.
1507. **Comprehensive German Review – First Year (5:5:1)**. Prerequisite: Two years of high school German or permission of department. A comprehensive one-semester review.
- 2301, 2302. [GERM 2311, 2312] **A Second Course in German I, II (3:3:0 each)**. Prerequisite: for 2301, GERM 1502 or 1507; for 2302 GERM 2301. Reading, cultural background, grammar review, and conversation.
3301. **German Culture and Society (3:3:0)**. Prerequisite: GERM 2302. Study of video, Internet, and textual resources on culture and current issues. Conducted in German. Fulfills multicultural and Core Humanities requirements. (Writing Intensive)
3303. **Conversation and Composition (3:3:0)**. Prerequisite: GERM 2302. 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. An introduction to periodization of German literature, literary genres, and literary theory. Conducted in German. Fulfills Core Humanities requirement. (Writing Intensive)
3305. **German Language Studies (3:3:0)**. Prerequisite: GERM 2302. 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. Readings in cultural history and literature, lectures, and tours on location. Taught in German. May not be repeated for credit toward major or minor. Fulfills multicultural and Core Humanities requirements. (Writing Intensive)
3312. **Literature of the Holocaust (3:3:0)**. Examination of the Holocaust as represented in literature, film, and art. Conducted in English. Fulfills multicultural and Core Humanities requirements. (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. Fulfills multicultural and Core Humanities requirements.
4000. **Individual and Group Studies in German (V1-6).** Prerequisite: Consent of department. Study in German under the guidance of a faculty member. May be repeated for credit up to 6 hours.
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 and 3303. 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: GERM 3303 and 3304. Readings from a particular period or study of a literary theme. May be repeated once for credit with consent of instructor. Conducted in German. Fulfills multicultural requirement. (Writing Intensive)
4309. **Business German (3:3:0).** Prerequisite: 6 hours from GERM 3301, 3303, 3304. 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 at least one 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).** 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 up to 12 hours.
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).** Prerequisite: 1301 for 1302.

- 2301, 2302. [GREE 2311, 2312] **A Second Course in Greek I, II (3:3:0 each).** Prerequisite: for 2301, GRK 1302; for 2302, GRK 2301. Review; selected readings from standard authors.
4300. **Individual Problems in Greek (3).** Prerequisite: GRK 2301 and 2302. Contents will vary to meet the needs of students. May be repeated once for credit with consent of instructor. Independent readings under guidance of a staff member.
4302. **Greek Composition (3:3:0).** Prerequisite: GRK 2302 or consent of instructor. Practice in Greek prose composition. May be repeated once for credit 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 once for credit.
5340. **Greek Poetry (3:3:0).** Selected readings in Greek poetic texts from various genres. Topics may vary. May be repeated once 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).** Prerequisite: ITAL 1301 for 1302.
- 2301, 2302. [ITAL 2311, 2312] **A Second Course in Italian I, II (3:3:0 each).** Prerequisite: for 2301, ITAL 1302; for 2302, ITAL 2301. Reading, cultural background, conversation, and composition.
3303. **Italian Conversation (3:3:0).** Prerequisite: ITAL 2302. Through discussions on contemporary Italian culture, students will improve their fluency in Italian.
3315. **Italian Filmmakers (3:3:0).** An analysis of the development and main themes of major Italian film-makers such as Fellini, Antonioni, Wertmüller, Avati, and Moretti. Taught in English.
3390. **Italian Cinema (3:3:0).** Covers the development of Italian cinema from the 1940s to the present. Taught in English. Fulfills Core Humanities requirement.
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 up to 9 hours with consent of instructor. Independent work under guidance of a staff member.
4301. **Topics in Italian Literature (3:3:0).** Prerequisite: ITAL 2302 or consent of instructor. A study of selected classical masterpieces or contemporary Italian literary works. May be repeated once when content is different.
4303. **Advanced Italian Conversation (3:3:0).** Prerequisite: ITAL 3303. This course is the continuation of Italian 3303. Students will be exposed to conversations with native Italian speakers and Italian media such as Italian news broadcasts, magazines, and documentaries.

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).** Prerequisite: JAPN 1501 for 1502. 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: for 2301, JAPN 1502; for 2302, JAPN 2301. Reading, cultural background, grammar review, conversation, and composition skills.

4300. **Individual Studies in Japanese (3)**. Prerequisite: JAPN 2302 or consent of instructor. Independent study in the Japanese language under the guidance of a faculty member. May be repeated for credit up to 24 hours with consent of instructor.

Latin (LAT)

Undergraduate Courses

- 1501, 1502. [LATI 1511, 1512] **A Beginning Course in Latin I, II (5:5:0 each)**. Prerequisite: 1501 for 1502.
1507. **Comprehensive Latin Review First Year (5:5:0)**. Prerequisite: Placement exam or consent of the coordinator of the Latin program/undergraduate advisor. 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: for 2301, LAT 1502 or 1507; for 2302, LAT 2301. Review; selected readings from standard authors.
4300. **Individual Problems in Latin (3)**. Prerequisite: LAT 2302 or consent of instructor. Contents will vary to meet the needs of the students. May be repeated for credit up to 18 hours 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 once 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 once for credit.
5310. **Seminar in Latin Literature (3:3:0)**. Content will vary to meet the needs of the students.
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)**. 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 once for credit.
7000. **Research (V1-12)**.

Linguistics (LING)

Undergraduate Courses

4311. **Methods of Teaching Second and Foreign Languages (3:3:0)**. Prerequisite: At least two language courses at third-year level, preferably a senior-level language course. Should be taken the semester prior to student teaching. Overview of historical and current methods of teaching second and foreign languages.
4315. **Introduction to Spanish Linguistics (3:3:0)**. Prerequisite: Consent of instructor. An introduction to the fundamentals of Spanish linguistics, including syntax, phonetics, phonology, semantics, history of the Spanish language, and linguistic variation.
4327. **English as a Second Language: Language Use and Learning (3:3:0)**. Prerequisite: Consent of instructor. Raises awareness of the social and educational implications of teaching English as a second language.
4332. **Child Language Acquisition (3:3:0)**. Prerequisite: Consent of instructor. Examines child language acquisition from birth and introduces key research and debates in the field of child language acquisition.
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.

4383. **Topics in Second Language and Bilingual Studies (3:3:0)**. Prerequisite: Consent of instructor. Linguistic, psycholinguistic, and sociolinguistic issues in bilingualism and second languages. May be repeated for a maximum of 6 hours if content is different.

Graduate Courses

5312. **Linguistics for Second Language Educators (3:3:0)**. Concepts in linguistics and linguistics analysis as they relate to bilingual and second language education.
5320. **Second Language Writing (3:3:0)**. A study of theories and research related to second language writing and their implications for teaching second language composition.
5322. **Theoretical and Research Foundations of Second Language Teaching (3:3:0)**. Study of theory and research underlying current language teaching with an emphasis on communicative approaches.
5325. **Technology in Teaching Second Languages (3:3:0)**. A study of theory, research, and practice in the use of technology for teaching second languages, including audio, video, CALL, and Internet technologies.
5327. **Second Language Curriculum Design (3:3:0)**. Analysis of second and foreign language teaching curriculum design models and application to current language teaching.
5328. **Teaching English in International Contexts (3:3:0)**. This course is designed to prepare students methodologically and professionally for teaching English in international contexts.
5330. **Second Language Acquisition (3:3:0)**. An introduction to second language acquisition as a research field, including basic and major research findings with emphasis on adult learners.
5340. **Second Language Testing (3:3:0)**. This course is designed to give language teachers a working knowledge of testing principles applied to second language classrooms and programs.
5382. **Seminar in Second Language Instruction (3:3:0)**. Study of current topics of interest in second language instruction and/or curriculum development. Course content will vary. May be repeated for credit for a maximum of 12 credit hours as topics vary.
5383. **Seminar in Second Language Acquisition (3:3:0)**. Study of current topics of interest in second language acquisition. Course content will vary. May be repeated as topic varies for a maximum of twelve credits.
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)**. Prerequisite: 1501 for 1502. 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)**. Prerequisite: Consent of instructor. 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)**. Prerequisite: for 2301, PORT 1502 or 1507; for 2302, PORT 2301. Reading, cultural background, grammar review, conversation, and composition. Reading, cultural background, grammar review, conversation, and composition.
3303. **Studies in Portuguese (3:3:0)**. Prerequisite: PORT 2302. 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. May be repeated once with different content. Fulfills Core Humanities requirement.
4300. **Individual Studies in Portuguese (3)**. Prerequisite: PORT 2302 and consent of instructor. 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 once 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 once for credit.
7000. **Research (V1-12).**

Russian (RUSN)**Undergraduate Courses**

- 1501, 1502. [RUSS 1511, 1512] **A Beginning Course in Russian I, II (5:5:1 each).** Prerequisite: 1501 for 1502. 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: for 2301, RUSN 1502; for 2302, RUSN 2301. 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. Fulfills multicultural and Core Humanities requirements.
3302. **20th Century Russian Civilization Through Literature in Translation (3:3:0).** Deals 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. Fulfills multicultural and Core Humanities requirements.
3303. **Russian Conversation and Composition (3:3:0).** Prerequisite: RUSN 2302. Designed to increase fluency in the spoken language and proficiency in composition. Taught in Russian. May be repeated for credit up to 12 hours.
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. Fulfills multicultural and Core Humanities requirements.
3305. **Studies in Advanced Russian (3).** Prerequisite: RUSN 2302 and consent of instructor. Advanced Russian language skill development at third and fourth year levels. May be repeated for credit up to 12 hours 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. Fulfills multicultural requirement. (Writing Intensive)
4302. **Contemporary Russian Literature in Translation (3:3:0).** Examines the works of major Russian authors such as Aleksandr Solzhenitsyn and Tatyana Tolstaya from 1953 to the present. Fulfills multicultural requirement. (Writing Intensive)

Graduate Courses

5301. **Russian Language for Graduate Students (3:3:0).** Conducted entirely in Russian. Students work towards achieving an American Council for Teaching Foreign Languages advanced or superior proficiency rating. May be repeated for credit up to 12 hours.
5303. **Topics in Russian Culture (3:3:0).** Studies 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 for credit up to 12 hours when content is different.
5304. **Topics in Russian Literature (3:3:0).** Studies 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 for credit up to 12 hours when content is different.
7000. **Research (V1-12).**

Slavistics (SLAV)**Undergraduate Courses**

3301. **The Vampire in East European and Western 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. Fulfills multicultural and Core Humanities requirements.
4300. **Individual Studies in Slavistics (3).** Prerequisite: Consent of instructor. 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 up to 24 hours 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).** Prerequisite: for 1501, consent of department; for 1502, SPAN 1501.
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. Course is taught in Spain.
- 2301, 2302. [SPAN 2311, 2312] **A Second Course in Spanish I, II (3:3:1 each).** Prerequisite: for 2301, SPAN 1502 or 1507, or consent of department; for 2302, SPAN 2301. 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: SPAN 1502, 1507, 1607 and SPCS 1200, 1305, all with a grade of B or better; or consent of department. Reading, culture, conversation, and composition. Equivalent to 2301 and 2302.
3303. **Intermediate Spanish Conversation (3:3:0).** Prerequisite: SPAN 2301 and 2302 or 2607. 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 2607. An overview of important Spanish grammar concepts.
3306. **Introduction to Hispanic Life and Culture (3:3:0).** Prerequisite: SPAN 2301 and 2302 or 2607. Origins, development, and characteristics of Hispanic life and culture. Conducted in Spanish. Fulfills multicultural and Core Humanities requirement.
3307. **Introduction to Hispanic Literatures (3:3:0).** Prerequisite: Student should complete two of SPAN 3303 and/or 3305 and/or 3306. Introduction to Spanish and Spanish American literatures through selected works and authors. This course is highly recommended as a prerequisite to all 4000 level literature courses. Fulfills Core Humanities requirement. (Writing Intensive)
3343. **Spanish Language Development (3:3:0).** Prerequisite: SPAN 2301 and 2302. 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. A basic survey of Mexico, with emphasis on its history and cultural patterns. Offered in Mexico each summer. Fulfills multicultural and Core Humanities requirement.
3389. **Individual Studies in Spanish (3).** Prerequisite: SPAN 2302 or 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 up to 9 hours 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. Fulfills multicultural and Core Humanities requirements.
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. Fulfills Core Humanities requirement.

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. Fulfills Core Humanities requirement.
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: Departmental consent. Contents will vary to meet the needs of students. May be repeated for credit up to 6 hours with consent of instructor. Specifically designed for individual projects calling for fewer than 3 semester credit hours.
4303. **Advanced Conversation (3:3:0)**. Prerequisite: SPAN 3303 or 3343. 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)**. Prerequisite: Two SPAN courses at the 3000-level. Spanish language, syntax, and grammar.
4307. **Advanced Composition (3:3:0)**. Prerequisites: SPAN 3303 and 3305 or 4305. Principles of correct writing and stylistics. (Writing Intensive)
4308. **Business Spanish (3:3:0)**. Prerequisite: Two SPAN courses at the 3000-level. 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)**. Prerequisite: Two SPAN courses at the 3000-level. Study of diverse topics such as medical or legal Spanish, Spanish on the Internet, etc. May be repeated once for credit with different content.
4320. **Masterpieces of Hispanic Literature (3:3:0)**. Prerequisite: SPAN 3307 or departmental consent. A study of selected works from Spanish and/or Spanish American literature. May be repeated once for credit if different instructor and different content. (Writing Intensive)
4321. **Hispanic Prose (3:3:0)**. Prerequisite: SPAN 3307 or departmental consent. Readings of selected prose of Spanish and/or Spanish-American Literature. May be repeated once for credit if different instructor and different content. (Writing Intensive)
4324. **Hispanic Drama and Poetry (3:3:0)**. Prerequisite: SPAN 3305 and 3307 or departmental consent. Study of selected dramas and/or poetry from Spanish and/or Spanish American literature. May be repeated once for credit with different instructor and different content. (Writing Intensive)
4325. **Hispanic Short Story (3:3:0)**. Prerequisite: SPAN 3307 or departmental consent. Study of short stories from Spain and/or Spanish America. May be repeated once for credit. (Writing Intensive)
4327. **Hispanic Literature-Special Topics (3:3:0)**. Prerequisite: Six hours of SPAN 3303, 3305, 4305, or 4307. Subject matter will vary to include such topics as women writers, Mexican Revolution, social protest, etc. May be repeated once for credit with different content. (Writing Intensive)
4332. **Civilización Hispánica: Hispanic Civilization (3:3:0)**. Prerequisite: Three hours of upper-level courses. 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 once for credit. Fulfills multicultural requirement.
4335. **Internship in Spanish (3)**. Prerequisite: Consent of department. Work experience in a community agency that deals with native Spanish speakers. Emphasis on cultural understanding and communicative skills. Fulfills multicultural requirement. (Writing Intensive)
4337. **Cultural Topics-Hispanic World (3:3:0)**. Prerequisite: Two courses at the 3000-level. Subject matter will vary to include such topics as folklore, Latin American women, etc. May be repeated once for credit with different content.
4343. **Advanced Language Skills (3:3:0)**. Prerequisite: SPAN 3333 or departmental consent. 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 once for credit.
4344. **Contemporary Mexico (3:3:0)**. Prerequisite: 3000-level course. A study of the various facets of contemporary Mexico: history, arts, politics, and economics. Offered only in Mexico each summer. Fulfills multicultural requirement.
4346. **Spanish Life and Culture (3:3:0)**. Prerequisite: 3000-level course. A survey of Spain with emphasis on its literature, history, and culture. Offered in Spain each summer. May be repeated once for credit.
4360. **Mexican American Literature (3:3:0)**. Prerequisite: SPAN 3307 or departmental consent. The development of Mexican-American literature from 1849 to the present with an emphasis

on literature of the Chicano movement. Fulfills multicultural requirement. (Writing Intensive)

4361. **Spanish for the Southwest (3:3:0)**. Study of similarities and differences between "standard" and "regional" Spanish. Fulfills multicultural requirement.
4373. **Capstone Conversational Spanish (3)**. Prerequisite: SPAN 3303 and 4303, or 4343, or departmental consent. For majors and teacher certification candidates. Additional development of aural/oral skills.
4389. **Individual Problems in Spanish (3)**. Prerequisite: Departmental consent. 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 up to 9 hours with different instructor and course content.
4392. **The Play in Spanish (3:3:0)**. Prerequisite: Two courses from SPAN 3303, 3305, 4305, or 4307. 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. Fulfills Core Visual and Performing Arts requirement.

Graduate Courses

5100. **Advanced Special Problems in Spanish Language and Literature (1)**. An individualized research project course. Contents will vary to meet the needs of students.
5304. **Advanced Business Spanish I (3:3:0)**. Prerequisite: Consent of instructor. Foundation in business vocabulary and discourse of management. Emphasis on geographic and cultural understanding of the Spanish-speaking world.
5340. **Spanish Language and Linguistics (3:3:0)**. Spanish phonology, dialectology, morphology, or Spanish syntax. May be repeated once for credit with different emphasis.
- 5341, 5342. **Intensive Spanish for Graduate Research I, II (3:3:0 each)**. Spanish readings with related grammar to acquaint graduates with Spanish as a research skill; equivalent to two years of normal coursework. Not intended to meet major or minor degree requirements.
5343. **Studies in Spanish (3:3:0)**. Concentrated studies in Spanish language or literature. May be repeated for credit up to 9 hours as topic varies.
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.
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 up to 12 hours.
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.

Department of Communication Studies

Patrick Hughes, Ph.D., Chairperson

Professors: Olaniran, Roach, Stewart

Associate Professors: Carter, Gring, Hughes, Scholl

Assistant Professors: Heuman, Langford

Lecturers: Gantt, Neal

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. Fulfills multicultural and Core Humanities requirements.
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 once 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 up to 12 hours

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 supports 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, which provides an opportunity for practice in applied settings.

Requirements for the Major. Students must have a 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 21 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 upper-level 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 upper-division 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, 1301, 2300, 3314, 3351, MCOM 1300, and 9 hours of electives in communication studies, all of which must be at the upper-division level.

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.

Communication Studies (COMS)

(To interpret course descriptions, see page 13.)

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 minors. Fulfills Core Communication (Oral) 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
- 2300. [SPCH 1315] **Public Speaking (3:3:0).** A course in the theory, preparation, delivery, and evaluation of public speeches. Fulfills Core Communication (Oral) 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior 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.
- 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. Fulfills multicultural requirement. Fulfills Core Humanities 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior 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.
- 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. Fulfills Core Humanities requirement.
- 3331. **Nonverbal Communication (3:3:0).** The study of the origin, function, and control of nonverbal, symbolic elements inherent in Communication Studies. Fulfills Core Social and Behavioral Sciences – 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. Fulfills Core Social and Behavioral Sciences– 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. Fulfills Core Social and Behavioral Sciences– Individual or Group Behavior requirement. (WS 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. Fulfills Core Social and Behavioral Sciences – 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. Fulfills Core Social and Behavioral Sciences – 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. Fulfills Core Social and Behavioral Sciences–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. Fulfills Core Communication (Oral) 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 (V1-3).** 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: Junior standing 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 or senior 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 or senior 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 or senior standing. Consideration of selected topics in corporate-organizational communication. May be repeated for credit.

Graduate Courses

- 5111. **Communication Instruction in Higher Education I (1:1:0).** First of two courses required of all communication studies teaching 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 teach-

- ing 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 (V1-6).**
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 (V1-12).**

Department of Economics and Geography

Joseph E. King, Ph.D., Chairperson

Professors: Elbow, King, Lee, Steinmeier, Templer

Associate Professors: Al-Hmoud, Becker, Carter, De Silva, Gilbert, McComb, Mulligan, Rahnema, von Ende

Assistant Professors: Delahunty, Moh, Sorrensen, Summers, Valcarcel, 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 or equivalent) 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.

The geography major consists of 31 hours of coursework in geography plus MATH 2300 or 2345. Required courses are GEOG 1401, 2300, 2351, 3300, 3340, 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, 3353, 3356, 3360, 3363, 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 13.)

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. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
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

Graduate Program

Students seeking a degree in economics should consult with the graduate advisor or the chairperson of the department.

Master's Program. 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.

Doctoral Program. 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.

macroeconomics. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.

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. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
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.
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.
4300. **Economic Research (3).** Prerequisite: ECO 3311 and 3312. Consent of instructor and advisor or chairperson. Directed undergraduate student research in selected areas under the supervision of selected departmental faculty. (Writing Intensive)
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. (Writing Intensive)
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. (Writing Intensive)
4322. **The Economics of Labor Markets (3:3:0)**. 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. (Writing Intensive)
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. (Writing Intensive)
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. (Writing Intensive)
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. (Writing Intensive)

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.
5321. **Labor Markets Theory and Policy (3:3:0)**. Prerequisite: ECO 5312 and 5314. Theory and econometric techniques to analyze the operation of the labor market, including labor supply and demand, unemployment, job search, human capital, and migration.
5322. **The Economics of Wages and Income (3:3:0)**. Prerequisite: ECO 5321. Examines the factors that determine wage differentials among workers, including job turnover, wage dynamics, compensating wage differentials, discrimination, contract theory, unions, and collective bargaining.
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. **Health Care 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. **Industrial Organization Theory (3:3:0)**. Prerequisite: ECO 5312 and 5346 or consent of instructor. Course focuses on theories of the "new industrial organization" applied to imperfect competition, from monopoly to the strategic analysis of oligopolistic markets.
5348. **Seminar in Empirical Industrial Organization (3:3:0)**. Prerequisite: ECO 5347 or consent of instructor. Focuses on recent developments in empirical industrial organization, public utility, and regulation literature.
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 13.)

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. **Fundamentals of Geography (3:3:0)**. Survey of world cultures and natural systems with a focus on human/environmental interaction, natural resources, globalization, and the concept of regions.
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 Core Natural Sciences requirement.
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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
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. Fulfills Core Technology and Applied Science requirement.

- 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
- 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.
- 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. Fulfills multicultural requirement. Fulfills Core Technology and Applied Science requirement.
- 3363. Geography of South America (3:3:0).** Study of the physical and human geography of South America, with special emphasis on contemporary issues. Fulfills multicultural requirement.
- 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.

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

Sam A. Dragga Jr., Ph.D., Chairperson

Professors: Aycock, Bailey, Barker, Clarke, Covington, Dragga, Hurst, Kuriyama, Purinton, Wenthe, Whitlark

Associate Professors: Baake, Baehr, Baugh, Carter, Conrad, Crowell, Daghistany, Desens, Grass, Hawkins, Kemp, Kimball, Kolosov-Wenthe, Koerber, Lang, McFadden, Patterson, Poch, Rice, Rickly, Samson, Schoenecke, Shelton, Shu, Spurgeon

Assistant Professors: Batra, Borshuk, Couch, Crowley, Eaton, Kim, Kvande, Snead, Still, Ybarra, Zdenek

Lecturers: Duke, Heise, Hiemstra, McLaughlin, Myers, Rylander

About the Program

This department supervises the following degree programs and certificates:

- Bachelor of Arts in English
- Bachelor of Arts in Technical Communication
- Master of Arts in English
- Master of Arts in Technical Communication
- Doctor of Philosophy in English
- Doctor of Philosophy in Technical Communication and Rhetoric
- Graduate Certificate in Linguistics
- Graduate Certificate in Publishing and Editing

The department cooperates in interdepartmental programs in linguistics and comparative literature at both the undergraduate and the graduate levels.

Undergraduate Program

The Department of English offers two undergraduate degrees:

Bachelor of Arts in English. Majors must specialize in literature and language, creative writing, or the certification program for teaching in the secondary schools.

Bachelor of Arts in Technical Communication. Majors may specialize in either professional communication or scientific and technical communication, depending on their choice of minor area. The undergraduate advisor for technical communication has a list of minors that reflects these two emphases.

The department sponsors both the local chapter of Sigma Tau Delta (the national English honorary society) and a chapter of the Society for Technical Communication. The department supports the publication of six journals: *32 Poems*, *Conradiana*, *The Eighteenth Century: Theory and Interpretation*, *The Iron Horse Literary Review*, *Technical Communication Quarterly*, and *William Carlos Williams Review*.

Minor in English. 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.

Minor in Technical Communication. A technical communication minor consists of 18 hours: ENGL 2311, and 15 hours of advanced technical communication courses (3000 or 4000 level) selected from the following: 2311, 3360, 3362, 3365, 3366, 3367, 3368, 3369, 4360, 4365, 4366, 4367, 4368, 4369, 4378, and 4380. To receive credit toward graduation, a student who is a technical communication minor must receive at least a C in courses in technical communication. 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, Accuplacer, 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).

Bachelor of Arts in English

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. 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 4374

- B. Three additional 4000-level courses from the following: ENGL 4300, 4301, 4311, 4312, 4313, 4314, 4315, 4321, 4342, 4351, 4371, or 4373

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

Graduate Program / English and Technical Communication

Before beginning a graduate program in English or technical communication, 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.

Graduate Certificate Programs

Graduate Certificate in Linguistics. This program comprises a minimum of 12 hours in linguistics courses. It 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.

Graduate Certificate in Publishing and Editing. This program requires a minimum of 15 hours of courses in English and related fields. These courses typically include study in such topics as scholarly editing, magazine publishing, history of the book, technical editing, and document design. They can also include work in public relations, advertising, and other topics relevant to the contemporary publishing industry. The director of the certificate, in consultation with 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 toward the certificate can be considered toward a graduate degree in English.

Master's Programs

Master of Arts in English. Advanced study in literature, creative writing, and linguistics are offered in this program. 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.

Master of Arts in Technical Communication. This master's degree 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 must 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/tcr for details of degree requirements and the course schedule.

Doctoral Programs

Doctor of Philosophy in English. The doctoral program 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 any area of English or American literature, comparative literature, creative writing, or linguistics. 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 satisfactory 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.

Doctor of Philosophy in Technical Communication and Rhetoric. The aim of this doctoral program is 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 must attend a two-week seminar every May. Prospective students are advised to consult www.english.ttu.edu/tcr for details of degree requirements and the course schedule.



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 4351
 - B. Three additional 4000-level courses from the following: ENGL 4300, 4301, 4311, 4312, 4313, 4314, 4315, 4321, 4342, 4351, 4371, 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.

Bachelor of Arts in Technical Communication

The Bachelor of Arts in Technical Communication will provide a broad liberal arts background and intensive training in the principles and practices of technical communication. It will prepare students for careers as technical communicators, editors, grant writers, Web site developers, information architects, and publications managers in a variety of professional domains, including publishing, education, government, health care, biology, chemistry, physics, and engineering. It will also prepare students for graduate education in technical communication as well as in law, business, science, and medicine.

The program requires 120 semester credit hours, consisting of the university general education requirements, 30 hours in a major field plus a required minor in an approved supporting field.

Required 2000-level course: ENGL 2311 (Counts toward the 12-hour English general degree requirement)

- I. **3000-Level**
 - A. One of the following: 3366, 3371, 3373
 - B. Four of the following: 3360, 3362, 3365, 3366, 3367, 3368, 3369
(Note: 3366 may only be used once.)
- II. **4000-Level**

Three of the following: 4360, 4365, 4366, 4367, 4368, 4369, 4378
- III. **Required:** 4380

English (ENGL)

(To interpret course descriptions, see page 13.)

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 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. Substantial writing required. Fulfills Core Communication (Written) requirement.
1302. **[ENGL 1302] Advanced College Rhetoric (3:3:0).** Prerequisite: Successful completion of ENGL 1301. Focuses on writing from sources, research methods, and documentation. Substantial writing required. Fulfills Core Communication (Written) requirement.
2305. **Introduction to Poetry (3:3:0).** Prerequisite: ENGL 1301, 1302. Critical study of and writing about a variety of poems. Substantial writing required. Fulfills Core Humanities requirement.
2306. **Introduction to Drama (3:3:0).** Prerequisite: ENGL 1301, 1302. Critical study of and writing about a variety of plays. Substantial writing required. Fulfills Core Humanities requirement.
2307. **Introduction to Fiction (3:3:0).** Prerequisite: ENGL 1301, 1302. Critical study of and writing about a variety of short stories and novels. Substantial writing required. Fulfills Core Humanities requirement.
2308. **Introduction to Nonfiction (3:3:0).** Prerequisite: 1301, 1302. Critical study of and writing about a variety of historical, biographical, and scientific writings. Substantial writing required. Fulfills Core Humanities requirement.
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. Substantial writing required.
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. Substantial writing required. Fulfills Core Humanities requirement.
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. Fulfills multicultural requirement. Substantial writing required.
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. Substantial writing required. Fulfills Core Humanities requirement.
2391. **Introduction to Critical Writing (3:3:0).** Prerequisite: ENGL 1301, 1302. Extensive practice in writing critical essays about literature. Substantial writing required. Fulfills Core Humanities requirement.
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. Substantial writing required.
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. Substantial writing required.
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. Substantial writing required.
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. Substantial writing required.
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. Substantial writing required.
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. Substantial writing required.
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. Substantial writing required.

- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required. Fulfills multicultural requirement.
- 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. Substantial writing required. Fulfills multicultural requirement.
- 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. Substantial writing required. Fulfills multicultural requirement.
- 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. Substantial writing required.
- 3362. Rhetorical Criticism (3:3:0).** Prerequisite: junior standing. Introduction to methods of rhetorical criticism; the nature, scope, and function of rhetoric, classical and modern theories of rhetoric; practice in applying critical methods to discursive and non-discursive artifacts. Substantial writing required.
- 3365. Professional Report Writing (3:3:0).** Prerequisite: Junior standing. Preparation of professional and academic reports and publications through the use of communication analysis. Substantial writing required.
- 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. Substantial writing required.
- 3367. Usability Testing (3:3:0).** Prerequisite: ENGL 2311 or 3365. Principles and techniques of testing online and print documents, using video and digital equipment, with emphasis on rhetorical effectiveness and usability of graphics, text, and format. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 3373. Modern English Syntax (3:3:0).** Prerequisite: 6 hours of 2000-level English courses. The syntactic and morphological analysis of modern English. Substantial writing required.
- 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. Substantial writing required.
- 3382. Women Writers (3:3:0).** Prerequisite: 6 hours of 2000-level English courses. Significant works by women. (WS 3382) Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 3385. Selected Plays of Shakespeare (3:3:0).** Prerequisite: 6 hours of 2000-level English courses. Nine to twelve plays. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required. Fulfills multicultural requirement.
- 3388. Film Genres: Avant-Garde, Documentary, Narrative (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. Substantial writing required.
- 3389. Short Story (3:3:0).** Prerequisite: 6 hours of 2000-level English courses. Short stories around the world. Substantial writing required.
- 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. Substantial writing required. Fulfills multicultural requirement.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 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. Substantial writing required.
- 4351. Advanced Creative Writing (3:3:0).** Prerequisite: 6 hours of 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. Studies in Composition (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. Substantial writing required.
- 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. Substantial writing required.

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. Substantial writing required.
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. Substantial writing required.
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. Substantial writing required.
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. Substantial writing required.
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 and in teacher preparation. 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 major in technical communication, and approval of the director of technical communication. Supervised work in technical communication. Requires portfolio and research paper. Substantial writing required.
4380. **Professional Issues in Technical Communication (3:3:0)**. Prerequisite: Senior standing, declared major in technical communication, 3 hours of 4000-level English courses, or approval of the director of technical communication. Advanced study of trends in technical communication, application of theory in community service-learning project, and preparation of a professional portfolio. (Writing Intensive)

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 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.
5317. **Studies in Postcolonial Literature (3:3:0)**. Concentrated studies in postcolonial theory and global literature, treating in various semesters poetry, prose, drama, film, popular culture, and major authors. May be repeated when topics vary.
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.
5327. **Studies in Multicultural American Literature (3:3:0)**. Concentrated studies in the literature, theory, and culture of minority American populations, treating in various semesters poetry, prose, drama, film, popular culture, and major authors. May be repeated when topics vary.
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. **Introduction to Rhetorical Theory (3:3:0)**. Classical and modern theories of rhetorical invention.
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.
5379. **Empirical Research Methods in Technical Communication and Rhetoric (3:3:0)**. Prerequisite: ENGL 5363. Empirical research methods in technical communication and rhetoric.
5380. **Advanced Problems in Literary Studies (3:3:0)**. Concentrated studies in works, authors, or approaches.
5382. **Theory and Research in the Written Discourses of Health and Medicine (3:3:0)**. Current theory and research in the written discourses of health and medicine, focusing on the roles of technical and professional communicators.
5383. **Grants and Proposals (3:3:0)**. Theoretical issues and practical experience dealing with the genre and process of writing grants and proposals.
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

Ronald J. Kendall, Ph.D., Chairperson

Professors: Anderson, Cobb, Dixon, Kendall

Associate Professors: Cox, Presley, Ramkumar, E. Smith, P.N. Smith

Assistant Professors: Canas, Gao, Godard-Coddling, Maul, Mayer, Salice

Research Assistant Professor: Brown

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

Dual Degree 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 learn about and 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 13.)

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.

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).
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)

Graduate Program

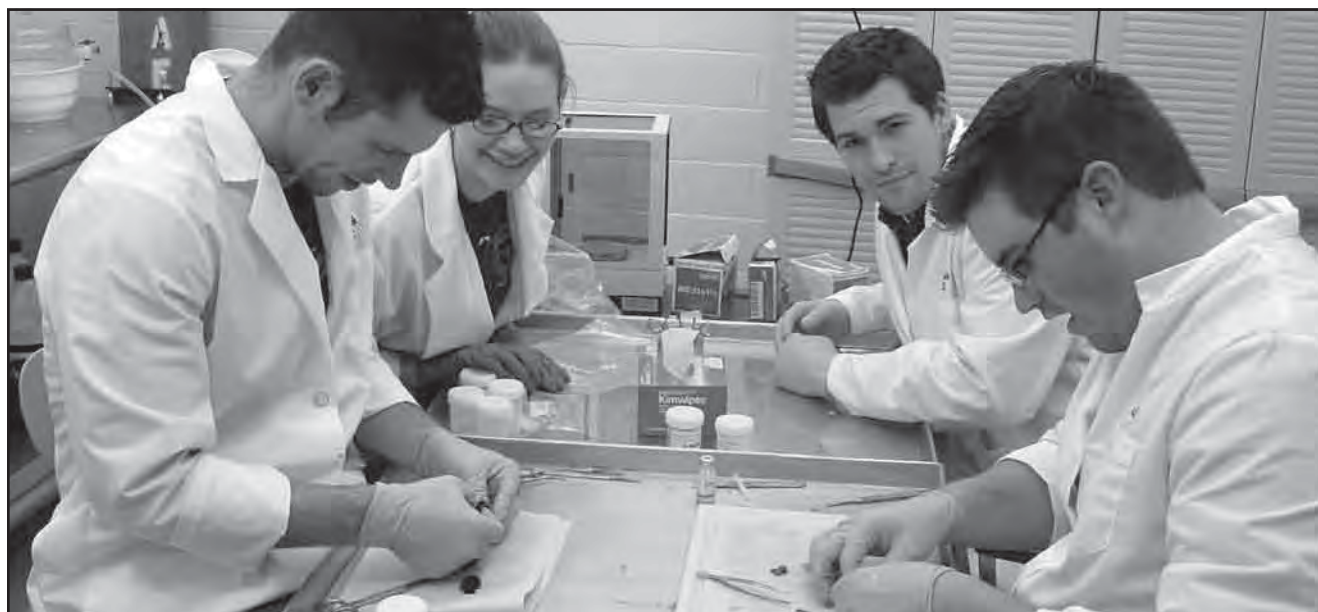
The Institute of Environmental and Human Health integrates the efforts of Texas Tech University, the School of Law, and the Health Sciences Center in a joint venture to assess the impacts of toxic chemicals and other stressors on the natural environment. Attracting graduate students at both the master's 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.

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.
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. **Environmental Toxicology Seminar (1:1:0).** Graduate standing or consent of instructor. Seminar on timely topics by experts in environmental toxicology. Required for all environmental toxicology students. 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.
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.
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.
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.
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.
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).** Designed for students who wish to understand the interrelationships of statistical distributions and particular statistical approaches to environmental toxicology data analysis.
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).**



Department of Geosciences

Calvin Barnes, Ph.D., Chairperson

Horn Professor: Chatterjee

Pevehouse Chair: Zhou

Professors: Barnes, Barrick, Haragan, Leary, Lehman, Ridley

Associate Professors: Gurrola, Karlsson, Nagihara, Schroeder, Yoshinobu

Assistant Professors: Basu, Hetherington, Holterhoff, Leverington, Weiss, Wiens

Research Assistant Professor: Hayhoe

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, 2303, 3102, 3302, 4101, 4312; GPH 2333, 4300, 4322, 4323; CHEM 1307, 1107; PHYS 1408, 2401; MATH 1351, 1352, 2350, and 2360 (or 3350); an additional 16 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). The senior research project (GEOL 4312) must be 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, 2303, 3302, 3428, 4312, either GCH 2303 or

GPH 2333, and at least 14 hours of junior-senior level geosciences electives (six hours of which must include a laboratory). 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 10 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

Graduate Program

Master's 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) 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.

Doctoral Program. 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 research proposals. 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.

1300, 1100, 2301, 2316, 3301, 4300, and GEOL 3322 or another approved science or mathematic 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.

Atmospheric Science (ATMO)

(To interpret course descriptions, see page 13.)

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. Partially fulfills Core Natural Sciences requirement.
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. Partially fulfills Core Natural Sciences requirement.

Geosciences—Geology Concentration Curriculum, B.S. Degree

FIRST YEAR			
Fall		Spring	
GEOL 1303, Physical Geology	3	GEOL 1304, Historical Geology	3
GEOL 1101, Physical Geology Lab.	1	GEOL 1102, Historical Geology Lab	1
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. I (Lab.)	1	CHEM 1108, Principles of Chem. II (Lab.)	1
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
HIST 2300, History of the U.S. to 1877†	3	HIST 2300, History of the U.S. Since 1877†	3
TOTAL	17	TOTAL	17
SECOND YEAR			
Fall		Spring	
GEOL 2303, Earth Materials	3	GPH 2303, Intro. to Geochemistry	3
GPH 2333, Intro. to Geophysics	3	GEOL 4320, Optical Mineralogy	3
Physics#	4	Physics#	4
Foreign Language	5	Foreign Language	5
Personal Fitness and Wellness†	1	Personal Fitness and Wellness†	1
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
GEOL 3302, Structural Geology	3	GEOL 4321, Igneous/Metamorph. Petog.	3
GEOL 3102, Field Methods	1	GEOL 4101, Undergraduate Seminar	1
GEOL 4420, Sed./Strat.	4	Minor^	3
Foreign Language	3	Foreign Language	3
English Literature†	3	English Literature†	3
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
TOTAL	17	TOTAL	16
SUMMER			
Geology Field Course††	6		
FOURTH YEAR			
Fall		Spring	
Geosciences Elective	3	Geosciences Elective	3-4
Minor^	3-4	GEOL 4312, Research	3
GEOL 4312, Research	3	Minor^	3-4
Oral Communications	3	Minor^	3-4
Social or Behavioral Science Elect.†	3	Multicultural Course	3
TOTAL	15-16	Visual or Performing Arts Elect.†	3
		TOTAL	18-21

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

2301. **Weather, Climate, and Human Activities (3:3:0).** Prerequisite: 1300. Observation and analysis of the impacts of weather and climate on human activity, e.g., storms, climate change, forecasting, weather modification, health, energy, transportation. Fulfills Core Technology and Applied Science requirement.
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).** Prerequisite: ATMO 1300, MATH 1320. A basic study of atmospheric processes and the principles that control them. Fulfills Core Technology and Applied Science requirement.
4300. **Independent Studies in Atmospheric Science (3:3:0).** Prerequisite: ATMO 1100, 1300. Independent studies in atmospheric science. May be repeated once for credit.

Graduate Courses

5101. **Atmospheric Science Seminar (1:1:0).** Prerequisite: Consent of instructor. 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. **Mesoscale Meteorology (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.
5322. **Atmospheric Electricity (3:3:0).** Electrical processes in the atmosphere and in weather: ionosphere and global circuit, storm electrification, lightning physics and phenomenology, relationships between lightning and convection, measurement.
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 (GCH)**Undergraduate Courses**

2303. **Introduction to Geochemistry (3:3:0)**. Prerequisite: GEOL 2303, CHEM 1308, 1108, MATH 1352 (CHEM 1308 and MATH 1352 to be taken concurrently). Principles and concepts of inorganic geochemistry with an emphasis on applications of geologic and environmental problems.

Graduate Courses

5300. **Individual Studies in Geochemistry (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.
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.
5305. **Environmental and Aqueous Geochemistry (3:3:0)**. Prerequisite: GCH 5405 or consent of instructor. 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. Partially fulfills Core Natural Sciences requirement.
1102. [GEOL 1104, 1404] **Historical Geology Laboratory (1:0:2)**. Prerequisite: GEOL 1101. Laboratory study of fossils, geologic maps, and geologic structure. Partially fulfills Core Natural Sciences requirement.
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. Partially fulfills Core Natural Sciences requirement.
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. Partially fulfills Core Natural Sciences requirement.
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. Partially fulfills Core Natural Sciences requirement.
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. Partially fulfills Core Natural Sciences requirement.
2303. [GEOL 2309, 2409] **Earth Materials (3:2:4)**. Prerequisite: GEOL 1303, 1101; CHEM 1307, 1107. Classification and origin of minerals and rocks. Relationships of rock and mineral stability to pressure, temperature, and tectonic processes.
3102. **Field Methods in Structural Geology (1:0:3)**. Prerequisite: GEOL 2303; 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 2303 or PETR 1305. 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)**. Prerequisites: GEOL 1101 and 1303. Emphasizes 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. Fulfills Core Technology and Applied Science requirement.
3328. **Geology of Energy Resources (3:3:0)**. Prerequisite: GEOL 1303. Origin, distribution, and exploitation of geological resources of energy, with emphasis on hydrocarbons, coal, and nuclear energy. Not for credit for geoscience majors.
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. Fulfills Core Technology and Applied Science requirement.
3450. **Paleontology and Paleocology (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)**. Prerequisite: Consent of instructor. Independent study under guidance of faculty member.
4101. **Undergraduate Seminar (1:1:0)**. Prerequisite: Senior standing. 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; prior approval from specific professor required. Independent research in an area of current interest in the geosciences. (Writing Intensive)
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 2303. 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)**. Prerequisite: GEOL 1303 and 3302 or ENCO 3385. 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)**. Prerequisite: Consent of instructor. Independent study under guidance of a faculty member.

5101. **Seminar (1:1:0).**
5300. **Individual Studies in Geology (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.
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.
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 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.
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).** 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.
5422. **Sedimentary Geology of Carbonates (4:3:3).** Classification and interpretation of carbonate rocks, processes that control their deposition and diagenesis, evolution of carbonate systems through times.

5424. **Clastic Sedimentology (4:3:3).** Origins, classification, petrology, diagenesis, and facies analysis of clastic sedimentary rocks. Survey of modern and ancient clastic depositional systems.
5426. **Sequence Stratigraphy (4:4:0).** Fundamental concepts of sequence stratigraphy and application to interpretation of sedimentary basins across a range of depositional systems. Application to petroleum exploration and production.
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 (GPH)

Undergraduate Courses

2333. **[GEOL 2310] Introduction to Geophysics (3:3:0).** Corequisites: GEOL 2303, MATH 1351. An overview of geophysical principles and methods with case studies in the use of geophysics to understand the three-dimensional structures of Earth.
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: GPH 2333 and 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 2333 and GEOL 3302 or MATH 1351. 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.
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

Terry Waldren, Ph.D., Interim Chairperson

Professors: Carter, McComb, Waldren

Associate Professors: Burns, Hart, Lochbaum, Meaney, Miller, Roncesvalles, Stodden, Tacón, Williams

Assistant Professors: Bae, Boros, Griffin, Podlog, Sawyer

Instructors: Hinojosa, Key, S. Reeve, Wiedenfeld

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Exercise and Sport Sciences
- Bachelor of Science in Health
- Master of Science in Exercise and Sport Sciences

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 in 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.

Physical Education Teacher 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 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 sport coaching in junior and senior high schools should complete the requirements in this track.

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.

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.

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.

Bachelor of Science in Health

Students interested in careers in health promotion should choose to major in health, which requires 48 hours. The Bachelor of Science in Health prepares students for careers in public and private agencies that provide health information and interventions to a variety of individuals and groups.

Minor Options

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.

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 Emphasis

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 non-credit internship of at least 1800 hours over a 3-year period. Students must complete the following courses: ZOOL 2403, ESS 3301, 3305, 3323, 4325, 4327, 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 health and 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 (PFW) 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.

Bachelor of Science in Health

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
MATH 1320, (recommended)*	3	MATH or PHIL 2310*	3
BIOL 1402 or BIOL 1403 or or CHEM 1305 & 1105 or PHYS 1401	4	POLS 2302, American Public Policy	3
POLS 1301, American Govt., Org.	3	ZOOL 2403, Human Anatomy	4
HLTH 1300, Patterns of Healthful Living	3	PFW 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 the U.S. to 1877	3	Designated Multicultural#	3
HLTH 2360, Community Health	3	Visual and Performing Arts	3
PFW	1	HLTH 2275, Practicum Com. Health	2
TOTAL	16	TOTAL	17
THIRD YEAR			
Fall		Spring	
HLTH 3311, Com. and Chronic Disease	3	HLTH 3312, Hlth Cons. Special Pop.	3
HLTH 3325, Hlth Con. 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, Internship 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 120-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.

Exercise Science Track

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
MATH 1351, Calculus I (recommended)*	3	MATH 1352 (recommended)*	3
CHEM 1307 & 1107 (recommended)	4	HIST 2300, History of the U.S. to 1877	3
ESS 1301, Introduction to ESS	3	POLS 1301, American 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
PFW	1	PFW	1
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Develop.	3
ESS 3305, Exercise Physiology	3	ESS 4392, Research Methods in ESS	3
ESS 3318, Exercise & Sport Psychology	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): CE 2301, CE 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: CE 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.

Physical Education Teacher Education Track**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
MATH 1320 (recommended)*	3	MATH or PHIL 2310*	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301 or HIST 3310	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
ESS 1301, Introduction to ESS	3	COMS 2300 (recommended)	3
PFW	1	PFW	1
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 2300-level (except ENGL 2371)**	3	ENGL 2300-level (except ENGL 2371)**	3
BIOL 1402 or 1403 or or CHEM 1305 & 1105 or PHYS 1401	4	ZOOL 2403, Human Anatomy	4
Sophomore Foreign Language***	3	EDIT 2318, Comp. & Info. Tech.	3
EDSE 2300, Schools, Society & Diversity#	3	Sophomore Foreign Language***	3
Elective	3	ESS 2245, Practical Exp. in Phys. Ed.	2
TOTAL	16	PFW	1
		TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ESS 3301, Biomechanics	3	ESS 3305, Exercise Physiology	3
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Develop.	3
ESS 3318, Exer. & Sport Psychology	3	EDSE 4310, Lrn., Cogn., Inst. Design	3
ESS 3342, Prin. of Teaching Skill Themes	3	EDSE 4322, Diversity & Learning	3
Visual & Performing Arts	3	ESS 3345, Adapted Physical Activities	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ESS 4445, School-Based P.E.	4	EDSE 4000, Student Teaching, Sec.	6
ESS 4345, Assessment of Phys. Perform.	3	EDEL 4000, Student Teaching, Elem.	3
Elective	3	EDSE 4330, Individual Study	3
EDLL 4382, Read & Write in Secondary	3	TOTAL	12
Elective	1		
TOTAL	14		

PETE core requires a minimum of 3 hours of PFW and ESS 1301, 2245, 3301, 3303, 3305, 3314, 3318, 3342, 3345, 4345, 4445.

* 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 18 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.

University and College of Arts and Sciences degree requirements must be satisfied.

Sport Studies Track**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
MATH 1320 (recommended)*	3	MATH or PHIL 2310*	3
COMS 2300 (recommended)	3	HIST 2300, History of the U.S. to 1877	3
BIOL 1402 or BIOL 1403 or CHEM 1305 & 1105 or PHYS 1401	4	POLS 1301, American Govt., Org.	3
ESS 1301, Introduction to ESS	3	ZOOL 2403, Human Anatomy	4
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 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
PFW	1	(recommended)	
TOTAL	16	PFW	1
		TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Development	3
ESS 3305, Exercise Physiology	3	Major, minor, or electives	12
ESS 3318, Exercise & Sport Psychology	3	TOTAL	15
Major, minor, or elective	8		
TOTAL	17		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ESS Major	6	ESS Major	6
Major, minor, or electives	9	Major, minor, or electives	9
TOTAL	15	TOTAL	15

Sports Studies designated electives (select 15hrs.): ESS 3321, 3323, 3352, 3354, 4000, 4363, 4392, and 4398.

* 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 120 hours with 40 of those hours at the 3000-4000 level; 24 hours should be ESS courses.

Exercise and Health Promotion Track**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
MATH 1320 (recommended)*	3	MATH or PHIL 2310*	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301 or HIST 3310	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
ESS 1301, Introduction to ESS	3	ESS 2222, Resistance Trng. & Cond.	2
TOTAL	15	Visual Performing Arts	3
		TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 2311 (except 2371)**	3	ENGL 2300-level (except 2371)**	3
CHEM 1305 & 1105 (recommended)	4	ZOOL 2403, Human Anatomy	4
Sophomore Foreign Language***	3	Sophomore Foreign Language***	3
ESS 3354, Sport World Culture (recommended)	3	CS 1300 or EDIT 2318 (recommended)	3
ESS 2275, Practicum Ex. & Health Prom.	2	COMS 2300 (recommended)	3
ESS 3321, First Aid	3	TOTAL	16
TOTAL	18		

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ESS 3301, Biomechanics	3	ESS 3305, Exercise Physiology	3
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Develop.	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

<i>Fall</i>		<i>Spring</i>	
ESS 3368, Ex. Testing & Pres.	3	ESS 4475, Internship in Exer. and Hlth.	4
ESS 4368, Applied Exercise Physiology	3	Minor	6
ESS 4372, Mgt. in Exer. and Hlth. Prom.	3	ESS designated electives	6
Minor	6	TOTAL	16
TOTAL	15		

Exercise and health promotion designated electives (select 6 hrs.) 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 120-hour degree with 40 hours of 3000-4000 level courses; 24 hours should be ESS courses.

Exercise and Sport Sciences (ESS)

(To interpret course descriptions, see page 13.)

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 (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: ZOOL 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: ZOOL 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: ZOOL 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.
- 3345. Adapted Physical Activities (3:2:2).** Prerequisite: ESS 2245. 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (WS 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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
- 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.

Graduate Program / Health, Exercise, and Sport Sciences

The Master of Science in Exercise and Sport Sciences provides advanced study in biomechanics, clinical exercise physiology, exercise physiology, motor behavior, sport and exercise psychology, sports management, strength and conditioning, or teaching physical education and sport. The clinical exercise physiology concentration has been recognized as an ACSM endorsed program since 2004. The sports management concentration has been recognized as a NASSM/NASPE approved program since 2003. The degree program consists of a minimum of 36 hours of graduate work and provides thesis and nonthesis options. The nonthesis option requires the completion of a comprehensive examination covering course content. The department will determine and prescribe any necessary leveling work. No foreign language is required. Before enrolling in any courses, students should consult with the associate chair for graduate programs or the departmental graduate secretary.

Program Courses

- ESS 5002. Clinical Internship (V1-6)
- ESS 5003. Internship in Sports Administration (V1-6)
- ESS 5302. Motor Control (3:3:0)
- ESS 5303. Psychology of Sport (3:3:0)
- ESS 5305. Motor Learning (3:3:0)
- ESS 5306. Biomechanics (3:3:0)
- ESS 5307. Motor Development (3:3:0)
- ESS 5309. Children in Sport (3:3:0)
- ESS 5310. Biomechanics of the Musculoskeletal System (3:3:0)
- ESS 5312. Behavioral and Psychological Aspects of Exercise (3:3:0)
- ESS 5313. Applied Psychology of Sport (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 5317. Seminar in Exercise and Sport Sciences (3:3:0)
- ESS 5320. Sport Leadership (3:3:0)
- ESS 5321. Financial Management in Sport (3:3:0)
- ESS 5322. Management of Sport and Athletics (3:3:0)
- ESS 5324. Marketing and Promotion in Sport (3:3:0)
- ESS 5325. Legal and Ethical Aspects of Sport (3:3:0)
- ESS 5327. Sport Facility Planning and Management (3:3:0)
- ESS 5328. Sport in American Culture (3:3:0)
- ESS 5329. Sport Event Management (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 5339. Laboratory Techniques in Exercise Physiology (3:3:0)
- ESS 5341. Curriculum and Instruction in Physical Education and Sport (3:3:0)
- ESS 5343. Applied Research in Physical Education and Sport (3:3:0)
- ESS 5347. Practicum in Teaching Physical Education and Sport (3:2:2)
- 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)

The department also participates in a collaborative Ph.D. program in physiology with the Department of Cell Physiology and Molecular Biophysics at the Health Sciences Center. The collaborative doctoral program is designed to include both basic and applied coursework.

The department has two collaborative Ph.D. programs with the College of Education. The collaborative 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 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.

The collaborative 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, exercise science as well as educational psychology and leadership. In addition, students earning a degree in this collaborative program will be prepared for careers in applied sport psychology and coaching.

- 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.
- 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.
- 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 of movements.
- 4368. **Applied Exercise Physiology (3:3:0).** Prerequisite: ESS 3305. Examination of physiological adaptations including changes in metabolic energy pathways, cardiorespiratory and muscu-

loskeletal 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.
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. Theory, practice, and instructional methodologies appropriate for teaching physical education in school settings.
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. **Clinical Internship (V1-6).** Prerequisite: 12 hours of approved coursework in sports health and/or departmental approval. An internship class that is conducted at clinical sites throughout Lubbock. 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 Methods 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.
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).**

Health (HLTH)

(To interpret course descriptions, see page 13.)

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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (WS 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. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
- 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.
- 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 socioeconomic 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
- 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.
- 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 (PFW)

(To interpret course descriptions, see page 13.)

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.

- 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.

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).** 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 mechanisms. 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.
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.
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

Randy McBee, Ph.D., Chairperson

Horn Professor: Kuethe

Professors: Bell, Carlson, Howe, Iber, Rainger, Reckner, Walker

Associate Professors: Adams, Brink, D'Amico, Forsythe, McBee, Miller, Mosher, Pelley, Stoll, Willet, Wong

Assistant Professors: Abi-Hamad, Cunningham, Fallwell, Hahn, Hart, Levario, Milam, Schmidt, Wilson

Adjunct Faculty: Alvarez, Inglis

Lecturers: Kreidler, Monroe

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 or 2322 and HIST 1301 or 2323
- 6 hours of U.S. history including 3 hours in a pre-1877 course
- 18 hours in advanced courses, including 3 hours each of U.S.; European; and African, Asian, or Latin American history
- Nine hours of the major 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 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.

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.

Master's Programs

M.A. Degree in History. 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.

M.A. Degree in History, Nonthesis Option. 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.

Doctoral Programs

Doctoral students must choose four fields of study for their programs organized according to the following requirements:

Geographic Major Field (27 hours). Upon entering the program, all doctoral students must first declare their major geographic field from among the following three fields. Each geographic field requires a sequence of courses designed to provide the student with the necessary background for teaching competence in the entire breadth of the geographic field:

- **North America**—Students choosing U.S. history as their major geographic field must take HIST 5311, 5312, and 5313.
- **Europe**—Students selecting Europe as their major geographic field must take HIST 5305. Those selecting Europe as a geographic field must take HIST 5305 and are required to choose, in consultation with and with the approval of their committee, two other 5000-level European history readings courses that satisfy their particular area and era of specialty.
- **World**—Students who choose world history as their major geographic field must take 9 hours of differing world history "Studies in" courses, excluding HIST 5307, which is already a general degree requirement.

Within their primary geographic field, students must also choose two emphases represented by two different faculty members within that geography. The selection of those emphases is left to the discretion of the students, their advisor, and their committee.

Non-Major Geographic Field (9 hours). Students must also select one non-major geographic field (one of the two geographies not selected for the major field).

One Thematic Field (9 hours). Students must also select one thematic field from the following list (or petition the Graduate Studies Committee for approval of a thematic field not appearing on the list) and complete 9 hours of coursework in that thematic

field. Thematic fields must include coursework that examines the particular historical theme across different geographies. *Students are required to select for the thematic field a committee member who does not represent either of their geographic fields.*

- War, Diplomacy, Social Conflict
- Economic and Business
- Sports and Recreation
- Religion and Society
- Science, Medicine, and Technology
- Environmental
- Memory and Memorialization
- Globalization
- Urbanization & Identity
- Empire and Conquest
- Diaspora and Immigration
- Borders and Barricades
- Atlantic World
- Ethics and Annihilation
- Propaganda and Rhetoric
- Indigenous Peoples
- Gender and Sexuality

Other Course Requirements (9 hours)

- All doctoral students regardless of which primary or secondary fields they choose are required to take HIST 5307.
- All doctoral students who have not previously taken HIST 5304 are required to take it in the first fall semester of their Ph.D. program.
- All doctoral students must also take HIST 6301 after the student has earned a grade of B or higher in HIST 5304.
- In the 60 hours required beyond the B.A. for the Ph.D. degree, all students must have taken a total of 6 hours of 6000-level research seminar courses.
- No more than 15 of the 60 hours of coursework required beyond the B.A. can be taken at the 7000-level.

Dissertation (6 hours minimum). 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).

Foreign Language Requirement. If not satisfied at the Master of Arts level, proficiency in one language other than English is required of all candidates for the Ph.D. degree. Proficiency in other languages and/or greater linguistic fluency in a language will be required (or not required) for the Ph.D. degree as specified by the candidate's exam committee in the candidate's formal degree plan. The language proficiency specified therein will reflect the judgments of the graduate advisor, the examination committee chairperson, and the examination committee regarding the linguistic competencies the candidate will need to successfully complete dissertation research in the proposed area(s) of specialization.

For the purpose of the requirements listed above, "proficiency" in a language is defined according to the following parameters: attainment of a grade of C- or better in a fourth semester undergraduate course (in Texas numeration, the 2302 course); attainment of a grade of B- or better in the second semester of an accelerated graduate language course (in Texas numeration the 5342 course); other class work equivalent to the above; or demonstration of an equivalent level of competency through an approved examination (administered by the Department of Classical and Modern Languages and Literatures when possible, by an approved outside agency, or by a scholar with demonstrable experience in the language in question) or by some other means acceptable to the committee, the department, and the Graduate School.

For the purposes of the above listed requirements, "linguistic fluency" is defined in two alternative ways: (1) the candidate should be able to demonstrate the ability to conduct an unprepared spontaneous complex conversation with a native speaker for a duration of five minutes or longer in such a way that he or she can be easily understood or (2) the candidate should have completed two upper-division courses with grades of C- or better or graduate courses with grades of B- or better in the language in question (i.e., two advanced courses beyond the 2302 or 5342 sequences or their equivalents).

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 approved American history courses.

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

• Secondary Education Teaching Field in Social Studies

(69 hours—6 hours must be 4000-level history courses)

- 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

History (HIST)

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. Fulfills Core Humanities requirement. (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. Fulfills Core Humanities requirement. (E)
- 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. Fulfills Core Social and Behavioral Sciences–U.S. History requirement. (Honors section offered.) (US)
- 2301. [HIST 1302] History of the United States Since 1877 (3:3:0).** Continuation of HIST 2300. Fulfills Core Social and Behavioral Sciences–U.S. History requirement. (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. Fulfills Core Humanities and multicultural requirements. (AAL)
- 2323. [HIST 2322] World History Since 1500 (3:3:0).** Introduction to basic narrative and major themes in world history since 1500. Fulfills Core Humanities requirement. (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. Fulfills multicultural requirement. (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. Fulfills multicultural requirement. (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. Fulfills Core Social and Behavioral Sciences – U.S. History requirement. (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. Fulfills multicultural requirement. (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. Partially fulfills Core Social and Behavioral Sciences – U.S. History requirement for juniors and seniors. (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. Partially fulfills Core Social and Behavioral Sciences–U.S. History requirement for juniors and seniors. (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. Fulfills multicultural requirement. (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. Partially fulfills Core Social and Behavioral Sciences – U.S. History requirement for juniors and seniors. (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. Fulfills Core Social and Behavioral Sciences—U.S. History requirement. (US) (WS 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. Fulfills multicultural requirement. (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. Fulfills multicultural requirement. (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. Partially fulfills Core Social and Behavioral Sciences—U.S. History requirement for juniors and seniors. (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. Partially fulfills Core Social and Behavioral Sciences—U.S. History requirement for juniors and seniors. (US)
3332. **History of United States Military Affairs Since 1900 (3:3:0).** Examines 20th century American military history up to the present. Partially fulfills Core Social and Behavioral Sciences—U.S. History requirement for juniors and seniors. (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)
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. Fulfills Core Humanities requirement. (E) (WS 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 of 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. (E)
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)
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. Fulfills multicultural requirement. (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. Fulfills multicultural requirement. (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. Fulfills multicultural requirement. (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. Fulfills multicultural requirement. (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. Fulfills multicultural requirement. (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. Fulfills multicultural requirement. (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 Atlantic World (3:3:0).** Prerequisite: Junior standing or consent of instructor. An exploration of British, Spanish, French, and Dutch colonial societies and their connections with one another as well as with African and Native American peoples. (US) (Writing Intensive)
4302. **The American Revolution and Colonial Society (3:3:0).** Prerequisite: Junior standing or consent of instructor. An exploration of why and how thirteen disputatious and diverse colonies united to wage a revolution and form a nation. (US) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
4310. **United States Foreign Relations Through Film (3:3:0).** Prerequisite: Junior standing or permission of instructor. A study of major issues in modern U.S. foreign relations as presented and interpreted through film. (US) (Writing Intensive)
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) (Writing Intensive)
4312. **U.S. Political Imagery and Culture (3:3:0).** An examination of the relationship between political images, ideologies, icons, and public perceptions in the U.S. from the late 18th century to the present. (US) (Writing Intensive)
4317. **The American Culture of Curiosity, 1800-1860 (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines the creation of a mass culture which combined education and amusement in print and commerce between the Revolution and the Civil War. (US) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive) (WS 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) (Writing Intensive)
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. Fulfills Core Humanities requirement. (US) (Writing Intensive) (WS 4327)
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) (Writing Intensive)
4338. **History of "Small Wars" (3:3:0).** A research seminar focusing on insurgencies involving both American and international forces (US) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
4343. **Alexander the Great (3:3:0).** Prerequisite: Junior standing or consent of instructor. This course is a detailed study of the rise of ancient Macedonia, the reign of Alexander the Great, and the Hellenistic world. (E) (Writing Intensive)
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) (Writing Intensive) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
4350. **European Urban History 1300 to 1800 (3:3:0).** Prerequisite: Junior standing or consent of instructor. This course will explore social, economic, political, and cultural structures of Western European cities from the 14th to the 18th century. (E) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
4360. **Germany Since 1945: A Divided Nation Confronts Its Past (3:3:0).** Prerequisite: Junior standing or consent of instructor. 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) (Writing Intensive)
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) (Writing Intensive)
4370. **Great Cities (3:3:0).** Prerequisite: Junior standing or consent of instructor. 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. (Writing Intensive)
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) (Writing Intensive)
4372. **History of Comparative Genocide (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines the history of the term "genocide" and analyzes modern and contemporary examples of mass exterminations. (Writing Intensive)
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) (Writing Intensive)
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. Fulfills Core Humanities requirement. (E) (Writing Intensive) (WS 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) (Writing Intensive)
4376. **History of the Italian Mafia (3:3:0).** Prerequisite: Junior standing or consent of instructor. 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) (Writing Intensive)
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) (Writing Intensive)
4378. **History of Italian Fascism (3:3:0).** Prerequisite: Junior standing or consent of instructor. 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. (E) (Writing Intensive)
4380. **A History of Masculinity (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines the history of masculinity and manhood in Great Britain and the United States since the mid-nineteenth century. (Writing Intensive)
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) (Writing Intensive)
4382. **Borderlands/Transnational History and Culture (3:3:0).** A research course that covers the social, political, and economic histories of specific borderland regions throughout the globe. (US) (Writing Intensive)
4385. **Global Islam: Past and Present (3:3:0).** Examines Islam not only as a religion but also as a global phenomenon that helps shape the lives of people globally. (AAL) (Writing Intensive)
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) (Writing Intensive)
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. (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
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) (Writing Intensive)
4396. **Studies Abroad in Southeast Asia (6:2:8).** Students have the opportunity to travel to Vietnam, Laos, Cambodia, and Thailand and to participate in cultural exchanges with government leaders, students, and Vietnamese veterans. (AAL) (Writing Intensive)
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. (Writing Intensive)
4398. **Senior Seminar in History (3:3:0).** Prerequisite: Senior standing or completion of 18 hours in history. 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. (Writing Intensive)

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).** 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 of European History (3:3:0).** Introduction to the themes and approaches that have been influential in the historical profession and in the study of European history.
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. **Historiography of the World (3:3:0).** Examines the major themes and interpretations 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.
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. **Historiography of Early America (3:3:0).** Examines the major themes and interpretations in 16th, 17th, and 18th century North America.
5312. **Historiography of 19th Century America (3:3:0).** Examines the major themes and interpretations in 19th century American history.
5313. **Historiography of 20th Century America (3:3:0).** Examines the major themes and interpretations in 20th century American history.

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.
5320. **Studies in the Atlantic World (3:3:0).** Explores a series of problems in the developing field of Atlantic history. May be repeated once for credit when topics vary.
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 U.S. Military History (3:3:0).** A readings summary on military history with emphasis on development of institutions and national struggles.
5329. **Studies in U.S. Sea Powers (3:3:0).** A study of significant topics in American naval history with emphasis on institutional, organizational, and operational development from the American Revolution to the Gulf War.
5330. **Studies in the Vietnam War (3:3:0).** A study of political, military, economic and social issues resulting from American's involvement in the Vietnam War.
5331. **Studies in the Classics of Military History (3:3:0).** A readings seminar to introduce the classic works of military strategists, theorists, tacticians, and historians.
5332. **Studies Abroad in Southeast Asia (6:2:8).** Students have the opportunity to travel to Vietnam, Laos, Cambodia, and Thailand and to participate in cultural exchanges with government leaders, students, and Vietnamese veterans. (AAL)
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.
5334. **Studies in Mexican-American History (3:3:0).** An extensive reading program and sustained dialogue centering on Mexican-American history with emphasis on theoretical approaches and methods of historical inquiry.
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.
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.
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.
5361. **Studies in the History of Insurgency (3:3:0).** A study of a type of warfare that has existed from the days of early civilizations. Topics will progress from Greece and Rome to Iraq.
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).** Prerequisite: HIST 5304.
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

Kent Pearce, Ph.D., Interim 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, Neusel, Pearce, Schovanec, Smith, Solynin, Strauss, Victory, Wang

Associate Professors: Byerly, Drager, Dwyer, Gelca, Hadjicostas, Iyer, Jang, Juan, Kirby, Ledet, Lee, Long, Monico, Paige, Seaquist, Surles, Toda, Trindade, Weinberg, Williams

Assistant Professors: Aulisa, Christensen, Hoang, Howle, Roeger, Seo

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 6 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

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. Each student must have a degree plan that has been approved by the departmental graduate advisor.

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.

Master's Programs

M.A. Degree in Mathematics. This program 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.

M.S. Degree in Mathematics. The M.S. program 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.

M.S. Degree in Mathematics with an Emphasis in Computer Science. 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.

M.S. Degree in Statistics. An 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.

Doctoral Program

Each doctoral student will undergo a preliminary examination as early as possible during graduate training. The examinations will be administered annually in May and August 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.

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.

Accelerated Bachelor's-to-Master's Degree Program. Undergraduate mathematics majors may apply for admission to the master's degree program during their junior year so they can begin taking graduate courses during their senior year. This program can result in a B.A./M.A., B.A./M.S., or B.S./M.S. depending on the needs of the student. The combined bachelor's and master's degree in mathematics differs only in the final two years; the first three years are the same as the standard B.S. in mathematics program. See either the graduate or undergraduate advisor for details.

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, 3372, 4370, and 4371.

The minimum requirements for the teaching field in mathematics (option II) at the secondary level are:

- MATH 1351, 1352, 2350, 2360, 3310, and 4331
- One of MATH 2300, 3342, or 4342
- One of MATH 3430, 4330, 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 (660 for 1351) on the SATM or at least 26 (29 for 1351)

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, 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, or 1330.
- MATH 1300 Contemporary Mathematics
- MATH 1320 College Algebra
- MATH 1330 Introductory Mathematical Analysis
- MATH 1321 Trigonometry
- 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 13.)

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: Code 2 or higher on MPE or a score of at least 610 on the SATM or a score of at least 26 on the ACTM or a grade of A or B in MATH 0301 or a grade of A or B in TSI 0202 or credit for a college level mathematics course. 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 Courses

- 1300. [MATH 1332] Contemporary Mathematics (3:3:0).** Prerequisites: Code 3 or higher on MPE or a score of at least 610 on the SATM or a score of at least 26 on the ACTM or a grade of A or B in MATH 0302 or a grade of A or B in TSI 0302 or credit for a college level mathematics course. Quantitative literacy and problem solving with applications to finance, population dynamics, politics, and business. Fulfills Core Mathematics requirement. Only one of MATH 1300, 1320, or 1420 can be used to fulfill Core Mathematics requirement.
- 1320. [MATH 1314] College Algebra (3:3:0).** Prerequisites: Code 3 or higher on MPE or a score of at least 610 on the SATM or a score of at least 26 on the ACTM or a grade of A or B in MATH 0302 or a grade of A or B in TSI 0302 or credit for a college level mathematics course. Inequalities, determinants, theory of equations, binomial theorem, progressions, mathematical induction. Fulfills Core Mathematics requirement. Only one of MATH 1300, 1320, or 1420 can be used to fulfill Core Mathematics requirement.
- 1321. [MATH 1316] Trigonometry (3:3:0).** Prerequisite: MATH 1320 or MATH 1420 or a test score of at least 610 on the SATM or 26 on the ACTM or 4 on Math Placement code. Trigonometric functions, radians, logarithms, solutions of triangles, identities, trigonometric equations, complex numbers, De Moivre's Theorem. Fulfills Core Mathematics requirement.
- 1330. [MATH 1324] Introductory Mathematical Analysis I (3:3:0).** Prerequisites: Code 3 or higher on MPE or a score of at least 610 on the SATM or a score of at least 26 on the ACTM or a grade of A or B in MATH 0302 or a grade of A or B in TSI 0302 or credit for a college level mathematics course. 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. Fulfills Core Mathematics requirement.
- 1331. [MATH 1325, 1425] Introductory Mathematical Analysis II (3:3:0).** Prerequisite: MATH 1330 or MATH 1430 or a test score of at least 610 on SATM or 26 on ACTM or 4 on Math Placement code. 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. Fulfills Core Mathematics requirement.
- 1350. [MATH 1348, 2312] Analytical Geometry (3:3:0).** Prerequisite: MATH 1321 or Code 6 or higher on MPE or a score of at least 660 on the SATM or a score of at least 29 on the ACTM.
- 1351. [MATH 2313, 2413, 2417, 2513, 2517] Calculus I (3:3:0).** Prerequisite: MATH 1350 or 1550 or 1321 and Code 5 on MPE or Code 7 on MPE or a score of at least 660 on the SATM or a score of at least 29 on the ACTM. Differentiation of algebraic and transcendental functions, applications of the derivative, differentials, indefinite integrals, definite integrals. Fulfills Core Mathematics requirement. (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. Fulfills Core Mathematics requirement. (Honors section offered.)
- 1420. [MATH 1414] College Algebra With Review (4:3:2).** Prerequisites: Code 2 or higher on MPE or a score of at least 610 on the SATM or a score of at least 26 on the ACTM or a grade of A or B in MATH 0301 or a grade of A or B in TSI 0202 or credit for a college level mathematics course. Review of topics from high school algebra, inequalities, functions and graphs, linear systems, sequences, mathematics induction. Fulfills Core Mathematics requirement. Only one of MATH 1300, 1320, or 1420 can be used to fulfill Core Mathematics requirement.
- 1430. Introductory Mathematical Analysis With Review (4:3:2).** Prerequisites: Code 2 or higher on MPE or a score of at least 610 on the SATM or a score of at least 26 on the ACTM or a grade of A or B in MATH 0301 or a grade of A or B in TSI 0202 or credit for a college level mathematics course. 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. Fulfills Core Mathematics requirement.
- 1550. [MATH 2412] Precalculus (5:5:0).** Prerequisite: Code 3 or higher on MPE or a score of at least 610 on the SATM or a score of at least 26 on the ACTM or a grade of A in MATH 0302 or a grade of A in TSI 0302 or credit for a college level mathematics course. Topics from college algebra, trigonometry, and analytical geometry that are necessary prerequisites for Calculus I. Fulfills Core Mathematics requirement.
- 2300. [MATH 1342, 1442, 2305, 2342, 2442] Statistical Methods (3:3:0).** Prerequisite: Code 4 or higher on MPE or a score of at least 610 on the SATM or a score of at least 26 on the ACTM or credit for a college level mathematics course. Methods of analyzing data, statistical concepts and models, estimation, tests of significance, introduction to analysis of variance, linear regression, and correlation. Fulfills Core Mathematics requirement.
- 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: Code 4 or higher on MPE or a score of at least 610 on the SATM or a score of at least 26 on the ACTM or MATH 1330. Statistics and probability for business. Data collection, description, interpretation, prediction, inference, and computer software. Fulfills Core Mathematics requirement.
- 2350. [MATH 2315, 2415] Calculus III (3:3:0).** Prerequisite: MATH 1352 or consent of department. Partial differentiation, functions of several variables, multiple integrals, line integrals, surface integrals, Stokes Theorem. Fulfills Core Mathematics requirement. (Honors section offered.)
- 2356. Quantitative Theory of Interest (3:3:0).** Prerequisite: MATH 1331 or 1351. Mathematical theory of compound interest, annuities, yield rates, amortization, funds, bonds, and depreciation.
- 2360. [MATH 2318, 2418] Linear Algebra (3:3:0).** Prerequisite: MATH 2350 or concurrent with 2350 or consent of department. Finite-dimensional vector spaces, linear transformations and matrices, eigenvalues and eigenvectors. Fulfills Core Mathematics requirement.
- 2370. [MATH 1350] Elementary Analysis I (3:3:0).** Prerequisite: MATH 1320 and major of EC or MDS or consent of department. Analytic geometry and the real number system with applications. Not for engineering, science, or mathematics majors. Fulfills Core Mathematics requirement.
- 2371. Elementary Analysis II (3:3:0).** Prerequisite: MATH 1320 and major of EC or MDS or consent of department. Elementary differential and integral calculus with application. Not for engineering, science, or mathematics majors. Fulfills Core Mathematics requirement.
- 3310. Introduction to Mathematical Reasoning and Proof (3:3:0).** Prerequisite: MATH 2350 or concurrent with 2350 or consent of department. 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 1352 or consent of department. 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 or consent of department. Descriptive statistics, elementary probability, random variables and distributions, mean, variance, parameter estimation, hypothesis testing, regression, analysis of variance. MATH 3342 and 4342 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 consent of department. 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 or consent of department. 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 or consent of department. 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 and 3310 or consent of department. Fundamental concepts of abstract algebra. Primarily group theory. (Writing Intensive)
3370. **Elementary Geometry (3:3:0)**. Prerequisite: MATH 2370 or consent of department. 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 1330 or 1351 or 2370 or consent of department. Combinatorics, probability theory. Bayes' Theorem, Bernoulli Trials. Probability distributions and statistics. Not for engineering, science, or mathematics majors.
3372. **Math Modeling for Teachers (3:3:0)**. Prerequisite: MATH 2371. Not for engineering, math or science majors. Calculus and non-calculus based models in science and engineering. Appropriate technology for simulation. Computer algebra systems.
3430. **Computational Techniques for Science and Mathematics (4:3:2)**. Prerequisite: MATH 2350 and 2360 or consent of department. 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. Fulfills Core Technology and Applied Science requirement.
4000. **Selected Topics (VI-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, or consent of instructor. Interpolation, approximations, numerical integration, and differentiation.
4312. **Introduction to Numerical Analysis II (3:3:0)**. Prerequisite: MATH 2360 or consent of instructor. Numerical techniques in linear algebra.
4330. **Mathematical Computing (3:3:0)**. Prerequisite: Consent of undergraduate program director. Department of Mathematics and Statistics. Topics from computational mathematics and programming.
4331. **Advanced Geometry (3:3:0)**. Prerequisite: MATH 2350 and 3310 or consent of department. Euclidean and non-Euclidean geometries.
- 4342, 4343. **Mathematical Statistics (3:3:0 each)**. Prerequisite: for 4342, MATH 2350; for 4343, MATH 4342 or consent of department. 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: for 4350, MATH 2350, 2360, and 3310 or consent of department; for 4351, MATH 4350 or consent of department. Sets, functions, vector fields, partial derivatives, power series, theory of integration, line, surface, and multiple integrals. 4350 is prerequisite for 4351. (4350 is Writing Intensive)
4354. **Differential Equations II (3:3:0)**. Prerequisite: MATH 3354 or consent of department. 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 4350 (concurrent) or consent of department. 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 or consent of department. Continuation of MATH 3360. Rings, fields, and applications.
4362. **Theory of Numbers (3:3:0)**. Prerequisite: MATH 3310 or consent of department. Prime numbers, congruencies, theorems of Fermat, Euler, and Wilson, residues, reciprocity law, Diophantine Equations.
4370. **Elementary Problem Solving (3:3:0)**. Prerequisite: MATH 3370 or consent of department. Techniques of problem solving using elementary number theory.
4371. **Basic Computer Literacy and Programming (3:3:0)**. Prerequisite: MATH 2371 or 3371 or consent of department. 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. (ME 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. (ME 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. **Theory of Ordinary Differential Equations I (3:3:0)**. 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.

- 5331. Theory of Ordinary Differential Equations II (3:3:0).** Prerequisite: MATH 5330 or consent of instructor. Advanced existence, uniqueness, continuation, and continuity results; symmetry and variance; center manifold theorem.
- 5332, 5333. Partial Differential Equations I, II (3:3:0 each).** 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.
- 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).**
- ics, statistics, engineering, or physical science majors; these students should take STAT 5384, 5385.
- 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).**

Statistics (STAT)

(To interpret course descriptions, see page 13.)

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 mathemat-

- 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 mathemat-

Department of Philosophy

Peder George Christiansen, Ph.D., Chairperson

Professors: Christiansen, Curzer

Associate Professors: Nathan, Schaller, Webb

Assistant Professors: Beck, Di Poppa, Hom, Kim, Ribeiro

About the Program

This department supervises the following degree programs and certificate:

- Bachelor of Arts in Philosophy
- Master of Arts in Philosophy
- Graduate Certificate in Ethics

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, religious studies, Asian 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). Addi-

tionally, 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.

Ethics Track. Philosophy majors may choose to pursue a concentration in ethics by completing, in addition to the five courses required for the major (see above), any five of the following courses:

- PHIL 3301 Ancient Philosophy (when the focus is Socratic and Platonic ethics)
- PHIL 3320 Introduction to Political Philosophy
- PHIL 3321 Philosophy of Law
- PHIL 3322 Biomedical Ethics
- PHIL 3323 Business Ethics
- PHIL 3325 Environmental Ethics
- PHIL 4320 Ethics (Advanced)
- PHIL 4321 Political Philosophy (Advanced)

Philosophy (PHIL)

(To interpret course descriptions, see page 13.)

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. Fulfills Core Humanities requirement.
2310. **Logic (3:3:0)**. Development of formal methods for evaluating deductive reasoning. Additional topics may include uses of language, definition, nondeductive inference. Fulfills 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. Fulfills Core Humanities requirement.
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. Fulfills multicultural requirement. Fulfills Core Humanities requirement.
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. Fulfills Core Humanities 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. Fulfills Core Humanities 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. Fulfills Core Humanities requirement. (Writing Intensive)
3304. **Existentialism and Phenomenology (3:3:0)**. Consideration of the meaning of human existence through study of thinkers

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 level- ing work during their first year of enrollment.

The department also offers a Graduate Certificate in Ethics. This requires four courses in ethics on the graduate level.

such as Nietzsche, Heidegger, Husserl, Merleau-Ponty, Sartre, and others. Fulfills Core Humanities requirement.

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. Fulfills Core Humanities requirement. (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior 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. Fulfills Core Humanities requirement.
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. Fulfills Core Humanities requirement.
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.
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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior 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. Fulfills Core Humanities requirement.
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.
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. Fulfills Core Humanities requirement.
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. Fulfills Core Humanities requirement.
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 sentinel logic and first-order predicate logic. May also treat topics such as identity, definite descriptions, axiomatic systems, completeness.
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. Fulfills Core Humanities requirement.
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. **Seminar in 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.
5333. **Seminar in Philosophy of Language (3:3:0)**. Central issues in philosophy of language, including the nature of meaning, truth, reference, and context. 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 of teaching philosophy for beginning instructors. Development of course objectives, syllabi, and teaching techniques. Practical pedagogical and associated philosophical issues. Required of all teaching assistants.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Physics

Nural Akchurin Ph.D., Chairperson

Horn Professor: Estreicher

Bucy Professor: Wigman

Professors: Akchurin, Borst, Cheng, Holtz, Lichti, Lodhi, Myles, Quade

Associate Professors: Gibson, Glab, Huang, Lamp, Thacker, Wilhelm

Assistant Professors: Grave De Peralta, Lee, Park, Sanati, Volobouev

Adjunct Faculty: Kubricht, Mark, Nair, Sill, Torres

Joint Faculty: Jiang, Kristiansen, Krompholtz, 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. An M.S. degree involving industry internships is available to selected graduate students.

Undergraduate Program

A typical sequence of courses in physics begins with PHYS 1305, 1408, 2401, and 2402, totaling 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, astrophysics, and physics education.

A broad variety of minor subjects can be elected by a student majoring in physics. These include such traditional choices as mathematics, 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 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 13.)

Undergraduate Courses

- 1400. [PHYS 1411] Solar System Astronomy (4:3:2).** This course covers the sun, planets, moons, asteroids, comets, gravitation, and formation. Fulfills Core Natural Sciences requirement. (Honors section offered.)
- 1401. [PHYS 1412] Stellar Astronomy (4:3:2).** This course covers stars, star formation, galaxies, and cosmology models. Fulfills Core Natural Sciences requirement. (Honors section offered.)

Physics Curriculum

FIRST YEAR			
Fall		Spring	
PHYS 1305, Engr. Physics Analysis I	3	PHYS 2401, Principles of Physics II	4
PHYS 1408, Principles of Physics I	4	CHEM 1307, Principles of Chem. I	3
MATH 1351, Calculus I	3	CHEM 1107, Principles of Chem. I Lab.	1
ENGL 1301, Essentials of Coll. Rhetoric	3	MATH 1352, Calculus II	3
Health and Physical Fitness	1	ENGL 1302, Advanced Coll. Rhetoric	3
TOTAL	14	Health and Physical Fitness	1
		TOTAL	15
SECOND YEAR			
Fall		Spring	
PHYS 2402, Principles of Physics III	4	PHYS 3304, Modern Physics Lab	3
MATH 2350, Calculus III	3	MATH 3350, Math for Engrs. & Scien.	3
CHEM 1308, Principles of Chem. II	3	POLS 2302, American Public Policy	3
CHEM 1108, Principles of Chem. II Lab.	1	English	3
POLS 1301, American Govt., Org.	3	Foreign Language	3
Foreign Lang.	3	Social or Behavioral Science	3
TOTAL	17	TOTAL	18
THIRD YEAR			
Fall		Spring	
PHYS 3305, Electricity & Magnetism†	3	COMS 2300, Public Speaking	3
PHYS 3401, Optics	4	PHYS 3306, Electricity & Magnetism†	3
MATH 3351, High. Math. Engr. & Sci.	3	HIST 2301, History of U.S. Since 1877	3
HIST 2300, History of the U.S. to 1877	3	Electives	6
English	3	TOTAL	15
TOTAL	16		
FOURTH YEAR			
Fall		Spring	
PHYS 4307, Quantum Mechanics	3	PHYS 4301, Computational Physics†	3
Advanced Physics Elective	3	PHYS 4302, Statistical and Thermal†	3
Advanced Electives*	3	PHYS 4304, Mechanics†	3
PHYS 3000, Undergraduate Research	1	Advanced Electives*	6
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.

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 examination and the Ph.D. 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 a physics pedagogy course if on a teaching assistantship. PHYS 5307 and 5322 are tools courses that develop necessary skills for use in other courses and in research. They should be taken early.

Master's Programs

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 the 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 master's examination.

Doctoral Program

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 of advanced courses should be made in consultation with the graduate and/or research advisor.

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. Fulfills Core Technology and Applied Science requirement.
1401. **[PHYS 1410] Physics for Non-Science Majors (4:3:2).** Covers the basic laws and vocabulary of science using a minimum of mathematics and counts toward fulfillment of the natural sciences requirement in A&S. Fulfills Core Natural Sciences requirement.
1402. **Physics of Living Matter (4:3:2).** Covers the physics principles found in living matter and techniques useful in biomedical sciences. Not for physics majors.
1403. **[PHYS 1401] General Physics I (4:3:3).** Prerequisite: MATH 1320 and 1321 or MATH 1550, 1351, 1352, 2322, 2323, 2350, 2360, 3350, 3351, 3354, or 4354. Non-calculus introductory physics covering mechanics, heat, and sound, thus providing background for study in science-related areas. Fulfills Core Natural Sciences requirement.
1404. **[PHYS 1402] General Physics II (4:3:3).** Prerequisite: PHYS 1403. Non-calculus introductory physics covering electricity, magnetism, light, and modern physics, thus providing background for study in science-related areas. Fulfills Core Natural Sciences requirement.
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. Fulfills Core Natural Sciences requirement.
1408. **[PHYS 2425] Principles of Physics I (4:3:3).** Prerequisite: MATH 1351 (can be taken concurrently) or MATH 1352, 2322, 2323, 2350, or 2360. Calculus-based introductory physics covering mechanics, kinematics, energy, momentum, and thermodynamics. Fulfills Core Natural Sciences requirement. (Honors section offered)
2401. **[PHYS 2426] Principles of Physics II (4:3:3).** Prerequisite: PHYS 1408 and MATH 1352 (can be taken concurrently) or MATH 3350, 3351, 3354, or 4354. Calculus-based introductory physics covering electric and magnetic fields, electromagnetic waves, and optics. Fulfills Core Natural Sciences requirement. (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).** Prerequisite: Permission of the department chair. 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. **Intermediate Physics Laboratory (3:0:6).** Prerequisite: PHYS 2402. Laboratory course on advanced physical principles. Experiments in atomic, molecular, solid state, and nuclear, and particle physics as well as relativity, electricity and magnetism including data acquisition and analyses.
- 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: Education majors only; preference given to EC or HDFS; instructor approval. This course teaches the fundamentals of physics and strategies for teaching these fundamentals. 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)

4400. **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.
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 permission of the department chair. 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. **Quantum Mechanics I (3:3:0)**. Prerequisite: MATH 3350 or equivalent. Introduction to fundamental concepts in quantum mechanics: probability, normalization, operators, solutions to Schrodinger equation for various potentials. Discussion of quantum mechanics in 3D, generalized uncertainty principle, angular momentum and hydrogen atom.
4308. **Quantum Mechanics II (3:3:0)**. Prerequisite: PHYS 4307. Review of quantum mechanics, time-independent and -dependent perturbation theory, variational principle, WKB approximation, the adiabatic approximation and scattering.
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. Deals 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)**. Prerequisite: Permission of the department chair. Offers independent study under the direct supervision of a faculty member. Not to be used for thesis or dissertation research or writing.
5001. **Master's Internship (V1-12)**. Prerequisite: Permission of the internship coordinator. Internship in an industrial or research laboratory setting. Arranged through the department and directly related to degree program.
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 and/or department chair. 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.
5308. **Molecular Biophysics (3:3:0)**. Study of the physics of the structures and dynamics of biological molecules and assemblies at the molecular level. Required for students in biophysics research.
5309. **Methods in Biophysics (3:3:2)**. Study of experimental and computational methods in biophysics. Requires and individual research project. Mandatory for students in biophysics research.
5311. **Nuclear Physics (3:3:0)**. Prerequisite: PHYS 5301. Deals with nuclear physics covering such topics as nuclear structure models, interactions, reactions, scattering, and resonance. Nuclear energy is discussed as an application.
5312. **Elementary Particle Physics (3:3:0)**. Prerequisites: PHYS 5302, 5303. The role of symmetries, gauge theories, and the Standard Model. First-order Feynman diagram calculations aided by computing tools and comparison with the experimental data. Experimental techniques and detectors in particle physics.
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.
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.
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.
6309. **Advanced Quantum Mechanics (3:3:0)**. Prerequisite: PHYS 5302. Scattering, second quantization, charge particle interactions, path integral, Klein-Gordon and Dirac equations, many electron systems.
6312. **Quantum Field Theory I (3:3:0)**. Prerequisites: PHYS 5301, 5302. A first course in quantum field theory. Path integral approach to quantization of fields, Feynman diagrams and calculation of quantum electrodynamics (QED) processes.
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

Philip Howard Marshall, Ph.D., Chairperson

Professors: Dometrius, Khan, A. Lee, Marshall, Mayer

Associate Professors: Barkdull, Patterson, Thames

Assistant Professors: Biglaiser, Goodman, Kwon, H. Lee, Lektzian, McKenzie, Murray, Nokken, Opp, Rugeley, Yang

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. 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.

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.

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.

Transfer Students. Transfer students who major in political science must complete at least 9 credit hours at the 3000/4000-level in political science at Texas Tech. Transfer students who minor in political science must complete at least 6 credit hours at the 3000/4000-level in political science at Texas Tech.

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.

Accelerated Bachelor's-to-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 13.)

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. Fulfills Core Social and Behavioral Sciences–Political Science requirement.
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. Fulfills Core Social and Behavioral Sciences – Political Science requirement.
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. Fulfills Core Social and Behavioral Sciences–Political Science requirement (with restrictions). (Writing Intensive)
- 3325.* **Political Parties (3:3:0).** Party history, functions, organization, finance, nominations, campaign methods, and elections. Fulfills Core Social and Behavioral Sciences – Political Science requirement (with restrictions). (Writing Intensive)
- 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement *or* Political Science requirement (with restrictions). (Writing Intensive) (WS 3326)
- 3327.* **The American Presidency (3:3:0).** The presidency, its constitutional basis, structure, powers, functions, and responsibilities. Fulfills Core Social and Behavioral Sciences – Political Science requirement (with restrictions). (Writing Intensive)
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. (Writing Intensive)
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. Fulfills Core Humanities requirement. (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. Fulfills Core Humanities requirement. (Writing Intensive)
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. Fulfills Core Humanities requirement. (Writing Intensive)
- 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. Fulfills Core Social and Behavioral Sciences – Political Science requirement (with restrictions). (Writing Intensive)
- 3340.* **Fiscal Administration (3:3:0).** Governmental budgeting and revenue raising, emphasizing theories, techniques, procedures,

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 polsggrad@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.

Dual Degree 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 dual 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 dual 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.

implementation, the political environment in which such activities take place, and possible alternatives to existing practices. Fulfills Core Social and Behavioral Sciences – Political Science requirement (with restrictions). (Writing Intensive)

- 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement **or** Political Science requirement (with restrictions).
- 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 develop-

ment policies. Attention to policy analysis skills and approaches used in government and consulting. Fulfills Core Social and Behavioral Sciences – Political Science requirement (with restrictions). (Writing Intensive)

- 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. Fulfills Core Social and Behavioral Sciences – Political Science requirement (with restrictions). (Writing Intensive)
- 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement or Political Science requirement (with restrictions).

- 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. Fulfills Core Social and Behavioral Sciences–Political Science requirement (with restrictions). (Writing Intensive)
- 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. Fulfills Core Social and Behavioral Sciences – Political Science requirement (with restrictions). (Writing Intensive)
- 3360.* **United States Foreign Policy (3:3:0)**. Examines the patterns and processes that shape U.S. foreign policy. Fulfills Core Social and Behavioral Sciences–Political Science requirement (with restrictions). (Writing Intensive)
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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
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. (Writing Intensive)
3364. **Comparative Foreign Policy (3:3:0)**. Surveys theories that connect domestic politics with foreign policy and applies them to a variety of countries. Fulfills multicultural requirement. (Writing Intensive)
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? (Writing Intensive)
3366. **International Political Economy (3:3:0)**. Explores interaction of politics and economics in trade, investment, finance, and development. (Writing Intensive)
3368. **Transnational Issues (3:3:0)**. Survey of current politics of human rights, migration, environment, and technological change. (Writing Intensive)
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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
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. Fulfills multicultural requirement. (Writing Intensive)
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. Fulfills multicultural requirement. (Writing Intensive)
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. Fulfills multicultural requirement. (Writing Intensive)
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. Fulfills multicultural requirement. (Writing Intensive)
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. Fulfills multicultural requirement. (Writing Intensive)
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 discussions of the political science profession by department and visiting faculty. Credit-no credit. May be repeated.
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.
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, nonstage 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.
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 13.)

Graduate Courses

5319. **Research methods in Public Administration (3:3:0).** Issues and techniques in data collection, analysis, and management for designing and implementing public policy. Focus on research design, measurement, and decision-making in public organizations.
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.
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.
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 and Leadership (3:3:0).** Apply major frameworks to diagnose organizational problems and to exercise leadership when resolving ethical dilemmas and leading organizational change.
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

M. David Rudd, Ph.D., Chairperson

Horn Professor: C. Hendrick, S. Hendrick

Professors: Clopton, Cogan, Delucia, Durso, Marshall, Richards, Rudd, Taraban, Winer, Young

Associate Professors: Borrego, Cohen, Cook, Epkins, Garos, Hardin, Harter, Larsen, Morgan, Mumma, Reich, Robitschek

Assistant Professors: Cukrowicz, DeMarree, Dressel, Jones, Marsh, Serra

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Psychology
- Master of Arts in Counseling Psychology
- Master of Arts in Experimental Psychology
- Master of Arts in Psychology
- Doctor of Philosophy in Clinical Psychology
- Doctor of Philosophy in Counseling Psychology
- Doctor of Philosophy in Experimental Psychology
- Doctor of Philosophy in Psychology

An overview of the requirements for the Bachelor of Arts in Psychology is given in this section of the catalog.

The requirements for the graduate programs are extensive and tailored, to some extent, to the specific student and the specific graduate program in psychology. These requirements are also revised regularly to align with the relevant accrediting agencies, such as the American Psychological Association (for the clinical and counseling psychology Ph.D. programs) and the Human Factors and Ergonomics Society (for the experimental psychology concentration in human factors, with combined B.A.–M.A. and M.A.–Ph.D. options).

Students in the clinical and counseling psychology Ph.D. programs are only admitted for the doctoral degree, but they may elect to complete the requirements for the optional master's degree during their work toward the Ph.D. in clinical or counseling psychology.

Students in the experimental psychology graduate programs are typically admitted for the doctoral degree, although a small number may be admitted for a terminal master's degree or for a combined B.A.–M.A. degree. The combined B.A.–M.A. degree entails a B.A. in psychology and an M.A. in experimental psychology, with a concentration in human factors. The Ph.D. in experimental psychology offers concentrations in cognitive/applied cognitive psychology, human factors, and social psychology.

Extensive details are available at www.psychology.ttu.edu in the online handbooks for each graduate program. Application forms and instructions for the graduate programs are also available online.

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 students to emphasize the acquisition of useful vocational and personal skills for later life and to prepare students for a graduate degree program in psychology, 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 toward 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 service 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 in 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 13.)

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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
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. (Writing Intensive)
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.
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 3401. 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. Fulfills Core Curriculum mathematics requirement (in conjunction with a mathematics course).
3401. **Research Methods (4:3:2).** Prerequisites: PSY 1300 and 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. (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, senior standing. 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 4305 or consent of instructor; junior standing. Description, classification, assessment, treatment, and research methods pertaining to behavioral and emotional disorders of childhood and adolescence. (Writing Intensive)
4316. **History of Psychology (3:3:0).** Prerequisite: PSY 1300 and junior standing. A survey of the historical development of modern psychology.
4317. **Psychometrics (3:2:1).** Prerequisite: PSY 3400 or equivalent. Basic principles and practices of measurement in psychology. Emphasis on construct validity and procedures to develop measures relevant to clinical, counseling, social, and health 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 with a grade of C or better. 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 with a grade of C or better. 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

Graduate Program / Psychology

The Department of Psychology admits students to and provides instruction in the following graduate degree programs:

- **Doctor of Philosophy in Clinical Psychology.** This Ph.D. program typically requires five to six years of full-time study, including an approved one-year internship at an appropriate training agency (e.g., approved outpatient clinic, hospital, forensic agency, community mental health center, healthcare system, university counseling center, K-12 school system). Extensive details regarding a typical curriculum are available in the program handbook, which is online at www.psychology.ttu.edu. Students may elect to earn an optional master's degree during their pursuit of the doctoral degree.
- **Doctor of Philosophy in Counseling Psychology.** This Ph.D. program typically requires five to six years of full-time study, including an approved one-year internship at an appropriate training agency (e.g., approved university counseling center, community mental health center, hospital, outpatient clinic, correctional facility, healthcare system, psychological-services consortium). Extensive details regarding a typical curriculum are available in the program handbook, which is online at www.psychology.ttu.edu. Students may elect to earn an optional master's degree during their pursuit of the doctoral degree.
- **Doctor of Philosophy in Experimental Psychology.** This Ph.D. program also offers a terminal master's degree (M.A.) option in experimental psychology and a combined B.A.–M.A. option with a concentration in one of the concentration areas of experimental psychology—human factors. The doctoral program typically takes four to five years of full-time study, and the terminal master's program typically takes two years of full-time study. Graduate students in the human factors concentration must complete an approved internship, often for one to two semesters, at an appropriate agency (e.g., federal or state agency, consulting company, engineering group, high-tech business, transportation agency, healthcare facility, military base). The concentration areas available in the experimental psychology graduate program at the master's and doctoral levels are cognitive/applied cognitive psychology, human factors, and social psychology. Extensive details regarding a typical curriculum in each of the concentration areas of experimental psychology are available online at www.psychology.ttu.edu.

The American Psychological Association accredits the clinical and counseling psychology doctoral program. The accrediting association can be contacted at: American Psychological Association, Office of Program Consultation and Accreditation, 750 First Street N. E., Washington, DC 20002-4242, 202-336-5500, 202-336-6123 (TDD). The Human Factors and Ergonomics Society accredits the experimental psychology graduate programs with a concentration in human factors.

The programs in clinical psychology and counseling psychology only admit students for the doctoral degree. During their pursuit of the doctoral degree, however, students may elect to earn an optional master's degree. There are not terminal master's degree admissions for clinical psychology and counseling psychology. A nonthesis master's degree in psychology typically requires successful completion of at least 36 credit hours of required

coursework at Texas Tech, plus successful completion of other program requirements like the second-year research project and certain statistics courses. A doctoral degree in psychology has some variance in the required total hours because of such factors as the differences between doctoral psychology programs, diversity of student interests, range of academic backgrounds, and other practical issues. Doctoral students in psychology at Texas Tech typically earn approximately 90-120 credit hours of required coursework in their graduate program before successfully completing their doctoral degree. In addition, other doctoral program requirements must be completed successfully before the doctoral degree is awarded.

The doctoral program in experimental psychology does admit a few students for terminal master's degrees in experimental psychology, although the majority of students in this program are admitted for the doctoral degree in experimental psychology. Doctoral students also complete requirements for a master's in experimental psychology as they pursue their doctorate in three concentration areas: cognitive/applied cognitive psychology, human factors, and social psychology. The human factors concentration is also available in a combined B.A.–M.A. version in which the bachelor's degree is awarded in psychology and the master's degree is awarded in experimental psychology with a concentration in human factors.

All the doctoral programs in psychology require courses specific to their own specialty, along with more general psychology courses that are department-wide requirements for graduate students, such as research methods, statistics, and some of the psychological bases of behavior (e.g., biological, cognitive, developmental, social, and historical bases of behavior). Courses in ethical and professional issues, multicultural issues and underserved populations, and supervision and consulting for the provision of psychological services are also required in some graduate programs (e.g., clinical psychology and counseling psychology).

All doctoral students are required to complete a second-year research project or its equivalent (e.g., an empirical master's thesis), doctoral qualifying exams specific to each doctoral program in the department, and a dissertation. Students in some of the programs, such as clinical psychology, counseling psychology, and the human factors concentration within experimental psychology, also complete numerous practicum courses and an approved internship. Interdisciplinary study with other relevant and cooperating departments/colleges on campus is also available. For example, some psychology doctoral students take elective human sciences courses such as child and adolescent development. Doctoral students with a human factors concentration in experimental psychology may choose engineering topics such as industrial, organizational, and computer engineering.

Application instructions and forms for psychology are available at www.psychology.ttu.edu. Deadlines for receipt of the complete application are **January 1** for the clinical psychology and counseling psychology doctoral programs and **February 1** for the experimental psychology doctoral program.

Many graduate courses in psychology—and all graduate courses in psychology with a practicum component—are limited to full-time graduate students who are officially admitted and enrolled in one of the psychology degree graduate programs. Full-time graduate students from other degree programs must get written permission from the instructor before enrolling in a psychology graduate course.

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 3401 and junior or senior standing. In-depth study of selected research areas in personality and social psychology, with special emphasis on scientific writing. (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 Topics (3:3:0).** Prerequisites: PSY 1300. Introduction to topics in cognitive science, including language, intelligence, memory, and consciousness. Topics vary by instructor. May be repeated once with consent of instructor.
- 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.
- 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).

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).** 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: PSY 5338 with a grade of C or higher and consent of instructor. Didactic introduction to psychotherapy procedures plus a practicum element.
- 5312. Introduction to Child and Adolescent Psychological Treatment (3:3:0).** Prerequisite: PSY 5303 and consent of instructor. Introduction to empirically-based treatment approaches pertaining to children, adolescents, and families, with a focus on case formulation and treatment planning.
- 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).** Prerequisite: Consent of instructor; concurrent enrollment in PSY 5002 is recommended. 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.
- 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: PSY 5002, 5306, and 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 the theoretical frameworks of motivation and application to a wide variety of research areas.
- 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.
- 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 with a grade of C or better

- (can be taken concurrently) or consent of instructor. 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 Repeated Measures and Intensive Longitudinal Designs (3:3:0).** Prerequisite: PSY 5347 and 5380 or equivalent. Analysis of repeated measures, longitudinal, and intensive longitudinal designs using multilevel models, time series regression, latent variable dynamic and growth curve analysis. 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. 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: Graduate majors and 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 or consent of instructor. 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

Jeffrey P. Williams, Ph.D., Chairperson

Professors: D. Johnson, Koch, Paine, Roberts, Tsai, Williams

Associate Professors: Dunham, Elbow, Ramirez, Schneider, Smithey, Walter

Assistant Professors: Bradatan, Durband, Houk, Lowe, Morrow, Wasserman

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. Two core courses as follows, all of which must be taken: SOC 3327 and 4325.
2. Three alternate courses to be chosen from among the following: ANTH 2305, 4343; PSY 4384; SOC 3335, 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, 4305, 3305, 3310 or 3311, and one alternate course to be chosen from the following: ANTH 3342, 3343, 3344, 3345, 3347, and 3348. 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 sciences, and social and behavioral sciences. Courses so indicated give humanities or natural sciences 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 in Social Work degree (B.S.W.) at Texas Tech is accredited by the Council on Social Work Education. Those who graduate with a social work major from this program are eligible to sit for the Baccalaureate Level Social Work Licensure Exam in Texas

and in many other states. The curriculum is based on the generalist social work model that 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. Certain professional concentrations in social work require completion of social work graduate training. For those interested in pursuing their social work education at the master's level (M.S.W.), the B.S.W. curriculum provides an important foundation. This foundation enhances an application for advanced standing in most graduate schools of social work that typically reduces the number of hours required at the graduate level. The Texas Tech social work program also offers a minor in social work.

Social Work Major. To become a social work major, students must simply declare social work as their major through the College of Arts and Sciences. 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 these courses in this order:

First take:

- SOC 1301 Introduction to Sociology
- SW 2301 Introduction to Social Work (with or after SOC 1301)
- SW 3311 Human Behavior and the Social Environment: Systems (with or after SW 2301)
- Human Biology (before or with SW 3312)
Choose either BIOL 1402 Biology of Animals, or ANTH 2300/2100 Physical Anthropology. A combination of BIOL 1403 and 1404 may be substituted for BIOL 1402.
- SW 3312 Human Behavior and the Social Environment: Lifespan (with or after SW 2301, with or after human biology)
- SW 3331 Social Work with Diverse Populations
- Statistics (or introductory research methods)
Acceptable: MATH 2300, SOC 3391, PSY 3400

After successful completion of the above courses, social work majors will apply for candidacy in the Social Work Program.

After acceptance to candidacy, take together:

- SW 3332 Social Work Practice: Interaction Skills
- SW 3333 Social Work Practice: Macro Systems

Then take:

- SW 3334 Social Work Practice: Micro Systems
- SW 3339 Social Work Research and Evaluation (must be taken after statistics)

Finally, take:

- SW 4311 Social Policy and Social Welfare Legislation
- SW 4340 Field Placement Integrative Seminar
- SW 4611 Field Experience

SW 4311, 4340, and 4611 should be taken together. **Note: Due to potential scheduling conflicts, students should not attempt to take other degree-required courses in their field placement semester.**

Advising. Since most social work classes are sequential (building on previous classes), new social work majors are strongly encouraged to visit with the program director for advising as soon possible. 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 specific foreign languages or American Sign Language, one of the human sciences, business, or education. The department recommends that social work majors discuss their options for a minor with the social work program director in an advising session.

Good Standing. Students may continue as a social work major as long as they remain in good standing in the program. To remain in good standing, the student must:

- Demonstrate compatibility with the social work profession. Compatibility is reflected in respect for social work ethical standards and values.
- Demonstrate potential for success in the social work profession. Potential for success is reflected in the ability to retain social work knowledge and perform social work skills at a level appropriate for progress in the program.
- Maintain a minimum 2.5 GPA in social work (SW) courses. Dropping below a 2.5 GPA in social work courses at any point is sufficient cause for a student to be placed on probation in the Social Work Program.

Candidacy in the Social Work Program. Any student at Texas Tech University may declare social work as a major. However, a student must apply and be approved for candidacy to enter and complete the practice courses, SW 3332 and SW 3333, which are necessary for the social work degree. Applications for candidacy will be reviewed by the faculty to ensure that the student is in good standing (refer to the above section) and to ensure that the student has successfully completed SW 2301, 3311, 3312 and 3331 with a grade of C or better in each while maintaining at least a 2.5 GPA in these social work classes. Depending on the circumstances, if candidacy is not approved, the student may be placed on probation and given one long semester to remedy the cause of the probation. The student will be notified by Texas Tech e-mail if probation is required.

Field Placement. The field experience allows students to demonstrate their abilities to assess client system situations and to apply generalist skills and the social work code of ethics with populations at risk across micro, mezzo and macro systems. It is a 400-hour closely supervised individual experience using social work knowledge, methods, skills, and ethics in a social agency selected and certified by the Social Work Program.

An Application for Field Experience must be completed early in the long semester prior to the field placement, usually while students are enrolled in SW 3334. The placement process can take several weeks to complete. An untimely delay in completion of the application and interviews may mean the postponement of the field placement by an additional semester. Some of the approved field sites require background checks before placement. Early in their social work education, social work majors should read, ask questions about, and sign the Field Expectations form (referred to as the green form). The field experience must be taken pass-fail. Only social work majors may participate. Professional liability insurance is required and payment is the responsibility of the student.

Transfer Credit. Under the Texas Common Course Numbering System, the College of Arts and Sciences and the program typically will accept the equivalent of SW 2301, 3311 and 3312 for transfer, especially if these are from a CSWE accredited program, but will not accept transfer credit for SW 3331, 4311, 4340 or 4611. Requests for transfer credit for all other social work courses will be considered based on a faculty review of course syllabi to ensure course compatibility with the program goals and objectives and with the curriculum expected within the degree program. It is the intention of the social work program to avoid repetition of foundational courses taken through CSWE approved programs, if at all possible. The program will typically accept up to 9 hours of transfer credit for social work courses.

No Credit for Life Experience. The Social Work Program does not give credit for work or other life experiences.

Social Work Minor. Students majoring in other fields sometimes choose to enhance their educational 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, sociology majors, pre-med students, political science majors and students in several areas of human sciences. The purpose of the minor is to provide an understanding of social work knowledge,

Graduate Program

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.

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.

Thesis, Nonthesis Options. 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.

Coursework. 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.

Assessment. 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.

Admission. 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.

values, and perspective. It should be noted that a minor in social work does not prepare a student for the role of a professional social worker. In Texas, as in many other states, a social work major in a bachelors degree from a Council on Social Work Education accredited program is required to sit for the social work licensure exam. However, all of the courses required for the minor may be used toward a social work major if students opt to make social work their major at a later time.

Most students minoring in social work need to take the following courses:

- SOC 1301 Introduction to Sociology
- SW 2301 Introduction to Social Work (with or after SOC 1301)
- SW 3311 Human Behavior and the Social Environment: Systems (with or after SOC 2301)
- Human Biology (before or with SW 3312)
Choose either BIOL 1402 Biology of Animals, or ANTH 2300/2100 Physical Anthropology. A combination of BIOL 1403 and 1404 may be substituted for BIOL 1402.
- SW 3312 Human Behavior and the Social Environment: Lifespan (with or after SW 2301 with or after human biology)
- SW 3331 Social Work with Diverse Populations

Sociology majors may not count SOC 1301 toward their minor, since it is required for their major. They may substitute either the policy class (SW 4311) or the research class (SW 3339) for SOC 1301. Note: SW 3339 has a prerequisite of statistics.

For further information, contact Helen Morrow, Ph.D., LCSW, Director of the Social Work Program, at helen.morrow@ttu.edu.

Anthropology (ANTH)

(To interpret course descriptions, see page 13.)

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 Core Social and Behavioral Sciences—Individual or Group Behavior requirement. (Fulfills the state standard requirement in multicultural education for education majors.)
2100. [ANTH 2101, 2401] **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. Partially fulfills Core Natural Sciences requirement.
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. Partially fulfills Core Natural Sciences requirement.
2301. [ANTH 2302, 2401] **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. Fulfills Core Social and Behavioral Sciences—Individual or Group Behavior requirement.
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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences—Individual or Group Behavior requirement. (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. 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. Fulfills Core Social and Behavioral Sciences—Individual or Group Behavior requirement.
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. Fulfills Core Social and Behavioral Sciences—Individual or Group Behavior requirement. (WS 3306)
3310. **Human Evolution (3:2:3).** Prerequisite: ANTH 2100 and 2300. 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 2100 and 2300. 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)
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. Fulfills Core Social and Behavioral Sciences—Individual or Group Behavior requirement.
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. Fulfills Core Humanities requirement.
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. Fulfills Core Humanities requirement. Fulfills multicultural requirement. (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. 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. The origins, development, and cultural achievements of the great civilizations of Middle and South America: the Incas, Aztecs, Mayas, and their predecessors.
3347. **Texas Prehistory (3:3:0).** Prerequisite: ANTH 2301. 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 interrelationships of language and other aspects of culture; languages as reflecting or actively molding human perception and experience. Fulfills Core Humanities requirement.
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. Fulfills Core Social and Behavioral Sciences - Individual or Group Behavior requirement. (Writing Intensive)
4000. **Individual Problems in Anthropology (V1-3).** Prerequisite: ANTH 2300, 2301, or 2302 plus advanced standing and consent of instructor. May be repeated for credit.
4305. **Doing Ethnography: Method and Theory (3:3:0).** Prerequisite: ANTH 2302. The history of research in cultural anthropology, development of methodological and theoretical approaches, and the exploration of ethnographic fieldwork and writing. (Writing Intensive)
4341. **Archaeological Methods and Techniques (3:2:3).** Prerequisite: ANTH 2301. 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 2300 and 2100 or consent of instructor. 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.
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. A summer session field school providing instruction in basic archaeological field techniques, including site survey, test excavations, record keeping, mapping, and collection documentation. (Writing Intensive)

Graduate Courses

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.
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).** 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.
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).** Offers students an appreciation of the dynamic nature of human bone as it relates to the health of prehistoric populations.
5352. **Ethnolinguistics (3:3:0).** Survey of the nature of the interrelationships between language and culture.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**

Social Work (SW)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

2301. **[SOCW 2361, 2362] Introduction to Social Work (3:3:0).** Examination of society's responses to human needs and social problems through voluntary and governmental social policies and services. Fulfills Core Social and Behavioral Sciences - Individual or Group Behavior requirement.
3311. **Human Behavior and the Social Environment: Systems (3:3:0).** Examination of interaction between person and environment, emphasizing mezzo and macro level systems, including small groups, organizations, and communities. Fulfills Core Social and Behavioral Sciences-Individual or Group Behavior requirement.
3312. **Human Behavior and the Social Environment: Lifespan (3:3:0).** Prerequisites or corequisites: SW 2301 and BIOL 1402 or ANTH 2300/2100. Examination of interaction between person and environment with emphasis on biological, social, emotional, and cultural systems across life-span. (Writing Intensive)
3331. **Social Work with Diverse Populations (3:3:0).** Integrated approach to theory, values, and skills of working with culturally diverse populations. Emphasis on empowering vulnerable populations to fulfill their potential. Fulfills multicultural requirement.
3332. **Social Work Practice: Interaction Skills (3:3:0).** Prerequisite: Acceptance into Social Work Candidacy. Foundation theory, principles, and skills of building and maintaining professional relationships for generalist social workers. Social work majors only.
3333. **Social Work Practice: Macro Systems (3:3:0).** Prerequisite: Acceptance into Social Work Candidacy. Knowledge base and skills of generalist social work practice with organizations and communities. Social work majors only. (Writing Intensive)
3334. **Social Work Practice: Micro Systems (3:3:0).** Prerequisite: SW 3332 and 3333. 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 or PSY 3400. Scientific approach to social work knowledge. Emphasis on evaluation of social welfare programs and social work practice. (Writing Intensive)
4300. **Independent Study in Social Work (3).** Prerequisite: Consent of instructor. Independent study in social work theory, practice, policy, research, or policy evaluation.
4311. **Social Policy and Social Welfare Legislation (3:3:0).** Prerequisites: SW 2301 and 3311. In-depth analysis of the social policy process. Emphasis on social welfare and social service delivery systems. (Writing Intensive)
4340. **Social Work: Field Placement Integrative Seminar (3:3:0).** Prerequisite: SW 3334; corequisite: SW 4611. 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).** Corequisite: SW 4340. Closely supervised 400-hour practicum using social work knowledge/skills/ethics in program-approved social agency. Social work majors only. Professional liability insurance required. Pass/fail.

Sociology (SOC)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

1301. **[SOCI 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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences-Individual or Group Behavior requirement.
1320. **[SOCI 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. Fulfills Core Social and Behavioral Sciences-Individual or Group Behavior requirement.
2331. **[SOCI 2301] The Sociology of Marriage (3:3:0).** Prerequisite: SOC 1301. History, present status, and current problems of the marriage institution. Fulfills Core Social and Behavioral Sciences-Individual or Group Behavior requirement. (WS 2331)
3324. **American Minority Problems (3:3:0).** Prerequisite: SOC 1301. Sociological analysis of the major racial and ethnic groups in the present United States. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences-Individual or Group Behavior requirement.
3325. **Gendered Lives (3:3:0).** Prerequisite: SOC 1301. Study of the gendered nature of society, emphasizing the experiences

- of women in such areas as family, health, and the economy. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement. (WS 3325)
3327. **Sociology of Law and Policing (3:3:0).** Prerequisite: SOC 1301. Examines social forces affecting the development and current operation of criminal law and policing. Special attention given to contemporary issues concerning each. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
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).** Prerequisite: SOC 1301. Changing family life styles, mate roles, parent-child relationships, adoption, abortion, population control, technical-industrial impact on American family unit. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement. (WS 3331)
3332. **Sociology of Bureaucracy (3:3:0).** Prerequisite: SOC 1301. 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. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
3335. **Family Violence (3:3:0).** Prerequisite: SOC 1301. Surveys definitions, prevalence, and theories of family violence. Focuses on impact of variations in definitions of family violence and societal responses to family violence. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
3337. **Inequality in America (3:3:0).** Prerequisite: SOC 1301. Inequality as expressed in occupational, class, ethnic, and sexual hierarchies is examined from varying sociological perspectives. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement. (WS 3337)
3348. **Sociology of China and Japan (3:3:0).** Prerequisite: SOC 1301. 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).** Prerequisite: SOC 1301. 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. Fulfills Core Technology and Applied Science requirement.
3368. **Sociology of Deviance (3:3:0).** Prerequisite: SOC 1301. 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. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
3383. **Alcohol, Drugs, and Society (3:3:0).** Prerequisite: SOC 1301. Analysis of social factors related to the use and abuse of alcohol and other drugs. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
3391. **Introduction to Social Research I (3:3:0).** Prerequisite: SOC 1301. 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).** Prerequisite: SOC 1301. Emergence of systematic sociological theory out of social philosophy; evolution of sociology as a discipline in the late 19th century. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement. (Writing Intensive)
3394. **Contemporary Sociological Theories (3:3:0).** Prerequisite: SOC 1301. 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 perspectives. Special attention given to linkages between micro and macro levels of the social world. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement. (Writing Intensive)
4307. **Individual Studies in Sociology (3).** Prerequisite: SOC 1301. 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).** Prerequisite: SOC 1301. Theory and research on aging: covering demographic, sociocultural, economic, individual, and social factors.

4325. **Criminology (3:3:0).** Prerequisite: SOC 1301. Crime and deviant behavior as a social process and their regulation in a democratic society.
4327. **Juvenile Delinquency (3:3:0).** Prerequisite: SOC 1301. 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).** Prerequisite: SOC 1301. The sociological study of religious groups and beliefs. The reciprocal relationships between religious institutions and society.
4362. **Cities and City Life (3:3:0).** Prerequisite: SOC 1301. The modern city in its ecological, cultural, and social aspects.
4381. **Sickness, Health, and Society (3:3:0).** Prerequisite: SOC 1301. The sociological study of the medical institution and its interrelationship with other societal institutions. Differential definitions of health and 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).** 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 (V1-6).**
7000. **Research (V1-12).**

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 development of business in the global economy. AACSB International, the national accrediting organization for business and management programs, fully accredits the baccalaureate and master's programs in business administration and accounting.

Degree Programs

The college offers programs leading to the following degrees and certificates:

- 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 and Joint Degree 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/Doctor of Pharmacy
- 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

Certificates

- Joint Business/Engineering Undergraduate Certificate in Technology Entrepreneurship
- Accounting Undergraduate Certificate in Energy
- ISQS Undergraduate Certificate in Management Information Systems
- Graduate Certificate in Healthcare Change
- Graduate Certificate in Leadership

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, Hunt, Westfall

Professors: Blair, Boal, Burns, Clancy, Duhan, Dukes, Ewing, Gardner, Goebel, Hein, Hoffman, Howell, Laverie, Lumpkin, Macy, Mann, McInnes, Mercer, Mitchell, Nichols, Pasewark, Ricketts, Viator, Wetherbe, Wilcox, Wilkes, Winters, Yadav

Associate Professors: Arnett, Bremer, Brigham, Buchheit, Cao, D. Collins, Cooney, Davis, Durrett, Ford, Gillan, Harrison, Jones, Krefting, Lin, Masselli, McDonald, T. Payne, Ritchey, Short, Song, Walden, Wan

Assistant Professors: Bagley, Bauguess, Buslepp, Cashman, Coglier, A. Collins, Conn, Dass, Delgadillo, Hansen, Huerta, McInturff, Quinn-Trank, Rinaldo, Roman, Romanus, Ryan, Stegemoller, Vozlyublennia, Wagner, Walker, Whitby

Instructors: Allen, Brown, Clark, Edwards, Flamm, Giberson, Giddens, Greene, Harper, Hoover, Jones-Bigbee, Kelley, Lay, Lynn, McWhorter, Nix, D. Payne, Reed, Schuetzberg, Smithee, Stevens, Stull, Westney, Whitebread

Undergraduate Program

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 2009 should be aware that laptop computers may be required for junior- and senior-level courses starting fall 2010.

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.

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.

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 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 by a Rawls College undergraduate advisor prior to enrollment. Credit from other institutions is not calculated into the student's Texas Tech GPA.

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 offered in several business courses.

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 and grades as required for each major.
- A minimum Texas Tech 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, workforce education, 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 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 GPA or higher on a minimum of 12 credit hours. 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 a 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.

Undergraduate Services Center

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 and Joint Degree 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 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
BA 3301	Fundamentals of Marketing. (Prerequisite: ECO 2302 and a minimum 2.75 GPA)
BA 3302	Financial and Managerial Accounting. (Prerequisite: minimum 2.75 GPA)
BA 3303	Foundations of Finance. (Prerequisite: minimum 2.75 GPA and BA 3302)
BA 3304	Operations Management. (Prerequisite: minimum 2.75 GPA)
BA 3305	Organization Management. (Prerequisite: minimum 2.75 GPA).

Curriculum

Lower-Division Curriculum

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 wishing to major in business are classified as pre-business COBA (College of Business Administration) majors until completion of the lower-division business core (BA 1101, ENGL 1301, 1302, MATH 1330, 1331, 2345, ACCT 2300, 2301, ISQS 2340, and ECO 2301, 2302) with grades of C or higher and a minimum 2.75 Texas Tech GPA. The following table summarizes the courses schedule for lower-division students.

FIRST YEAR			
Fall		Spring	
BA 1101, Fund. Bus. Professionalism	1	MATH 1331, Intro. Math. Analysis	3
MATH 1330, Intro. Math. Analysis	3	ENGL 1302, Advanced Coll. Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	HIST 2301, History of U.S. Since 1877*	3
Humanities*†	3	Natural Science*†	4
Natural Science*†	4	Visual and Performing Arts*†	3
(ENCO majors take GEOL 1303 & 1101)		TOTAL	16
HIST 2300, History of U.S. to 1877*	3		
TOTAL	17		
SECOND YEAR			
Fall		Spring	
ACCT 2300, Financial Acct. ^	3	ACCT 2301, Managerial Accounting**	3
ISQS 2340, Intro. Info. Systems in. Bus.	3	MATH 2345, Intro. Stats. Bus.	3
ECO 2301, Prin. Economics I	3	ECO 2302, Prin. Economics II	3
POLS 1301, American Govt., Org.*	3	POLS 2302, American Public Policy*	3
Multicultural course*†	3	Elective (Non BA or Non Eco.) or	3
TOTAL	15	foreign language for IB majors,*	
		and ENGL 3365 for ENCO majors	
		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 on first attempt.

** Accounting majors must achieve A or B on first attempt

Upper-Division Curriculum

Admission to the lower-division COBA designation does not assure admission to any upper-division major in the Rawls College of Business. After attaining the minimum requirements of the lower-division, students may apply to the Undergraduate Services Center for a specific major. Junior- and senior-level business and economics courses may be taken upon admission to the upper division of the college. Note that the minimum GPA for any major may increase due to limited space availability. Upper-division requirements for each major are discussed in the following sections.

Undergraduate Majors

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 Texas Tech GPA and an A or B on first attempt 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			
Fall		Spring	
ACCT 3304, Intermediate Acct. I^	3	ACCT 3305, Intermediate 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. Mgt.	3	FIN 3320, Financial Mgt.	3
MGT 3373, Managerial Communication	3	MGT 3370, Organization & Mgt.	3
ACCT 3101, Seminar in Prof. Practice	1	TOTAL	15
TOTAL	16		

FOURTH YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	MGT 4380, Strategic Management	3
ENGL 3365, Prof. Report Writing*	3	Non-accounting Electives*†	8
or COMS 3358, Bus. & Pro. Comm.		Non BA / 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 on first attempt 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			
Fall		Spring	
ACCT 3304, Intermediate Acct. I^	3	ACCT 3305, Intermediate 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. Mgt.	3	FIN 3320, Financial Mgt.	3
MGT 3373, Managerial Communication	3	MGT 3370, Organization & Mgt.	3
ACCT 3101, Seminar in Prof. Practice	1	TOTAL	15
TOTAL	16		

FOURTH YEAR			
Fall		Spring	
ACCT 4301, Principles of Auditing	3	Graduate Courses	9
Economics Course**	3	ENGL 3365, Prof. Report Writing	3
ACCT 3306, Prin. Cost & Mgr. Acct.	3	TOTAL	12
Non-accounting electives*	5		
TOTAL	14		

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 on first attempt to declare accounting major.

Economics Major

THIRD YEAR			
Fall		Spring	
ECO 3311, Intermed. Macroeconomics	3	BLAW 3391, Business Law I	3
FIN 3320, Financial Mgt.	3	ECO 3312, Intermed. Economic Theory	3
MGT 3370, Organization & Mgt.	3	ECO 3323, Prin. of Money, Bnk. & Credit	3
MKT 3350, Intro. to Marketing	3	or FIN 3323, Intro. Fin. Mkts. & Insts.	
ISQS 3344, Intro. Prod. Oper. Mgt.	3	MGT 3373, Managerial Communication	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	Free Electives*	9
Group B†	6	TOTAL	12
Elective (Non BA / 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.

Energy Commerce Major

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. The energy commerce curriculum reflects the current world energy mix, primarily hydrocarbons with increasing emphasis on alternatives and renewables. Energy commerce majors must take GEOL 1303 and 1101 to fulfill one of their lower-division laboratory science requirements. Requires a 3.3 GPA to declare an ENCO major.

Oil and Gas Concentration

THIRD YEAR			
Fall		Spring	
ENCO 3301, Energy Industry Fundament.	3	BLAW 4395, Oil & Gas Law I	3
ENCO 3385, Petroleum Land Mgmt.	3	COMS 3358, Bus. & Prof. Commun	3
BLAW 3391, Business Law I	3	ENCO 3361, Nat. Gas Transp. & Mkt	3
ISQS 3344, Intro. Prod. & Oper. Mgt.	3	MKT 3350, Intro to Mkt	3
MGT 3373, Managerial Communications	3	PETR 4000, Survey of Petr. Engr.	3
TOTAL	15	TOTAL	15

SUMMER			
ENCO 3390, Land, Titles & Records OR ENCO 4382, Energy Industry Internship	3		

FOURTH YEAR			
Fall		Spring	
ENCO 3386, Oil & Gas Agreements or BLAW 4396, Oil & Gas Law II	3	ENCO 3386, Oil & Gas Agreements or BLAW 4396, Oil & Gas Law II	3
FIN 3320, Financial Mgt.	3	ENCO 4312, Energy & Environ. Econ.	3
MGT 3370, Org. & Mgt.	3	Jr/Sr Economics Course	3
Group A*	6	Group A*	3
TOTAL	15	TOTAL	12

* GROUP A – Choose 3 courses from ACCT 4310; ENCO 3394, 4363, 4364, 4321, 4315.

Economics and Alternative Markets Concentration

THIRD YEAR			
Fall		Spring	
ENCO 3301, Energy Industry Fundament.	3	AAEC 4317, Commodities Futures Trd.	3
ENCO 3385, Petroleum Land Mgmt.	3	COMS 3358, Bus. & Prof. Commun	3
BLAW 3391, Business Law I	3	ENCO 4321, Energy Finance	3
FIN 3320, Financial Mgt	3	MKT 3350, Intro to Mkt	3
MGT 3373, Managerial Comm	3	MGT 3370, Org. & Mgt.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ACCT 4310, Petr. Accounting	3	ENCO 3394, Power Gener. & Trans.	3
ENCO 4363, Alt. Ener. Mkts -Trans. Fuel or ENCO 4364, Alt. Energy Mkts -Elec.	3	ENCO 4312, Energy & Environ. Eco.	3
ISQS 3344, Intro to Prod. & Oper Mgt.	3	Jr/Sr Economics Course	3
Group A*	6	Group A*	6
TOTAL	15	TOTAL	15

* Group A -Choose 4 courses from BLAW 4392; ENCO 3361, 4315, 4382; FIN 3321, 3322; MKT 3353

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 on first attempt in ACCT 2300 and FIN 3320.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermediate Acct. I	3	ECO Elective^	3
BLAW 3391, Business Law I	3	FIN 3321, Fin. Statement Analysis	3
FIN 3320, Financial Management	3	FIN 3323, Intro. Fin. Mkts. & Institutions	3
MGT 3370, Organization. & Mgt	3	MGT 3373, Managerial Communication	3
MKT 3350, Intro. to Marketing	3	FIN 3322, Corporation Finance I	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ECO Elective^	3	Group B †	3
FIN 3324, Investments	3	FIN 4385, Senior Finance Seminar	3
ISQS 3344, Intro. Prod. Oper. Mgt.	3	Elective (Non BA/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, 3336, 4323, 4325, 4326, 4327, 4328, 4329, 4330, 4333, 4335, 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 Major Investment Concentration

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, Intermediate Acct. I	3	FIN 3321, Fin. Statement Analysis	3
FIN 3320, Financial Management	3	FIN 3322, Corporation Finance I	3
MGT 3370, Organization & Mgt.	3	FIN 3323, Intro. Fin. Mkts. & Institutions	3
MKT 3350, Intro. to Marketing	3	FIN 3324, Investments	3
MGT 3373, Managerial Communication	3	Elective (Non BA/Non Eco)	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
Group A*	3	Group A*	6
ISQS 3344, Intro. Prod. Oper. Mgt.	3	Group B +	3
Eco Elective **	3	Eco Elective **	3
BLAW 3391, Business Law I	3	FIN 4385, Senior Finance Seminar	3
TOTAL	12	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 Major Managerial Finance Concentration

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 Analysis	3
FIN 3320, Financial Management	3	FIN 3322, Corporation Finance I	3
MGT 3370, Organization & Mgt.	3	FIN 3323, Intro. Fin. Mkts. & Institutions	3
MKT 3350, Intro. to Marketing	3	FIN 3324, Investments	3
MGT 3373, Managerial Communication	3	ISQS 3344, Intro. Prod. Oper. Mgt.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	Group A*	3
FIN 4328, Int. Fin.	3	Group B+	3
Group A*	3	FIN 4385, Senior Finance Seminar	3
Eco Elective**	3	Eco Elective**	3
TOTAL	12	Elective (Non BA/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.

Finance Major Real Estate Concentration

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 on first attempt.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermediate Acct. I	3	ECO Elective^	3
BLAW 3391, Business Law I	3	FIN 3321, Fin. Statement Analysis	3
FIN 3320, Financial Management	3	FIN 3323, Intro. Fin. Mkts. & Institutions	3
MGT 3370, Organization & Mgt.	3	FIN 3332, Real Estate Fundamentals	3
MKT 3350, Intro. to Marketing	3	MGT 3373, Managerial Communication	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ISQS 3344, Intro to Prod. & Oper. Mgt.	3	FIN 3322 Corporation Finance I	3
FIN 3324, Investments	3	FIN 4385, Senior Finance Seminar	3
Group A**	3	Group A**	6
Elective (Non BA / 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, 3336, 4329, 4333, 4335, 4336 and BLAW 3393.

^ ECO Elective – Choose 2 courses from ECO 3311, 3320, 3324, 3326.

General Business Major

THIRD YEAR			
Fall		Spring	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Financial Management	3	MGT 3373, Managerial Communication	3
ISQS 3344, Prod. & Operations Mgt.	3	Major Courses+	9
MGT 3370, Organization & 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 BA / Non Eco.)*	3	Major Course+	3
Free Elective*	3	Free Electives*	6
TOTAL	15	TOTAL	12

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 Operations Management Concentration

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 4376	Entrepreneurship II: Discovering Entrepreneurial Opportunities

With industrial engineering minor (18 hours):

IE 3301	Engineering Economic Analysis
IE 3311	Operations Research
IE 3361	Work Analysis and Design

Take three of the following seven courses:

IE 3343	Quality Assurance and Engineering Statistics
IE 3371	Production Control
IE 4311	Operations Research II
IE 4351	Facilities Planning and Design
IE 4361	Engineering Design for People
IE 4362	Industrial Ergonomics
IE 4363	Work and Product Safety Engineering

General Business Major Intelligence Concentration

Required courses:

MKT 3356	Marketing Research and Analysis
BA 4000	Data and Text Mining for Business Intelligence (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
BA 4000	Six Sigma (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
IE 3311	Operations Research I
IE 3341	Engineering Statistics
IE 3343	Quality Assurance in Engineering Statistics
IE 4311	Operations Research II
CS 3364	Design and Analysis of Algorithms
CS 4354	Concepts of Data Base Systems
GEOG 3300	Geographic Information Systems
GEOG 4400	Topics in Geographic Information Systems



General Business Major Project Management Concentration

Required courses:

ISQS 3345	Object Oriented Systems
ISQS 4350	Information Systems Project Management
MGT 4376	Entrepreneurship II: Discovering Entrepreneurial Opportunities
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 Preprofessional Health Concentration (Premedicine Only)

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
- HOM 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 premed program.

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	
IB 3105, + Cross-Cultural Mgt. Skills	1	BLAW 3391, Business Law I	3
Should be taken prior to		FIN 3320, Financial Management	3
Study Abroad Semester		MGT 3370, Organization & Mgt.	3
Study Abroad Semester	12	MGT 3373, Managerial Communication	3
(May also be done in spring		MKT 3350, Intro. to Marketing	3
of 3rd year or fall of 4th year)		TOTAL	15
TOTAL	12		

FOURTH YEAR

Fall		Spring	
FIN 3323, Intro. Fin. Mkts. & Institutions	3	FIN 4328, International Finance	3
ISQS 3344, Prod. & Operations Mgt.	3	MGT 4380, Strategic Management	3
MGT 4375, International Management	3	MGT 4358, International Marketing	3
Group A*	6	Group B**	3
TOTAL	15	Group C^	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 must be satisfied with an appropriate course.

* Group A - 2 courses as approved by IB advisor from: GEOG 3337, 3353, 3363, 4305, 4357; HIST 3330, 3351, 3352, 3374, 3382, 3383, 3384, 3389, 3398, 4360, 4363, 4375, 4391, 4392, 4393, 4394, 4395; IB 4361, 4382, 4383; POLS 3363, 3364, 3366, 3368, 3372, 3373, 3374, 3375, 3376, 4397.

** Group B - Choose one course from ECO 3333 and 4331.

^ Group C - 3 hours of language above minimum required.

+ 1-hour course only for students participating in Study Abroad semester.



Marketing Major

The undergraduate program in marketing offers a solid curriculum and learning experiences that prepare students for success. The marketing major is designed to offer a solid understanding of marketing with cutting edge ideas and practices that prepare students for their first position in marketing and provide the foundation needed to advance.

THIRD YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	ISQS 3344, Prod. & Operations Mgt.	3
FIN 3320, Financial Management	3	Group A+	9
MGT 3370, Organization & Mgt.	3	Group B^	3
MGT 3373, Managerial Communication	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 BA 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.

Marketing Major—Sales Concentration

THIRD YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	ISQS 3344, Prod. & Operations Mgt.	3
FIN 3320, Financial Management	3	MKT 3352, Consumer Behavior	3
MGT 3370, Organization & Mgt.	3	MKT 4359, Sales Management	3
MGT 3373, Managerial Communication	3	Group A**	3
MKT 3350, Intro. to Marketing	3	Restricted Elective*	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Jr./Sr. Economics	3	MGT 4380, Strategic Management	3
GROUP A**	3	MKT 4354, Market Promotion	3
Restricted Elective*	3	MKT 4350, Personal Selling	3
Non BA/Non ECO elective	3	Group A**	3
Group B^	3	Group B^	3
Total	15	Total	15

* Restricted Electives: COMS 3358 and ENGL 3365

** Group A: Choose 3 from MKT 3353, 3356, 4351, 4358

^ Group B: One additional junior- or senior-level business course provided it is not used to fulfill another requirement.

Marketing Major—Global Supply Chain Concentration

The emphasis in global logistics focuses on managing the international flow of goods, services, finances, and information among organizations in global supply chains. Logistics management is comprised of a variety of activities that influence customer satisfaction and competitive advantage, including procurement, inventory control, transportation, warehousing, facility management, and materials handling. The global logistics emphasis prepares students for careers in logistics and supply chain management.

THIRD YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	ISQS 3344, Prod. & Operations Mgt.	3
FIN 3320, Financial Management	3	MKT 3353, Supply Chain Mgt	3
MGT 3370, Organization & Mgt.	3	MKT 4358, International Mkt	3
MGT 3373, Managerial Communication	3	MKT 4359, Sales Management	3
MKT 3350, Intro. to Marketing	3	Group B*	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Jr./Sr. Economics	3	MGT 4380, Strategic Management	3
MKT 4370, Logistics Mgt	3	MKT 4371, Logistics Analytical Methods	3
IB 3361, International Commerce	3	Group B*	3
Non BA/Non ECO elective	3	Free elective	3
Free elective	3	Total	12
Total	15		

* Group B: One additional junior- or senior-level business course provided it is not used to fulfill another requirement

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 Texas Tech GPA is required to declare management as a major.

THIRD YEAR			
Fall		Spring	
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, Organization & Mgt.	3	MGT 3376, Organ. Behavior	3
MGT 3373, Managerial Communication	3	MGT 3379, Adv. Organization & Mgt.	3
MKT 3350, Intro. to Marketing	3	Group A*	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Group A+	6	MGT 4380, Strategic Management	3
Group B^	3	Free Electives*	6
Electives (Non BA / 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 MKT 3374, 3375, 4370, 4371, 4372, 4375, 4376, 4386, 4397 or HOM 4371.

^ Group B – Choose one additional junior- or senior-level business course, provided it is not used to fulfill another requirement.

Management Information Systems 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 between managers and computers and is 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			
Fall		Spring	
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. Systems	3	ISQS 4348, Telecom. Systems Anal.	3
ISQS 3346, Internet Programming	3	ISQS 4350, Info. Sys. Proj. Mgt.	3
MGT 3373, Managerial Communication	3	MKT 3350, Intro. to Marketing	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Jr./Sr. Economics or Comp. Sci.**	3	ISQS 4349, Info. Systems Design	3
ISQS 3351, Telecom Security with Linux	3	ISQS 4385, Strategic IT/Telecom. Mgt.	3
ISQS 3360, Telecom Securities Theory	3	ISQS 4382, Internship in ISQS†	3
MGT 3370, Organization & Mgt.	3	ISQS Elective+	3
Elective (Non BA / Non Eco.)*	3	Elective (Non BA / Non Eco.)*	3
TOTAL	15	TOTAL	15

+ Choose 1 from: ISQS 3345, 3358, 4361.

Web Application Design Track

THIRD YEAR			
Fall		Spring	
FIN 3320, Financial Management	3	BLAW 3391, Business Law I	3
ISQS 3349, Intro. Data Comm. Systems	3	ISQS 3344, Prod. & Operations Mgt.	3
ISQS 3348, Data Base Mgt. Systems	3	ISQS 3345, Object Oriented Systems	3
ISQS 3346, Internet Programming	3	ISQS 3358, Business Intelligence	3
MGT 3373, Managerial Communication	3	MKT 3350, Intro. to Marketing	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Jr./Sr. Economics or Comp. Sci.**	3	ISQS 4349, Info. Systems Design	3
ISQS 4348, Systems Analysis	3	ISQS 4382, Internship in ISQS†	3
ISQS 4350, Info. Systems Project Mgt.	3	ISQS 4385, Strategic IT/Telecom. Mgt.	3
MGT 3370, Organization & Mgt.	3	ISQS 4361, Web Application Design	3
Elective (Non-BA/Non-ECO)*	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 or any upper-level computer science course.

† ISQS 4382 or other with written approval.

Undergraduate Certificates

Accounting Certificate in Energy (ACE)

The Accounting Certificate in Energy is designed to prepare undergraduate accounting majors for accounting careers in the oil and gas industry. Students will take five courses related to the energy industry and upon graduation will receive an Accounting Certificate in Energy in addition to the B.B.A. degree. Participation in this certificate program is available to only those students not pursuing the M.S.A or accelerated M.S.A degrees. Students will be required to complete ACCT 3304 and have a minimum GPA of 3.25 in order to enroll in ENCO 3301. Students will be required to maintain a minimum 3.25 GPA in order to proceed with the certificate.

Take the required courses ACCT 4310, ENCO 3301 and 3350, then take two from the following:

- ENCO 3361 Natural Gas Transportation and Marketing
- ENCO 4312 Energy & Environmental Economics
- ENCO 3394 Power Generation & Transmission
- ENCO 4363 Alternative Energy Markets: Transportation and Fuel
- ACCT 4382 Accounting Certificate Energy Internship.

Joint Business/Engineering Undergraduate 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: BA 3302, Financial and Managerial Accounting..... 3 hrs.
- Required Engineering Foundation Course for
Business Students: IE 4320, Fundamentals of Systems ... 3 hrs.
- Required Courses for **All Certificate Program Students:**
MGT 4376, Entrepreneurship II: Discovering Entrepreneurial Opportunity..... 3 hrs.
IE 4331, Individual Studies in Industrial Engineering: Engineering Entrepreneurship..... 3 hrs.

ISQS Undergraduate Certificate in Management Information Systems (MIS)

The purpose of the certificate program in MIS is for BA 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 13.)

Undergraduate Courses

2300. [ACCT 2301] **Financial Accounting (3:3:0)**. Prerequisite: 2.75 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 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 on first attempt. 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 on first attempt; 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 on first time completed. 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 on first time completed. 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 on first time completed. 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 on first time completed and completion of or concurrent enrollment in ACCT 3305 and 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 on first time completed. Accounting for the production, refining, and distribution of oil and gas with emphasis upon production.
4314. **International Accounting (3:3:0)**. Prerequisite: ACCT 3304 on first time completed 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 Program / Rawls College of 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 the 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 with a grade of B or better in one of the last two semesters preceding graduation. Students may be directed to enroll in a specific section. Non-business students may not take more than 12 hours of BA courses.

Master's Programs

Master of Business Administration. The 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. Many different concentrations are available. M.B.A. students may expect to complete the program in 16 to 24 months. Students possessing any undergraduate degree are invited to apply.

A joint venture with the Texas Tech University Health Sciences Center 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.

Executive-Style Master of Business Administration. M.B.A. programs are offered in an executive-style format for students who wish to remain employed full-time and commute to Lubbock on some weekends and/or during the summer. Students may expect to complete the program in 27 to 36 months.

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. The 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, business intelligence, risk management, 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.

Accelerated 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.S.

or M.S.A.). A maximum of 9 semester hours of graduate work may apply to both 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.A. program which grants both degrees simultaneously).

Doctoral Program

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.

Dual Degree 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 the student to earn both the Doctor of Jurisprudence and M.S.A. 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. 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 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 health organization management. The program may be completed in four years.

(Continued on next page)

Doctor of Pharmacy—Master of Business Administration

The student will earn both the Pharm.D. and M.B.A. degrees during the four years of pharmacy school. This degree track produces outstanding pharmacists with greater insight into the intricacies of healthcare management systems. Students admitted to the M.B.A. program begin the course of study in the summer before the first-year of pharmacy school. Business courses are offered in Lubbock during the summer and via telecast during the academic year. Areas of study include accounting, management strategy, business decision-making skills and methods, business information systems, and other core skills in the business curriculum. For a more specific knowledge of the organizational context in which healthcare is provided, students complete a seven course concentration in health organization management.

Master of Business Administration and Other Master's Degrees

The college, in association with other colleges and schools, offers programs that enable students to obtain selected master'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), the College of Architecture (Master of Architecture), and the College of Arts and Sciences (M.S. in Environmental Toxicology or M.A. in a Foreign Language). These dual programs require 12 to 24 fewer hours than if both degrees were pursued separately.

Master of Business Administration—Master of Science with a Major in Business Administration (Risk Management Emphasis). The college offers a program that enables students to obtain an M.B.A. and a risk management emphasis in the Master of Science with a major in Business Administration with a total of 60 hours. This emphasis is designed for students desiring enhanced quantitative skills.

Graduate Certificate Programs

Graduate Certificate in Healthcare Change. The Graduate Certificate in Healthcare Change is designed to prepare staff, front-line managers, and executive-level leaders to focus on healthcare management issues including quality, safety, efficiency, satisfaction, and cost. The 12-hour certificate is jointly sponsored by the Rawls College of Business Health Organization Management Program and the Texas Tech University Health Sciences Center School of Nursing. Contact: HOM Program Office, 806.742.1236, hom@ttu.edu.

Graduate Certificate in Leadership. The 12-hour Graduate Certificate in Leadership will provide the experienced manager the opportunity to build and reinforce the interpersonal skills that are essential to the management role at every level – first line, middle, and top management. This program may be taken as a stand-alone certificate. Additionally, the credits may be used in partial fulfillment of a M.B.A. offered through the Rawls College of Business. Contact: Dr. Michael Ryan, michael.r.ryan@ttu.edu, 806.742.3175.

Academic Requirements

The Rawls College of Business requires that master's program students maintain at least a 3.00 GPA. Doctoral students must maintain at least a 3.20 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 have at least three credit hours with grades of A above a 3.00 GPA on all graduate courses in the program.

Graduate Courses

5301. **Financial and Managerial Accounting (3:3:0).** Prerequisite: Grades of B or better in either ACCT 2300, 2301 or BA 3302. Examines financial accounting: The objectives, structure, and substance of financial reports; and management accounting. The use of accounting in the management of an organization.
5302. **Current Accounting Theory (3:3:0).** Prerequisite: Admission to the M.S.A. program and ACCT 3305. Examination of current accounting literature, such as pronouncements of the Financial Accounting Standards Board.
5303. **Accounting Systems Management and Control (3:3:0).** Prerequisite: Admission to M.S.A. program and ACCT 4301. A study of control implications and control integration into the systems analysis, design, and implementation process, emphasizing information technology.
5305. **Accounting Research and Communication (3:3:0).** Prerequisite: Admission to M.S.A. program. Written and oral communication of the results of individual studies of selected accounting topics.
5306. **International Taxation (3:3:0).** Prerequisite: Admission to M.S.A. program. Study of taxation of individual and business entities operating outside the States and foreign entities operating in the States.
5308. **Federal Income Tax Law for Partnerships (3:3:0).** Prerequisite: Admission to M.S.A. program and ACCT 5318. 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.
5309. **Special Entity-Ownership Accounting Issues (3:3:0).** Prerequisite: Admission to M.S.A. program and ACCT 3305. 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 (3:3:0).** Prerequisite: Admission to M.S.A. program and ACCT 3306. Current issues in cost and managerial accounting.
5315. **Estate and Gift Taxation (3:3:1).** Prerequisite: Admission to M.S.A. program. Intensive study of federal taxation of the estate and trust entities and the transfer of property rights through gifts and bequest.
5318. **Income Tax Research and Planning (3:3:0).** Prerequisite: Admission to M.S.A. program. 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.
5319. **Auditing Theory and Practice (3:3:0).** Prerequisite: Admission to M.S.A. program and ACCT 4301. A study of advanced concepts, theories, and techniques applied to external financial, governmental, and internal audit engagements.
5320. **Business and Economic Concepts for Auditors (3:3:0).** Prerequisite: Admission to the M.S.A. program and ACCT 5319. Investigates the critical need for knowledge of business and economic concepts for auditing success.
5323. **Advanced Topics in Accounting (3:3:0).** Prerequisite: Admission to M.S.A. program and ACCT 3305. Advanced study of selected topics in accounting.
5324. **Issues in International Accounting (3:3:0).** Prerequisite: ACCT 5401. Current issues in international accounting.
5327. **Advanced Income Taxation Accounting (3:3:0).** Prerequisite: Admission to M.S.A. program and a grade of A or B in ACCT 3304 and 3307. Study of advanced income tax affecting business and investment.
5332. **Ethics in Accounting (3:3:0).** Prerequisite: Admission to M.S.A. program. 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: Admission to M.S.A. program and must be taken in last full semester of study. Prepares students for the accounting profes-

sion through intensive study, testing, and preparation for professional certification.

5382. **Internship in Accounting (3)**. Prerequisite: Admission to M.S.A. program and 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.
6300. **Colloquium in Accounting Research (3)**. Prerequisite: Admission to doctoral program. Studies in selected areas of accounting research. Topics vary by semester.
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.
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.

Business Administration (BA)

Undergraduate Courses

1101. **[BUSI 1301] Fundamentals of Business Professionalism (1:1:0)**. Prerequisite: 2.75 GPA; for freshmen only. Integration of fundamental business principles 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 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 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

5199. **M.B.A. Capstone (1:1:0)**. Prerequisite: Completion of, or concurrent enrollment in, all of the M.B.A. core courses. Integration and review of all M.B.A. core courses; comprehensive exam over all M.B.A. courses; evaluation of individual management and leadership skills; formulation of individual Career Development Plan; assessment of individual progress toward M.B.A. program goals.
5380. **Directed Experience (3)**. 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)**. Minimum standards determined by area. Written approval form required. This course permits students to enhance their knowledge 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 2.7 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.
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)**. Prerequisite: ENCO 3385 with a minimum grade of C. Case law based study of jurisprudence affecting the oil and gas industry. Emphasis is on concurrent ownership, split estates, and oil and gas leases. Spring only.
4396. **Oil and Gas Law II (3:3:0)**. Prerequisite: BLAW 4395 with a grade of C or higher. 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.
5291. **Intermediate Business Law (2:2:0)**. Prerequisite: BLAW 3391 or 5290. Issues relating to business organizations, intellectual property, the Uniform Commercial Code for Sales, real property law, and loans (secure transactions) as time permits.
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: 3.3 GPA, completion of lower-division courses, and concurrent enrollment in ENCO 3385. History and overview of the energy industry providing basics of oil and gas exploration, production, electricity generation and transmission and emerging alternative technologies. Fall only.
- 3350. Basic Land Practices (3:3:0).** Petroleum engineering majors and ACE certificate students only. An overview designed to provide the non-specialist with foundation knowledge of the business and legal aspects of the oil and gas industry.
- 3361. Gas Transportation and Marketing (3:3:0).** Prerequisite: ENCO 3385 with a minimum grade of C. Midstream issues relating to the right of way, gas gathering, processing and compression. Marketing and transportation agreements. Pipeline regulation.
- 3385. Petroleum Land Management (3:3:1).** Prerequisite: 3.3 GPA, completion of lower-division courses and concurrent enrollment in ENCO 3301. Overview designed to provide a foundation knowledge negotiations, real property and contract law and regulations of the oil and gas industry. Fall only.
- 3386. Oil and Gas Agreements (3:3:0).** Prerequisite: ENCO 3385 and BLAW 4395. Covers contracts utilized in petroleum exploration and production, specifically farmouts, joint operating agreements, gas balancing, secondary recovery, and federal exploratory units.
- 3390. Land Titles and Records (3:3:0).** Prerequisite: ENCO 3385 with a minimum grade of C. Practical skills training in tracing and chaining property titles. Combines classroom, abstract office and courthouse experience. First summer session only. ENCO 3390 and ENCO 4382 cannot both be used toward degree requirements.
- 3394. Power Generation and Transmission (3:3:0).** Prerequisite: ENCO 3385 with a grade of C or better. An overview of the electric power industry from production to consumption. Topics include generation and transmission project economics, power markets, public policy and future developments.
- 4312. Energy and Environmental Economics (3:3:0).** Prerequisites: ENCO 3385 with a grade of C or better. Focus on oil and gas project economics and capital formation. Emphasis on project cost, revenue forecasting, reserve analysis, and financial risk.
- 4315. International Energy Policy and Law (3:3:0).** Prerequisite: ENCO 3385 with a minimum grade of C. Analysis of current energy policies of the U.S. and select foreign governments, focusing on geopolitical events and environmental issues affecting the energy business.
- 4321. Energy Finance (3:3:0).** Prerequisite: ENCO 3385 and FIN 3320 with a minimum grade of C. Course focuses on capital formation and finance vehicles utilized in the energy industry.
- 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).
- 4363. Alternative Energy Markets: Transportation and Fuel (3:3:0).** Prerequisite: ENCO 3385 with a minimum grade of C. Compares market economies and technology of conventional and unconventional fossil fuels to emerging alternative and renewable energy sources of transportation fuels.
- 4364. Alternative Energy Markets: Electricity (3:3:0).** Prerequisite: ENCO 3385 with a minimum grade of C. Compares market economies and technology of conventional and unconventional fossil fuels to emerging alternative and renewable energy sources of electricity generation.
- 4382. Energy Industry Internship (3).** Prerequisite: ENCO 3385 with a minimum grade of C. Summer only. Employment experience with an industry partner. Not at Lubbock campus.
- 4390. World Energy Project (3:3:0).** Prerequisite: ENCO 3385 and permission of instructor. Industry sponsored project to provide basic energy needs in the developing world. Students spend extended summer session abroad.

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 grade of B or higher. 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.
- 3324. 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.
- 3332. Real Estate Fundamentals (3:3:0).** Prerequisite: FIN 3320 with a grade of C 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.
- 4325. Principles of Portfolio Management (3:3:0).** Prerequisite: FIN 3321, 3324 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, 3324 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. Fulfills multicultural requirement.
- 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).** Prerequisites: FIN 3320 with a grade of B or higher; FIN 3321, 3322 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 3320 with a grade of B or better. 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 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

5219. **Financial Management Tools (2:2:0)**. Prerequisite: ACCT 5301 or concurrent and ISQS 5345 or concurrent. Time value of money; evaluation of financial performance; risk and return; and basic valuation models.
5320. **Financial Management Concepts (3:3:0)**. Prerequisite: FIN 5219, ISQS 5345, and ACCT 5301. Essential financial management concepts with applications to financial decision making in organizations. Special emphasis on cases and computer financial models.
5321. **Financial Management Case Analysis (3:3:0)**. Prerequisite: Admission to finance concentration in M.B.A. or M.S./B.A. program and FIN 5219 and 5320, or FIN 4330. 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 (3:3:0)**. Prerequisite: Admission to finance concentration in M.B.A. or M.S./B.A. program and FIN 5320 concurrent, or FIN 4330 or FIN 3324. 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 (3:3:0)**. Prerequisite: Admission to finance concentration in M.B.A. or M.S./B.A. program and 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: Admission to finance concentration in M.B.A. or M.S./B.A. program and FIN 5325 or FIN 3324 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 (3:3:0)**. Prerequisite: Admission to finance concentration in M.B.A. or M.S./B.A. program and FIN 5320 or FIN 4330. Focuses on the pricing and use of financial derivative securities and their role in investment management and financial risk management.
5329. **The Money and Capital Markets (3:3:0)**. Prerequisite: Admission to finance concentration in M.B.A. or M.S./B.A. program and FIN 4330 or 5320. 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.
5332. **Fundamentals of Real Estate (3:3:0)**. Introduction to real property law, finance, valuation, investment analysis, and brokerage. Includes operations of real estate markets and urban analysis.
5333. **The U.S. Financial System in a Global Environment (3:3:0)**. Prerequisites: Admission to finance concentration in M.B.A. or M.S./B.A. program and ACCT 5401 or 5301, and 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)**. Prerequisite: FIN 4330 or 5320. 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: Admission to finance concentration in M.B.A. or M.S./B.A. program and FIN 4330 or 5320. 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)**. Prerequisite: FIN 4330 or 5320. 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)**. Prerequisite: Consent of instructor. 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)**. Prerequisites: ACCT 5401 and ISQS 5345, or concurrent enrollment. Must make a grade of C or higher. 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 major theories and empirical studies that have been developed in the area of corporate finance.
6333. **Seminar in Investments (3:3:0)**. Prerequisite: Consent of instructor. Doctoral seminar covering the major theories and empirical studies that have been developed in the areas of investments and asset pricing.
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 that have been developed 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.

Health Organization Management (HOM)

Undergraduate Courses

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.
4378. **Clinical Aspects of Health Organization Management (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 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 Texas Tech GPA; MGT or Honors College student. Fundamental issues surrounding today's managed care organizations and their impact on stakeholders.

Graduate Courses

5306. **HOM I: Introduction to Healthcare Systems (3:3:0).** Prerequisites: Declared/admitted to HOM, certificate, M.P.A. in health concentration, or instructor's permission. 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: HOM 5306 with a grade of B or better 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: HOM 5306 and 5307 with a grade of B or better 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: HOM 5306, 5307, and 5308 with a grade of B or better, or consent of instructor. Analyzes and examines core healthcare legal, operational, and management issues through the use of targeted cases and projects.

Information Systems and Quantitative Sciences (ISQS)

Undergraduate Courses

2340. **[BCIS 1305, 1405] Introduction to Information Systems in Business (3:3:0).** Prerequisite: A 2.75 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 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.
3344. **Introduction to Production and Operations Management (3:3:1).** Prerequisite: ISQS 2340, MATH 2345, and a minimum 2.75 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. Fulfills Core Technology and Applied Science requirement.
3345. **Object Oriented Systems (3:3:0).** Prerequisite: ISQS 3346 and 3348 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 2340. Internet programming using PHP, Python, .NET, Ruby, and/or any other advanced web application techniques of interest to the industry.
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 advisor approval. The design, management, and maintenance of information systems to provide strategic organizational advantage.

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).** 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 (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. 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. Foundations and major topics of regression analysis, model formulation, and methods to deal with standard and nonstandard regression applications in business.
5359. **Individual Study in ISQS (3).** Prerequisite: Consent of instructor. Directed individual study of advanced ISQS topics varying with the need of the particular student. Can be repeated for credit if subject matter is different.
5382. **Internship in Information Systems and Quantitative Science (3).** Prerequisite: Consent of instructor. 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: ISQS 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 Information Systems and Quantitative Sciences (3)**. Prerequisite: Consent of instructor. Topics include issues in MIS, statistics, and operations management. May be repeated twice.
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 (IB)

Undergraduate Courses

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.

4361. **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 GPA. The management function; basic principles, concepts, and practices in the operation of organizations. (Writing Intensive)
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. Fulfills Core Communication (Oral) requirement. (Writing Intensive)
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.
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 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 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. Fulfills multicultural requirement.
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.
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 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 Texas Tech GPA; MGT major or Honors College student. Offers interdisciplinary perspective on development of management knowledge. (Writing Intensive)
- 4388. Change and Innovation Processes (3:3:0).** Prerequisite: MGT 3370 with a grade of C or higher; 3.0 Texas Tech GPA; MGT major or Honors College student. Focuses on understanding and managing innovation and change processes.
- 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.
- 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 Ethics (3:3:0).** Prerequisite: MGT 5371. Students apply alternative leadership and ethical perspectives through cognitive skill building and experiential learning to accelerate their development as authentic leaders.
- 5373. Entrepreneurship (3:3:0).** 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 (3:3:0).** Emphasizes negotiation skills and strategy development for managing organizational stakeholders.
- 5375. Organization Theory (3:3:0).** 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).** 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. Strategy, 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 students for application of opportunity recognition skills in the real world.
- 5381. Managing Innovation and Change (3:3:0).** Focuses on understanding organization innovation and change and applying this knowledge to managing innovation and change processes.
- 5382. Internship in Management (3).** Prerequisite: Consent of instructor. 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).** 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: Admission to the M.B.A. program. Global and local strategy formulation and implementation of corporate, business, and functional strategies.
- 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 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. (Writing Intensive)
- 3351. Services Marketing (3:3:0).** Prerequisite: MKT 3350 with a grade of C or better. Services are more difficult to market than products. This course explores the dynamic nature of services marketing based on value and relationships.
- 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.
- 4350. Personal Selling (3:3:0).** Prerequisite: MKT 4359 with a grade of B or better. Customer-focused selling, including socialization to a career in sales.
- 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. Fulfills multicultural requirement.

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.
4370. **Logistics Management (3:3:0)**. Prerequisite: MKT 3350 with a grade of C or better. Covers all aspects of business logistics: demand management, customer service, procurement, inventory management, warehousing, transportation, and facility management.
4371. **Logistics Analytical Methods (3:3:0)**. Prerequisite: MKT 4370 with a grade of C or better. Introduction to the principal analytical tools and models that are used in logistics along with application of the tools to logistics problems
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

5355. **Research Design (3:3:0)**. An in-depth examination of measurement issues, including latent constructs and data-gathering procedures in marketing.
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 (3:3:0)**. 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. A study of marketing planning and strategic issues related to the marketing effort.
5362. **Multinational Marketing (3:3:0)**. Prerequisite: MKT 5360. A survey of international marketing principles, cultural differences, world markets, and political restraints.
5363. **E-Marketing (3:3:0)**. Prerequisite: MKT 5360. 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. 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. 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)**. Prerequisite: Consent of instructor. 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)**. Prerequisite: Consent of instructor. A survey of quantitative methods for and issues in the analysis of marketing data.



College of Education

Interim Dean

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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, 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. Elementary students may also specialize in math 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 educators 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 2006-2008 was 98 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, Business, Engineering, Human Sciences, Mass Communications, or Visual and Performing Arts 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 elementary teachers with specializations in math and science education, special education, English as a second language, or bilingual education will major in the College of Education. Students seeking elementary certification 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 elementary, 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 elementary 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 (elementary, 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 elementary 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 the Web site www.educ.ttu.edu/certification. 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 elementary; 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 elementary, middle-level, and secondary schools. Students must have a bachelor's degree. Those seeking a certificate to teach elementary children 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/clinalexperiences.

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 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 Coordinators: Dr. Ratna Narayan and Dr. Walter Smith

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)
IS 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

Walter S. Smith, Ph.D., Chairperson

Professors: Benavides, Midobuche, Santos, Simpson, Smith

Associate Professors: Agnello, Aguirre-Muñoz, Akrofi, Anderson, Button, Hamman, Janisch, Johnson, Lesley, McMillan, Miller, Morgan-Fleming, Muñoz, Myers, Price, Sheets, Todd, Watson, Wilhelm

Assistant Professors: Fehr, Fox, Furgerson, Matteson, Narayan, Ortiz, C. Pratt, Salazar, Saldaña, Torres (Visiting)

Instructors: Biggers, Craig, Dennis, Duke, Halsey, Lupton, McLaren, Mitchell, B. Pratt, Spears, Stocks, Talkmitt

About the Program

This department supervises the following degree programs and certificates:

- 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
- Master of Science in Multidisciplinary Science
- Doctor of Philosophy in Curriculum and Instruction
- Graduate Certificate in Developmental Literacy
- Master Mentor Teacher Graduate Certificate

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 elementary generalist and as a bilingual generalist teacher. 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 elementary generalist 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 elementary generalist 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.

Elementary Math/Science Emphasis. This degree is designed to prepare those who wish to emphasize math and science courses as they prepare to be certified as an elementary generalist.

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 1403, 1404, GEOL 1101, 1102, 1303, 1304, BIOL 1403 1404, ATMO 1300, ASTR 1400, 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, is 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 123-129 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 in the College of Education.

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 13.)

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.
- 3310. **Spanish for Bilingual Teachers (3:3:0).** Prerequisite: Admission to Bilingual Program or consent of instructor. Proficiency and instructional skills for bilingual classrooms. Emphasis on academic language.
- 3320. **Content Area Instruction in Spanish for Dual Language Classrooms (3:3:0).** Prerequisite: EDBL 3310. Teacher-training course taught entirely in Spanish. Instructional language for bilingual education across content areas in dual language classrooms.
- 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 English 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

- 5310. **Advanced Spanish for Bilingual Teachers (3:3:0).** Prerequisite: Admission to the graduate program in bilingual education or consent of instructor. Advanced proficiency and instructional skills for bi-lingual classrooms. Emphasis on academic language.
- 5320. **Advanced Content Area Instruction in Spanish for Dual-Language Classrooms (3:3:0).** Prerequisite: EDBL 5310. Teacher-training course. Advanced instructional language for bilingual education across content areas in dual-language classrooms.
- 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)

Graduate Program / Curriculum and Instruction

Post-Baccalaureate Initial Teaching Certification. Post-baccalaureate programs designed to meet initial certification requirements for teaching in early childhood (early childhood to grade six), 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.

Master's Programs

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 that is designed to meet the diverse needs of professional educators in elementary, secondary, and post-secondary education. Thesis and nonthesis options are available. 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 nonthesis 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/eled.

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. For more information and application materials see www.educ.ttu.edu/edse.

Doctoral Program

Doctor of Philosophy in Curriculum and Instruction. The Ph.D. in curriculum and instruction may be completed with a concentration in one of five areas: Bilingual/English as a Second Language Education, Curriculum Studies/Teacher Education, Language and Literacy Education, Physical Education and Sports Science, or Science and Mathematics Education. Courses are taken in curriculum and instruction, the student's concentration, research methods, diversity, and technology. For further information contact the department (walter.smith@ttu.edu).

Graduate Certificate Programs

Developmental Literacy. The 15-hour Graduate Certificate in Developmental Literacy fills a need in the community for qualified teachers in developmental reading programs, adult basic education, adult literacy programs, alternative high schools, reading intervention programs in traditional high school settings, and GED programs. Contact: Dr. Mellinee Lesley, 806.742.1997, Ext. 240, mellinee.lesley@ttu.edu

Master Mentor Teacher. The 12-hour Master Mentor Teacher Graduate Certificate is designed to prepare experienced teachers to mentor new teachers in instructional strategies, classroom management strategies, and other aspects of daily classroom life, in addition to the policies and procedures specific to individual campuses. Contact: Dr. Susan Myers, 806.742.1997 Ext. 513, susan.myers@ttu.edu

- 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, instructional 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.

Graduate Courses

- 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.
- 5330. **Ethics and Education (3:3:0).** A critical study of ethical theories and their implications for teaching and the teaching profession.
- 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.
5377. **Technology in Science/Math Education (3:3:0).** Explores the use of technology to promote science, mathematics, and integrated learning with a focus on current research.
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.
5386. **Constructivist Inquiry Methodologies in Curriculum and Instruction (3:3:0).** Explores various constructivist research methodologies vital to research in educational settings. Narrative, autoethnography, action research, interactionism, and other theoretical approaches are explored and practiced.
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.
6331. **John Dewey's Theory of Education (3:3:0).** A critical analysis of John Dewey's theory of education, pedagogy, and curriculum.
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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
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 I (3:1:3).** Prerequisite: Admission to teacher education. Directed experiences in various roles at the elementary level.
4394. **Internship in Elementary Education II (3:1:3).** Prerequisite: EDEL 4393 and admission to teacher education. Directed experiences in various roles at the elementary school level.

Graduate Courses

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.
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.
5393. **Internship in Language Literacy Education (3)**. Prerequisite: Advanced graduate classification in education. Experiences in the various roles of language literacy education.
6000. **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

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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
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. **Schooling and the Adolescent(3:3:0)**. Psychological, social factors that create and affect adolescents in school. Special attention given to instructional strategies and influences on students' school participation. 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)**. 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.
5320. **Developing Curricula in Secondary Schools (3:3:0)**. Foundations, principles, and issues of curriculum in secondary level schools.
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

William Y. Lan, Ph.D., Chairperson

Horn Professor: Bradley

Professors: Griffin-Shirley, Hartmeister, Lan, Parr, Rodriguez, Runnels

Associate Professors: Burley, Claudet, Crooks, Davidson, Duemer, Hendricks, Klinker, Lock, Marbley, Maushak, Mendez-Morse, Pogrud, Shonrock, Stevens

Assistant Professors: Banda, Carpenter, Carter, Cheon, Crews, DiAndreth-Elkins, Inan, Jacob, Jones, Lechtenberger, Paton, Rudd, Siwatu, Taylor, Valle, Wang

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 and certificates:

- 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 Certificate in Autism
- Graduate Certificate in Dual Sensory Impairment
- Graduate Certificate in Mental Health Counseling

Graduate Degree Programs

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 community counseling. The doctoral program offers one major in counselor education. The master's and doctoral programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs. Applicants must complete the Counselor Education Application Packet available at the Web site www.educ.ttu.edu/epce.

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. Transfer credits are accepted from CACREP programs. 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 Certifica-

tion. Additional information about counselor education is available online 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 different 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 including cognition and motivation, human development, research, measurement and statistics, and an applied domain. 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 91 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 positions 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.

Graduate Certificate Programs

Autism. The 15-hour Graduate Certificate in Autism allows students to specialize in the area of autism while developing additional skills in working with children with autism spectrum disorders. The certificate can be undertaken during a master's or post-baccalaureate certification program or as a stand-alone certificate. Contact: Abby Tomlinson, 806.742.7115, Ext. 246, abby.tomlinson@ttu.edu

Dual Sensory Impairment. The 15-hour Graduate Certificate in Dual-Sensory Impairment closely mirrors CEC standards and Perkins Competencies for Teachers of Learners who are deaf and blind with additional emphasis on best practice assessment. The certificate can be undertaken during a master's or post-baccalaureate certification program or as a stand-alone certificate. Contact: Abby Tomlinson, 806.742.7115, Ext. 246, abby.tomlinson@ttu.edu

Mental Health Counseling. The 15-hour Graduate Certificate in Mental Health Counseling is a post-master's certificate designed for counseling professionals who wish to expand their training to a specialization in the mental health area. Contact: Dr. L.J. Gould, 806.742.1997 Ext. 296, lj.gould@ttu.edu

Counselor Education (EPCE)

(To interpret course descriptions, see page 13.)

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 each semester.
5352. **Advanced Issues in School Counseling (3:3:0).** Prerequisite: EPCE 5358, 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).** 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 and 12 hours of EPCE 5094.
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).** 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)**. 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.
5376. **Fundamentals of Assessment for School and Community Counselors (3:3:0)**. Deals with assessments specific to professional counselors.
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: EPCE 6360. Supervised employment or field experience in a school or community agency setting. May be repeated for credit. Students cannot enroll in more than 3 hours of this course each semester.
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: Consent of instructor. 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 Ph.D. 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 Supervision in Counselor Education (3)**. Prerequisite: Admission to the Graduate School, full status admission to the Ph.D. 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).
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.

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.

Educational Psychology (EPSY)

Undergraduate Courses

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 life cycle 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).** Supervised internships in applied educational settings.
6000. **Master's Thesis (V1-6).**
6100. **Professional Seminar in Educational Psychology (1:1:0).** This course will orient EPSY Ph.D. students to the field of educational psychology, scholarly bodies of work, and program faculty and their research agendas.
6301. **Advanced Data Analysis (3:3:0).** Prerequisite: EPSY 5381 or consent of instructor. Study of multivariate techniques for analyzing educational data, including such topics as factor analysis and structural equation modeling.
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: EPSY 5356 and 6301. 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).** Prerequisites: EPSY 5382 and 6304 with a grade of B or higher. Study of methods used in the analysis of data gathered through qualitative research methods and of ways of reporting these research findings. 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 Comprehensive Community 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. **Funding Higher Education (3:3:0).** Focus is on the concepts and conditions that define higher education funding. Also covered are the impact and influence of process, policies, governance, and multiple internal and external constituencies on financial decisions.
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).**
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).** Required culminating class for both Ph.D. and Ed.D. students. Students will prepare a draft of chapters one through three of their dissertations. At the end of the class, students will have a working draft of their dissertation proposal.
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. Fulfills Core Technology and Applied Science requirement.
3318. **Applications of Technology in Education (3:3:0).** Engages the undergraduate student in the use of technology as an educational tool. Students will have the opportunity to explore and utilize technology applications that enhance the teaching/learning process. Fulfills Core Technology and Applied Science requirement.

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).** 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, including 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).** 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).** 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).** 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)**. Covers organization and management of computer resources; selection and acquisition of computer hardware and software.
5397. **Practicum in Educational Technology (3:3:0)**. Supervised experience in an educational setting which requires the application of competencies such as teaching, management, supervision, and administration.
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)**. Prerequisites: Minimum of 6 hrs in EDIT and 6 hrs in EPSY with a grade of B or higher 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)**. Prerequisites: EDIT 5370 and 5380 and 6 hrs in EPSY with a grade of B or higher 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)**. Prerequisites: EDSP 5093, 5301, 5308, 5390, and EPSY 5389 with a grade of B or higher. 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. **ABA I: 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.
5345. **ABA II: Data Collection Methods and Single-Subject Designs (3:3:0)**. Teaches the basic data collection procedures and implementation of single-subject research designs in applied settings.
5346. **ABA III: FBA and Function Based Interventions (3:3:0)**. Prerequisites: EDSP 5303 and 5345. Provides teachers and related service providers strategies for conducting functional behavioral assessments in applied settings and for planning and implementing interventions.
5347. **ABA IV: Behavior Change Procedures (3:3:0)**. Prerequisites: EDSP 5303, 5345, 5346. Offers strategies designed to increase appropriate behaviors and decrease inappropriate behaviors.
5348. **ABA V: Advanced Issues in Applied Behavior Analysis (3:3:0)**. Prerequisites: EDSP 5303, 5345, 5346, 5347. Provides an expansion of the principles and procedures of ABA through assessment and treatment procedures, including precision teaching and verbal analysis of behavior.
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).** 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).** Research practices and problem areas in special education. May be repeated for credit.
5391. **Intermediate Seminar in Orientation and Mobility (3:3:0).** Focuses on research practices and problem areas in intermediate orientation and mobility services for students with visual impairments and additional disabilities.
5392. **Advanced Seminar in Orientation and Mobility (3:3:0).** Focuses on research practices and problem areas in advanced orientation and mobility services for students with visual impairments and additional disabilities.
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.
6302. **Program Evaluation in Special Education (3:3:0).** Prepares doctoral students to develop, implement, and evaluate education and rehabilitation programs for individuals with disabilities.
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).**



Whitacre College of Engineering

Interim Dean

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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 Edward E. Whitacre Jr. 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 department 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 ABET, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, 410.347.7700. The engineering physics program will remain accredited by ABET, Inc. through September 30, 2010. 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 Whitacre 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 Whitacre College of Engineering.

The Whitacre 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 Whitacre 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 Whitacre 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 Whitacre 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 Whitacre 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 Whitacre 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 Whitacre 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: BA 3302, Financial and Managerial Accounting 3 hrs.
- Required Engineering Foundation Course for
Business Students: IE 4320, Fundamentals of Systems ... 3 hrs.
- Required Courses for **All Certificate Program Students:**
MGT 4376, Entrepreneurship II: Discovering Entrepreneurial Opportunity 3 hrs.
IE 4331, Individual Studies in Industrial Engineering:
Engineering Entrepreneurship 3 hrs.

Advanced Degrees in Engineering. Programs are available through the Whitacre 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 Whitacre 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 Whitacre 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 Whitacre College of Engineering. Problems in transferring to Texas Tech are minimized by the student's early commitment to transfer to the Whitacre College of Engineering.

WISE Offers Multidisciplinary Degrees in Wind Science, Energy

The Wind Science and Engineering (WISE) Research Center at Texas Tech has a 39-year history of multidisciplinary, wind-related research. The center offers an interdisciplinary education in wind science and engineering to develop professionals who are experts in design for windstorms and wind-induced effects.

The WISE Research Center partners with numerous colleges at Texas Tech and the Graduate School to administer two unique multidisciplinary programs:

- Bachelor of Science in University Studies with a Wind Energy Specialization
- Doctor of Philosophy in Wind Science and Engineering

To learn more about these programs, see page 87 for information about the bachelor's degree and page 84 for graduate degree information.

General Standards and Requirements

The requirements for a degree from the Whitacre 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 Whitacre 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.

Correspondence Courses. All correspondence work taken for a degree program requires written approval from the dean of the Whitacre College of Engineering prior to registration. Correspondence courses taken from institutions other than Texas Tech must be certified by the College 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.

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. Details about these programs can be found in the catalog text for individual departments within the College of Engineering.

Master of Engineering Degree. In addition to the specialized degree programs offered in each department, the college offers a Master of Engineering degree that does not specify an area of specialization and does not require a thesis. The program is designed primarily for practicing engineers who can receive credit for up to 15 of the required 36 semester hours completed in residence at another accredited graduate school. 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.

Healthcare Engineering Option in Master of Engineering Degree. As a result of having a strong engineering college, a comprehensive health sciences center with hospital facilities, and a quality business college all on the same campus, Texas Tech University is one of the first institutions in the nation offering a graduate degree option in healthcare engineering. The curriculum leading to the Master of Engineering degree with an option in healthcare engineering is designed to meet the growing demand for engineers trained to apply the principles of engineering, health sciences, and business administration to managing the physical, technological, and support services of healthcare facilities.

This interdisciplinary curriculum consists of 36 graduate-level semester credit hours, including 33 course credits (11 courses) and 3 credits for research. The 11 courses include 9 required courses and 2 electives in engineering, health sciences, and business. To allow practicing engineers to manage career and family commitments while earning graduate credentials and upgrading their professional skills, the university offers a number of the courses online.

For further information about the healthcare engineering option, contact Dr. Ming Chyu, 806.742.3563 ext 230, m.chyu@ttu.edu.

The designated engineering science courses are CE 2101, 2301, 3302, 3303, 3305, CHE 3321, 3330, EE 3302, IE 3301, ME 3311, 2322, 3331, and 3370. The designated engineering technology science courses are GTEC 1312, 2351, and 2311.

Basic Science and Mathematics Requirements. Students enrolling in the Whitacre College of Engineering must take placement exams in chemistry and math unless they pass MATH 1351 and CHEM 1307 and 1107 by exam or coursework with a grade of C or better. 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 Whitacre 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 Whitacre College of Engineering at least one year before the anticipated date of graduation. Subsequently, 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 Whitacre 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.

Course Descriptions

Course descriptions for the college's various engineering specializations can be found within the catalog information for each department. Those courses with an ENGR prefix that are common to many disciplines within the college can be reviewed below.

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. (Writing Intensive)
1301. **Engineering Design for Sustainability (3:2:3).** Emphasizes energy, environment, creativity, engineering design, innovation, entrepreneurship and teamwork. Teams design projects focused on conceptualization of sustainable transportation and/or building systems for the future.

1315. **Introduction to Engineering (3:2:2).** Corequisite: MATH 1351. Introduction to the engineering profession, including the distinction between different majors, engineering problem solving, professionalism and ethics, and experiences in team design projects.
2312. **Manufacturing Processes (3:2:3).** An applications oriented introduction to the current manufacturing processes used in industry. A lecture and hands-on approach is utilized to enhance student learning.
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. Fulfills Core Communication (Oral) requirement.
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.
3301. **International Engineering (3:3:0).** Prerequisite: Junior or senior standing. Global influences on engineering, cultural issues, design practices, multinational teams, IP May be offered abroad.
3303. **Fundamentals of Mechanics (3:3:0).** Prerequisites: MATH 2350, PHYS 1408. Introduction to the principles of mechanics, including statistics, dynamics, and mechanics of solids.
3321. **Fundamentals of Thermal Science (3:3:0).** Prerequisites: MATH 2350, PHYS 1408. Introduction to the principles of the thermal sciences, including thermodynamics, fluid mechanics, and heat transfer.
4101. **Fundamentals of Engineering Exam Review (1:0:3).** Review of engineering topics in preparation for taking the NCEES Fundamentals of Engineering Exam.
4312. **Turbomachinery Design and Analysis (3:3:0).** Prerequisite: ME 2322 or GTEC 2351. The design and analysis of tur-bomachinery to include steam turbines, gas turbines, and compressors.
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. Available in classroom and by online distance learning. Fulfills Core Humanities requirement.

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.
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.
5362. **Advanced Semiconductor Processing and Process Characterization (3:2:3).** Prerequisite: EE 5381. This course stresses process flow, yield management, specific device processing steps, and process control. Packaging and back-end processing.
5392. **Ethics in Engineering Research (3:3:0).** Prerequisite: bachelor's degree. Applications of professional ethics to engineering practice and research in fields of education and technology-related industry. May also be taken by distance learning.
6330. **Master's Report (3).** Prerequisite: Graduate standing. Formal technical report on an interdisciplinary topic under guidance of faculty from one or more departments.

Department of Chemical Engineering

M. Nazmul Karim, Ph.D., Chairperson

Horn Professor: McKenna

Professors: Hoo, Karim, Mann, Rengasamy, Simon

Associate Professors: Vaughn, Weeks, Wiesner

Assistant Professors: Khare, Vanapalli

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 overemphasized. 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 laptop 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 Whitacre 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. In addition to activities that contribute to course grades, students should expect periodic assessment of technical competence, including a comprehensive examination in their senior year.

Transfer Admissions. Students transferring into this department from other institutions or from another department at Texas

Graduate Program

All master's students and doctoral candidates are required to register for CHE 7121, 7122, 7123, or 7124 each long semester unless exempted by the chairperson. Seminar courses do not count toward fulfilling credit hour requirements.

Master of Science in Chemical Engineering. The master's program is a structured program requiring five core courses: CE 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.

Master of Science in Chemical Engineering, Nonthesis Option. 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.

Doctoral Program. In addition to the five core courses and 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.

**Curriculum for Bachelor of Science
in Chemical Engineering**

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1351, Calculus I*	3	MATH 1352, Calculus II	3
CHEM 1307 & 1107, Principles of Chem. I**	4	CHEM 1308 & 1108, Principles of Chem. II	4
CHE 1121, Chemical Engineering Seminar	1	CHE 1305, Engineering Analysis	3
TOTAL	11	PHYS 1408, Principles of Physics I^	4
		TOTAL	17
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Adv. Math. for Engr. I	3
CHEM 3305 & 3105, Organic Chemistry I	4	CHE 2306, Exposition of Tech. Info.	3
CHE 2410, Intro. to Chemical Process	4	CHE 2421, Chemical Engr. Thermo. I	4
PHYS 2401, Principles of Physics II	4	CHE 3330, Engr. Materials Science	3
TOTAL	15	TOTAL	13
THIRD YEAR			
Fall		Spring	
CHE 3315, Fluid Mechanics	3	CHEM 3308, 3108, Physical Chem. II	4
CHE 3326, Heat Transfer	3	CHE 3232, Transport Lab.	2
CHE 3322, Chemical Engr. Thermo. II	3	Chemical Engineering Elective	3
TOTAL	9	CHE 3341, Mass-Transfer Operations	3
		CHE 4323, Chem. Reaction Engineering	3
		TOTAL	15
FOURTH YEAR			
Fall		Spring	
CHE 4232, Unit Operations Laboratory	2	CHE 4153, Process Control Lab.	1
CHE 3353, Process Control	3	CHE 4555, Chem. Proc. Design Simul.	5
Chemical Engineering Elective	3	Chemical Engineering Elective	3
IE 3301, Engr. Economic Analysis	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		

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.

**Curriculum for Dual Bachelor of Science in
Chemical Engineering and Computer Science**

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	MATH 1352, Calculus II	3
MATH 1351, Calculus I*	3	CHEM 1308 & 1108, Chemistry II	4
CHEM 1307 & 1107, Chemistry I**	4	PHYS 1408, Principles of Physics I^	4
CHE 1121, Chemical Engineering Seminar	1	CS 1412, Programming Principles II	4
CS 1411, Programming Principles I	4	TOTAL	15
TOTAL	15		
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
PHYS 2401, Principles of Physics II	4	CHEM 3305 & 3105, Organic Chem. I	4
CHE 2410, Intro. to Chemical Process	4	CHE 2421, Chem. Engr. Thermo. I	4
CS 2413, Data Structures	4	CS 1382, Discrete Compu. Structure	3
TOTAL	15	ENGL 1302, Advanced College Rhetoric	3
		TOTAL	17
THIRD YEAR			
Fall		Spring	
MATH 3350, Adv. Math. for Engr. I	3	CHEM 3308 & 3108, Physical Chem. II	4
CHE 3315, Fluid Mechanics	3	CHE 2306, Exposition of Tech. Info.	3
CHE 3322, Chem. Engr. Thermo. II	3	CHE 3341, Mass-Transfer Operations	3
CS 2371, Introduction to Digital Design	3	CS 2350, Computer Org. Assem. Lang.	3
TOTAL	12	TOTAL	13
FOURTH YEAR			
Fall		Spring	
CHE 3326, Heat Transfer	3	CHE 3232, Transport Lab.	2
CS 3361, Concepts of Prog. Lang.	3	CHE 4372, Engineering Experimentation	3
CS 3383, Theory of Automata	3	CHE 4323, Chem. Reaction Engineering	3
Chemistry Elective#	4	CS 3352, Intro. Systems Program.	3
TOTAL	13	IE 3301, Engr. Economic Analysis	3
		TOTAL	14
FIFTH YEAR			
Fall		Spring	
CHE 4232, Unit Operations Lab.	2	CHE 4153, Process Control Lab.	1
CHE 3353, Process Control	3	CHE 4381, Numerical Techniques	3
CS 3364, Des. & Analysis of Algorithms	3	CHE 4555, Chem. Proc. Design Simul.	5
CS 3365, Software Engineering	3	CS 3375, Computer 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.

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 Whitacre 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 CHE 2306 and 4555. Writing intensive courses include CHE 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: CS 1411 is substituted for CHE 1305, seven of the CS hours at the junior level or higher are substituted for CHE 3330 and for four hours of chemistry electives, and IE 3301 is counted toward the Core Curriculum Group and Individual Behavior requirement.

Several substitutions are also made in the B.S.C.S. curriculum: CHE 2306 is substituted for ENGL 2311 and COMS 3358, CHE 3343 is substituted for the Mathematical Probability and Statistics elective, CHE 3353/4153 are substituted for a computer science elective, CHE 4381 is substituted for a computer science elective, and two

Curriculum for Combined Bachelor of Science and Master of Science in Chemical Engineering

FALL		FIRST YEAR		SPRING	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3		
MATH 1351, Calculus I*	3	MATH 1352, Calculus II	3		
CHEM 1307 & 1107, Prin. of Chem. I**	4	CHEM 1308 & 1108, Prin. of Chem. II	4		
CHE 1121, Chem. Engr. Seminar	1	CHE 1305, Engineering Analysis	3		
TOTAL	11	PHYS 1408, Principles of Physics I [^]	4		
		TOTAL	17		

FALL		SECOND YEAR		SPRING	
MATH 2350, Calculus III	3	MATH 3350, Adv. Math. for Engr. I	3		
CHEM 3305 & 3105, Organic Chem. I	4	CHE 2306, Exposition of Tech. Info.	3		
CHE 2410, Intro. to Chemical Process	4	CHE 2421, Chem. Engr. Thermo. I	4		
PHYS 2401, Principles of Physics II	4	CHE 3330, Engr. Materials Science	3		
TOTAL	15	TOTAL	13		

FALL		THIRD YEAR		SPRING	
CHE 3315, Fluid Mechanics	3	CHEM 3308 & 3108, Chem. II	4		
CHE 3326, Heat Transfer	3	CHE 3232, Transport Lab.	2		
CHE 3322, Chem. Engr. Thermo. II	3	CHE4323, Chem. Reaction Engineering	3		
TOTAL	9	CHE 3341, Mass-Transfer Operations	3		
		IE 3301, Engr. Econ. Analysis	3		
		TOTAL	15		

FALL		FOURTH YEAR		SPRING	
CHE 4232, Unit Oper. Lab.	2	CHE 4153, Process Control Lab.	1		
CHE 3353, Process Control	3	CHE 4555, Chem. Proc.	5		
Graduate Core Course+	3	Graduate Core Course+	3		
Graduate Core Course+	3	Graduate Core Course+	3		
TOTAL	11	TOTAL	12		

FALL		FIFTH YEAR		SPRING	
CHE 5721, Graduate Seminar	1	CHE 5721, Graduate Seminar	1		
Graduate Core Course+	3	Graduate Elective Course++	3		
Graduate Elective Course++	3	Graduate Elective Course++	3		
CHE 6000, Master's Thesis	6	CHE 6000, Master's Thesis	3		
TOTAL	13	TOTAL	10		

Critical-Path Hours—118

Additional Requirements:

American Government	6	Humanities/Multicultural††	3
U.S. History	6	Chemistry Electives#	8
Visual and Performing Arts†	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: CHE 5310, 5312, 5321, 5323, or 5343.

++ One graduate level elective must be a CHE course, the other two may be in any area of engineering, science, or mathematics.

required CHE 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 243). 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 CHE 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: CHE 4344 Polymers and Materials Laboratory and a course in materials science and engineering (either CHE 3330, ME 2311, or MTEC 3441). The remaining four courses should be selected from the following list:

CHEM 3306	Organic Chemistry II
CHEM 4310	Polymer Chemistry
CHE 4340	Polymer Processing
CHE 4341	Polymerization Engineering
CHE 4342	Polymer Physics and Engineering
CHE 4345	Dynamics of Polymeric and Nonlinear Fluids
CHE 4346	Polymer Viscoelasticity
EE 4381	VLSI Processing
ME 3328	Materials and Mechanics Laboratory
ME 4341	Materials in Design
ME 4344	Manufacturing Processes for Engineering Materials

Chemical Engineering (CHE)

(To interpret course descriptions, see page 13)

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. Fulfills Core Technology and Applied Science requirement.
- 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. Fulfills Core Communication (Oral) requirement. (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: CHE 2410; corequisite: MATH 2350. Prerequisite: CHE 2410; prerequisite or 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.
- 3322. Chemical Engineering Transport Laboratory (2:0:6).** Prerequisite: CHE 2306, 3315 and 3326; corequisite: CHE 3341. Experiments in mass, momentum, and heat transport; statistical analysis of data. (Writing Intensive)
- 3315. Fluid Mechanics (3:3:0).** Prerequisite: CHE 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: CHE 2421. Solution thermodynamics, phase and chemical equilibria, analysis of processes.

3325. **Intermediate Transport Phenomena (3:3:0)**. Prerequisite: CHE 3315, CHE 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: CHE 2421 and MATH 1308 and MATH 1352. Engineering properties of metals, conduction, convection, and radiation. Design and performance of heat exchangers and furnaces.
3330. **Engineering Materials Science (3:3:0)**. Prerequisite: CHEM 1308 and MATH 1352. 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: CHE 3322. Theory and practice of mass transfer. Particular emphasis on the operations of distillation, absorption, and extraction.
3353. **Process Control (3:3:0)**. Prerequisite: CHE 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.
4153. **Process Control Laboratory (1:0:3)**. Prerequisite: CHE 3353. Experiments with control equipment and the minicomputer. Professional practice course.
4232. **Unit Operations Laboratory (2:0:6)**. Prerequisite: CHE 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: CHE 3322 and 3326. An introduction to the kinetics of chemical conversion processes and the design of chemical reactors
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: CHE 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: CHE 3330, ME 3311, or MTEC 3441. Synthesis aPrerequisite or corequisite: CHE 3330, or 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: CHE 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 CHE 3330 or consent of instructor. Linear viscoelasticity, Boltzmann superposition, experimental methods, molecular theory, and mechanical properties of solid polymers.
4363. **Biochemical Engineering (3:3:0)**. Prerequisite: CHE 4323 (may be taken concurrently). 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 phenomena and chemical reactions at the molecular and cellular level in biological systems.
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.
4376. **Catalytic Processes (3:3:0)**. Prerequisite: CHE 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: CHE 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 CHE 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: CHE 3341, 3353, 4323, IE 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.

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.
5316. **Linear Chemical Process Control Theory (3:3:0)**. Prerequisite: CHE 3353, 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: CHE 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: CHE 5312 and 5310 or consent of instructor. Tensor analysis; partial

* The master's program is a structured program requiring the five core courses denoted by asterisks.

differential equations for multicomponent fluid mixtures; two phase flow problems; and interfacial transport.

- 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.
- 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 characterisation.
- 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.
- 5365. **Biotransport (3:3:0).** Mass and momentum transport in living 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: CHE 4323. Physical and chemical mechanisms involved in industrial catalytic processes. Kinetic modeling and determination of their parameters. Effects of pore diffusion and mass-transfer.
- 5381. **Statistical Mechanics for Chemical Engineers (3:3:0).** Prerequisite: CHE 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.
- 5385. **Bioprocess Control (3:3:0).** Problems and solutions associated with optimization and control of bioprocesses.
- 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.
- 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

H. Scott Norville, Ph.D., Chairperson

Horn Professor: Mehta

Professors: Fedler, Kiesling, Norville, Rainwater, J. Smith, Swift

Associate Professors: Cleveland, Jackson, Jayawickrama, Liu,

Morse, Ramsey, Senadheera, D. Smith, Song, Won

Assistant Professors: Chen, Hernandez, Lawson, 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
- 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.

Transfer Admission. Students applying for transfer into Civil and Environmental Engineering from another institution or from another

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.

Professors and instructors reserve the right to restrict the use and type of calculators used during class hours and tests.

Admission. 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.

Master's Degree Programs

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.

Master of Environmental Engineering. 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. 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 engi-

neering 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.

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 1307/1107), and English I and II (ENGL 1301 and 1302) with a GPA of 2.50 or higher.

Civil Engineering (CE)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 1130. **Civil Engineering Seminar I (1:0:2).** Introduction to the practice of civil engineering. Fulfills Core Technology and Applied Science requirement.
- 1305. **Engineering Analysis I (3:3:0).** Prerequisite: MATH 1351 (may be taken concurrently). Formulation development and presentation of solutions to typical engineering problems. An introduction to numerical analysis and various computer techniques. Fulfills Core Technology and Applied Science requirement.
- 2101. **Construction Materials Laboratory (1:0:3).** Prerequisite: CE 1305 (may be taken concurrently). Laboratory determination and interpretation of engineering properties of construction materials including steel, concrete, aluminum, wood, and masonry.
- 2301. **[ENGR 2301] Statics (3:3:0).** Prerequisites: MATH 1352, PHYS 1408 (may be taken concurrently). Equilibrium of particles and rigid bodies, friction, centroids, and moments of inertia.
- 3103. **Mechanics of Solids Laboratory (1:0:3).** Prerequisite: CE 3303. Laboratory measurements and observation of behavior of solid materials.
- 3105. **Mechanics of Fluids Laboratory (1:0:3).** Prerequisite: CE 3305. Experimental studies of fluid behavior.
- 3121. **Geotechnical Engineering Laboratory (1:0:3).** Corequisite: CE 3321. Laboratory determination and engineering evaluation of the physical properties of soils.
- 3171. **Environmental Engineering Laboratory I (1:0:3).** Corequisite: CE 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).** Prerequisites: CE 2301 and MATH 2350 (may be taken concurrently). A study of motions of particles and rigid bodies.
- 3303. **Mechanics of Solids (3:3:0).** Prerequisite: CE 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: CE 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 CE 3305. Corequisite: CE 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: CE 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: CE 3440. Fundamental principles of structural design with consideration for the selection of materials and systems. Team approach to design; oral and written presentations. (Writing Intensive)
- 3354. **Engineering Hydrology (3:3:0).** Prerequisite: CE 3305. Analysis and design methods related to the occurrence and distribution of surface and groundwater; precipitation, infiltration, runoff, and frequency analysis. (Writing Intensive)

Bachelor of Science in Civil Engineering Curriculum

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, U.S. History to 1877	3	CE 1305, Engineering Analysis I	3
CE 1130, Civil Engr. Seminar I	1	PHYS 1408, Principles of Physics I	4
EGR 1207, Engr. Graphics	2	CHEM 1308, Principles of Chem. II	3
CHEM 1307, Principles of Chem. I	3	CHEM 1108, Principles Chem. II (Lab.)	1
CHEM 1107, Principles of Chem. I (Lab.)	1	TOTAL	17
TOTAL	16		
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math. for Engrs. I	3
PHYS 2401 or EE 3301	3-4	ME 2322 or IE 3301	3
CE 2301, Statics	3	CE 3303, Mechanics of Solids	3
CTEC 2301, Surveying	3	CE 3305, Mechanics of Fluids	3
POLS 1301, American Govt., Org.	3	Statistics*	3
CE 2101, Construction Materials Lab.	1	TOTAL	15
TOTAL	16-17		
THIRD YEAR			
Fall		Spring	
CE 3440, Structural Analysis I	4	CE 3372, Water Systems Design	3
CE 3354, Intro. to Hydrology	3	CE 3341, Principles of Struc. Design	3
CE 3309, Environmental Engr. I	3	CE 3302, Dynamics	3
CE 3171, Environmental Engr. Lab.	1	CE 3321, Intro. to Geotechnical Engr.	3
CE 3105, Mechanics of Fluids Lab.	1	CE 3121, Geotechnical Engr. Lab.	1
CE 3103, Mechanics of Solids Lab.	1	POLS 2302, American Public Policy	3
HIST 2301, U.S. History Since 1877	3	TOTAL	16
TOTAL	16		
FOURTH YEAR			
Fall		Spring	
CE 4343, Design of Concrete Structures	3	CE 4330, Design of Engr. Systems	3
ENGR 4392, Engr. Ethics & Impact on Soc.	3	ENGR 4101, Fund. of Engr. Exam Review	1
Tech. Writing/Oral Communication**	3	Elective (Humanities)^	3
CE 4361, Transport. Engineering	3	Elective (Humanities)^	3
Elective (Design)+	3	Elective (Design)+	3
TOTAL	15	Sr. Elective++	3
		TOTAL	16

Minimum hours required for graduation—126

* Select from IE 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 ENGR 2331.

+ Electives shall be selected as follows (f=fall, s=spring, r=rotating): Design—choose from CE 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 CE elective [CE 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, Calculus I	3	MATH 1352, Calculus II	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
EGR 1207, Engr. Graphics	2	CE 1305, Engineering Analysis I	3
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Principles of Chem. I (Lab.)	1	CHEM 1108, Principles Chem. II (Lab.)	1
POLS 1301, American Govt. Org.	3	HIST 2300, History of U.S. to 1877	3
ENVE 1100, Env. Engr. Seminar	1	TOTAL	16
TOTAL	16		
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	POLS 2302, American Public Policy	3
PHYS 1408, Principles of Physics I	4	Environmental Science Elective**	3
CHEM 3305, Organic Chemistry I	3	CE 3305, Mechanics of Fluids	3
CE 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
CE 3309, Environmental Engineering	3	Indiv.-Group Behavior Elective†	3
CE 3303, Mechanics of Solids	3	CE 3372, Water Systems Design	3
CE 3354, Engineering Hydrology	3	Vis./Performing Arts Elective††	3
Engr. Communication^	3	CE 3321, Intro. to Geotech. Engr.	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
CE 4353, Design of Hydraulic Systems	3	ENVE 4399, Bio. Mun. Wastewater Trt.	3
CE 3105, Mechanics of Fluids Lab.	1	Humanities Elective#	3
ENVE 4107, Adv. Phys. & Chem. Water Lab	1	ENVE 4391, Advanced Water Treatment	3
ENVE 4307, Phy./Chem. Mun. Wastewater	3	ENVE 5303 Design Air Pol. Ctrl. Syst.	3
ENVE 4385, Microbial Appl. in Env. Engr.	3	CE 5363, Groundwater Hydrology	3
ENGR 4392, Engr. Ethics & Impact on Soc.	3	ENVE 4191, Adv. Water Treatment Lab	1
ENVE 4185, Microb. App. in Env. Engr.	1	TOTAL	16
TOTAL	15		
FIFTH YEAR			
Fall		Spring	
CE 5364, Groundwater Transp.	3	ENVE 5306, Env. Systems Design II	3
ENVE 5305, Env. Systems Design I	3	ENGR 4101, Fund. of Engr. Exam Review	1
Technical Elective^^	3	CE 5395, Solid and Hazardous Waste	3
CE 5360, Open Channel Hydraulics	3	Technical Electives##	9
CE 5393, Unit Processes Lab.	3	TOTAL	16
TOTAL	15		

Minimum hours required for graduation—156

* Select IE 3341 or MATH 3342.

** Select environmental science elective such as GEOG 1401, 3300, 3310, GEOL 3323, 3428, ATMO 3301, CHEM 3311, 4303, or others with advisor approval.

^ Either PETR 3308 or ENGR 2331.

^^ Choose one from IE 5302, 5306, 5307 or ENTX 6445.

† IE 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 CE 5331, 5361, 5366, 5383; GEOG 5300; IE 5329.

- 3372. Water Systems Design (3:3:0).** Prerequisite: CE 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: CE 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. Prin-

ciples and practice of engineering ethics and professionalism. (ENGR 4392)

- 4311. Problem-Based Learning: Steel Structures (3:2:3).** Prerequisite: CE 2101 and 3440; corequisite: CE 3341. Planning, design, and construction of a steel structure posed as a problem with realistic constraints. (Writing Intensive)
- 4312. Problem-Based Learning: Concrete Structures (3:2:3).** Prerequisite: CE 2101, 3305, 3440; corequisite: CE 3341. Planning, design, and construction of a concrete structure posed as a problem with realistic constraints. (Writing Intensive)
- 4321. Geotechnical Engineering Design (3:3:0).** Prerequisite: CE 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. (Writing Intensive)

4329. **Design of Bridge Structures (3:3:0)**. Corequisite: CE 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 CE 4342 or CE 4343 or corequisite CE 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: CE 3440 or consent of instructor. Analysis of structures by matrix methods.
4342. **Design of Steel Structures (3:3:0)**. Prerequisite: CE 2101 and 3341. Design of structural steel systems by the LRFD method.
4343. **Design of Concrete Structures (3:3:0)**. Prerequisite: CE 2101 and 3341. A course in design of reinforced concrete systems by strength design methods.
4353. **Design of Hydraulic Systems (3:3:0)**. Prerequisite: CE 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: CE 3321, IE 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: CE 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.

Graduate Courses

5101. **Civil Engineering Seminar (1:1:0)**. Individual study of engineering problems of special interest and value to the student.
5185. **Microbial Applications in Environmental Engineering Lab (1:1:3)**. Prerequisite: Consent of instructor. Determine concentration of coliforms, nutrients, and organic pollutants in water. Analyze water quality data. (ENVE 4185)
5191. **Advanced Water Treatment Lab (1:1:3)**. Prerequisite: Consent of instructor. Design and conduct flocculation, coagulant dose, sedimentation, and disinfection studies and assess impact on water quality. (ENVE 4191)
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: CE 5310 and 5311 or consent of instructor. Theory of the finite element method-constant strain elements; plane stress or strain for axisymmetric problems; application to plates and shells, torsion, heat transfer and seepage problems.
5321. **Advanced Soil Engineering I (3:3:0)**. Prerequisite: CE 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: CE 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: CE 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: CE 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: CE 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: CE 4342 or consent of instructor. Advanced design of structures, utilizing LRFD design concepts.
5343. **Advanced Reinforced Concrete Design (3:3:0)**. Prerequisite: CE 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: CE 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.
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: CE 5360 or 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 nonreactive 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: CE 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: CE 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.
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.
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.
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.
4107. **Advanced Physical and Chemical Municipal Water Treatment Lab (1:1:3)**. Prerequisite: Consent of instructor. Characterization of water using alkalinity, pH, BOD, and solids concentrations. Students will conduct column tests and filtration studies and analyze water quality data. (ENVE 5107)
4185. **Microbial Applications in Environmental Engineering Lab (1:1:3)**. Prerequisite: Consent of instructor. Determine concentration of coliforms, nutrients, and organic pollutants in water; analyze water quality data. (CE 5185)
4191. **Advanced Water Treatment Lab (1:1:3)**. Prerequisite: Consent of instructor. Design and conduct flocculation, coagulant doses, sedimentation, and disinfection studies; assess impact on water quality. (CE 5191)
4307. **Physical and Chemical Municipal Wastewater Treatment (3:3:0)**. Prerequisite: CE 3309 and consent of instructor. Char-

acterization of municipal wastewaters and the application of physical and chemical design procedures to remove and dispose of criteria pollutants in wastewater.

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.
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, CE 3309 or consent of instructor. Municipal wastewater treatment methods, including suspend and attached growth biological systems, nitrification, denitrification, phosphorous removal, sludge stabilization, and treated effluent and sludge disposal.

Graduate Courses

5107. **Advanced Physical and Chemical Wastewater Treatment Lab (1:1:3)**. Prerequisite: Consent of instructor. Characterization of alkalinity, pH, BOD, and solids concentrations. Students will conduct column tests and filtration studies. Analyze water quality data. (ENVE 4107)
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.
5399. **Biological Municipal Wastewater Treatment (3:3:0)**. Municipal wastewater treatment methods, including suspend and attached growth biological systems, nitrification, denitrification, phosphorous removal, sludge stabilization, and treated effluent and sludge disposal.



Department of Computer Science

Joseph E. Urban, Ph.D., Chairperson

Horn Professor: Cooke

Professors: Gelfond, Hewett, J. Urban, S. Urban

Associate Professors: Lakhani, Lopez-Benitez, Mengel, Pyeatt, Rushton, Sinzinger, Temkin, Watson, Zhuang

Assistant Professors: Andersen, Shin, Siami Namin, Sridharan, Youn, Zhang

Instructors: Pitalua, Rees, Srisinroongruang

About the Program

The Computer Science department offers the following degree programs and certificate:

- Bachelor of Science in Computer Science
- Master of Science in Computer Science
- Master of Science in Software Engineering
- Doctor of Philosophy in Computer Science
- Graduate Certificate in Software Engineering

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 Whitacre 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 CS 1411, 1412, 2413 and three of the following courses: CS 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 Whitacre 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 the mathematics or computer science departments.

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 (CS)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 1300. [COSC 1300, 1400] 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. Fulfills Core Technology and Applied Science requirement.
- 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 CS major or minor.
- 1305. [COSC 1301, 1309, 1315, 1330, 1401; ENGR 2304] 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: CS 1411. Sets, functions, counting principles, basic probability, logic, proof methods, and graphs.
- 1411. [COSC 1320, 1336, 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 1337, 1437] Programming Principles II (4:3:3).** Prerequisite: CS 1411. Object-oriented programming with emphasis on evaluation of alternative program design strategies. Class design, recursion, linked, and dynamically allocated structures. Fulfills Core Technology and Applied Science requirement.
- 2350. [COSC 1319, 1419, 2319, 2325, 2419, 2425] Computer Organization and Assembly Language Programming (3:3:0).**

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 specialties 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.

Please see the Department of Computer Science Web site for additional details and requirements of the Graduate Program and admissions (www.cs.ttu.edu).

Graduate Certificate in Software Engineering

The Graduate 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 CS 5373 and 5374 plus two courses from the following list: CS 5332, 5355, 5363, 5377, 5379, 5380, and IE 5320.

Master's Degree Programs

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 must file their master's degree plan with the approval of 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 (CS 5381, 5383, 5384) and two systems courses (CS 5352, 5375, 5368). Students choosing the 30-hour thesis plan must apply 6 hours of CS 6000 and may apply 3 hours of CS 7000 credit toward their degree. Students choosing the 36-hour nonthesis option may not use CS 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 CS 5301, 5302, and 5303.

The degree plan for students pursuing a Master of Science in Software Engineering (M.S.S.E.) must include CS 5363, 5373, and 5374 as well as SE electives (chosen from CS 5332, 5355, 5377, 5379, 5380; IE 5320) and CS electives (CS graduate courses). Students choosing the 30-hour thesis option must take 6 hours of CS 6000 as well as three elective courses from the SE electives (one course may be substituted with CS 7000) and two courses from CS electives. Students choosing the 36-hour nonthesis option may not use CS 6000 or 7000 toward their degree and must take five elective courses from the SE electives and four courses from the CS 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 coursework, 12 hours of CS 8000 (Doctor's Dissertation), and candidacy exam.

- Prerequisite: CS 1412, EE 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, 2336, 2415, 2436] Data Structures (4:3:3)**. Prerequisite: CS 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: CS 2350 or EE 3362 and CS 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: CS 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: CS 1382, 2413, and MATH 2360. A theoretical course focusing on the design and analysis of computer algorithms.
3365. **Software Engineering (3:3:0)**. Prerequisite: CS 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.
3368. **Introduction to Artificial Intelligence (3:3:0)**. Prerequisite: CS 1382. This course provides introduction to theory, design, and implementation of intelligent systems.
3371. **Embedded Systems Design (3:3:0)**. Prerequisite: CS 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: CS 2350 or EE 3362. 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: 1382. The relationship between language, grammars, and automata. 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 interest. May be repeated for credit.
4311. **Senior Project Design (3:3:0)**. Prerequisite: CS majors only; CS 3365, 3364, and COMS 3358 or ENGR 2331; 12 additional hours of upper-division computer science coursework; senior standing.

Dual-Degree Curriculum: Math–Computer Science

FIRST YEAR			
Fall		Spring	
CS 1411, Programming Princ. I	4	CS 1412, Programming Princ. II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	CS 1382, Discrete Compu. Structure	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, American Govt., Org.	3	ENGL 1302, Advanced College Rhetoric	3
Elective (Core Curr.)**	3	Personal Fitness and Wellness*	2
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
CS 2413, Data Structures	3	CS 2350, Computer Org. Assem. Lang.	3
EE 2372, Modern Dig. Sys.	3	PHYS 2401, Principles of Physics II	4
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
PHYS 1408, Principles of Physics I	4	CHEM 1307, 1107, Prin. of 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	
CS 3383, Theory of Automata	3	CS 3375, Computer Architecture	3
CS 3361, Concepts. Prog. Lang.	3	MATH 3360, Found. of Algebra I	3
MATH 3354, Differential Equations I	3	Foreign Language Elective^	5
Foreign Language Elective^	5	Elective (Core Curriculum)**	3
CS 3364, Des. & Analysis of Algorithms	3	COMS 3358, Bus. & Prof. Comm.	3
TOTAL	17	or ENGR 2331, Prof. Comm. for Engrs.	
		TOTAL	17
FOURTH YEAR			
Fall		Spring	
CS 4354, Con. Database Systems	3	CS 3352, Intro. Sys. Prog.	3
MATH 3430, Computational Techniques	4	CS 3365, Software Engineering	3
MATH 4342, Mathematical Statistics	3	MATH 4310, Intro. Num. Analysis 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 (CS)††	3	CS 4311, Sr. Proj. Design	3
Elective (CS)††	3	CS 4352, Operating Systems	3
MATH 4350, Advanced Calculus	3	MATH 4312, Intro. Num. Analysis 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	
CS 1411, Programming Princ. I	4	CS 1412, Programming Princ. II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	CS 1382, Discrete Compu. Structure	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, American Gov., Org.	3	ENGL 1302, Advanced College Rhetoric	3
Elective (Core Curr.)**	3	Elective (Core Curr.)**	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
CS 2413, Data Structures	4	CS 2350, Computer Org. Assem. Lang.	3
PHYS 1408, Princ. of Physics I	4	PHYS 2401, Princ. Phys. II	4
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
EE 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	CS 3352, Intro. Sys. Prog.	3
CS 3361, Concepts. Prog. Lang.	3	Elective (CS 3000-level)	3
CS 3364, Des. & Analysis of Algorithms.	3	CS 3375, Comp. Arch.	3
CS 3383, Theory of Automata	3	CS 3365, Software Engineering	3
COMS 3358, Bus. & Prof. Comm.	3	Elective (Core Curr.)*	3
or ENGR 2331, Prof. Comm. for Engrs.		TOTAL	15
TOTAL	15		
FOURTH YEAR			
Fall		Spring	
Elective (Core Curr.)*	3	CS 4311, Sr. Project Design	3
Elective (CS)**	3	Graduate Core Course†	6
Graduate Core Course†	6	CS 4352, Oper. Sys.	3
CS 4354, Conc. Database Systems	3	Elective (Core Curr.)*	3
TOTAL	15	TOTAL	15
FIFTH YEAR			
Fall		Spring	
Graduate Elective Course††	6	Graduate Elective Course††	6
CS 6000, Master's Thesis^	3	CS 6000, Master's Thesis^	3
TOTAL	9	TOTAL	9

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 CS major.

† Graduate Core Courses: Select two from CS 5381, 5383, 5384, and two from CS 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 CS 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 CS 6000. Nonthesis students must also pass the departmental Master's Comprehensive Examination.

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. (Writing Intensive)

4312. Senior Project Implementation Laboratory (3:0:9). Prerequisite: CS 4311. Students will complete the projects begun in CS 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: CS 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: CS 3352, 3364. Concepts and design of different components of operating systems. 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: CS 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: CS 3352, CS 3364. Introduction to multi-threaded programming, data parallelisms, and message passing techniques.

Curriculum for Computer Science

FIRST YEAR			
Fall		Spring	
CS 1411, Programming Principles I	4	CS 1412, Programming Principles II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	CS 1382, Discrete Compu. Structure	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, American Gov., Org.	3	ENGL 1302, Advanced College Rhetoric	3
Elective (Core Curr.)*	3	Elective (Core Curr.)*	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
CS 2413, Data Structures	4	CS 2350, Computer Org. Assem. Lang.	3
PHYS 1408, Princ. of Physics I	4	PHYS 2401, Princ. of Physics II	4
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
EE 2372, Modern Digital Systems 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, Stats. Engineers & Scientists	3	CS 3352, Intro. to Sys. Programming	3
CS 3361, Concepts. Prog. Lang.	3	Elective (CS 3000-level)	3
CS 3364, Des. & Analysis of Algorithms	3	CS 3375, Computer Arch.	3
CS 3383, Theory of Automata	3	CS 3365, Software Engineering	3
COMS 3358, Bus. & Prof. Comm.	3	Elective (Core Curr.)*	3
or ENGR 2331, Prof. Comm. for Engrs.		TOTAL	15
TOTAL	15		
FOURTH YEAR			
Fall		Spring	
Elective (Core Curr.)*	3	CS 4311, Sr. Project Design	3
Elective (CS)**	3	Elective (CS)**	3
Elective (CS)**	3	CS 4352, Operating Systems	3
Elective (CS)**	3	Elective (Core Curr.)*	3
CS 4354, Con. Database Systems	3	TOTAL	12
TOTAL	15		

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 CS major.

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: CS 3352. Digital transmission fundamentals, local area networks, network protocols, and common Internet applications.
4395. **Introduction to Computer Graphics (3:3:0).** Prerequisite: CS 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: CS 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 (V1-3).** 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

Curriculum for Combined B.S. in Computer Science and M.S. in Software Engineering

FIRST YEAR			
Fall		Spring	
CS 1411, Programming Princ. I	4	CS 1412, Programming Princ. II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, American Gov. Org.	3	CS 1382, Discrete Compu. Structure	3
Elective (Core Curr.)*	3	Elective (Core Curr.)*	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
CS 2413, Data Structures	4	CS 2350, Computer Org. Assem. Lang.	3
PHYS 1408, Princ. of Physics I	4	PHYS 2401, Princ. Phys. II	4
EE 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	
		TOTAL	17
THIRD YEAR			
Fall		Spring	
MATH 3342, Stat. Eng. & Sci.	3	CS 3352, Intro. Sys. Prog.	3
CS 3361, Concepts of Program. Lang.	3	Elective (CS 3000-level)	3
CS 3364, Des. & Analysis of Algorithms	3	CS 3375, Computer Architecture	3
CS 3383, Theory of Automata	3	CS 3365, Software Engineering	3
COMS 3358, Bus. & Prof. Communication	3	Elective (Core Curr.)*	3
or ENGR 2331, Prof. Comm. for Engrs.		TOTAL	15
TOTAL	15		
FOURTH YEAR			
Fall		Spring	
CS 5363, Software Project Mgmt.	3	CS 5374, Soft. Ver. and Val.	3
Elective (CS)**	3	CS 4311, Sr. Project Design	3
CS 4354, Concepts of Database Systems	3	CS 4352, Oper. Sys.	3
Elective (Core Curr.)*	3	Elective (Core Curr.)*	3
Elective (SE)†	3	CS 5373, Software Modeling & Arch.	3
TOTAL	15	TOTAL	15
FIFTH YEAR			
Fall		Spring	
Elective (SE)†	6	Elective (SE)†	6
CS 6000, Master's Thesis^	3	CS 6000, Master's Thesis^	3
TOTAL	9	TOTAL	9

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 CS 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 CS 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 CS 6000. Nonthesis students must also pass the departmental Master's Comprehensive Examination.

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 CS 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 CS 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).** Covers fundamental principles of virtual reality and development of future virtual reality applications.
5323. **Computer Haptics (3:3:0).** Provides 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).** 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).** 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).** 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).** 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).** Systems aspects of relational databases. Emphasizes 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).** 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).** Capstone design and implementation experience of a major software project applying comprehensive software engineering techniques.
5359. **Software Studio II (3:3:0).** A continuation of software engineering projects begun in CS 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).** 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).** Comprehensive introduction to the field of parallel and distributed computing systems. Algorithms, architectures, networks, systems. Theory and applications.
5368. **Intelligent Systems (3:3:0).** 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).** 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).** 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).** 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).** 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).** 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).** 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).** 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).** 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).** 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

Vittal S. Rao, Ph.D., Chairperson

Horn Professors: Kristiansen, Mitra

Edward E. Whitacre, Jr. Endowed Chair: Jiang

Linda F. Whitacre Endowed Chair: Lin

Professors: J. Dickens, Gale, Giesselmann, Krompholz, Neuber, Nikishin, Rao

Associate Professors: Baker, Bayne, Dallas, Karp, Lie, Nutter, Saed, Sari-Sarraf

Assistant Professors: Bernussi, Fan, Pal

Instructors: Cox, M. Dickens, Storrs

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.

Students pursuing a Bachelor of Science in Electrical Engineering degree may gain a concentration in the following areas:

- Analog VLSI – EE 4310, 4314, 4321
- MEMS – EE 4381, 4385, 4386
- Power Systems – EE 4343, 4344, 4391
- Signal Processing – EE 4364, 4367
- Communication Systems – EE 4342, 4344, 4360
- Digital Systems – EE 4314, 4375, 4382
- Control Systems – EE 4324, 4368

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 labora-

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 breadth and depth of knowledge; thesis and dissertation projects are an important expression of creative research activity. A nonthesis option is available for master's students.

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 and Maddox Laboratory
- Wireless Communication Systems 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.

tory 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 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 be prepared to take calculus classes at Texas Tech. Students who are not adequately prepared for calculus, chemistry, and/or physics must take appropriate courses before enrolling in MATH 1351, CHEM 1307, 1107, and/or PHYS 1408. 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.

Students must meet all degree and prerequisite requirements with grades of C or better. 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 an accelerated bachelor's to master's degree program or a minor should consult a faculty or academic advisor. A minor in electrical engineering consists of EE 3331, 2372, 3302, 3303, 3311, and 3362. Any student within nine semester hours of graduation may take courses for graduate credit. Accelerated M.S.-B.S. 150-hour programs are also available. Students interested in pursuing these degrees should inform the academic advisor during the first semester of their junior year.

Electrical Engineering (EE)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

1304. **Introduction to Electrical and Computer Engineering (3:3:0).** Prerequisite: MATH 1351 (concurrent enrollment allowed). 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: MATH 1351 (concurrent enrollment allowed). An introduction to the fundamentals of computing and structured programming for electrical engineering. Fulfills Core Technology and Applied Science requirement.
2372. **Modern Digital System Design (3:3:0).** Prerequisite: MATH 1351 (concurrent enrollment allowed). 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.
3302. **Fundamentals of Electrical Engineering (3:3:0).** Prerequisite: MATH 1352; majors only. Principles of electric circuits. DC, transient, and sinusoidal steady-state analysis.
3303. **Linear System Analysis (3:3:0).** Prerequisite: EE 1304, 3302; MATH 3350 (concurrent enrollment allowed). 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: EE 3302. Introduction to electronic devices, amplifiers, and electronic systems. Principles of electronic circuit design and analysis.
3312. **Electronics II (3:3:0).** Prerequisite: EE 3311, 3303. For majors only or departmental consent. Analysis and design of special-purpose amplifiers and oscillators.
3323. **Principles of Communication Systems (3:3:0).** Prerequisite: EE 3303, 3311, MATH 3342 or IE 3341. 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.

Curriculum for Electrical Engineering

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
EE 1304, Intro. Electrical & Comp. Engr.	3	EE 1305, Intro. to Engr. & Comp. Program.	3
ENGL 1301, Essentials of Coll. Rhetoric	3	EE 2372, Mod. Dig. Syst. Des.	3
POLS 1301, American Govt., Org.	3	CHEM 1307, Principles of Chem. I	3
HIST 2300, History of the U.S. to 1877*	3	CHEM 1107, Principles of Chem. I (Lab)	1
TOTAL	15	ENGL 1302, Advanced College Rhetoric	3
		TOTAL	16
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math for Engr. I	3
EE 3302, Fund. of Elec. Engr.	3	MATH 3342 or IE 3341, Statistics**	3
EE 3362, Dig. Dsgn. Using Microcontrollers	3	EE 3311, Electronics I	3
PHYS 1408, Principles of Physics I	4	EE 3331, Proj. Lab. I	3
HIST 2301, History of U.S. Since 1877*	3	EE 3303, Linear System Analysis	3
TOTAL	16	POLS 2302, American Public Policy*	3
		TOTAL	18
THIRD YEAR			
Fall		Spring	
EE 3332, Proj. Lab. II	3	EE 3333, Proj. Lab. III	3
EE 3312, Electronics II	3	EE 3341, Electromag. Theory I	3
EE 3323, Prin. Comm. Sys.	3	EE 3353, Feedback Contr. Sys.	3
PHYS 2401, Principles of Physics II	4	MATH 3351, Higher Math for Engrs.	3
Oral Communications Elective*	3	Other Engineering Elective †	3
TOTAL	16	Humanities Elective*	3
		TOTAL	18
FOURTH YEAR			
Fall		Spring	
EE 4333, Senior Proj. Lab. IV	3	EE 4334, Proj. Lab. V	3
EE 3342, Electromag. Theory II	3	EE 4000-Level Elective	3
EE 4000-Level Elective	3	EE 4000-Level Elective	3
Other Engineering Elective †	3	EE 4000-Level Elective	3
Individual or Group Behavior Elective*	3	Visual & Performing Arts Elective*	3
TOTAL	15	Multicultural Elective ††	3
		TOTAL	15-18

Minimum hours required for graduation—129

All students must satisfy the university foreign language requirement with two years of foreign language credit from high school (same language) or two semesters of college credit (same language).

Electives must be selected from approved lists to ensure that ABET, Core Curriculum, departmental, and legislative requirements are satisfied.

* Choose from Core Curriculum list.

** Taking MATH 3342 will complete a math minor.

† Select from departmentally approved list.

†† Requirement can be met in combination with Humanities, Individual or Group Behavior, or Visual and Performing Arts

Curriculum for Computer Engineering

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
EE 1304, Intro. Electrical & Comp. Engr.	3	CS 1411, Programming Principles I	4
ENGL 1301, Essentials of Coll. Rhetoric	3	EE 2372, Mod. Dig. Syst. Des.	3
POLS 1301, American Govt., Org.	3	CHEM 1307, Principles of Chem. I	3
HIST 2300, History of the U.S. to 1877*	3	CHEM 1107, Principles of Chem. I (Lab)	1
TOTAL	15	ENGL 1302, Advanced College Rhetoric	3
		TOTAL	17
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math for Engr. I	3
CS 1412, Programming Principles II	3	MATH 3342 or IE 3341, Statistics	3
EE 3302, Fund. of Elec. Engr.	4	CS 2413, Data Structures	4
EE 3362, Dig. Dsgn. Using Microcontrollers	3	EE 3331, Proj. Lab. I	3
PHYS 1408, Principles of Physics I	4	EE 3311, Electronics I	3
TOTAL	17	EE 3303, Linear System Analysis	3
		TOTAL	19
THIRD YEAR			
Fall		Spring	
EE 3334, Comp. Eng. Proj. Lab. II	3	EE 3333, Proj. Lab. III	3
EE 3312, Electronics II	3	EE 3341, Electromag. Theory I	3
EE 3323, Prin. Comm. Sys.	3	CS 1382, Discrete Compu. Structure	3
CS 3365, Software Engineering	3	CS 3352, Intr. Systems Programming	3
PHYS 2401, Principles of Physics II	4	POLS 2302, American Public Policy*	3
TOTAL	16	TOTAL	15
FOURTH YEAR			
Fall		Spring	
EE 4333, Senior Proj. Lab. IV	3	EE 4334, Proj. Lab. V	3
EE/CS Elective ^	3	EE/CS Elective ^	3
Humanities Elective*	3	EE/CS Elective ^	3
Oral Communications Elective*	3	HIST 2301, History of U.S. Since 1877*	3
Individual or Group Behavior Elective*	3	Visual & Performing Arts Elective*	3
TOTAL	15	Multicultural Elective†	3
		TOTAL	15-18

Minimum hours required for graduation—129

All students must satisfy the university foreign language requirement with two years of foreign language credit from high school (same language) or two semesters of college credit (same language).

Electives must be selected from approved lists to ensure that ABET, Core Curriculum, departmental, and legislative requirements are satisfied.

* Choose from Core Curriculum list.

^ Choose two courses from EE 4364, 4367, 4375, 4382; CS 3361, 3364, 3368, 3383, 4352, 4354, 4395.

† Requirement can be met in combination with Humanities, Individual or Group Behavior, or Visual and Performing Arts

150-Hour Combined Bachelor of Science, Master of Science in Electrical Engineering With Thesis

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 to ensure that ABET, Core Curriculum, departmental, and legislative requirements are satisfied.

FOURTH YEAR			
Fall		Spring	
EE 4333, Senior Project Lab. IV	3	EE 4334, Project Lab. V	3
EE 3342, Electromagnetic Theory II	3	EE 5000-Level Elective	3
EE 4000-Level Elective	3	EE 5000-Level Elective	3
EE 5000-Level Elective	3	Other Engineering Elective †	3
Individual or Group Behavior Elective*	3	Visual & Performing Arts Elective*	3
TOTAL	15	Multicultural Elective ††	3
		TOTAL	15-18
FIFTH YEAR			
Fall		Spring	
EE 5000-Level Elective	3	EE 5000-Level Elective	3
EE 5000-Level Elective	3	EE 5000-Level Elective	3
EE 5120, Graduate Seminar	1	EE 5000-Level Elective	3
EE 6000, Master's Thesis	6	EE 5120, Graduate Seminar	1
TOTAL	13	TOTAL	10

* Choose from Core Curriculum list.

† Select from departmentally approved list.

†† Requirement can be met in combination with Humanities, Individual or Group Behavior, or Visual and Performing Arts.

Curriculum for 150-Hour Combined Bachelor of Science in Computer Engineering, Master of Science in Electrical Engineering With Thesis

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, Core Curriculum, departmental, and legislative requirements are satisfied.

FOURTH YEAR			
Fall		Spring	
EE 4333, Senior Project Lab. IV	3	EE 4334, Project Lab. V	3
EE 5000-Level Elective	3	EE/CS 5000-Level Elective^	3
Oral Communications Elective*	3	EE/CS 5000-Level Elective^	3
Humanities Elective*	3	HIST 2301, History of U.S. Since 1877*	3
Individual or Group Behavior Elective*	3	Visual & Performing Arts Elective*	3
TOTAL	15	Multicultural Elective †	3
		TOTAL	15-18
FIFTH YEAR			
Fall		Spring	
EE 5000-Level Elective	3	EE 5000-Level Elective	3
EE 5000-Level Elective	3	EE 5000-Level Elective	3
EE 5120, Graduate Seminar	1	EE 5000-Level Elective	3
EE 6000, Master's Thesis	6	EE 5120, Graduate Seminar	10
TOTAL	13	TOTAL	10

* Choose from Core Curriculum list.

^ Two EE/CS 5000-level electives must be selected from 5000-level courses comparable to those on the BS CMPE elective list.

† Requirement can be met in combination with Humanities, Individual or Group Behavior, or Visual and Performing Arts.

Electrical Engineering–Computer Science Dual-Degree Curriculum

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
EE 1304, Intro. Electrical & Comp. Engr.	3	EE 2372, Mod. Dig. Syst. Des.	3
CS 1411, Programming Principles I	4	CS 1412, Programming Principles I	4
ENGL 1301, Essentials of Coll. Rhetoric	3	CHEM 1307, Principles of Chem. I	3
POLS 1301, American Govt., Org.	3	CHEM 1107, Principles of Chem. I (Lab)	1
TOTAL	16	ENGL 1302, Advanced College Rhetoric	3
		TOTAL	17
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math for Engr. I	3
CS 2413, Data Structures	4	MATH 3342 or IE 3341, Statistics**	3
EE 3302, Fund. of Elec. Engr.	3	EE 3303, Linear Syst. Analysis	3
EE 3362, Dig. Dsgn. Using Microcontrollers	3	CS 1382, Discrete Comp. Structure	3
PHYS 1408, Principles of Physics I*	4	POLS 2302, American Public Policy*	3
TOTAL	17	TOTAL	15
THIRD YEAR			
Fall		Spring	
EE 3331, Proj. Lab. I	3	EE 3341, Electromag. Theory I	3
EE 3311, Electronics I	3	EE 3323, Prin. Comm. Sys.	3
CS 3365, Software Engr.	3	EE 3312, Electronics II	3
MATH 2360, Linear Algebra	3	CS 3361, Concepts Prog. Lang.	3
PHYS 2401, Principles of Physics II	4	HIST 2300, History of U.S. to 1877*	3
TOTAL	16	TOTAL	15
FOURTH YEAR			
Fall		Spring	
EE 3332, Project Lab. II	3	EE 3333, Proj. Lab. III	3
EE 3342, Electromagnetic Theory II	3	EE 3353, Feedback Contr. Sys.	3
CS 3375, Machine Struc. & Org.	3	CS 3364, Des. & Analysis of Algorithms	3
Other Engineering Elective †	3	CS 4000-Level Elective	3
HIST 2301, History of U.S. Since 1877*	3	Oral Communications Elective*	3
TOTAL	15	TOTAL	15
FIFTH YEAR			
Fall		Spring	
EE 4333, Senior Proj. Lab. IV	3	EE 4334, Proj. Lab. V	3
CS 3352, Intro. to Systems Programming	3	CS 4352, Operating Systems	3
Individual or Group Behavior Elective*	3	CS 3383, Theory of Automata	3
Humanities Elective*	3	EE 5000-Level Elective	3
Multicultural Elective ††	3	TOTAL	12
TOTAL	12-15		

Minimum hours required for graduation—150

All students must satisfy the university foreign language requirement with two years of foreign language credit from high school (same language) or two semesters of college credit (same language).

Electives must be selected from approved lists to ensure that ABET, Core Curriculum, departmental, and legislative requirements are satisfied.

* Choose from Core Curriculum list.

** Taking MATH 3342 will complete a math minor.

† Select from departmentally approved list.

†† Requirement can be met in combination with Humanities, Individual or Group Behavior, or Visual and Performing Arts.

- 3331. Project Laboratory I (3:0:9).** Prerequisite: ENGL 1302, EE 3302. A laboratory course to accompany second-year basic courses in electrical or computer engineering. (Writing Intensive)
- 3332. Project Laboratory II (3:0:9).** Prerequisite: EE 3303, 3311, 3331, and 3362. For EE and EECS 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: EE 3312, 3323, 3332 (or 3334); majors only or departmental consent. 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: EE 3303, 3311, 3331, and 3362. For CMPE 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: EE 3303 and PHYS 2401. 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: EE 3341 and MATH 3351 or 2360. For majors only or departmental consent.

Dual Bachelor of Science in Electrical Engineering and Computer Science Plus Master of Science in Electrical Engineering With Thesis

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 to ensure that ABET, General Education, departmental, and legislative requirements are satisfied.

THIRD YEAR			
Fall		Spring	
EE 3331, Proj. Lab. I	3	EE 3341, Electromag. Theory I	3
EE 3311, Electronics I	3	EE 3323, Prin. Comm. Sys.	3
CS 3365, Software Engr.	3	EE 3312, Electronics II	3
MATH 2360, Linear Algebra	3	CS 3361, Concepts Prog. Lang.	3
PHYS 2401, Principles of Physics II	4	HIST 2300, History of U.S. to 1877*	3
TOTAL	16	Ind. Group Behavior Elective*	3
		TOTAL	18
FOURTH YEAR			
Fall		Spring	
EE 3332, Proj. Lab. II	3	EE 3333, Proj. Lab. III	3
EE 3342, Electromag. Theory II	3	EE 3353, Feedback Contr. Sys.	3
CS 5375 or EE 5375	3	CS 3364, Des. & Analysis of Algorithms	3
HIST 2301, History of U.S. Since 1877*	3	CS 5000-Level Elective	3
Visual & Performing Arts Elective*	3	Oral Communications Elective*	3
TOTAL	15	TOTAL	15
FIFTH YEAR			
Fall		Spring	
EE 4333, Senior Proj. Lab. IV	3	EE 4334, Proj. Lab. V	3
CS 3352, Intro. to Systems Programming	3	CS 4352, Operating Systems	3
EE 5000-Level Elective	3	CS 3383, Theory of Automata	3
Humanities Elective*	3	EE 5000-Level Elective	3
Multicultural Elective†	3	TOTAL	12
TOTAL	12-15		
SIXTH YEAR			
Fall		Spring	
EE 5000-Level Elective	3	EE 5000-Level Elective	3
EE 5000-Level Elective	3	EE 5000-Level Elective	3
EE 5120, Graduate Seminar	1	EE 5120, Graduate Seminar	1
EE 6000, Master's Thesis	6	EE 6000, Master's Thesis	3
TOTAL	13	TOTAL	10

* Choose from Core Curriculum list.

† Requirement can be met in combination with Humanities, Individual or Group Behavior, or Visual and Performing Arts.

General solutions for Maxwell's equations. Traveling waves in scalar media. Boundary conditions and constraints imposed by bounding surfaces.

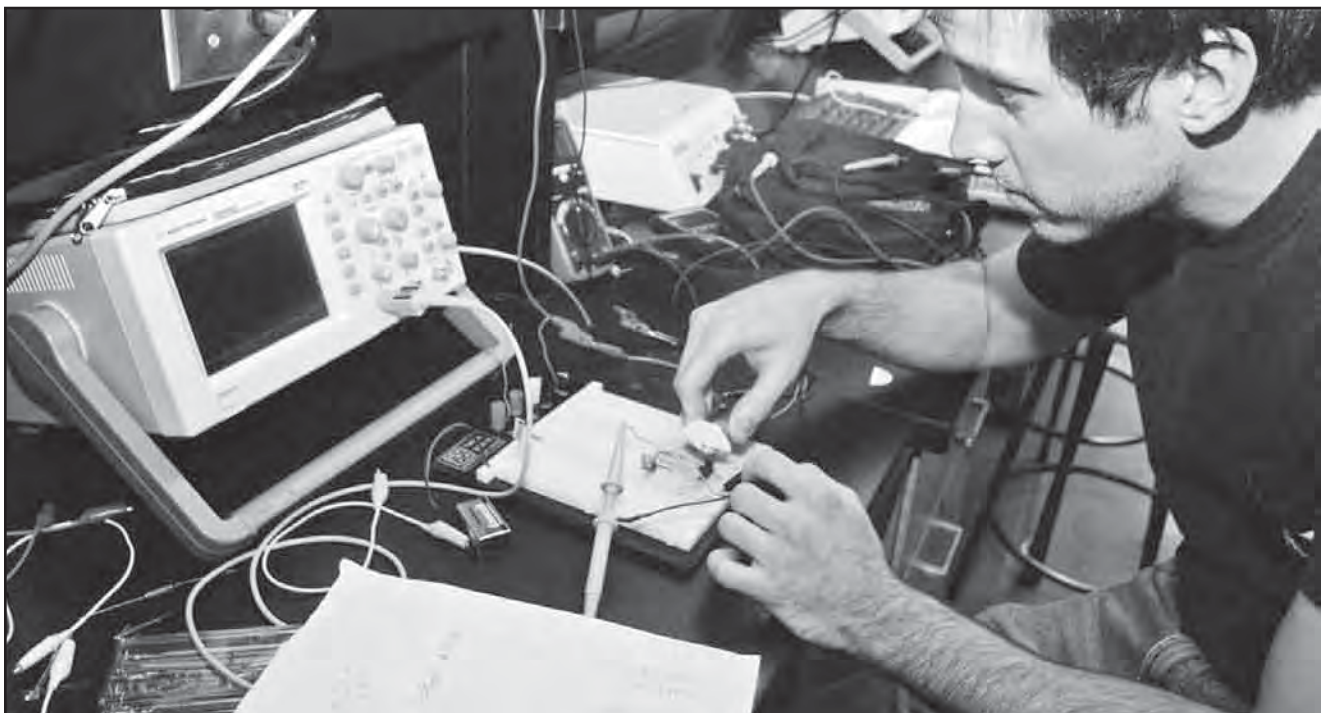
- 3353. Feedback Control Systems (3:3:0).** Prerequisite: EE 3312. For majors only or departmental consent. An introduction to the analysis and design of automatic control systems. Control system concepts. Controller design and digital control.
- 3362. Digital Design Using Microcontrollers (3:3:0).** Prerequisite: EE 1305, 2372. Advanced digital systems design. Assembly language programming, interfacing, and applications of microcontrollers.
- 4310. Introduction to VLSI Design (3:3:0).** Prerequisite: EE 3312. 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: EE 3312, 3341. 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: EE 3312, 3323, 3353. 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: EE 3312, 3323, 3353. 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: EE 3312, 3323. For majors only or departmental consent. Analysis and design techniques for modern communication circuits.

- 4324. Computer-Aided Circuit Analysis (3:3:0).** Prerequisite: EE 3312 and 3323. 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: EE 3323. 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. Individual Studies in Electrical Engineering (3).** Prerequisite: Prerequisite: Instructor approval. For majors only. Individual study involving a rigorous theoretical investigation of some aspect of an electrical engineering problem of current interest. Formal written and oral reports are required. May not be repeated for credit.
- 4333. Project Laboratory IV (3:0:9).** Prerequisite: EE 3333. 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: EE 3333. 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: EE 3312. 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: EE 3341. 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: EE 3342. 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: EE 3342. 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: EE 3342. 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: EE 3312, 3323. 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: EE 3323. 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: EE 3323, 3342. 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: EE 3323. 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: EE 3323. 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: EE 3353. 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. Microprocessor Architecture (3:3:0).** Prerequisite: EE 3362. 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 2401, MATH 3350. 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: EE 3312, 3362. 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: EE 3311, 3303. 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: EE 4385. For majors only or departmental consent. Application of micro-fabrication to create microsensor systems. Integration of optics, optoelectronics, and microfluids. Includes other MEMS projects.
- 4391. Electric Machines and Drives (3:3:0).** Prerequisite: EE 3341. 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.
- 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. Low Power VLSI (3:3:0).** Advanced and low power CMOS processes and devices, modeling and simulation, low power design, power management, systems-on-a-chip integration issues.
- 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.
- 5331. Individual Studies in Engineering Applications (3:3:0).** Prerequisite: Graduate standing in engineering and consent of instructor. An individual study course involving a rigorous theoretical investigation of some aspect of an engineering problem of current interest. A formal report is required. May be repeated for credit.
- 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.
- 5350. Introduction to Medical Instrumentation (3:3:0).** Biomedical instrumentation, transducers, signals, circuits and filters, utilization of biopotential techniques in respiration, cardiac, and audiology.

5351. **Biomedical Signal Processing (3:3:0).** An overview of conventional and modern signal processing techniques and their applications taught in the context of biomedical signals and signal models.
5352. **Medical Imaging (3:3:0).** Medical imaging techniques including radiography and ionizing radiation, computer aided tomography, PET, MRI, and image reconstruction and processing techniques.
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.
5355. **Genomic Signal Processing and Control (3:3:0).** An introduction to genomics with techniques from signal processing and control. Intergene relationships, classification of disease, genetic regulatory networks, and dynamic behavior.
5356. **Biosensors and Bioelectronics (3:3:0).** Biosensors and semiconductor devices, cells, and other biomaterials. Bio-Micro-Electro-Mechanical Systems (Bio-MEMS) and low-power wearable/implantable medical devices.
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.
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.
5366. **Testing of Digital Systems (3:3:0).** Prerequisite: Consent of instructor. High level test synthesis, fault modeling and diagnosis, design for test, built-in self test, test code generation and applications.
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. **Microprocessor 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: EE 4385 or 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: EE 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).**



Engineering Physics

Richard Gale, Coordinator; Charles W. Myles, Director; Timothy Dallas, Director

Professors: Gale, Holtz, Lichti, Myles, Parameswaram, Rainwater
Associate Professors: Akchurin, Dallas, Gibson, Lamp, Thacker, Vaughn

About the Program

The Whitacre 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 Whitacre 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.

The Bachelor of Science in Engineering Physics degree program with the specialized option in electrical engineering is accredited by the Engineering Accreditation Commission of the ABET, Inc., and will remain accredited by ABET, Inc., 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, 410.347.7700, through September 30, 2010.

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 life-long 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 electrical engineering department and dean's office to specialize. No later than the first semester of the junior year, students must file a degree plan approved by the electrical engineering advisor, the physics advisor, and the dean of the college. Students, in consultation with the physics advisor and the electrical 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. Analysis I	3	PHYS 2401, Principles of Phys. II	4
PHYS 1408, Principles of Phys. I	4	EE 2372, Mod. Dig. Systems Design	3
ENGL 1301, Essentials of Coll. Rhetoric	3	EE 1304, Intro. Electrical & Computer Eng.	3
POLS 1301, American Govt., Org.	3	ENGL 1302, Advanced College Rhetoric	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math. for Engrs. I	3
PHYS 2402, Principles of Phys. III	4	EE 3331, Project Lab. I	3
EE 3302, Fundamentals of Elec. Eng.	3	EE 3303, Linear Systems	3
EE 3362, Digital Design-Microcontrollers	3	Elective (Prob. & Stat.)	3
CHEM 1307, Principles of Chem. I	3	EE 3311, Electronics I	3
CHEM 1107, Principles of Chem. I (Lab)	1	TOTAL	15
TOTAL	17		
THIRD YEAR			
Fall		Spring	
PHYS 3305, Elect & Mag.	3	PHYS 3204, Intermed. Lab.	2
EE 3312, Electronics II	3	PHYS 3306, Elec. and Magnet.	3
EE 3323, Prin. of Comm. Sys.	3	EE 3333, Project Lab. III	3
EE 3332, Proj. Lab. II	3	Elective (Vis. and Perf. Arts)	3
Elective (Engineering)**	3	POLS 2302, American Public Policy*	3
PETR 3308, Engr. Communications	3	Elective (History)	3
TOTAL	18	TOTAL	17
FOURTH YEAR			
Fall		Spring	
PHYS 4307, Intro. Quant. Mechanics	3	PHYS 4304, Mechanics	3
EE 4333, Project Lab IV	3	PHYS 4302, Statist. Therm. Phys.	3
PHYS 4306, Senior Project	3	or PHYS 4309, Solid State Physics	
Elective (Engineering)**	3	EE 4334, Project Lab. V	3
Elective (History)	3	Elective (Indiv. and Group Behav.)	3
TOTAL	15	Elective (Humanities and Fine Arts)	3
		TOTAL	15

* Any approved political science course may be substituted.

** Non-electrical engineering.

Department of Engineering Technology

William R. Burkett, Ph.D., P.E., Chairperson

Professors: Burkett, Pigott

Associate Professors: Alayyan, Darwish, Ernst, Green

Assistant Professor: Lee, Liang

Instructors: Gray, Helm, Hubbard, Leaverton, Shturman

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 non-traditional learner. (The non-traditional 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. These students often 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 non-traditional 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 life-long 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, manufacturing, 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 a Core Curriculum oral communications course.

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 18-21 hours of selected engineering technology courses. The appropriate engineering technology advisor should be consulted for a list of approved courses.

Transfer Admissions. Students transferring into this department from other institutions must meet the transfer admission requirements of the university. To obtain a degree in engineering technology, transfer students must complete at least 30 credit hours of engineering technology courses from Texas Tech University.

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 EGR 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.

Electrical-Electronics Specialization

FIRST YEAR

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
CHEM 1305, Chem. and Society	3	PHYS 1404, Principles of Physics II	4
CHEM 1105, Gen. Chem. I (Lab.)	1	GTEC 1312, AC/DC Technology	3
PHYS 1403, Principles of Physics I	4	GTEC 1112, AC/DC Lab.	1
POLS 1301, American Govt., Org.	3	EGR 1207, Graphics ACAD	2
TOTAL	17	TOTAL	16

SECOND YEAR

Fall		Spring	
MATH 2350, Calculus III	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	CS 1411, Prog. Lang. in C/C++	4
GTEC 2311, Statics	3	TOTAL	17
TOTAL	17		

THIRD YEAR

Fall		Spring	
MATH 3322, Math. for Engr. Tech. or 3350, Math for Engr. 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.	3	EET 3314, Digital Technology II	3
EET 3316, Power Distribution	1	EET 3114, Digital Tech. II Lab	1
EET 3116, Power Distribution Lab.	3	EET 3324, Linear Des. Appls.	3
EET 3321, Prog. Logic Controller	1	EET 3124, Linear Des. Lab	1
EET 3121, Prog. Logic Cont. Lab.	3	Oral Communications Elective^	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 Analysis	1	EET 4352, Digital Signal Process	3
Humanities Elective*	3	GTEC 4231, Intro. to Project Mgt.	2
Individual or 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.

^ Must be approved by advisor and meet university requirements.



**Curriculum for Mechanical Engineering
Technology Specialization**

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1321, Trigonometry	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, American Gov't. Org.	3
EGR 1206, Engineering Graphics	2	GTEC 1211, Computer Prog.	2
ENGR 2312, Manufacturing Processes	3	TOTAL	15
TOTAL	15		

SECOND YEAR			
Fall		Spring	
MATH 1352, Calculus II	3	GTEC 3311, Strength of Materials	3
PHYS 1404, Gen. Phys. II	4	GTEC 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, American Public Policy	3	MATH 3322, Math. for Engr. Tech.	3
GTEC 2311, Statics	3	TOTAL	15
TOTAL	17		

THIRD YEAR			
Fall		Spring	
MTEC 3441, Materials Tech.	4	GTEC 3412, Fluid Mechanics & 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
Oral Communications Elective*	3	HIST 2301, History of U.S. Since 1877	3
MTEC 4351, Mechanisms of Mach.	3	TOTAL	14
GTEC 4231, Project Mgt.	2		
TOTAL	16		

FOURTH YEAR			
Fall		Spring	
MTEC 4311, AC System Design I	3	MTEC 4353, Mech. Design	3
MTEC 4321, Mech. Tech. Lab	3	GTEC 4322, Cost and Prof. Analysis	3
MTEC 4170, Capstone Design I	1	MTEC 4270, Capstone Design II	2
MTEC Elective	3	Technology & Applied Science 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—125 including internship

* Must be approved by advisor and meet university requirements.

Curriculum for Construction Specialization

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	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
EGR 1207, Engineering Graphics	2	TOTAL	15
TOTAL	15		

SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	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 3322/3350, Higher Math	3
TOTAL	16	TOTAL	16

THIRD YEAR			
Fall		Spring	
POLS 2302, American Public Pol.	3	MATH 2300, Statistical Methods	3
Oral Communications Elective^	3	CTEC 4343, Constr. Safety Health	3
CTEC 3311, Struct. Analysis	3	CTEC 3302, Transportation Tech.	3
CTEC 3313, Found. & Earthwork	3	GTEC 2351, Thermodynamics	3
CTEC 4342, Cost Estimating	3	CTEC 4341, Const. Management	3
CE 3121, Geotech, Engr. Lab	1	CE 2101, Const. Mat'l. Lab	1
TOTAL	16	TOTAL	16

FOURTH YEAR			
Fall		Spring	
CTEC 4312, Steel Structures	3	GTEC 4322, Cost & Prof. Analysis	3
CTEC 4313, Masonry Struc.	3	CTEC 4311, Concrete Structures	3
CTEC 4270 Capstone Design	2	CTEC 4321, Contracts & Specs.	3
ECO 2305, Principles 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.

^ Must be approved by advisor and meet university requirements.

Construction Engineering Technology (CTEC)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 1312. Construction Methods (3:2:3).** Introduction to the construction environment and construction methods, materials, processes, working drawings, and specifications. Field trips to local construction sites and laboratory construction projects are required. Fulfills Core Technology and Applied Science requirement.
- 2301. [ENGR 1307] Surveying and Surveys (3:2:3).** Prerequisite: MATH 1321. Care and use of modern surveying equipment; differential leveling, area calculations; horizontal and vertical curves; effects of observation errors. Fulfills Core Technology and Applied Science requirement.
- 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).** Prerequisites: GTEC 3311 with a C or higher; corequisite: CTEC 3313. 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. 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. 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: Junior or 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)

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.
- 2311. **Linear Electronics (3:3:0).** Prerequisites: PHYS 1404; corequisites EET 2111. Must earn a C or higher. Fundamentals of electronic circuit theory and characteristics of active devices networks.
- 2312. **Optoelectronic Devices (3:3:0).** Prerequisites: EET 2311, 2111, 2314, and 2114; corequisites: EET 2112. Must earn a C or higher. A study of optoelectronic devices, fiber optics, and basic communication systems.
- 2314. **[ENGR 1407] Digital Technology I (3:3:0).** Corequisites :EET 2311 and 2114. 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.
- 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.
- 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.
- 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).** Corequisite: EET 3121. 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)

Engineering Graphics (EGR)**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 projection, selected topics of descriptive geometry, engineering drawing techniques, and computer-aided design and drafting software.

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 (3:3:0).** Corequisites: MATH 1351, PHYS 1404 and GTEC 1211. Principles of electrical and magnetic circuits and their application in the operation of electrical power equipment. Fulfills Core Technology and Applied Science requirement.
- 2151. **Introduction to Thermodynamics Lab (1:0:3).** 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. 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.
- 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 engineer-

ing 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

3342. **Process Automation (3:2:3)**. Prerequisite: ENGR 2312 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. (Writing Intensive)
3441. **Materials Technology (4:3:3)**. Prerequisites: CHEM 1305 or 1307. Must earn a C or better. 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. (Writing Intensive)
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: 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. 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

Patrick E. Patterson, Ph.D., Chairperson

Professors: Beruvides, Kobza, Patterson, J. Smith, M. Smith, Wyrick, Zhang

Associate Professors: de Farias, Matis, Rivero

Assistant Professors: Farris, Simonton, Wang

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.

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.

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 Whitacre 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.

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.

Curriculum for Industrial Engineering

FIRST YEAR			
Fall		Spring	
IE 1305 or ENGR 1315	3	IE 1101, Intro. to IE	1
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
CHEM 1307, Principles of Chem. I	3	EGR 1206, Engr. Graphics	2
CHEM 1107, Principles of Chem. I (Lab.)	1	CHEM 1308, Principles of Chem II	3
Social Science—Humanities*	3	CHEM 1108, Principles of Chem II Lab.	1
TOTAL	16	Social Science Elective*	3
		TOTAL	16
SECOND YEAR			
Fall		Spring	
ENGR 2331, Pro. Comm. for Engr.	3	IE 3301, Engr. Economic Analysis	3
MATH 2350, Calculus III	3	ME 2311, Materials	3
PHYS 1408, Principles of Physics I	4	MATH 3350, Higher Math Engr. I	3
CE 2301, Statics	3	Social Science—Humanities*	3
IE 2301, Engr. Design Prod.	3	PHYS 2401, Principles of Physics II	4
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
IE 3351, Manufacturing Engineering	3	IE 3311, Operations Research I	3
IE 3341, Engineering Statistics	3	IE 3343, Quality Assurance. & Engr. Stat.	3
IE 3361, Work Analysis & Des.	3	IE 3371, Production Control	3
ME 2322, Engineering Thermodynamics I	3	IE 3372, Management Systems Control	3
Soc. Sci.—Humanities*	3	EE 3301, General Elec. Engr.	3
TOTAL	15	Soc. Sci.—Humanities*	3
		TOTAL	18
FOURTH YEAR			
Fall		Spring	
IE 4311, Operations Research II	3	IE 4333, Senior Design Proj.	3
IE 4361, Engr. Des. for People	3	IE Electives†	6
IE Elective†	3	CE 3302, Dynamics,	3
IE 4351, Facilities Planning	3	or CE 3303, or ME 3331	
Engineering Elective^	3	Soc. Sci.—Humanities*	3
TOTAL	15	TOTAL	15

Minimum hours required for graduation—127

* Choose from Core Curriculum requirements.

† IE electives from the following courses: IE 4320, 4331, 4352, 4362, 4363.

^ Engineering elective from the following courses: CE 3302, 3303, 3305, ME 3331, 3370.

Industrial Engineering (IE)

(To interpret course descriptions, see page 13.)

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. Fulfills Core Technology and Applied Science requirement.
- 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)
- 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
- 3311. Operations Research I (3:3:0).** Prerequisite: 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).** Prerequisite: 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: IE 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: ME 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. Fulfills Core Technology and Applied Science requirement.
- 3361. Work Analysis and Design (3:2:3).** Prerequisite: IE 3341. Principles and techniques of work measurement, methods 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: IE 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.
- 4120. Innovation and Intellectual Property (1:1:0).** Prerequisite: Senior standing. Innovation and creativity for engineering design. Protection strategies for intellectual property.
- 4311. Operations Research II (3:3:0).** Prerequisite: IE 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 last long semester before graduation. 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: IE 3311, 3361, 3371. Modern plant layout and materials handling practices, stressing the importance of interrelationships with management planning, product and process engineering, methods engineering, and production control.
- 4352. Manufacturing Engineering II (3:3:0).** Prerequisite: IE 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: IE 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: IE 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. Fulfills Core Technology and Applied Science requirement.
- 5302. Environmental Ergonomics (3:2:3).** 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).** 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).** 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).** 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).** 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: IE 4363 or IE 5306. 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).** 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).** 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: IE 3311 or 5311. 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: IE 5316 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).** 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

Graduate Courses

- 5301. Ergonomics and Design (3:2:3).** Functional anatomy and physiology of the musculoskeletal system and their applications in work design. Introduction to work physiology, kinesiology, and anthropometry and their applications.

- professional interrelationships of engineers and their environment in relation to the modern production organization.
5324. **Advanced Economics of Systems (3:3:0).** Prerequisite: IE 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: IE 3341. 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: IE 3371. 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).** 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: IE 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: IE 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: IE 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).** 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).** Advanced topics in manufacturing materials and processes, including metallic/nonmetallic materials and their fabrication, nanomaterials, powder metallurgy, nontraditional machining, rapid prototyping, and materials' testing.
5352. **Advanced Manufacturing Engineering (3:3:0).** Focuses on advanced topics in the manufacturing systems and technologies, including design for manufacturing, failure mode and effect analysis, concurrent engineering, lean manufacturing, cellular manufacturing, Six Sigma, statistical process control, and emerging nanotechnology.
5355. **Computer-Aided Manufacturing (3:3:0).** 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.
5356. **Biomedical Design and Manufacturing (3:3:0).** Introduction to concepts and issues in biomedical design and manufacturing, including biomaterials and nanomaterials, medical devices, body mechanics, design requirements, manufacturing, quality control, and ethics.
5357. **Manufacturing Facilities Planning and Design (3:3:0).** Theory and application of the location, layout, and design of modern manufacturing facilities, including materials handling practice, manufacturing systems layout, and warehouse operations.
5358. **Nanomanufacturing (3:3:0).** Introduction to principle and application in nanomanufacturing, including self-assembly, nano-molding and embossing, nanotransfer printing, scanning probe lithography, and synthesis of nanostructured materials.
5371. **Bioengineering Systems (3:3:0).** Fundamentals of bioengineering with an emphasis on a systems viewpoint. Use of engineering tools to understand, mimic, and utilize biological processes.
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 13.)

Graduate Courses

5101. **Graduate Seminar of Advanced Manufacturing Systems and Engineering (1:1:0).** Discussion of advanced manufacturing systems and engineering.
5333. **Manufacturing Systems and Engineering Internship (3).** 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).** Thesis research carried out under the supervision of the student's major advisor.



Department of Mechanical Engineering

Jharna Chaudhuri, Ph.D., Chairperson

Professors: Anderson, Barhorst, J. Berg, Chaudhuri, Chyu, Eibeck, Ertas, Hashemi, James, Jankowski, Maxwell, Parameswaran, Rasty
Associate Professors: Desrosiers, Ekwaro-Osire, Idesman, Ma, Oler, Pantoya

Assistant Professors: Bhattacharya, Han, He, Hui, Smirnov, Tate, Yang

Lecturers: C. Berg, Branson, Fanning, Hanson, 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 industries, 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 a GPA of 2.5.

Enrollment in Mechanical Engineering Courses. Enrollment in Introduction to Mechanical Engineering (ME 1315) is open to all students accepted for admission to Texas Tech University. Enrollment in any mechanical engineering course beyond ME 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 ME 1315.

Selecting Elective Courses. The flexibility of the elective courses is designed to allow the student to explore areas outside of the mechanical engineering discipline. The department will accept upper-division courses and their prerequisites for elective credit from other departments in the Whitacre College of Engineering; the Rawls College of Business; and the Departments of Biological Sciences, Chemistry and Biochemistry, Geosciences, Mathematics and Statistics, and Physics without prior approval. Students can request approval in other areas by contacting the advising office.

Selecting a Minor. Students who are interested in obtaining a minor will find that through the application of the electives and dual credit for specific courses, most 18-hour minors can be completed with no more than an additional 3-6 hours beyond the minimum degree requirements. The department encourages minors in the following areas: business, bioengineering, nuclear engineering, petroleum engineering, civil engineering, environmental engineering, computer science, geology, mathematics, and physics. For more detailed information on how to incorporate a minor into the mechanical engineering degree, see the example degree plans on the departmental Web site (www.me.ttu.edu) or contact the department advisor.

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 table. In the final undergraduate semester, two graduate courses will be substituted for the 6 hours of department 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 Whitacre College of Engineering Co-op program. This normally involves three work assignments in industry for a cumulative duration of one year. These work assignments are normally completed prior to the start of the senior year. Each co-op experience earns 1 credit hour and, together, the three co-op experiences may be used to satisfy a 3-credit hour elective requirement. 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 used toward the mechanical engineering degree. The department rigorously enforces prerequisite requirements for all courses.

Curriculum for Mechanical Engineering

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
CHEM 1307, Principles of Chem. I	3	PHYS 1408, Principles of Physics I	4
CHEM 1107, Principles of Chem. I (Lab.)	1	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	EGR 1206, Engr. Graphics	2
ME 1315, Intro to Mech. Eng.	3	Elective (History)*	3
HIST 2300, History of U.S. to 1877	3	TOTAL	15
TOTAL	16		
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Higher Math. Engr. I	3
PHYS 2401, Principles of Physics II	4	ME 2322, Engr. Thermo. I	3
EE 3301, General EE	3	ME 2364, Engr. Mechanics I	3
ME 2311, Materials Science	3	ME 2315, Computer Aided Analysis	3
POLS 1301, American Govt., Org.	3	Elective (Political Science)*	3
TOTAL	16	Elective (Oral Communication)*	3
			18
THIRD YEAR			
Fall		Spring	
ME 3464, Engr. Mechanics II	4	MATH 3342, Math Stats for Engineers	3
ME 3165, Compu. Fluid Dyn (Lab)	1	ME 3333, Dyn. Systems & Vibrations	3
ME 3322, Engr Thermodynamics II	3	Dept. Elective**	3
ME 3331, Dynamics	3	ME 3365, Intro. to Design	3
ME 3370, Fluid Mechanics	3	ME 3164, Finite Analysis (Lab.)	1
ME 3328, Materials & Mech. (Lab.)	2	ME 3371, Heat Transfer	3
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
ME 4334, Cont. Dynamic Sys.	3	ME 4371, Engr. Design II	3
ME 4234, Systems & Controls (Lab)	2	Elective (Math or Science)**	3
ME 4370, Engr. Design I	3	IE 3301, Engr. Economic Analysis	3
ME 3251, Thermal Fluid Sys (Lab)	2	Elective (Visual/Performing Arts)*	3
Elective (Humanities)*	3	Elective (Multicultural) †	3
Department Elective**	3	Department Elective**	(3)
TOTAL	16	TOTAL	15

All students must satisfy the university foreign language requirement with two years of foreign language credit from high school OR two semesters of college credit.

* 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

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.

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. Students are required to take ME 5120 in their first full-time graduate semester. For the rest of their program, students are required to attend a number of seminars. The seminar course does not count toward fulfilling credit hour requirements. Departmental guidelines for coursework, advisory committee, seminar course, technical papers, and the final evaluation can be obtained from the department's graduate advisor.

Admission. 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.

Master's Program

Three general plans of study are available for the master's degree: (1) the thesis option consisting of 24 hours of graduate coursework and 6 hours of credit for the master's thesis; (2) the nonthesis report option consisting of 33 hours of graduate coursework and 3 hours of credit for the master's report; and (3) the nonthesis coursework only option consisting of 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.

Doctoral Program

In addition to regulations established by the Graduate School for the Doctor of Philosophy degree, students are required to demonstrate high proficiency in a single research area through a record of accomplishments. As part of this record, students should have at least one technical paper submitted to an archival journal relevant to their field of expertise prior to the defense of their thesis.

The individual faculty advisors reserve the right regarding journal publication requirement beyond one paper submitted.

Mechanical Engineering (ME)

To interpret course descriptions, see page 13.)

Undergraduate Courses

- 1315. Introduction to Mechanical Engineering (3:2:2).** Prerequisite: MATH 1351 (may be taken concurrently). 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. Fulfills Core Technology and Applied Science requirement.
- 2311. Materials Science (3:3:0).** Prerequisite: CHEM 1307, 1107, and MATH 1352. Fundamental thermodynamic and chemical nature of the structure and properties of materials.

- 2315. Computer-Aided Analysis (3:2:2).** Prerequisite: ME 1315, PHYS 1408, MATH 1352. Introduces numerical methods used in solution of typical engineering problems. Includes design activity.
- 2322. Engineering Thermodynamics I (3:3:0).** Prerequisite: PHYS 1408, MATH 1352. Properties of pure substances, ideal gas behavior, first and second law analysis, and applications to energy conversion and power cycles. Fulfills Core Technology and Applied Science requirement.
- 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. Finite Element Analysis (FEA) (1:0:2).** Prerequisite: ME 3464 (may be taken concurrently). Introduces students to the use of finite element analysis software to perform load and stress analyses on mechanical components.
- 3165. Computational Fluid Dynamics (1:0:2).** Prerequisite: ME 3370 (may be taken concurrently). Introduces students to computer-based analysis and design of fluid/thermal systems.
- 3228. Materials and Mechanics Laboratory (2:1:1).** Prerequisites: ME 2364 and 2311. Evaluating and reporting the characteristics of materials and mechanical systems. (Writing Intensive)
- 3251. Thermal-Fluid Systems Laboratory (2:1:1).** Prerequisites: ME 3370, 3322, 3371 (may be taken concurrently). Measurements, testing, performance evaluation, and documentation of thermal-fluid systems. (Writing Intensive)
- 3322. Engineering Thermodynamics II (3:3:0).** Prerequisite: ME 2322. Principles of thermodynamics for general systems, cycle analysis, availability and irreversibility, thermodynamics of state, thermodynamics of nonreacting and reacting mixtures. Includes design activity.
- 3331. Dynamics (3:3:0).** Prerequisite: MATH 2350 and ME 2364. Kinematics and kinetics of particles and rigid bodies. (Writing Intensive)
- 3333. Dynamic Systems and Vibrations (3:3:0).** Prerequisites: MATH 3350, ME 2315, 3331. Modeling and analysis of dynamic systems, equilibrium, stability and linear systems theory, introduction to mechanical vibrations.
- 3365. Introduction to Design (3:3:0).** Prerequisite: ME 3464. Analysis, design, and evaluation of mechanical elements.
- 3370. Fluid Mechanics (3:3:0).** Prerequisite: ME 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: ME 2315 and 3370. Introduction to heat transfer by the mechanisms of conduction, convection, and radiation. Includes design activity.
- 3464. Engineering Mechanics II (4:4:0).** Prerequisite: ME 2364. Analysis of structures to determine stresses, strains, and deformations using classical and finite element methods.
- 4000. Special Topics in Mechanical Engineering (VI-6).** Prerequisite: Departmental approval. Individual studies of special topics in mechanical engineering. May be repeated for credit.
- 4234. Control of Dynamic Systems Laboratory (2:1:1).** Prerequisite: ME 4334. Hands-on experience in the modeling and control of dynamic systems.
- 4330. Advanced Topics in Mechanical Engineering (3:3:0).** Prerequisite: Departmental approval. Advanced topics in mechanical engineering. May be repeated for credit. Approved ME elective.
- 4331. Individual Study in Mechanical Engineering (3).** Prerequisite: departmental approval. Individual study in advanced mechanical engineering areas. Approved ME elective. May be repeated for credit.
- 4334. Control of Dynamic Systems (3:3:0).** Prerequisite: ME 3333. Corequisite: ME 4234. Introduction to analysis and design of control systems, including applications to electromechanical systems.
- 4335. Robot and Machine Dynamics (3:3:0).** Prerequisite: ME 4334 (may be taken concurrently). 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 ME elective. (ME 5317)
- 4338. Polymeric Composite Materials (3:3:0).** Prerequisites: ME 2311, MATH 3350. Introduction to design of structures made of composite materials, including materials selection, fabrication, materials behavior, and structural analysis. Approved ME elective.
- 4342. Failure Analysis/Forensic Engineering (3:3:0).** Prerequisite: ME 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. Approved ME elective.
- 4345. Probabilistic Mechanical Design (3:3:0).** Prerequisite: ME 3365. Application of probabilistic approaches in mechanical design. Techniques for the quantification of uncertainty and risk inherent in mechanical systems. Mechanical reliability methods. Approved ME or design elective.
- 4354. Sustainable Transportation Design (3:3:0).** Prerequisite: ME 3371. Application of engineering processes to design creative, innovative, and economically viable fuels, powertrains, vehicles, and transportation systems that promise to significantly reduce the use of fossil fuels and the production of greenhouse gasses. Approved ME elective.
- 4356. Aerodynamics (3:3:0).** Prerequisite: ME 3370. An introduction to aerodynamics, including wing and airfoil theory, aircraft performance, and aircraft stability and control. Approved ME elective.
- 4358. Combustion (3:3:0).** Prerequisite: ME 3322 and 3371. Introduction to combustion kinetics; the theory of premixed flames and diffusion flames; turbulent combustion; dynamics of detonations and deflagrations. Approved ME elective.
- 4360. Sustainable Energy (3:3:0).** Prerequisite: ME 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: ME 2311, 3331, 3365, 3371 (may be taken concurrently). 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: ME 4370. Design projects characteristic of mechanical engineering, including consideration of cost, design optimization, codes and standards, and ethics. (Writing Intensive)
- 4375. HVAC System Design (3:3:0).** Prerequisite: ME 3322 and 3371. The determination of loads and the design of heating, ventilating, and air conditioning systems. Approved ME 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 ME elective.
- 4386. Introduction to Microsystems II (3:3:0).** Prerequisite: ME 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 ME elective.
- 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 ME 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 ME 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: ME 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: ME 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: ME 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: ME 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. (ME 4335)
5321. **Thermodynamics (3:3:0)**. Prerequisite: ME 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: ME 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: ME 3371. Liquid-vapor two-phase flow hydrodynamics, boiling and condensation heat transfer, mechanisms and prediction methods.
5325. **Convection Heat Transfer (3:3:0)**. Prerequisite: ME 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: ME 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: ME 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: ME 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: ME 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: ME 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: ME 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: ME 5340. Engineering aspects of failure. Failure mechanisms and related environmental factors. Principles of fracture mechanics and fractography. Techniques for failure analysis and prevention.
5344. **Introduction to High Pressure Science and Technology (3:3:0)**. Prerequisite: ME 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 ME 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 ME 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: ME 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: ME 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: ME 5347 and/or consent of instructor. Large strains and rotations, stress and strain measures, large strain elasticity, plasticity, twinning, crystallography, and phase transformations. Nonlinear continuum thermodynamics, constitutive equations. Experimental regularities.
5350. **Mechanics of Composite Material (3:3:0)**. Prerequisite: ME 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: ME 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: ME 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: ME 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)**.

Bob L. Herd Department of Petroleum Engineering

Lloyd R. Heinze, Ph.D., Chairperson

Roy S. Butler Professor: Heinze

Associate Professors: House, Menouar, Ziaja

Assistant Professors: Awal, Siddiqui

Instructors: Giussani, Taylor, Watson

About the Program

This department supervises the following degree programs and certificate:

- Bachelor of Science in Petroleum Engineering
- Master of Science in Petroleum Engineering
- Doctor of Philosophy in Petroleum Engineering
- Graduate Certificate in Petroleum Engineering

Mission. The mission of the Bob L. Herd Department of Petroleum Engineering 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 Whitacre 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 1,900 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 15 years. Approximately 50 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 eight 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 610, a minimum score of 28 on the mathematics ACT, or take mathematics courses at a junior or community college to be prepared to take calculus classes at Texas Tech.

All students in the department are expected to have access to a personal computer. Many instructors require students to transfer homework via email. Some instructors transfer information to students using the Internet. The department recommends that students acquire a personal laptop computer to facilitate coursework. Students should check with the department for hardware and software recommendations.

Curriculum. Petroleum engineering applies the curriculum management of the Whitacre College of Engineering.

Minors. Along with the Bachelor of Science in Petroleum Engineering degree, students may declare a minor (18 hours in a subject) in a field of their choice. Any required or elective courses in petroleum engineering may be applied toward the minor with the approval of the minor department (and department advisor). While declaration of a minor is not required, it is strongly recommended. Suggested minors are, but not limited to, mechanical engineering, geosciences, mathematics, or energy commerce. These minors can be earned with some additional hours.

A minor in petroleum engineering consists of 18 or more hours in petroleum engineering courses, including PETR 1305, 2302, 2302; GEOL 1303; and two junior- or higher-level PETR courses (with the exception of PETR 3308). Prerequisites and corequisites for all of the courses will be enforced.

Freshman Admissions. For admission into the Bob L. Herd Department of Petroleum Engineering, freshmen and entering transfer students (with less than 12 hours of transferable college work) must meet published assured admission standards. Students who are interested in declaring petroleum engineering as their major but do not meet assured admission requirements will enter the major of engineering undeclared and remain as such until the student meets the transfer admission requirements.

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), PHYS 1408, and English I and II (ENGL 1301 and 1302) with a GPA of 2.5 or higher. This GPA criteria will change to 3.0 in the 2011-2012 catalog year.

Petroleum Engineering (PETR)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 1101. Introduction to Petroleum Engineering (1:1:0).** Prerequisite: PETR major or department approval. 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).** Corequisites: MATH 1351 and PETR 1101. 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. Fulfills Core Technology and Applied Science requirement.
- 2301. Petroleum Development Methods (3:3:0).** Prerequisites: MATH 1352, PETR 1305, and PHYS 1408 with a C or higher; PETR major or department approval. Introduction to petroleum engineering, rotary drilling, and well completion practices,

Curriculum for Petroleum Engineering

FIRST YEAR			
Fall		Spring	
CHEM 1107, Principles of Chem. Lab I	1	ENGL 1302, Adv. College Rhetoric	3
CHEM 1307, Principles 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, Principles of Physics I	4
Elective - Core Curriculum*	3	Elective - Core Curriculum*	3
MATH 1351, Calculus I	3	TOTAL	16
PETR 1101, Intro. to Petr. Engr.	1		
TOTAL	17		
SECOND YEAR			
Fall		Spring	
CE 2301 / ME 2364, Statics	3	CE 3305 / ME 3370, Fluids	3
Elective - Oral Communications*	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, Principles of Physics II	4	ME 2322 / ChE Thermodynamics	3
TOTAL	16	PETR 2301, Petr. Development Methods	3
		TOTAL	16
THIRD YEAR			
Fall		Spring	
CE 3302 / ME 3331, Dynamics	3	CE 3303 / ME 3464, Solids	3
GEOL 3302, Structural Geology	3	GEOL 4324, Hydrocarbons	3
MATH 3342, Statistics for Engineers	3	IE 3301, Engr. Economic Analysis	3
PETR 3308, Engr. Communications	4	PETR 3304, Formation Evaluation	3
PETR 3402, Reservoir Rock Properties	3	PETR 3306, Reservoir Engineering	3
TOTAL	16	ENGR 4392, ** Engr. Ethics and Impact	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 Elective - Special Studies	
Elective - Core Curriculum*	3	(4000 or 4331)	3
PETR 4121 / ENGR 4100 PE Seminar	1	Elective - Core Curriculum*	3
TOTAL	18	TOTAL	15

Minimum hours required for graduation - 132

One year (two semesters) of a single foreign language required if student did not successfully complete 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 oral communication, and 3 hours of visual and performing arts (F). Students should consult the Core Curriculum requirements prior to registration for courses.

** ENGR 4392 fulfills the Core Curriculum humanities elective requirement.

including casing, cementing, perforating, and workovers. Discussion of equipment design and use.

- 2302. Reservoir Fluid Properties (3:3:0).** Prerequisites: MATH 1351 and CHEM 1307 with a C or higher; department approval. 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).** Prerequisites: PHYS 2401, MATH 2350, and PETR 3402 with a C or higher; department approval; 2.50 GPA; corequisite PETR 3306. 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).** Prerequisites: PETR 2302, PETR 3402, PHYS 2401, and MATH 2350 with a C or higher; department approval; 2.50 GPA. Corequisite: PETR 3304. Understanding the fundamentals of fluid flow through porous media, reservoir types and recovery mechanisms. Estimation of hydrocarbon in place for oil and gas reservoirs. Application of material balance calculations for various reservoir types and applications of fluid flow through porous media in predicting production performance.
- 3308. Engineering Communications (3:3:0).** Prerequisites: ENGL 1301, 1302, junior or senior standing, department approval. 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).** Prerequisites: ENGL 1302, PETR 2302, MATH 1352, CE 3305 or ME 3370, and PHYS 1408

Graduate Program / Petroleum Engineering

The department is staffed with industry-experienced faculty members who have an average of more than 20 years of experience per person. 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 of the Texas Tech campus. This proximity provides the student with unique opportunities for directly interfacing with industry as well as for first-hand observations of oil field operations. The department has been consistently ranked in the top 10 petroleum engineering departments nationwide 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. Access to a laptop is required.

All petroleum-engineering courses can be taken for credit. A grade of B or better must be obtained in all graduate courses. 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 five core areas that denote the teaching and research concentration of the faculty. The master's degree plan of a petroleum engineering student should include at least one course from each of the five core areas; the doctoral degree plan should include at least two courses in each core area.

Drilling Engineering—PETR 5000, 5302, 5303, 5315, 5317.

Production Engineering—PETR 5000, 5306, 5314, 5316, 5318, 5319.

Reservoir Engineering—PETR 5000, 5307, 5311, 5320, 5321, 5323, 5325, 5326.

Formation Evaluation—PETR 5000, 5304, 5305, 5308, 5324, 5328, 5329.

Computational—PETR 5309, 5310, 5312, 5313, 5322, 5327.

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 graduate program.

Master's Program

Master's With Thesis. The master's program requires a minimum of 33 graduate credit hours above the baccalaureate degree, including 6 credit hours allowed for the thesis. The department graduate advisor will meet, advise, and approve courses for the degree each semester. 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.

Master's Without 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.

Combined 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 combined 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. Students must meet all Graduate School admission requirements (www.depts.ttu.edu/gradschool).

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.

Graduate Certificate Program

The department offers a Graduate Certificate in Petroleum Engineering that is intended to supplement a course of study for the student who possesses an engineering degree other than petroleum engineering. The successful student will complete 18 hours as determined by the program and must complete with a B or better. The certificate program is intended to provide the above-average student with basic education in petroleum engineering.

with a C or higher; 2.50 GPA; department approval. Understanding the basic properties of reservoir rocks and how they relate to the storage and production of oil and gas. Important concepts such as heterogeneity, capillary pressure, relative permeability, resistivity are included as part of the course. The course is complemented by relevant lab experiments where the students get hands on experience on measuring some of the single and multiphase flow properties of reservoir rocks. (Writing Intensive)

- 4000. Special Studies in Petroleum Engineering (V1-6).** Prerequisite: Department and instructor approval. Individual studies in petroleum engineering areas of special interest. Can be used for practical curriculum training, but petroleum engineering majors may not use it as a substitute for PETR 4331, PETR elective. May not be substituted for PETR 4331. May be repeated for credit.
- 4121. Petroleum Engineering Seminar (1).** Prerequisites: PETR 3308, CE 2301 or ME 2364, CE 3302 or ME 3331, CE 3303 or ME 3464, CE 3305, ME 2322, IE 3301, and CHEM 1307/1107 with a C or higher; senior standing; 2.50 GPA; department approval. Study of engineering problems of special interest and value to the student.
- 4300. Petroleum Property Evaluation and Management (3:2:3).** Prerequisites: PETR 3304, 3306, 3308, IE 3301, GEOL 3302, 4324, MATH 3342, and 3350 with a C or higher; 2.50 GPA; department approval. Corequisites: 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).** Prerequisites: PHYS 2401, MATH 2350 and CE 3302 or ME 3331 and CE 3305 or ME 3370 and PETR 3304, 3306, and 3402 with a C or higher; 2.50 GPA; departmental approval. Corequisites: PETR 4306, 4405, and 4407. Natural flow analysis—reservoir performance (Inflow Performance Ratio), wellbore performance (Tubing Performance Ratio), surface flowline performance (Flow Performance Ratio). Artificial Lift Methods. Wellbore Stimulation—Acidizing, Hydraulic fracturing. (Design Course)
- 4306. Enhanced Oil Recovery Processes (3:3:0).** Prerequisite: PETR 3306 with a C or higher; 2.50 GPA, departmental approval. Corequisites: PETR 4303, 4405, and 4407. 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).** Prerequisites: PETR 3304 and 3306, MATH 3342 and 3350, and PHYS 2401 with a C or higher; 2.50 GPA, departmental approval. Corequisites: PETR 4300 and 4309. 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).** Prerequisites: PETR 3304, 3306, 3308 and 4407, IE 3301, MATH 3342 and 3350, ME 2322, CE 3302 or ME 3331, and CE 3303 or ME 3464, and CE 3305 or ME 3370 with a C or higher; 2.50 GPA; senior standing; departmental approval. Corequisites: PETR 4300 and 4308. Casing and Tubing string design. Special downhole equipment. Wellhead and Choke. Production testing. Production logging and Wellbore diagnostics. Surface facilities—separators, treaters, desalting, storage tanks, gas and oil metering. Well maintenance. (Design Course)
- 4331. Special Problems in Petroleum Engineering (3).** Prerequisite: Consent of department. Individual studies in advanced engineering areas of special interests. May be repeated for credit.
- 4405. Natural Gas Engineering (4:3:3).** Prerequisite: PETR 3306, ME 2322, PHYS 2401, MATH 3342, and 3350 with a C or higher; 2.50 GPA; department approval. Corequisite: PETR 4303, 4306, and 4407. The production of natural gas and condensate reservoirs; processing, transportation, distribution, and measurement of natural gas and its derivatives. (Design course)
- 4407. Drilling Engineering (4:3:1).** Prerequisites: PETR 2301, 3308, 3402, CE 3305 or ME 3370, PHYS 2401, MATH 3342, 3350, GEOL 3302, IE 3301; 2.50 GPA. Corequisite: PETR 4303, 4306, and 4405. Rotary drilling systems, drilling fluids 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 (3:3:0).** Prerequisites: 3.50 GPA and department approval. Study of topics of current interest under the guidance of instructional faculty. May be repeated for credit on different topics or areas of interest.
- 5121. Graduate Seminar (1:1:0).** Prerequisites: 3.0 GPA, department approval. 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).** Prerequisites: 3.50 GPA, permission of instructor, department approval. 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).** Prerequisites: 3.50 GPA, permission of instructor, department approval. 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).** Prerequisites: 3.50 GPA, PETR 4407 or consent of instructor, department approval. 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).** Prerequisites: 3.50 GPA, PETR 3304 or consent of instructor, department approval. Methods of analyzing various types of well logs to obtain quantitative hydrocarbon reservoir parameters.
- 5305. Advanced Formation Evaluation (3:3:0).** Prerequisites: 3.50 GPA, PETR 3304 or consent of instructor, department approval. 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).** Prerequisites: 3.50 GPA, permission of instructor, department approval. 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).** Prerequisites: 3.50 GPA, consent of instructor, department approval. 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).** Prerequisites: MATH 3350, PER 4308, or consent of instructor; 3.50 GPA; department approval. Theory of transient fluid flow in petroleum reservoirs and applications of methods to interpret transient pressure behavior.
- 5309. Hydrocarbon Reservoir Simulation (3:3:0).** Prerequisites: MATH 3350 or consent of instructor, 3.50 GPA, department approval. 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, 3.50 GPA, and consent of department. Treatment of advanced concepts of reservoir simulation for multidimensional, multiphase flow in hydrocarbon reservoirs.
- 5311. Thermal Oil Recovery (3:3:0).** Prerequisites: 3.50 GPA, consent of instructor, department approval. 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).** Prerequisites: 3.50 GPA, consent of instructor, department approval. 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).** Prerequisites: 3.50 GPA, consent of instructor, department approval. 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).** Prerequisites: 3.50 GPA, consent of instructor, department approval. 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).** Prerequisites: PETR 4303, 4407, 3.50 GPA, and consent of department. 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)**. Prerequisites: PETR 4303, 3.50 GPA, and consent of department. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. Casing string plan; Tubing String plan. Inflow-tubing-and Flowline performance Relationships. Skin calculations for gravel pack, perforation completion, and formation damage. Nodal analysis of well flow. Acid stimulation-matrix, wormhole, cavity and fractured. Borehole extension by hydraulic fracturing, abrasive/jet perforation with CT-unit, fish-bone type multilateral drain holes.
5318. **Gas Production Engineering (3:3:0)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. Introduction to CFD software (simulator), OLGATM. Multi-phase flow vertical, inclined, horizontal conduits. Transient multiphase pipeline flow analysis. Comparison of CFD-steady-state flow and Empirical correlations for vertical and horizontal flows. Multiphase flow metering. Slug flow analysis in pipeline. Concept of flow assurance.
5320. **Advanced Reservoir Engineering (3:3:0)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. Frontal advanced theory for multiphase flow, immiscible flow, capillary cross flow, psuedo-functions, streamlines, measures of heterogeneity, field case studies, pattern flooding, and use of black oil reservoir simulators.
5326. **Miscible Flooding Techniques (3:3:0)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. Use of open-hole logs, survey of induction and lateral log suites to determine reserves. (Leveling program course)
5383. **Reservoir Engineering Fundamentals (3:3:0)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. Reservoir performance predictions, computation of in place gas, condensate and oil reservoirs, applications of ME for reservoir mechanisms, decline curves, EOR methods, fluid flow in porous media. (Leveling program course)
5384. **Basic Fluids and Rock Properties (3:3:0)**. Prerequisites: 3.50 GPA, consent of instructor, department approval. 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 (V1-6)**.
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

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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, Maqusi, Purinton, San Francisco

Associate Professors: Brink, McGinley, Tomlinson, Wilhelm

Assistant Professors: Bradatan, Caswell, Leslie

About the College

Texas Tech University offers special programs for highly motivated and academically talented students who want to maximize their college education. The Honors College combines the personal attention and challenging instruction of a small liberal arts college with the diversity of course offerings, extra-curricular activities, and intellectual opportunities of a major research university. Honors courses are small, student-centered, and discussion-oriented. Honors seminar classes are interdisciplinary and often examine connections among related areas of study. Honors courses provide a learning experience that complements and expands on any academic major or career path. The goal is for students to see relationships among different areas of study, develop critical thinking abilities, obtain research experience, learn a foreign language, gain international exposure, and obtain communication skills that will

allow them to become informed and independent thinkers and successful practitioners in whatever career path they choose.

With the exception of students who enroll in one of the two Honors majors, students accepted into the Honors College are also enrolled concurrently in the college that houses their major area of study. Enrollment in the Honors College provides a number of benefits for students. It allows them to meet and interact with other highly motivated students and offers special benefits such as early registration, housing in an Honors residence hall (on a first-come, first-served basis), extended library privileges, opportunities to expand their intellectual awareness (e.g., a weekly current events forum and a book club), and formal and informal contact with Honors College faculty members. The college also schedules a variety of special events such as speakers, recreational activities, and cultural performances. The Honors College is able to award a small number of scholarships for high achieving students as well as those qualifying on a needs basis. Partial funding also is available to support study abroad and undergraduate research.

Honors students are encouraged to engage in the greatest possible range of educational experiences during their time in the university, including: (1) the Honors Undergraduate Research program, which enables and compensates students to take part in undergraduate research with faculty in many disciplines and prepares them for more advanced work at the graduate level; (2) international study, which enhances marketability and fosters personal growth and acquisition of cultural knowledge and language skills; and (3) personalized academic advisement.

Honors students who complete at least 24 hours of Honors credit (including two Honors seminars) graduate "In Honors Studies," a distinction that is noted on transcripts and diplomas and receives special recognition in the graduation program. 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, and/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, ACT, or 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 GPA of 3.4 or better. The college also will consider admitting students who do not meet the above criteria but 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 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 and with an interdisciplinary focus.

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 does 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 standards 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.

Bachelor of Arts Degree in Honors 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 expected 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 Bell, 206 McClellan Hall, gary.bell@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 distinctive 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, documentary filmmaking, 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. 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. Marjean Purinton, 107 McClellan Hall, marjean.purinton@ttu.edu, 806.742.1828.

Honors Studies (HONS)

Undergraduate Courses

- 1101. Honors Arts and Letters Seminar I (1:1:0).** Required for all Honors Arts and Letters majors. This course integrates content from English, history, and political science required core courses.
- 1102. Honors Arts and Letters Seminar II (1:1:0).** Required for all Honors Arts and Letters majors. 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. Fulfills Core Humanities requirement. (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. Fulfills Core Technology and Applied Science requirement. (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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (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. Fulfills Core Visual and Performing Arts requirement. (Writing Intensive)
- 2301. Honors Experience in Fine Arts I (3:3:0).** Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. 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. European Fine Arts (3:3:0).** Hands-on survey of European fine arts, including visual arts, architecture, music, theatre, and dance. Fulfills Core Visual and Performing Arts requirement. (Writing Intensive)
- 2311. Seminar in International Affairs (3:3:0).** Humanistic approach to study of international concerns such as migration, trade, environment, population change, economic development, religion, and diplomacy with special reference to cultural values. Fulfills Core Humanities requirement.
- 2314. Honors Seminar in International Cinema (3:3:0).** Analysis of foreign and ethnic cinema as an expression of human values and creativity viewed through the lens of a distinctive culture or cultures. Fulfills Core Visual and Performing Arts requirement.
- 2405. Honors Integrated Science I (4:3:2).** Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An integrated science course introducing students, in an interdisciplinary way, to physics and chemistry. Fulfills Core Natural Sciences requirement. Not open to science majors. Part of a two-semester integrated presentation. (Writing Intensive)
- 2406. Honors Integrated Science II (4:3:2).** Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An integrated science course introducing students in an interdisciplinary way to biology and geosciences. Fulfills Core Natural Sciences requirement. Not open to science majors. Part of a two-semester integrated presentation. (Writing Intensive)
- 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. (Writing Intensive)
- 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. Fulfills Core 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 life today, directed toward cultivating sound individual judgments in a technological society. Fulfills Core 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. Fulfills Core Social and Behavioral Sciences – 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. Fulfills Core 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. (Writing Intensive)

Humanities (HUM)

Undergraduate Courses

- 2301 [HUMA 1301]. The Western Intellectual Tradition I (3:3:0).** An exploration of Western intellectual development in literature, philosophy, and the arts from the Greek and Roman Eras to the Renaissance. Fulfills Core Humanities requirement. (Writing Intensive)
- 2302 [HUMA 1302]. The Western Intellectual Tradition II (3:3:0).** The exploration of Western intellectual development in literature, philosophy, and the arts from the Renaissance to the present. Fulfills Core Humanities requirement (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.) (Writing Intensive)

Natural History and Humanities (NHH)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 1301. The Natural History Tradition (3:3:0).** An introduction to the field of nature writing. Field trip required. Fulfills Core Humanities requirement. Special field trip fee. (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. Fulfills Core Technology and Applied Science requirement.
- 2302. The Literature of Place (3:3:0).** An introduction to the literature of place through a series of writing and reading workshops. (Writing Intensive)
- 3300. Research Methods: Writing the Natural World (3).** Writing for publication. A writing workshop in creative nonfiction focused on the relationship between people and nature. Field trips required. (Writing Intensive)
- 3305. Ecology (3:3:0).** An introduction to the ecology of individuals, populations, and ecosystems. Special field trip fee. (Writing Intensive)
- 3306. Course Readings in Natural History (3:3:0).** An exploration of contemporary writers whose focus is primarily the relationship of people with nature. (Writing Intensive)
- 3350. Advanced Fieldcraft: Nature as Text (3).** An advanced exploration of location. Research of literature, culture, and ecology of a region in preparation for immersion in a field experience. Field trip required. Special field trip fee (Writing Intensive).
- 4300. NHH Senior Portfolio (3).** Prerequisite: Proposal Approval. Individual project work under the guidance of a faculty member. (Writing Intensive)
- 4350. Field Methods: The Capstone Experience (3).** Academic study centered around an immersion field experience. Field trip required. Students are expected to be in good physical condition. Special field trip fee. (Writing Intensive)

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 see the Web site www.depts.ttu.edu/hs/advising/ 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 are available on Raiderlink. Students needing additional assistance may visit with an advisor. To make an appointment, call Academic Advising Services at 806.742.1180 or visit HS 159. Office hours are from 8 to 5 p.m. Monday through Friday.

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, an official degree audit will be emailed 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 degree audit will be reviewed prior to the last semester and students will be notified by email of any discrepancies that may prevent graduation. Any change in graduation date must be communicated to the Academic Advising Services office.

Last 30 Hours. The last 30 hours prior to graduation must be taken in residence at Texas Tech. "In residence" is defined as any course taught under a Texas Tech number, including distance education courses and those taught at locations other than the Lubbock campus. All distance education courses must be approved in writing (see Academic Advising Services). Graduating seniors are not allowed to take distance education courses in their last semester.

Credit by Examination. A matriculated student may attempt credit by examination (see Admission to the University catalog section).

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). Full-time status is 12 hours.

Ineligible Registration. The College of Human Sciences reserves the right to drop any ineligibly registered student from a course for reasons such as lower- or 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.

Course Descriptions

Course descriptions for the college's various specializations can be found within the catalog information for each department. Those courses with a HUSC prefix that are common to many disciplines within the college can be reviewed below.

Human Sciences (HUSC)

(To interpret course descriptions, see page 13.)

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: Junior or senior standing. Offers students the opportunity to develop job search strategies, interviewing skills, resume writing, and professional and personal growth after graduation. Offers opportunities to meet and interview with potential employers for entry-level positions.

Graduate Courses

- 5311. **Problems in Human Sciences (3:3:0).** May be repeated for credit.
- 6000. **Master's Thesis (VI-12).**

Graduate Program

The College of Human Sciences offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees.

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 Graduate Degrees."

Master of Science Degree. 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.

Doctoral Degree. The Doctor of Philosophy degree has majors in environmental design, nutritional sciences, family and consumer sciences education, hospitality administration, human development and family studies, personal financial planning, and marriage and family therapy.

Admission. 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.

Distance Education. 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

Sterling Shumway, Ph.D., Chairperson

Professors: Couch, Hampton, S. Harris, Ivey

Associate Professors: Allison, Durband, Finke, Gustafson, K. Harris, Huston, Katz, Kimball, Korb, Morris, Shumway

Assistant Professors: Akay, K. Alexander, Gilliam, Karakurt, Lauderdale, Salter, Smith, Smock, Whiting,

Instructors: Barnhill, Comiskey, Killman, Morelock, Springer

About the Program

The department supervises the following degree programs and certificates:

- 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
- Doctor of Philosophy in Personal Financial Planning
- Doctor of Philosophy in Marriage and Family Therapy
- Graduate Certificate in Addictions and the Family
- Graduate Certificate in Personal Financial Planning

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.

Undergraduate Program

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, the 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
ADRS 4329	Eating Disorders
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. Students who complete a degree in community, family, and addiction services are eligible to take the Licensed Chemical Dependency Counselor examination and register as a Licensed Chemical Dependency Counselor Intern 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 prepares students to excel in careers related to human services administration and service delivery, including substance abuse prevention and counseling, management of community service and outreach organizations, non-profit administration, or case management. The CFAS major also provides a strong foundation for students planning to pursue a graduate degree in counseling, marriage and family therapy, substance abuse prevention or treatment, or other mental health fields.

All upper-division CFAS courses 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.

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 secondary 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 middle 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.

Students seeking teacher certification must meet all requirements outlined in the College of Education section of the 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 and 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. More information can be found at www.fcscalliance.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. One minor may be selected outside the college. 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

Undergraduate and graduate degrees in personal financial planning are available through the Division of Personal Financial Planning, which is a separate division within the Department of Applied and Professional Studies. See page 299.

Curriculum for B.S. in Family and Consumer Sciences

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric [^]	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Math. or Logical Reasoning*	3
Mathematics*	3	Individual/Group Behavior*	3
Visual & Performing Arts*	3	Tech/App. Sciences*	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy [^]	3
Minor Requirement	3	TOTAL	15
TOTAL	16		

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
Humanities*	3	Oral Communication*	3
Natural Lab Science*	4	Minor Requirements	9
Minor Requirements	6	TOTAL	15
TOTAL	16		

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
Natural Lab. Science*	4	Human Science Core Elective	3
FCSE 3303, Educ. Processes in FCSE	3	Minor Requirements	9
HUSC 3214, Jr./Sr. Seminar	2	Elective	3
Minor Requirements	6	TOTAL	15
TOTAL	15		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
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

Curriculum for B.S. in Community, Family, and Addiction Services

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302 Advanced Coll. Rhetoric [^]	3
ENGL 1301, Essentials of Coll. Rhetoric	3	PSY 1300, Intro to Psychology	3
MATH 1300, Contemporary Math. or MATH 1320, College Algebra	3	Visual & Performing Arts*	3
Humanities*	3	ADRS 2310, Understand Addictive Beh.	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
CFAS 2301, Intro to CFAS	3	TOTAL	15
TOTAL	16		

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
NS 1410 Science of Nutrition	4	ADRS 2327, Substance Abuse Prevention	3
CFAS 2300, Comm., Civility, & Ethics	3	PFP 2330 (S) Personal Fin. Counseling	3
CFAS 2360, Multicultural Competence	3	Natural Lab Science*	4
PFP 2310, Tech. Applications in PFP	3	Free Elective	3
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 2300, or PSY 3400, Statistics	3	HUSC 3214, HS Seminar [^]	2
ENGL 2311, Technical Writing [^]	3	HDS 2322, Int. Relationships or	3
PSY 4305, Abnormal Psychology [^]	3	PFP 3301, Personal & Family Finance	3
ADRS 3325, Fam. Dynamics of Addiction	3	HDFS 3320 (F), Contemporary Family [^]	3
Family Issues Elective (C)	3	CFAS 4330 (S), Administration in CFAS [^]	3
TOTAL	15	ADRS 4325 (S), Treat. of Addiction [^]	3
		TOTAL	14

SUMMER

Practicum, CFAS 4314 (SS) [^]

6

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
CFAS 4380 (F), Develop. & Evaluation [^]	3	FCSE 4325 (S), Fam. Issues & Soc. Act. [^]	3
FCSE 3303, Educ. Processes in FCSE	3	CFAS 4300 (S), Coaching Leaders [^]	3
Research & Ind. Study Elective (B)	3	CFAS 4390 (S), 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 SW 3339.

(C) Choose from HDFS 3317, 3321, or 3331

Graduate Programs / Applied and Professional Studies

The Department of Applied and Professional Studies supervises graduate degree programs in marriage and family therapy, family and consumer sciences education, and personal financial planning. 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, educational 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 53 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 Certification. Graduate students 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 secondary 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.).

Online 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 is available at www.hs.ttu.edu/gpidea or by contacting an FCSE advisor.

Marriage and Family Therapy

The graduate 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

The Division of Personal Financial Planning, which is administered by the Department of Applied and Professional Studies, supervises degree programs leading to a Master of Science and a Doctor of Philosophy in Personal Financial Planning. See information on these programs in the Division of Personal Financial Planning catalog section on page 299.

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 to be 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.

Curriculum for B.S. in Family and Consumer Sciences with Teacher Certification**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric [^]	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Math. or Logical Reasoning*	3
Mathematics*	3	NS 1410, Science of Nutrition	4
FCSE 2102, Intro. to FCSE	1	POLS 2302, American Public Policy	3
POLS 1301, American Govt., Org.	3	EDSE 2300, Schools, Society, & Diversity	3
Visual & Performing Arts*	3	TOTAL	16
CFAS 2300, Comm., Civility, & Ethics	3		
TOTAL	17		

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
English Literature†	3	ENGL 2311, Intro. to Tech. Writing [^]	3
Natural Lab. Science*	4	HDFS 3301, Theories of Human Dev.	3
ADM 1303 (F), Clothing Const	3	HDFS 3331, Parenting	3
ADM 2311 (F), Textiles [^]	3	ID 4000, (S), Housing and Interiors	3
TOTAL	16	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
FCSE 3301 (F), Foundation of FCSE [^]	3	PPF 2330, Personal Financial Counseling	3
HDFS 3320, Contemporary Family	3	FCSE 4302 (S), Pro. App. in FCS [^] **	3
RHIM 3460, Food System Mgmt. I	4	EDSE 4310, Learn./Cog./Inst. Design [^] **	3
EDIT 3318, App. of Tech in Elem. Edu.	3	EDSE 4322, Div./Class. Learn. Env. [^] **	3
HDFS 3312, Dev. During Childhood [^]	3	EDLL 4382, Read/Write 2nd Class. [^] **	3
HDFS 3310, Prenatal and Infant Dev. [^]	3	TOTAL	15
TOTAL	19		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
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 3470, Food Systems Mgmt. II	4	FCSE 4304 (S), Inst. Man. in FC [^] **	3
PPF 3301, Family Financial Counseling	3	TOTAL	15
HDFS 3413, Pre-School Lab w/Young Chil.	4		
or HDFS 3411, Super. Exp. w/Infants			
TOTAL	17		

TOTAL—130 hours

* Choose from Core Curriculum requirements.

[^] Prerequisites apply.

† Choose from ENGL 2305, 2306, 2607, 2308, 2351, 2388, 2391

Concurrent enrollment 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

Addictive Disorders and Recovery Studies (ADRS)**Undergraduate Courses**

2125. **Collegiate Community Seminar (1:1:3).** Prerequisite: Consent of department. 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).** 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 or corequisite: ADRS 2310 with a grade of C or better. An examination of the family system with specific reference to the causes and effects of chemical abuse, addiction, and the process of recovery. Fulfills Core Social and Behavioral Sciences-Individual or Group Behavior requirement.
3329. **Addiction, Recovery, and Relationships (3:3:0).** Prerequisite or corequisite: ADRS 2310 with a grade of C or better. Addicted persons may have difficulties with intimate relationships. Relationships can also be a specific addiction. Examines addiction, relationships, and addictive relationships.
4000. **Individual Study (3).** Prerequisites: ADRS 2310 with a grade of C or better and written consent of supervising faculty member. Teaching assistantships, independent coursework, or student-initiated research experience. May be repeated once for credit.
4320. **Research in Addictive Disorders (3).** Prerequisite: ADRS 2310 with a grade of C or better 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).** Prerequisites: ADRS 2310 and ADRS 3325 with a grade of C or better. 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 with a grade of C or better. Nature of eating disorders and approaches to prevention and intervention.

Graduate Courses

5310. **Issues of Addiction and Recovery (3:3:0).** Provides students with an introduction to addiction, including the nature of addiction, epidemiology, history, models, lifespan issues, treatment, and recovery.
5311. **Problems in Addictive Disorders and Recovery Studies (3).** Individual study in problems related to addictive disorders and recovery. May be repeated for credit.
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. Fulfills Core Communication (Oral) requirement.
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).** Focus on the interrelationships of race, class, and gender and their impact on community, family, and addiction services. Fulfills multicultural requirement.
4000. **Individual Study in CFAS (VI-6).** Prerequisite: GPA of 2.5, 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).** 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).** Prerequisites: CFAS 2301 with a grade of C or higher, 2.5 GPA, and consent of instructor. 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.
4320. **Research in Community, Family, and Addiction Services (3).** Prerequisites: CFAS 2301 with a grade of C or higher, 2.5 GPA, and consent of instructor. Supervised faculty-initiated research experience in selected areas. May be repeated once for credit.
4330. **Administration in Community, Family, and Addiction Services (3:3:0).** Prerequisites: CFAS 2301 with a grade of C or higher and 2.5 GPA. 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: 2.5 GPA. 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).** Prerequisites: CFAS 2301 with a grade of C or higher and 2.5 GPA. Approaches to program development in community settings, needs assessment, and evaluation. (Writing Intensive)
4390. **Senior Seminar in CFAS (3:3:0).** Prerequisites: 2.5 GPA and CFAS 2301, 4314, 4380 with a grade of C or higher. Capstone experience in grant writing and board/community/staff

management. Includes final preparation of grant proposal for community agency. (Writing Intensive)

Family and Consumer Sciences Education (FCSE)

Undergraduate Courses

2102. **Introduction to Family and Consumer Sciences (1:1:0).** For human sciences majors only. Exploration of family and 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 with a grade of C or higher, 2.5 GPA, and application and/or admission to the Teacher Education Program. Introduction to programs in secondary schools and other settings. (Writing Intensive).
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).** 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: Consent of instructor. May be repeated for credit.
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).** Prerequisites: FCSE 4306, 4308 with a grade of C or higher. 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 with a grade of C or higher. Application of family and consumer sciences knowledge and skills in the secondary classroom. Includes field experience. (Writing Intensive).
4304. **Instructional Management in Family and Consumer Sciences (3:3:0).** Prerequisites: FCSE 4306, 4308 with a grade of C or higher. Corequisite: FCSE 4601. Principles and procedures for managing the family and consumer sciences classroom. Designed to support the student teaching experience. (Writing Intensive)
4306. **Occupational Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 4302 with a grade of C or higher. Application of family and consumer sciences knowledge and skills in occupational preparation programs. Includes field experience.
4307. **Internship in Family and Consumer Sciences (3:3:0).** Prerequisites: FCSE 3301 or 3303 with a grade of C or higher, 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 with a grade of C or higher. 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).** Prerequisites: ENGL 1302 with a grade of C or higher, 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. (Writing Intensive)
4601. **Student Teaching in Family and Consumer Sciences (6:6:0).** Prerequisites: FCSE 4306, 4308 with a grade of C or higher. Corequisite: FCSE 4304. Supervised teaching in an approved secondary family and consumer sciences program. (Writing Intensive)

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 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).** Assessment of individual achievement in all subject areas in family and consumer sciences. Development of instruments and interpretation of data assessments.
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: Consent 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).** 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. May be repeated for credit.
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).**

Marriage and Family Therapy (MFT)

Graduate Courses

5300. **Introduction to Marriage and Family Therapy Practice (3:3:0).** Prerequisite: MFT majors only; consent of instructor. Analyses of and solutions for common problems in marriage and family therapy practice.
5301. **Family Therapy I (3:3:0).** Prerequisite: MFT majors only; 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).** Prerequisites: MFT majors only; 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).** Prerequisites: MFT majors only; 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.

5311. **Problems in Marriage and Family Therapy (3).** Prerequisite: MFT majors only. Individual study in problems related to marriage and family. May be repeated for credit.
5322. **Family Systems (3:3:0).** Prerequisite: MFT majors only; consent of instructor. 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).** Prerequisites: MFT majors only; consent of instructor. 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).** Prerequisite: MFT majors only; consent of instructor. 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).** Prerequisites: MFT majors only
6303. **Family Therapy III (3:3:0).** Prerequisites: MFT majors only; 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).** Prerequisites: MFT majors only; 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).** Prerequisites: MFT majors only; 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).** Prerequisites: MFT majors only; 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).** Prerequisites: MFT majors only; 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).** Prerequisites: MFT majors only; 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).** Prerequisites: MFT majors only; 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).** Prerequisites: MFT majors only; 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).** Prerequisites: MFT majors only; 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: MFT majors only; completion of MFT 6396 with a grade of C or better and consent of instructor. Course provides structured experience in supervision of marriage and family therapy students.
7000. **Research (V1-12).** Prerequisite: MFT majors only; consent of instructor.
7395. **Internship in Marriage and Family Therapy (3).** Prerequisite: MFT majors only; consent 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).** Prerequisite: MFT majors only; consent of instructor.

Division of Personal Financial Planning

Vickie Hampton, Ph.D., Director

Professor: Hampton

Associate Professors: Durband, Finke, Huston, Gustafson, Katz, Korb

Assistant Professors: Akay, Gilliam, Lauderdale, Salter

Adjunct Faculty: Evensky

Instructor: 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 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 accomplish the following:

- 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.

Undergraduate Program

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 earn a C or better in all support and major course requirements and 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.

Accelerated Bachelor's-to-Master's Degree Program. The Accelerated Bachelor's-to-Master's degree program allows academically capable students to accelerate their undergraduate degree programs, begin graduate work in their fourth year, and finish both the bachelor's and master's degrees in a total of approximately five years. This is accomplished by allowing six hours of graduate coursework in personal financial planning to count towards the undergraduate degree and the master's degree.

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

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Adv. Coll. Rhetoric^	3
ENGL 1301, Essentials of Coll. Rhet.	3	MATH 1331, Intro. Math. Analysis^	3
MATH 1330, Intro. Math. Analysis^	3	ACCT 2300, Financial Accounting^	3
CFAS 2300, Comm., Civility & Ethics	3	ECO 2301, Princ. of Economics I	3
POLS 1301, American Govt., Org.	3	PFP 2310, Tech. Apps. in PFP	3
PFP 1301, Cultural & Gender Issues	3	TOTAL	15
TOTAL	16		

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
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
ECO 2302, Princ. of Economics II	3	PFP 2330 (S), Pers. Fin. Counseling I	3
MATH 2345, Intro. to Statistics^	3	Natural Lab. Science*	4
PFP 2315, PFP for Professionals^	3	PFP 3375, Risk Man./Emp. Benefits^	3
TOTAL	15	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
PFP 3397 (F), Life Ins. Planning^	3	PFP Elective (see advisor)	2
BLAW 3391, Business Law I^	3	PFP 3350 (S), 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, Asset Management I^	3	PFP 4376, Asset Management II^	3
TOTAL	15	TOTAL	14

SUMMER

PFP 3399 Intern. in Pers. Fin. Plan.^ 3

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
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	Guided Major Elective or	3
PFP Elective (see advisor)	2	PFP Elective (see advisor)	3
PFP 4370, PFP Capstone^	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	14	TOTAL	13

TOTAL—121 hours

^ Prerequisites apply

* Choose from Core Curriculum requirements

+ HS Core choose 1 course from: ADRS 2310, NS 1325, HDFS 2322

(F) Offered fall semester only; (S) offered spring semester only

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 Personal Financial Planning.

M.S. students must earn a C or better in all courses unless otherwise noted. Only 6 hours of PFP courses can be transferred into the M.S. degree from another university. Ph.D. students are required to earn a B or better in all courses counted toward their degree.

Master's Programs

Nonthesis Master's. The nonthesis master's degree in personal financial planning requires a minimum of 42 hours. Appropriate leveling coursework may be required.

Dual Degrees. Personal Financial Planning offers three dual degrees at the master's level:

- Law/Personal Financial Planning, J.D.–M.S.
- General Business /Personal Financial Planning, M.B.A.–M.S.
- Business Administration (Finance)/Personal Financial Planning, M.S.–M.S.

Doctoral Program

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.

Admission. 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.

Personal Financial Planning (PFP)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 1301. Cultural 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. Fulfills Core Technology and Applied Science requirement. F, S.
- 2315. Personal Financial Planning for Professionals (3:3:0).** Prerequisites or corequisites: Any 1000- or 2000-level MATH course, ACCT 2300 and ECO 2301 or 2302 with a grade of C or higher; PFP majors and minors only. 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.
- 2330. Personal Financial Counseling I (3:3:0).** Prerequisite: PFP 2315. Methods and skills to assist individuals and families to

resolve financial problems. Addresses personal and professional attitudes and behaviors toward money.

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.
3178. **Estate Planning Lab (1:0:1).** Prerequisite: 2.8 GPA. Enrollment in this course and concurrent enrollment in PFP 3378 will provide coverage of all aspects of estate planning and taxation. F, S.
3210. **Professional Field Experience (2:2:0).** Prerequisite: 2.8 GPA, 6 hours of PFP courses from 1301, 2315, 2310, 2330. 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).** Introduction to personal financial planning, including goal setting, cash management, credit, insurance, taxes, housing, investment alternatives, and retirement plans. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. F, S, SS.
3330. **Personal Financial Counseling II (3:3:0).** Prerequisites: 2.8 GPA, PFP 2315, 2330, and ENGL 2311 with a grade of C or higher. PFP majors only. 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 and PFP 2315 with a grade of C or better. Study of the impact of federal and state taxation on personal financial planning decisions. S.
3374. **Retirement Planning (3:3:0).** Prerequisites: 2.8 GPA; PFP 2310, 2315, ACCT 3307, and ENGL 2311 with a grade of C or higher. Prerequisite or corequisite: PFP 3376. A foundation course in retirement planning and retirement income strategies. F, S.
3375. **Risk Management and Employee Benefits (3:3:0).** Prerequisite: 2.8 GPA; PFP 2310, ENGL 2311 with a grade of C or better; PFP 2315 with a grade of C or better (concurrent enrollment allowed). A foundation course in personal risk management and employee benefits. F, S.
3376. **Asset Management I (3:3:0).** Prerequisite: 2.8 GPA; PFP 2310, MATH 2345 with a grade of C or better; PFP major, minor or consent of instructor. Focuses on the theory and practice of investment analysis with a special emphasis on the basic tools, techniques, and methodologies employed by financial planners. Topics covered include financial asset classes and instruments, risk-return tradeoff, basic equity valuation and analysis, efficient market hypothesis, bond prices and yields, derivative securities and mutual funds. F, S.
3378. **Estate Planning (3:3:0).** Prerequisites: 2.8 GPA; BLAW 3391, PFP 2310, 2315. Prerequisite or corequisite: 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 with a grade of C or better. 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 or corequisite: 2.8 GPA; PFP 3374, 3375, 3376, 3378, and 3397 with a grade of C or better. Principles of professional practices focusing on business and marketing principles, effective managerial strategies and the student's transition to the professional workplace. Enrollment precedes PFP 3399. S. (Writing Intensive)
3399. **Internship in Personal Financial Planning (3:1:6).** Prerequisite: 2.8 GPA, PFP 3398 with a grade of C or higher. Supervised intern experiences in established career-related positions. May be repeated for credit. SS.
4000. **Individual Study (V1-6).** Prerequisite: 2.8 GPA and consent of instructor. 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.
4175. **Special Topics in Personal Financial Planning (1:1:0).** Prerequisite: varies, depending on topic. Study of special topics in personal financial planning. Can be repeated for up to 6 hours when topics vary. F, S.
4370. **Personal Financial Planning Capstone (3:1:3).** Prerequisites: 2.8 GPA; PFP 3374, 3375, 3376, 3378, 3397, 3398, 3399 with

a grade of C or higher. Prerequisites or corequisites: PFP 3330, 3350 with a grade of C or higher. 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 with a grade of C or better. Theory and practice of asset allocation, along with analysis of mutual funds, ETFs, and variable annuities using industry leading software. F, S.
4377. **Practicum in Personal Financial Planning (3:1:6).** Prerequisite: 2.8 GPA; Consent of instructor. Supervised experience designed to prepare the student for a career in financial planning/counseling.
4380. **Advanced Technological Applications in Personal Financial Planning (3:1:3).** Prerequisite: 2.8 GPA. Prerequisite or corequisite: PFP 4370 with a grade of C or higher. Advance coursework in professional software packages for financial planning and investment portfolio applications. F, S.
4396. **Asset Management III (3:3:0).** Prerequisites: 2.8 GPA, PFP 4376 with grade 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.

Graduate Courses

5175. **Special Topics in Personal Financial Planning (1:1:0).** Prerequisites: 3.0 GPA. Study of special topics in personal financial planning. Can be repeated for up to 6 hours when topics vary. F, S.
5198. **Professional Practices in Personal Financial Planning (1:1:0).** Prerequisite: Completion or concurrent enrollment in PFP 5371 with a grade of C or higher. Emphasis on the principles of professional practice focusing on business and marketing principles, 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 with a grade of C or higher 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.
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 nonmajors who want to use this information in their personal and professional lives. F, S, SS, Distance.
5330. **Financial Planning and Law for Settlement Planners (3:3:0).** Exploration of the theoretical and practical environmental framework upon which settlement planning rests. Topics include principles of financial planning, property law, alternative dispute resolution, planning for incapacity, and other relevant topics.
5335. **Settlement Planning Seminar (3:3:0).** Exploration of the emerging profession of settlement planning, defined as personal financial planning for the recipient of a legal settlement. Topics include forecasting needs, structured settlement annuities, dissipation risk, and many others.
5340. **Case Studies in Settlement Planning (3:3:0).** Case study course designed to enable students to synthesize their understanding of settlement planning by producing comprehensive settlement plans. Emphasis will be on the needs of catastrophically injured persons.
5350. **Individual Tax Planning Topics (3:3:0).** Prerequisites: PFP 5371 and ACCT 5311 with a grade of C or higher. 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 major, dual degree student, or consent of instructor. Integrates an in-depth examination of the theory and practice of investment analysis with real-life examples and cases financial planners might encounter in the profession. Topics covered include financial asset classes and instruments, risk-return tradeoff, basic equity valuation and analysis, efficient market hypothesis, bond prices

- and yields, derivative securities and mutual funds, along with discussions of articles printed in the financial media. F
5367. **Product Evaluation and Applications in Financial Planning (3:3:0).** Prerequisite: PFP 3376 and 4376 or PFP 5362; PFP 3375 and 3397 or PFP 5395 and 5397; and PFP 3374 or 5394 with a grade of C or higher. This course focuses on the evaluation and use of financial planning products to meet client needs and on related client communications.
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 major, dual 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 with a grade of B or higher and PFP 5372 (concurrent enrollment allowed). Theory and practice of asset allocation, along with analysis of mutual funds, ETFs, and variable annuities using industry leading software. S.
5373. **Personal Financial Planning Capstone (3:3:0).** Prerequisites: PFP 5362 or FIN 5325; and PFP 5371 with a grade of C or higher. Prerequisite or corequisite: PFP 5372, 5394, 5395, 5397, 5398, and ACCT 5311 with a grade of B or higher. 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 majors only, dual degree students, or consent of instructor. The study and use of methods to assist families of different socioeconomic groups in correcting financial behavior. S.
5378. **Research Methods I (3:3:0).** Prerequisites: PFP 6374. Introduces doctoral students to the scientific research process. Various elements of the research process will be identified and analyzed and students will have an opportunity to work with data and statistical software to engage in the research process.
5380. **Technological Applications in Personal Financial Planning (3:1:3).** Prerequisite or corequisite: PFP 5373 with a grade of C or better, PFP major, dual degree student, or consent of instructor. Advanced studies in professional software packages for financial planning and investment portfolio applications.
5385. **Behavioral Finance from a Personal Financial Planning Perspective (3:3:0).** Prerequisites: PFP 5372 and 5377 with a grade of C or higher. Introduces concepts in behavioral finance that relate to an individual's decision making within the area of personal financial planning.
5390. **Practicum in Personal Financial Planning (3:1:6).** Prerequisite: GPA of 3.0 and 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).** Prerequisites: PFP 5371 and ACCT 5311 with a grade of C or higher; Prerequisite or corequisite: PFP 5362 with a grade of C or higher. PFP major only, dual degree student, or consent of instructor. Advanced studies in retirement planning covering retirement plans in the corporate setting, personal retirement planning, and retirement income strategies. F
5395. **Risk Management and Employee Benefits (3:3:0).** Prerequisite: PFP major, dual 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).** Prerequisites: 3.0 GPA, PFP 5362 and 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.
5397. **Life and Health Insurance Planning (3:3:0).** Prerequisite: PFP major, dual 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. F
5398. **Estate Planning (3:3:0).** Prerequisites or corequisites: PFP 5371 and ACCT 5311 with a grade of C or higher; PFP major, dual degree student, or consent of instructor. Application of estate planning methodologies and policies to personal financial planning. S.
5399. **Internship in Personal Financial Planning (3:1:6).** Prerequisite: PFP 5198 with a grade of C or higher. Supervised internship experiences in established career-related positions in the financial planning field.
6000. **Master's Thesis (V1-6).**
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.
6330. **Research Fund Development (3:3:0).** Prerequisite: PFP 5378. 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.
6374. **Family Economics (3:3:0).** Prerequisites: Doctoral standing in the PFP Division and ECO 5310. Introduces doctoral students to economic theory from a household perspective. Consumption, saving, and investment behavior are the topics of focus.
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: PFP 5378. A continuation of Research Methods I. The dissertation process and timeline will be discussed in detail. Students will be expected to formulate and conduct scientific research as well as prepare a manuscript to communicate the results of their research study.
6383. **Regulatory Policy (3:3:0).** A survey of regulatory policies and issues relating to personal financial planning and consumer interests.
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.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**



Department of Design

Cherif Amor, Ph.D., Interim Chairperson

Professor: Shroyer

Associate Professors: Amor, Collier, Curry, Khan

Assistant Professor: Hwang

Instructors: Anderson, Dobbs, Gaines, Haynie, Lambert, Leos, Peggram, Richards

About the Program

The department supervises the following degree programs:

- Bachelor of Interior Design
- Bachelor of Science in Apparel Design and Manufacturing
- Master of Science in Environmental Design
- Doctor of Philosophy in Interior and Environmental Design

A student may minor in one of the undergraduate programs by completing a minimum of 18 hours selected in conference with the program director/coordinator.

Undergraduate Program

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 schools. 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 Hi-Tech Fashion Group, Fashion Tours of major fashion centers, two yearly design competitions, a Senior Fashion Exhibit, and a runway show.

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 4000 or 4310 to enter the Fashion Group International design competitions in the junior or senior years. One design competition must be entered during the junior or senior years to meet program requirements.

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.

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 nonresidential 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.

Freshman Portfolio Review. At the end of spring semester, freshmen submit a portfolio with representative work from specific studio courses (ARCH 1341, 2342, ID 1380, 1382, 2380). A consensus of opinion by the faculty is required for determining recommendations for the student. Prior to being admitted to ID 2383, students who received “conditional” evaluations must have met the recommended conditions identified by the reviewers.

Laptop Computer Requirement. All incoming freshmen and transfer students are required to have a laptop computer. Minimum specifications can be found at www.depts.ttu.edu/hs/dod/computer.php.

Senior Portfolio Review. During the senior year and while enrolled in ID 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

Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric [^]	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Math. or Logical Reasoning*	3
MATH*	3	ARCH 2342 (S), Arch. Design Drawing [^]	3
ARCH 1341 (F), Arch. Freehand Drawing#	3	POLS 1301, American Govt., Org.	3
ID 1380 (F), Intro. to Interior Design#	3	ID 2380 (S), Interiors II [^] #	3
ID 1382 (F), Interiors I#	3	TOTAL	15
TOTAL	16		
Fall		Spring	
Natural Lab. Science*	4	Natural Lab. Science*	4
ENGL 2311, Intro. to Tech. Writing [^]	3	ART 1310 or 2311, Art Hist. Survey I or II	3
ID 2383 (F), Interiors III [^]	3	POLS 2302, American Public Policy	3
IARCH 2311, Hist of World Architecture	3	ID 3381, Lighting Systems [^]	3
ID 3311 (F), Interior Materials [^]	3	ID 3387 (S), Computer Aided Drafting I [^]	3
TOTAL	16	TOTAL	16
Fall		Spring	
ECO 2305, Princ. of Economics	3	HIST 2300, History of U.S. to 1877	3
ARCH 2351 (F), Arch. Construction I [^]	3	ID 3190 (S), Pre-Internship Seminar [^] #	1
ID 3382 (F), Period Furnishing I [^]	3	ID 3385 (S), Advanced Design Proc. [^] #	3
HUSC 3214, Human Sciences Seminar [^]	2	ID 3383 (S), Period Furnishings II [^]	3
ID 4383 (F), Computer Aided Drafting II [^]	3	ID 3386 (S), Studio Procedures [^] #	3
TOTAL	14	PHOT 2310 or ID 3325 (S)	
		TOTAL	16
Fall		Spring	
BA 3301, Fundamentals of Mkt. [^]	3	CFAS 2300, Comm., Civility & Ethics	3
or RHIM 4316, Hospitality Mgmt. Mkt. [^]		ID 4104 (S), Senior Portfolio Seminar [^] †	1
Human Sciences Elective+	3	HIST 2301, History of U.S. Since 1877	3
ID 4606 (F), Collaboration Studio [^]	6	ID 4385 (S), Advanced Interiors [^] †	3
Arch 3350 (F), Arch. Construction II [^]	3	Technology Elective*	3
TOTAL	15	TOTAL	13
TOTAL—124 hours			

* Choose from Core Curriculum requirements.

[^] Prerequisites apply.

Concurrent enrollment required

+ HS Core; choose 1 course from: ADRS 2310, NS 1325, HDFS 2322, PFP 3301

† Portfolio presented for faculty review

(F) Offered fall semester only; (S) offered spring semester only; (SS) offered summer only

**Curriculum for B.S. in Apparel
Design and Manufacturing**

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric [^]	3
ENGL 1301, Essentials of 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	
CFAS 2300, Comm., Civility & Ethics	3	Natural Science Lab.*	4
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877 [^]	3
ART 3305 (F), 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	15	TOTAL	16

THIRD YEAR			
Fall		Spring	
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy [^]	3
ADM 3312 (F), Hist. and Phil of Dress [^]	3	HUSC 3214, Human Sci. Seminar [^]	2
ADM 3305 (F), Comp. App. in App. Des. [^]	3	ART 3312, Art History III [^]	3
ART 2311, Art History II	3	ADM 3308 (S), Adv. Flat Pattern Design [^]	3
Individual or Group Behavior*	3	ADM 4307 (S), Apparel Manufacturing [^] **	3
TOTAL	15	TOTAL	14

FOURTH YEAR			
Fall		Spring	
Human Sciences Elective ⁺	3	Humanities*	3
Natural Lab Science*	4	ADM 4350 (S), Apparel Portfolio Dev. [^]	3
ADM 4309, Surface Design [^]	3	ADM 4310 (S), Apparel Product Dev. [^] ++	3
or ADM 3310, Knit. Textile & App. Des. [^]	3	ADM 4389 (S), Pro. Pract. Fash. Design [^]	3
Technology Elective*		Guided Elective †	3
TOTAL	13	TOTAL	15

SUMMER			
ADM 4390 (SS), Internship [^]	3	ADM 4391 (SS), Internship [^]	3

TOTAL—125

* Choose from Core Curriculum requirements.

** Portfolio presented to faculty.

[^] Prerequisite applies.

Concurrent enrollment required

+ HS Core; choose 1 course from: ADRS 2310, NS 1325, HDFS 2322, PPF 3301

++ Required for competition participation

† Guided Electives: ART 3329, ARCH 1353, PHOT 2310, foreign language, or ADM 3325

(F) Offered fall semester only; (S) offered spring semester only; (SS) offered summer only

**Curriculum for Master of Science
in Environmental Design**

To be admitted to the graduate program, students must complete applications to the Department of Design and to the Graduate School. To obtain departmental procedures and guidelines, students should contact the advisor of graduate programs. No grade below a C will be accepted in any graduate course; a student must maintain a 3.0 GPA.

Summer Session I		Summer Session II	
ENVD 5382, Interior Design Systems	3	ENVD 5381, Env. Design Analysis	3
ENVD 6370, Env. Design Tech. and Dev.	3	ENVD 5301, Grad. Res. Seminar	3
TOTAL	6	TOTAL	6

Fall		Spring	
ENVD 5301, Grad. Research Seminar or	3	ENVD 5310, Readings	3
ENVD 5380, Human Factors: Ergonomics		EPSY 5380, Intro to Statistics	3
ENVD 6389, Environ. Design Studio	3	Research Methods	3
ENVD 5388 (or 5384), Design of Int. Env.	3	TOTAL	9
TOTAL	9		

Summer Session I	
ENVD 6000, Master's Thesis or	6
or ENVD 6001, Master's Report	
TOTAL	6

TOTAL—36 hour

Graduate Programs

Admission into the master's and doctoral programs requires submission of the following:

- Grade point average
- Copies of official transcripts
- Three letters of recommendation
- A design portfolio
- A resume
- TOEFEL scores for international students

The department offers an optional internship for students who have not previously had practicing professional experience in interior design or allied disciplines. To obtain departmental procedures and guidelines, students should contact the director of graduate programs.

Master's Program

The Master of Science in Environmental Design encompasses two options: (1) M.S. thesis-option and (2) M.S. non-thesis option. In the M.S. thesis-option, students are required to defend the thesis based on original research and using applied research paradigms. In the M.S. non-thesis option, students are required to write a report on emerging design trends using basic research paradigms. The master's degree in environmental design (thesis and non-thesis options) requires a minimum of 36 hours, including thesis/report. 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.

Doctoral Program

The Doctor of Philosophy in Interior and Environmental Design 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.

Apparel Design and Manufacturing (ADM)**Undergraduate Courses**

- 1301. Introduction to Apparel Design (3:3:0).** Corequisite: ADM 1303. ADM majors only. Overview of apparel design room practices. Emphasis on the business, art, and craft of apparel design. (Writing Intensive) F.
- 1303. [HECO 1328] Clothing Construction (3:1:4).** Corequisite: ADM 1301. ADM majors only. 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).** Prerequisites: ADM 1301 and 1303 with a grade of C or better. Corequisite: ADM 2308. ADM majors only. Intermediate apparel

assembly, alteration of commercial patterns, and selection of appropriate fabrics. S.S.

- 2302. Fashion Illustration (3:1:4).** Prerequisites: ART 1302 and 1303 with a grade of C or higher. ADM majors only. 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).** Prerequisites: ADM 1301 and 1303 with a grade of C or better; ADM majors only. Corequisite: ADM 1304. Application of basic flat pattern techniques to bodices, skirts, sleeves, neckline, and bodice-sleeve combinations. S.
- 2310. Design Through Draping (3:1:4).** Prerequisites: ADM 1303, 1304, 2308 with a grade of C or better; ADM majors and minors only. 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).** Prerequisites: ADM 1301 and 1303 with a grade of C or better; ADM majors only. Selection, use, and care of textiles in relation to fiber characteristics, yarn, and fabric structure. F.
- 3303. Tailoring (3:1:4).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, and 2311 with a grade of C or better; ADM majors only. 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).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, and 2311 with a grade of C or better; ADM majors only. 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).** Prerequisites: ADM 1301, 1303, 1304, 2302 (may be taken concurrently), 2308, 2310, and 2311 with a grade of C or better; ADM majors only. Application of advanced flat patterning techniques in apparel design.
- 3310. Knitted Textile and Apparel Design (3:1:4).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, and 2311 with a grade of C or better; ADM majors only. 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).** Prerequisites: Junior or senior standing. Apparel throughout the ages as reflected in cultures of the past and as an influence on contemporary design. Fulfills multicultural requirement. F. (Writing Intensive)
- 3325. Study Tour in Apparel Design (3:3:0).** Study of the development, practice, and effect a specific locale has had on the fashion design industry. This will be accomplished by study and presentation in a seminar format, and a trip to that area during spring break. (ID 3325)
- 4000. Individual Study (VI-6).** Prerequisites: Consent of instructor and ADM majors only. 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).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, 2311, and 3305 with a grade of C or better; ADM majors only. 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).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, 2311 and ART 1302, 1303, 2304 with a grade of C or better; ADM majors only. Exploration of textile dying, printing, and painting with emphasis on composition using varied media and materials. F.
- 4310. Apparel Product Development (3:1:4).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, 2311, and 3305 with a grade of C or better; junior standing; ADM majors only. 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).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, 2311, and 3305 with a grade of C or better; junior standing; ADM majors only. 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).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, 2311, 3305, 3308, and 3312 with a grade of C or better; senior standing; ADM majors only. Planning and implementing strategies necessary for securing 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).** Prerequisites: for 4390, 2.0 GPA, ADM 4389, and ADM majors only; for 4391, ADM 4390 with a grade of C or better, ADM majors only. Applied problems in apparel design emphasizing student participation in business and industry. SSI, SSII.

Interior Design (ID)

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.
- 1382. Interiors I (3:1:4).** Corequisite: ID 1380. ID majors only. Introduces principles and concepts relevant to planning residential environments. F.
- 2380. Interiors II (3:1:4).** Prerequisites: ID 1380, 1382, and ARCH 1341 with a grade of C or higher. ID majors only. Introduces skills necessary to design, analyze, and present concept, preliminary, working, and presentation drawings for residential environments. S.
- 2383. Interiors III (3:1:4).** Prerequisites: ID 2380 with a grade of C or higher, ARCH 2342 with a grade of C or higher, and satisfactory completion of Freshman Portfolio Review. Graphic media application in rendering and presentation methods. Perceptual development in volumetric organization relative to 2 and 3 dimensional design. F.
- 3190. Preinternship Seminar (1:1:0).** Prerequisites: ID 3385 and 3386 with a grade of C or higher (may be taken concurrently), ID majors only, 2.0 GPA, enrollment required in spring immediately preceding ID 4307, junior standing. Emphasis on preparation for interior design internship, career opportunities, job search, and interview strategies. S.
- 3311. Interior Materials (3:2:3).** Prerequisites: ID 2380 with a grade of C or higher, ID majors only. Selection of materials used in residential and nonresidential environments based on characteristics, composition, installation methods, and maintenance requirements. F. (Writing Intensive)
- 3325. Study Tour in Interior Design (3:3:0).** ID majors only. 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. (ADM 3325).
- 3381. Lighting Systems (3:2:2).** Prerequisites: ID 2383 with a grade of C or higher, ID majors only. Survey of the human factors relating to the luminous environment that support health, safety, comfort, human performance, and aesthetics. S.
- 3382. Period Furnishings I (3:3:0).** Prerequisites: ID 2383 with a grade of C or higher. 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. Fulfills multicultural requirement. F.
- 3383. Period Furnishings II (3:3:0).** Prerequisites: ID 3382 with a grade of C or higher, ID majors only. 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).** Prerequisites or corequisites: ID 3381 and 4383 with a grade of C or higher, ID majors only. 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. S. (Writing Intensive)
- 3386. Studio Procedures and Professional Practices for Interior Designers (3:3:0).** Prerequisites: junior or senior standing, ID majors only. 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).** Prerequisites: ID 2380 with a grade of C or higher, ID majors only. Introduction to computer-aided design and two-dimen-

- professional drafting for the interior designer and other uses of computers in the practice of interior design. S.
- 4000. Individual Study (V1-6).** Prerequisite: Consent of instructor. May be repeated for up to 6 hours credit. F, S, SSI.
- 4104. Senior Portfolio Seminar (1:1:0).** Prerequisites: ID 4606 with a grade of C or higher, ID majors only, graduating senior's final semester. Analysis of professional issues with emphasis on portfolio development and review. S.
- 4307. Internship in Interior Design (3:1:6).** Prerequisites: ID 3190, 3385, and 3386 with a grade of C or higher, ID majors only. Supervised intern experiences in established career-related positions. May be repeated as ID 4000 Individual Study. SSI.
- 4383. Computer-Aided Drafting for Interior Designers II (3:1:4).** Prerequisites: ID 3387 with a grade of C or higher, ID majors only. 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. Fulfills Core Technology and Applied Science requirement. F.
- 4385. Advanced Interiors (3:1:4).** Prerequisite: ID 3385 and 4383 with a grade of C or higher, ID majors only. 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 (6:1:9).** Prerequisite: ID 3385 and 4383 with a grade of C or higher, ID majors only. An interdisciplinary studio for the design profession that addresses the process and skills necessary for collaboration. F.

Environmental Design (ENVD)

Graduate Courses

- 5301. Graduate Research Seminar (3:3:0).** Introduction to philosophies, technologies, and processes involved in research and graduate study.
- 5307. Internship (3:1:6).** Supervised internship experiences in established career-related positions. 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.
- 5380. Human Factors: Ergonomics in Environmental Design (3:3:0).** Study of human factors and the anthropometric aspects of ergonomics as applied to environmental design.
- 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: ID 3381. 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)**
- 6001. Master's Report (V1-6).** May be repeated for credit.
- 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 Built environment.
- 6378. Research Methods II (3:3:0).** Prerequisites: ENVD 5378 and 3 credit hours of statistics with a grade of C or higher. Application of statistical packages to analyze data and interpret results.
- 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

Anisa H. Zvonkovic, Ph.D., Chairperson

Professors: Bell, Caldera, Feng, Fischer, Haley, Hart, O'Boyle, Reifman, Scott, Wherry, Zvonkovic

Associate Professors: Colwell, Crawford, Fitzpatrick, McCarty, Mulsow, Sharp

Assistant Professors: Behrens, Cong, Kulkofsky, Niehuis, Trejos

Instructors: Johnson

About the Program

This department supervises the following degree programs and certificate:

- 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
- Graduate Certificate in Gerontology

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 elderly adults. 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 a 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 a 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
- 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 27 credit hours:

- HDFS 2300, Gender Roles: Life Span Developmental Perspectives
- HDFS 2303, Life Span Human Development
- HDFS 3301, Theories of Human Development and the Family
- HDFS 3320, Contemporary Family
- HDFS 3322, The Family in the Community
- HDFS 3324, Dynamics of Family Interaction
- HDFS 3350, Development in Cross-Cultural Perspective
- HDFS 3390, Research Methods in HDFS
- HDFS 4314, Community Practicum in Human Development and Family Studies or HDFS 4320, Research in Human Development and Family Studies.

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; CFAS 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 15 hours from A, B, and C in the following list:

A. Human Development and Family Studies Area – Choose 2 courses (minimum 6 hrs.)

- HDFS 2305 Developmental Assessment of Young Children
- HDFS 2311 Introduction to Early Childhood
- HDFS 2320 Basic Interpersonal Skills
- HDFS 2322 Partnering: The Development of Intimate Relations
- HDFS 3306 Child and Adolescent Guidance
- HDFS 3310 Prenatal and Infant Development
- HDFS 3312 Development During Childhood
- 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 3326 Families in Crisis
- HDFS 3331 Parenting
- HDFS 3332 Aging in the Family
- HDFS 4306 Preparing Environments for Children

Graduate Program / Human Development and Family Studies

The department offers master's and doctoral degrees in human development and family studies. The focus of the graduate programs in the department is research-oriented, and these degrees require a thesis and dissertation, respectively. These programs have prepared students for careers as university faculty, full-time researchers, medical school faculty, and human service providers. Applicants should contact the department concerning admissions requirements, programs of study, and financial assistance. Admission to a graduate degree program requires the recommendation of the department and the Graduate School. The department also offers a master's degree and a graduate certificate in gerontology through its membership in the Great Plains Interactive Distance Education Alliance, a multiple-university association with online graduate programs.

Faculty research interests in the HDFS department are broad and multidisciplinary, creating many areas of specialization. Individual development research includes participants across the lifespan as well as within multiple domains of development (e.g., social, emotional, and cognitive). Special emphasis is placed on exploring development in context (e.g., cultural, ecological), and understanding developmental problems and solutions. Relationship process research includes inter-generational family relationships (ranging from infant-parent dyads to adult children and their elderly parents), close relationships (e.g., intimate and marital relationships), social interactions, and family issues (e.g., impact of work and stress on families). The department also specializes in research on theory, statistical methods and analyses, Hispanic and other ethnic studies, and issues particular to rural populations.

Master's Program

Master of Science in Human Development and Family Studies. Students in the master's program take two theories courses (Theories of Human Development and Family Theories), research methods, introduction to statistics, and a colloquium in HDFS. All students are required to complete a research-based thesis and at least 6 hours of thesis research. Beyond these requirements, about half of the hours in the program (17 of 36) are electives, so students may tailor the program to their own needs and interests.

Great Plains IDEA Master's and Certificate Program in Gerontology. The HDFS department is a member of the Great Plains Interactive Distance Education Alliance (Great Plains IDEA), a multiple-university association with online graduate programs. Through this organization, the department offers a master's degree in HDFS with a specialization in gerontology and a graduate certificate 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 universities that are part of the Gerontology program include Iowa State, Kansas State, North Dakota, Oklahoma State, and Texas Tech. This program is designed to prepare professionals who are either working directly with older people or are involved in education and research related to aging adults.

The primary objectives of this program are the following:

- To provide distance education to a wide spectrum of potential and current professionals in the field of gerontology
- To integrate and maximize resources within and across institutions participating in Great Plains IDEA
- To advance the research and graduate education in aging so that competent, well-educated professionals serve older citizens.

Doctoral Program

Students in the Doctor of Philosophy in Human Development and Family Studies program also complete the master's program requirements. In recognition of the methodological and statistical sophistication of the field, they take three additional quantitative statistics courses and a qualitative methods course. In recognition of a likely future career as college faculty, they spend two semesters in a college teaching practicum. Students are also required to take the lead on a research project (the 7000 project), prior to becoming a doctoral candidate and to complete a dissertation with at least 12 hours of dissertation research. Nearly half of the hours in the doctoral program (39 of 84 hours) are electives, so that students may define their own area of specialization. At least 9 courses must be related to their specialization, and up to 5 courses may be taken outside of the HDFS department. Up to 30 transfer hours may be applied toward doctoral program requirements upon the approval of the student's committee and the Graduate School.

Noteworthy features of many graduate students' degree programs include the following:

- Practicum: All doctoral students register for teaching practicum (HDFS 5101), the successful completion of which is required before doctoral students can teach for HDFS. Teaching practicum provides strong mentorship to emerging instructors.
- CFLE: The graduate program provides most of the core competencies required for Certified Family Life Education (CFLE), and several graduate students have pursued this certification.
- Risk-taking: This is a minor offered through the department.
- Women's Studies: Many graduate students pursue a certificate or minor in Women's Studies.

B. Application/Research Area – Choose one course for 3 hrs.

- HDFS 3360 Family Life Education and Ethics
- HDFS 3411 Laboratory Experiences With Infants and Toddlers
- HDFS 3413 Laboratory Experiences With Young Children
- 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 6 credit hours of electives from A or B.

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. (WS 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. F, S.
- 2305. **[TECA 1354] Developmental Assessment of Young Children (3:3:1).** Prerequisite: 2.5 GPA. Discusses the goals, benefits,

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, Advanced Coll. Rhetoric [^]	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Natural Lab Science*	4
Mathematics Elective*	3	SOC 1301 or 1320	3
PSY 1300, General Psychology	3	POLS 2302, American Public Policy	3
POLS 1301, American 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, or PSY 3400	3
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
CFAS 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 Human Develop.	3	HUSC 3214, Human Sci. Sem. [^]	2
HDFS 3322, Family in the Community	3	HDFS 3390, Research Methods [^]	3
HDFS 3350, Dev. in Cross-Cult. Pers.	3	HDFS 3324, Dynamics of Fam. Interact.	3
HDFS 3320, Contemporary Family	3	HDFS Elective (Group A)	3
Human Science Core+	3	Minor or Elective	3
TOTAL	15	TOTAL	14

FOURTH YEAR

Fall		Spring	
HDFS Elective (Group A)	3	HDFS 4314 [^] or 4320 [^]	3
HDFS Elective (Group B)	3	Community or Research Practicum	12
HDFS Elective (Group A or B)	6	Minor or Elective	15
Minor Elective	3	TOTAL	15
TOTAL	15		

TOTAL—122 hours

* Choose from Core Curriculum requirements

[^] Prerequisites apply.

+ Choose from: ADRS 2310, NS 1325, or PFP 3301

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.

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 IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric [^]	3
ENGL 1301, Essentials of Coll. Rhetoric	3	HDFS Elective	3
Mathematics Elective*	3	POLS 2302, American Public Policy	3
FCSE 2102, Intro. to FCSE	1	CFAS 2300, Comm., Civility, & Ethics	3
POLS 1301, American Govt., Org.	3	Mathematics or Logical Reasoning*	3
Visual & Performing Arts*	3	TOTAL	15
HDFS Elective	3		
TOTAL	17		

SECOND YEAR

Fall		Spring	
Natural Lab Science*	4	ID 4000, Individual Study	3
English Literature+	3	HDFS 3310, Prenatal and Infant Dev. [^]	3
HDFS 3301, Theories of Human Dev.	3	PFP 2330, Personal Financial Counsel.	3
HIST 2300, History of U.S. to 1877	3	ENGL 2311, Intro. to Tech. Writing [^]	3
ADM 1303 (F), Clothing Construction	3	NS 1410, Science of Nutrition	4
HDFS 3350, Dev. in Cross-Cultural Persp.	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	19	TOTAL	19

THIRD YEAR

Fall		Spring	
FCSE 3301, Foundations of FCSE [^]	3	HDFS 3331, Parenting	3
HDFS 3312, Dev. During Childhood [^]	3	HDFS 3411 [^] or 3413 [^]	4
PFP 3301, Personal & Family Finance	3	EDSE 4310, Learning, Cog. & Instr. [™]	3
HDFS 3320, Contemporary Family	3	EDLL 4382, Language, Literacy [™]	3
EDIT 3318, Adv. Tech in Education	3	EDSE 4322, Diversity in Classroom [™]	3
TOTAL	15	FCSE 4302, Field Exp. & Prof. App. (S) ^{**}	3
		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
RHIM 3460, Food Systems Mgmt. I	4	FCSE 4304 (S), Instruct. Mgmt. in FCS ^{**}	3
HDFS Elective	3	TOTAL	15
TOTAL	13		

TOTAL—132 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

+ Choose from ENGL 2305, 2306, 2607, 2308, 2351, 2388, 2391

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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (Writing Intensive)

3306. Child and Adolescent Guidance (3:3:0). HDFS 3301 with a grade of C or higher and 2.5 GPA. 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). Prerequisites: HDFS 3301 with a grade of C or higher and 2.5 GPA. 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.

Bachelor of Science: Early Childhood Teacher Certification in Early Childhood to Sixth Grade

The early childhood specialization prepares professionals to work with children from infancy through sixth 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 sixth 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

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric [^]	3
MATH 1320, College Algebra	3	MUSI 2301 or 3336	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
Oral Communication*	3	Nat. Lab Sci. (Earth/Space Sci)*	4
HDFS 2311, Intro. to Early Childhood	3	GEOG 1300, Fundamentals of Geog.	3
TOTAL	15	or GEOG 2351, Region. Geog. of World	
		TOTAL	16

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
English Elective+	3	Natural Lab Science (Life Science)*	4
MATH 2370, Elem. Analysis I [^]	3	HDFS 3312, Dev. During Childhood [^]	3
ART 3372, Rethinking Art Edu.	3	HDFS 3310, Prenatal and Infant Dev. [^]	3
HDFS 3301, Theories of Human Dev.	3	HDFS 3350 or EDEL 2300	3
TOTAL	15	MATH 3370, Elem. Geometry [^]	3
		TOTAL	19

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
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
TOTAL	16	TOTAL	17

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
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—128 hours

* Choose from Core Curriculum requirements.

Concurrent enrollment and acceptance into Teacher Certification Program (apply prior semester); 2.7 GPA minimum

[^] Prerequisites apply.

+ Choose from ENGL 2305, 2306, 2607, 2308, 2351, 2388, 2391

Please review the standards in choosing science courses at the Web site (www.sbec.state.tx.us). Educator Standards EC-Grade 6 Science:

- A. Life: PSS 2401, PSS 1411, BIOL 1401, 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.

3312. **Development During Childhood (3:3:0)**. Prerequisites: HDFS 3301 with a grade of C or higher and 2.5 GPA. Examination of psychomotor, social-emotional, and cognitive-language development during childhood. F, S.
3316. **Development in Adolescence (3:3:0)**. Prerequisites: HDFS 3301 with a grade of C or higher and 2.5 GPA. 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.
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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. F, S. (WS 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. 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)**. Prerequisites: 2.5 GPA and sophomore or higher 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.
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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. 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. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. 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. Fulfills multicultural requirement. 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)
3411. **Supervised Experiences with Infants and Toddlers (4:2:4)**. Prerequisites: HDFS 3310 with a grade of C or higher and 2.5 GPA. Supervised experiences with infants and toddlers. State law requires students to pass a background check. F, S. (Writing Intensive)
3413. **Supervised Experiences with Young Children (4:2:4)**. Prerequisites: HDFS 3312 with a grade of C or higher and 2.5 GPA. Supervised experiences with young children. State law requires students to pass a background check. F, S. (Writing Intensive)
4000. **Individual Study (V1-6)**. Prerequisites: 2.5 GPA and consent of instructor. Teaching assistantships, independent coursework, or student-initiated research experience. May be repeated once for credit. F, S.
4306. **Preparing Environments for Children (3:3:0)**. Prerequisites: 2.5 GPA and HDFS 3411 or 3413 with a grade of C or higher.

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).** Prerequisites: 2.5 GPA, HDFS 3322 with a grade of C or higher, 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).** Prerequisites: 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. Focuses on recent developments in theory, philosophy, research, and/or applied approaches to human development and family studies. May be repeated once for credit.
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.
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.
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).** Prerequisites: HDFS 5349 with a grade of C or higher and 2.5 GPA. 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).** 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).** Prerequisites: 2.5 GPA and HDFS 5349, 5351, 6352 with a grade of C or higher. 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).** Prerequisites: 2.5 GPA and HDFS 5349, 5351, 6352, 6364 with a grade of C or higher. 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).** Prerequisites: 2.5 GPA and HDFS 5349, 5351 with a grade of C or higher. Provides 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).** 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

Shane Blum Ph.D., Chairperson

Professors: Dodd, Harp, Hoover, Huffman, Reed, Spallholz

Associate Professors: Adams, Blum, Boylan, Fowler, Goh, Stout

Assistant Professors: Kolyesnikova, McCool, Phelan, Wang, Yuan

Instructors: Barko, Boyce, Edwards, Fillipp, Hlavaty, Kloiber, 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. See the Web site (www.depts.ttu.edu/hs/intern/).

Mission. The mission of the department is to provide quality education, research, and service focused on the knowledge and skills intrinsic in the disciplines of 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.** Acceptance into the competitive Didactic Program in Dietetics (DPD) is based on the student's GPA in nutrition, chemistry, and zoology courses and overall GPA after 60 hours. A list of the exact courses and criteria for acceptance may be found at www.depts.ttu.edu/hs/nhr/ns/undergrad.php. The Didactic 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 required 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, students are eligible to take the national examination given by the Commission of Dietetic Registration (CDR) and, after passing the national exam, they 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 in 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 Bachelor of Science 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 in 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 a minimum of 18 semester hours of selected coursework. Specific courses for the RHIM minor are finalized and approved by the student's major and minor advisors.

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.

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 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 by the faculty and student. RTL 3389, Professional Practices in Retailing, is required during 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 a minimum 18 semester hours of selected coursework. Specific courses for the minor are finalized and approved by the student's major and minor advisors.

Nutritional Sciences (NS)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

1201. **Introduction to Dietetics (2:2:0).** Prerequisite: NSGD majors only. Introduction to the field of dietetics including registration, ethical, legal, and professional issues. F.
1301. **Introduction to Nutrition (3:3:0).** Prerequisite: NSGD majors only. An introduction to nutrition and its role in human health. For nutrition majors and minors only. F, S.
1325. **[BIOL 1322, HECO 1322] Nutrition, Foods, and Healthy Living (3:3:0).** No NSGD majors. 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

Curriculum for B.S. in Retailing

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric [^]	3
Mathematics Elective *	3	Mathematics Elective*	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ECO 2302 or 2305, Prin. of Economics	3
RTL 1320, Fashion and Culture	3	Human Sciences Elective+	3
POLS 1301, American Govt., Org.	3	RTL 1340, Intro to Retailing	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	COMS 3358 or CFASS 2300	3
ENGL 2311, Intro. to Technical Writing [^]	3	POLS 2302, American Public Policy	3
RTL 2350, Retail Promotion	3	BA 3303, Foundations of Finance	3
RTL 2340, Contemporary Issues in Rtl.	3	or RHIM 3322, Cost Control II [^]	
TOTAL	15	RTL 3380 (S), Retail Buying & Control	3
		TOTAL	15

THIRD YEAR			
Fall		Spring	
RTL 3340, Intern. Retailing	3	Visual & Performing Arts*	3
RTL 3360, App. Concepts in Team. Technology Elective*	3	RTL 3389, Profes. Practices in Rtl. [^]	3
BA 3305, Organizations Mgt. or RHIM 3341, Hospitality Mgt. [^]	3	BA 3301, Marketing Conc. & Strat. [^] or RHIM 4316, Hospitality Mgt. Mkt. [^]	3
Natural Science*	4	Natural Science*	4
TOTAL	16	Elective	3
		TOTAL	16

INTERNSHIP			
RTL 3690 (SS), Internship in Retailing [^]	3		

FOURTH YEAR			
Fall		Spring	
RTL 4320 (F), Category Mgt. [^]	3	Elective	9
Elective	6	RTL 4360, Retail Management [^]	3
RTL 4330, Retailing Research [^]	3	Humanities*	3
TOTAL	12	TOTAL	15

TOTAL—120 hours

NOTE: Students are expected to have competency in computer usage.

* Choose from Core Curriculum requirements.

[^] Prerequisites apply.

+ Choose from ADRS 2310, NS 1325, HDFS 2322, or PFP 3301.

(S) Offered in spring semester only; (SS) offered summer sessions only

to convey the basic principles of nutritional science. No NSGD majors. Fulfills Core Natural Sciences requirement. F, S.

2310. **[HECO 1315] Principles of Food Preparation (3:2:2).** Application of scientific principles to food preparation. Fulfills Core Technology and Applied Science requirement. F, S.

2420. **Nutrition (4:3:2).** Prerequisite: NS 1301 with a grade of C or better. Sources and roles of nutrients and their importance to human health. For nutrition majors and minors only. F, S.

3310. **Essentials of Dietetic Practice (3:2:2).** Prerequisite: NSGD majors only, NS 2420 with a grade of C or higher, 2.75 GPA, Didactic Program in Dietetics approval. Role of dietician in modern health care system. Techniques of assessment, nutrition care planning, and documentation. Legal aspects of dietetic practice. (Writing Intensive)

3320. **Nutrition and Diet Therapy for Allied Health Professionals (3:3:0).** 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 or 1325 or 1410 with a grade of C or higher. No NSGD majors. Nutrition concepts and applied nutritional practices for the competitive and amateur athlete and physically active individual. S.

3340. **Nutrition in the Life Cycle (3:3:0).** Prerequisite: NS 2420 with a grade of C or higher, 2.75 GPA, DPD* approval. Factors that affect diet and nutrition throughout the life cycle. F, S. (Writing Intensive)

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 2303 and 2103 or CHEM 3305 and 3105 with a grade of C or higher. Survey of general biochemistry.

Nutritional Sciences: Preprofessional Health Careers Curriculum

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ZOOL 2402, Anatomy & Physiology [^]	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced 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, American Public Policy	3
POLS 1301, American Govt., Org.	3	NS 1301 (S), Intro. to Nutrition	3
PSY 1300 or SOC 1301	3	TOTAL	17
TOTAL	17		
SECOND YEAR			
Fall		Spring	
NS 2420 (F), Nutrition	4	HIST 2300, History of U.S. to 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
TOTAL	15	MATH 2300, Statistical Methods [^]	3
		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	HIST 2301, History of U.S. Since 1877	3
NS 3402 (F), Survey of Biochemistry [^]	4	NS 4320 (S), Nutritional Biochem. [^]	3
Oral Communication*	3	NS 4120 (S), Medical Terminology	1
HUSC 3214, Human Sciences Seminar	2	MBIO 3401, Prin. of Microbiology	4
TOTAL	16	TOTAL	15
FOURTH YEAR			
Fall		Spring	
NS 4340 (F), Medical Nutr. Therapy I [^]	3	NS 4350 (S), Emerging Issues	3
NS 4330, Comm. Nutrition [^]	3	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	15		

TOTAL—124 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 IS 1100	1	ENGL 1302, Advanced 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	NS 2310, Scientific Food Preparation	3
POLS 1301, American Govt., Org.	3	NS 1301, 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
ZOOL 2403, Human Anatomy	4	RHIM 3341, Hospitality Management [^]	3
NS 2420, Nutrition [^]	4	RHIM 3322, Hospitality Control II [^]	3
CHEM 2303/2103 (F), Intro. Organic [^]	4	POLS 2302, American Public Policy	3
TOTAL	15	AAEC 3401 [^] or MATH 2300 [^]	3-4
		TOTAL	15-16
THIRD YEAR			
Fall		Spring	
FDSC 3301 [^] or 3303	3	Humanities Elective*	3
NS 3402 (F), Survey of Biochemistry [^]	4	NS 4120 (S), Medical Terminology	1
NS 3340, Nutrition in the Life Cycle [^]	3	NS 3411, Dietetic Counseling Strat. [^]	4
Human Science Elective+	3	RHIM 3390, Purchasing in Hosp. Ind. [^]	3
NS 3310 (F), Ess. of Dietetic Practice [^]	3	NS 4320 (S), Nutritional Biochemistry [^]	3
TOTAL	16	TOTAL	14
FOURTH YEAR			
Fall		Spring	
NS 4340 (F), Medical Nutritional Ther. I [^]	3	NS 4350 (S), Emerging Issues [^]	3
NS 4201 (F), Professional Issues in Diet. [^]	2	NS 4341 (S), Medical Nutr. Therapy I [^]	3
RHIM 4360, Exper. Methods w/Foods [^]	3	NS 4330/4130, Comm. Nutr. & Field [^]	4
Visual and Performing Arts Elective*	3	NS 4380 (S), Cultural Foods [^]	3
NS 3470, Inst. Food Systems [^]	4	Oral Communication*	3
TOTAL	15	TOTAL	16

TOTAL—123 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: Family and Consumer Sciences Teacher Certification

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	MATH 2300, Statistical Methods	3
Mathematics Elective*	3	POLS 2302, American Public Policy	3
POLS 1301, American Govt., Org.	3	NS 1410, Science of Nutrition	4
CHEM 1305/1105, Chem & Society I	4	CHEM 1306/1106, Chem & Society II	4
FCSE 2102, Intro. to FCSE	1	TOTAL	17
TOTAL	15		
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
ZOOL 2403, Human Anatomy	4	Human Sciences Elective+	3
ENGL 2311, Intro. to Technical Writing	3	NS 3325 (S), Sports Nutrition	3
ECO 2305, Principles of Economics	3	English Literature [^]	3
or EDSE 2300, Schools, Soc. & Diversity		RHIM 3470, Food Systems Mgmt. II	4
NS 2310, Principles of Food Prep.	3	TOTAL	16
TOTAL	16		
THIRD YEAR			
Fall		Spring	
NS 3340, Nutrition in the Life Cycle	3	NS 4380, Cultural Aspects of Food	3
CFAS 2300, Comm., Civility, and Ethics	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
TOTAL	15	EDLL 4382, Reading & Writing/Sec.**	3
		TOTAL	18
FOURTH YEAR			
Fall		Spring	
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
Visual & Performing Arts*	3	TOTAL	15
RHIM 4360, Experimental Foods	3		
TOTAL	15		

TOTAL—127 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)[^] Choose from ENGL 2305, 2306, 2607, 2308, 2351, 2388, 2391

(F) Offered fall semester only; (S) offered spring semester only

- 3411. Dietetic Counseling Strategies (4:3:1).** Prerequisite: NS 3310 with a grade of C or higher. Application of interviewing, counseling, and educational techniques in dietetics, including individual and group methods. F, S.
- 3470. Institutional Food Systems Management (4:3:2).** Prerequisites: NS 2310 with a grade of C or higher, 2.75 GPA, Didactic Program in Dietetics approval. NSGD majors only. Overview of institutional food management, including cycle menus, delivery systems, meeting special diet needs, and quality improvement of the facility. F, 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).** Prerequisite: NS 2420 with a grade of C or higher. 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, S.
- 4201. Professional Issues in Dietetics (2:2:0).** Prerequisite: Final fall semester prior to graduation; for dietetic nutrition majors only. Prepares students for professional careers in dietetics and/or dietetic internships.

Curriculum for B.S. in Restaurant, Hotel, and Institutional Management

FIRST YEAR				
Fall		Spring		
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric [^]	3	
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics Elective*	3	
Mathematics Elective*	3	POLS 2302, American Public Policy [^]	3	
POLS 1301, American Govt., Org.	3	NS 1410, Science of Nutrition	4	
RHIM 2310, Intro. to Hospitality Mgmt.	3	RHIM 2308, Hotel Operations	3	
RHIM 2312 or Elective	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	
ECO 2305, Principles of Economics	3	Human Sciences Elective+	3	
CMLL 1301, Indv. Studies in Mod. Lang.	3	Elective	3	
RHIM 3310, Food Systems Mgmt. I	4	RHIM 3350, Travel and Tourism	3	
Elective	3	RHIM 3470, Food Systems Mgmt. II [^]	4	
TOTAL	16	TOTAL	16	
THIRD YEAR				
Fall		Spring		
RHIM 3320, Facilities Management	3	ANSC 3404, Cons. Selec./Util.	4	
Oral Comms*	3	RHIM 3390, Purchasing in Hosp. Ind. [^]	3	
RHIM 3341, Hospitality Management [^]	3	RHIM 3358, Human Res. in Serv. Ind.	3	
RHIM 3321, Hospitality Control I	3	RHIM 3322, 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				
(must be away from Lubbock)				
RHIM 3000, Internship in Hospitality [^]	2			
FOURTH YEAR				
Fall		Spring		
RHIM 4322, 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, Hospitality Mgmt. Mkt. [^]	3	
RHIM elective†	3	RHIM 4313, Legal Asp. of Hosp. Ind.	3	
TOTAL	13	TOTAL	12	
TOTAL—123 hours				
NOTE: Students are expected to have competency in computer usage.				
NOTE: 2 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, PFP 3301.				
# Must take graduating semester.				
(F) Offered fall semester only; (S) offered spring semester only.				

Curriculum for B.S. in Restaurant, Hotel, and Institutional Management with Teaching Certification in Family and Consumer Sciences

FIRST YEAR				
Fall		Spring		
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric [^]	3	
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics Elective*	3	
Mathematics Elective*	3	POLS 2302, American Public Policy	3	
POLS 1301, American Govt., Org.	3	NS 1410, Science of Nutrition	4	
RHIM 2310, Intro. to Hospitality Mgmt.	3	RHIM 2308, Hotel Operations	3	
Visual & Performing Arts*	3	ECO 2305 Prin. of Economics	3	
FCSE 2102, Intro. to Fam. & Con. Sci.	1	or EDSC 2300, Schools, Soc. & Diversity		
TOTAL	17	TOTAL	19	
SECOND YEAR				
Fall		Spring		
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	CFAS 2300, Comm., Civility, & Ethics	3	
ENGL 2311, Intro. to Tech. Writing	3	English Literature†	3	
RHIM 3460, Food Systems Mgmt. I	4	RHIM 3390, Purchasing in Hosp. Ind.	3	
Human Sciences Core Elective+	3	RHIM 3470, Food Systems Mgmt. II	4	
RHIM 3350, Travel and Tourism	3	TOTAL	16	
TOTAL	19			
THIRD YEAR				
Fall		Spring		
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 (must be away from Lubbock)				
	2			
FOURTH YEAR				
Fall		Spring		
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. Mkt.	3	FCSE 4301 (S), Student Teaching**	3	
FCSE 4306 (F), Occupational FCS [^] **	3	TOTAL	12	
RHIM 4313, Legal Asp. of Hosp. Ind.	3			
TOTAL	16			
TOTAL—135 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)				
† Choose from ENGL 2305, 2306, 2607, 2308, 2351, 2388, 2391				
(F) Offered fall semester only; (S) offered spring semester only				

- 4320. Nutritional Biochemistry (3:3:0).** Prerequisite: NS 3402 or CHEM 3310 with a grade of C or higher. Concepts of normal nutrition in relation to the chemistry and physiology of the human body.
- 4330. Community Nutrition (3:3:0).** Prerequisite: NS 2420 with a grade of C or better; 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, S.
- 4340. Medical Nutritional Therapy I (3:3:0).** Prerequisites: NS 3310 and ZOOL 2402 or 2403 with a grade of C or higher. 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).** Prerequisite: NS 4340 with a grade of C or higher. 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).** Prerequisites: NS 2420, 3340 with a grade of C or higher. 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. A study of the historical, social, psychological, economic, religious, and aesthetic significance of food customs in various cultures. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement. (Writing Intensive)

Graduate Courses

- 5000. Independent Study in Nutrition (V1-6).** 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.

Graduate Program

The department supervises degree programs leading to the following Master of Science and Doctor of Philosophy degrees:

- Master of Science in Nutritional Sciences
www.depts.ttu.edu/hs/nhr/ns/master.php
- Doctor of Philosophy in Nutritional Sciences
www.depts.ttu.edu/hs/nhr/ns/phd.php
- Master of Science in Restaurant, Hotel, and Institutional Management
www.depts.ttu.edu/hs/nhr/rhim/academics_masters.php
- Doctor of Philosophy in Hospitality Administration
www.depts.ttu.edu/hs/nhr/rhim/academics_doctoral.php

M.S. Degree. 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.

Ph.D. Degree. 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.

Internship Program. 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. See information at www.depts.ttu.edu/hs/intern/.

Admission. 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.

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, hematologic, 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. 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. Study of essential vitamins and factors affecting vitamin utilization.
5334. **Advanced Medical Nutrition Therapy (3:3:0).** Prerequisite: NS 3340 and 4320. 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-level biology. 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. 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)**

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 with a grade of C or higher, RHIM majors only. Experiences in hospitality settings. Must be away from Lubbock. May be repeated for a maximum of six hours credit. F, S, SSI, SSII.
3100. **Introduction to Internship in Hospitality (1:1:0).** Prerequisites: RHIM major and sophomore or higher standing. Introduction to concepts and expectations of the internship experience. F, S.
3145. **Event Management in the Hospitality Industry Laboratory (1:0:2).** Corequisite: RHIM 3245 with a grade of C or higher.

- Study of concepts and execution of event management in the hospitality industry. (RTL 3145)
- 3245. Event Management in the Hospitality Industry (2:2:0).** Corequisite: RHIM 3145 with a grade of C or higher. Study of concepts and execution of event management in the hospitality industry. (RTL 3245)
- 3308. Hotel Group Sales and Services (3:3:0).** Emphasis on the function of convention and meeting sales and service departments 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, S.
- 3322. Hospitality Control II (3:3:0).** Prerequisite: RHIM 3321 with a grade of C or higher. Application of fiscal control devices in the hospitality industry. Includes computer applications in industry situations. F, S.
- 3330. Special Topics in Hospitality (3:3:0).** Prerequisite: Consent of instructor. Semester long study of a specific topic pertinent to the hospitality industry. F, S.
- 3332. Customer Relations for Hospitality Enterprises (3:3:0).** Prerequisite: Must have junior or senior standing. 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).** Prerequisite: Sophomore, junior, or senior standing. 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. Fulfills multicultural requirement. F, S, SSII.
- 3355. Club and Resort Management (3:3:0).** Prerequisite: RHIM majors only. 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 with a grade of C or higher. Current ethical, economic, legislative, and industrial developments related to purchasing food products and durable goods. F, S.
- 3460. Food Systems Management I (4:2:4).** Prerequisite: Sophomore, junior, or senior 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 (4:2:4).** Prerequisite: RHIM 3460 with a grade of C or higher. Optimum use of human, financial, and material resources by managers. Laboratory experiences include commercial food preparation and service. F, S, SSI.
- 4000. Individual Study (V1-6).** Prerequisite: Consent of instructor. May be repeated for up to 6 hours credit. F, S, SSI, SSII.
- 4300. Practicum (3:3:0).** Prerequisite: RHIM 3000 and 3100 with a grade of C or higher, 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: Junior or senior standing. 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).** Prerequisite: Junior or senior standing. 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: RHIM 4316 or MKT 3350 or BA 3301 with a grade of C or higher. Aspects of opening and operating a small hospitality business. S.
- 4322. Hospitality Cost Control III (3:3:0).** Prerequisite: RHIM 3322 with a grade of C or higher. Utilization of fiscal control devices in the hospitality industry to develop financial assets and manage their application. F, S.
- 4325. Hospitality Field Study Tour (3:1:4).** Prerequisite: RHIM majors only. 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.
- 4340. Wine Marketing (3:3:0).** Analyzes the concepts of marketing as related to the wine industry. Students will develop a marketing plan for a winery.
- 4350. Wine Tourism (3:3:0).** Examines the business of wine with specific focus on wine tourism. Addresses global tourism and local economic impact of the wine industry.
- 4360. Experimental Methods with Food (3:2:3).** Suggested prerequisites: RHIM 3460 or NS 2310. Investigation of food quality factors through laboratory experiences which conclude with a comprehensive research project.
- 4415. Advanced Food Production Management (4:2:6).** Prerequisite: RHIM 3470 with a grade of C or higher and FDSC 3303 with a grade of D or higher. For RHIM majors only. 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).** 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).** 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.
5360. **Event Management in the Hospitality Industry (3:3:0).** Study of concepts and execution of event management in the hospitality industry.
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).** 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).** Prerequisite: RHIM 5322. 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

1320. **Fashion and Modern Culture (3:3:0).** Survey course analyzing the impact of modern culture on the fashion industry.
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).** 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).** 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.
3145. **Event Management in the Retailing Industry Laboratory (1:0:2).** Corequisite: RTL 3245. Study of concepts and execution of event management in the retailing industry. (RHIM 3145)
3245. **Event Management in the Retailing Industry (2:2:0).** Corequisite: RTL 3145. Study of concepts and execution of event management in the retailing industry. (RHIM 3245)
3340. **International Retailing (3:3:0).** Prerequisites: ENGL 2311 with a grade of C or higher and ECO 2305 or 2302. Cultural differences, world markets, and political constraints encountered in international retailing strategy. Fulfills multicultural requirement. F, S. (Writing Intensive)
3360. **Applied Concepts in Teamwork (3:3:0).** 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 (3:2:2).** The application of planning, purchasing, and controlling inventories. S.
3389. **Professional Practices in Retailing (3:3:0).** Prerequisite: RTL 2350, RTL 3380 (can be concurrent), junior or senior standing. Principles of professional practices focusing on legal, ethical, and human resource workplace issues and effective managerial strategies. Enrollment precedes RTL 3690. S.
3390. **Internship in Retailing (3:1:5).** Prerequisite: RTL 3389 with a grade of C or higher. Supervised applications of concepts, principles, and techniques learned in the classroom; emphasis on student participation in the retailing industry. Minimum of 400 hours of supervised retail employment at a departmental approved site. May be repeated for credit.
4000. **Individual Study (V1-6).** Prerequisites: Consent of instructor and RTL majors only. 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).** Prerequisite: RTL majors only. Study of international/domestic retailers and manufacturers. May be repeated once for credit. S.
4320. **Retail Category Management (3:2:2).** Prerequisite: Junior or senior standing. The application of planning, purchasing, and controlling inventories with emphasis on product selection, shelf merchandising, promotion, and pricing. F, S.
4330. **Retailing Research (3:3:0).** Prerequisites or corequisites: RTL 2340 and ENGL 2311 with a grade of C or higher. 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).** Prerequisites: RTL 3340 with a grade of C or higher, senior standing. Prerequisites or corequisites: BA 3301 or RHIM 4316 and BA 3305 or RHIM 3341 with a grade of C or higher. 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).** Prerequisites: RTL 3390, 4320, 4330, 4360 with a grade of C or higher; senior in final semester. SI, SII.

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. Texas Tech 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 requires students to complete no fewer than 64 semester hours in the basic liberal arts. The minimum number of semester hours required by the college for the B.A. degree has been set at 120 hours 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.

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 a 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 completion of the mass communications core curriculum and 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 MCOM 1300, 3300,** 3320 with grades of C or better.
6. Completed the entry-level course in the major sequence with a grade of C or better. The entry-level course in advertising is ADV 3310, electronic media and communications is EMC 3300, journalism is JOUR 2300, and public relations is PR 3310.
7. Passed the college's grammar, spelling, and punctuation exam.
8. Completed JOUR 2310 with a grade of C or better.
9. Completed 27–33 hours from general degree requirements with a 2.75 GPA.

University 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 assistant 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 assistant 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.

* The College of Mass Communications is not accepting new majors to the photocommunications degree.

** MCOM 3300 may be substituted with a specific major theories course.

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 assistant dean of undergraduate students is required if the student is classified as a senior, if the student is taking the exam for 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 assistant dean of undergraduate students.

Second Bachelor's Degree. Permission to enroll in courses to pursue a second bachelor's degree must be obtained from the assistant dean of undergraduate students. 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 18 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 a 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 assistant dean of undergraduate students may not be applied to degree program requirements.

Degree Plan and Intention to Graduate. Students will declare their major and minor upon completion of the Mass Communications core curriculum. Students must file a degree plan declaring the

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 degree is designed to prepare students to enter the communications industry or to continue studies toward a Doctor of Philosophy degree. 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 degree 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 degree requires 87 hours of graduate study beyond the baccalaureate degree or 60 hours beyond the Master of Arts degree, 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.

major and minor no later than 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.

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 mass communications 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 a 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 ADV 3312 for advertising, EMC 3315 for electronic media and communications, JOUR 3310 and 3312 for all concentrations of journalism, and PR 3312 for public relations.
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 concentrations in the college must take the following core courses: MCOM 1300, 3300 (or approved theories course in a specific major), 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. Students in any major or concentration in the college must pass 12 hours of English courses.
14. 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.
15. Courses listed for majors in the college may 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, 3350, 3380, 3390, 4350, 4370, 3 hours journalism elective; 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 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, EMC 3300, 3308, 3310, JOUR 2300, 2310, PHOT 2310, and PR 3310. Additional minors are available in advertising, electronic media and communications, journalism, 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 Admission to the University 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. Except for the humanities and 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 a major and a minor (if selected).

Semester Hours

English 12
The 12 hours of English must consist of ENGL 1301 and 1302 and two literature courses (excluding ENGL 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
Select from Core Curriculum requirements approved list.

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 assistant 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, IE 3341, MUTH 3303, PSY 3400, and SOC 3391. MATH 2300 or 2345 is required for all mass communications majors and will satisfy 3 hours of this requirement.

Natural Sciences 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.

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.

American History 6
Students will normally enroll in HIST 2300 and 2301 although any American history courses from the Core Curriculum requirements approved list 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.

Visual and Performing Arts 3
Selected from Core Curriculum requirements approved list.

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.

Major and Electives

In addition to the above requirements, the student must take major and elective courses sufficient to total 120 semester credit hours.

Students should have selected their major by the time they are enrolled in JOUR 2310 or they reach their junior year. They will be required to complete a minimum of 39 hours for their major subject, including 6 hours of intensive writing courses. At least 18 hours of the major subject must be in courses at the junior-senior level. All courses in the major 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 (MC 113).

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.

Course Descriptions

Course descriptions for the college's various specializations can be found within the catalog information for each department. Those courses with a MCOM prefix that are common to many disciplines within the college can be reviewed below.

Mass Communications (MCOM)

(To interpret course descriptions, see page 13)

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. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
- 3300. **Mass Media Theories and Society (3:3:0)**. Prerequisite: Must have at least 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: Must have at least 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)**. Prerequisites: Must have at least sophomore standing and MATH 2300 or 2345 with a grade of C or higher. 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 with a grade of B or higher. 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)**. 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)**. Prerequisites: MCOM 5364 and 5374 with a grade of B or higher. 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

Robert W. Meeds, Ph.D., Chairperson

Professors: Hudson

Associate Professors: Bichard, Meeds

Assistant Professors: Bradley, Farnall, Sparks

Instructor: Rodriguez

About the Program

The advertising program in the College of Mass Communications gives students the training and background to enter and become leaders in advertising communications. Students gain an understanding of the creative and business-related aspects of advertising, including copywriting, sales, design, production, creative strategy, media planning, and research. The department also hosts industry professionals who speak to students about internships and careers in advertising. Advertising majors are not required to have a minor outside the college. Students majoring in advertising may take additional coursework in advertising or from other departments within the college or they may take approved electives outside the college.

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 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, and public relations.

Advertising Curriculum

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	ADV 3310	ADV 3312	ADV 4308
ECO 2305 or 2301 and 2302	MCOM 3320	ADV 3320	ADV 4312
MATH 2300, or 1330 and 1331, or 2345	MCOM 3380	ADV 3351	3 hrs. Group A
	JOUR 2310	ADV 3361	3 hrs. Group B
	3 hrs. Group A	3 hrs. Group A	
	3 hrs. Group B	3 hrs. Group B	
	3 hrs. Group C	3 hours Group C	

Students majoring in advertising are required to complete 33 semester hours within the college, including the following:

- ADV 3310, 3312, 3320, 3351, 3361, 4308, 4312; JOUR 2310; MCOM 1300, 3320, 3380
- 9 hrs. from Group A (ADV 3390, 4000, 4300, 4301, 4304, 4313)
- 9 hrs. from Group B (MCOM 3300; EMC 3308, 3315, 3333, 3335, 3380, 4301, 4315, 4325; PHOT 3330; JOUR 3317, 4301; PR 3312, 3341, 4301)
- 6 hrs. from Group C electives (BA 3301, 3305; ENGL 2311, 2351, 3365; PFP 3301; PSY 3304)

Advertising (ADV)

(To interpret course descriptions, see page 13.)

Undergraduate Courses

- 3310. Principles of Advertising (3:3:0).** Must have at least a 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).** Prerequisites: ADV 3310 and JOUR 2310 with a grade of C or higher; 2.75 GPA. Corequisite: Lab. 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)

- 3320. Advertising and Society (3:3:0).** Prerequisite: At least sophomore standing. Examines advertising's role in modern society and its relationship to the consumer in historical and contemporary contexts.
- 3330. Advertising Theory (3:3:0).** Prerequisite: ADV 3310. Examines the development and practical application of theories and models related to advertising effects, audience response, and return on investment.
- 3340. Internet and New Media Advertising (3:3:0).** Prerequisites: ADV 3310, 3312. Explores Internet and new media advertising issues and techniques. Includes evaluating and creating Internet and new media-based advertising campaigns.
- 3351. Advertising Media Planning (3:3:0).** Prerequisites: ADV 3310, JOUR 2310 (may be taken concurrently), MATH 2300 or 2345 or 1330 and 1331 with a grade of C or higher. 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 3312 with a grade of C or higher. Corequisite: Non-credit lab. Can be taken concurrent with ADV 3351 if ADV 3312 is completed with a C or higher. Teaches computer proficiency with the major software packages in Adobe Creative Suite 2, including Illustrator, InDesign and Photoshop. Analyzes the creative aspects of advertising, strategy, copy, layout, typography, and production. Provides practical application of how to plan and execute effective print and broadcast messages.
- 3390. Internship in Advertising (3).** Prerequisites: Junior or senior standing; ADV 3351 and JOUR 2310 with a grade of C or higher; 2.75 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).** Prerequisites: Junior or senior standing, 9 hours of advertising courses with a grade of C or higher, and consent of instructor prior to registration. May be repeated once for credit.
- 4301. Special Topics in Advertising (3:3:0).** Prerequisite: Sophomore standing or higher. Considers selected topics in advertising. May be repeated for credit when topic varies.
- 4304. Advanced Creative Strategy (3:3:0).** Prerequisite: ADV 3361 with a grade of C or higher. Advanced formulation and techniques of creative strategy with emphasis on copywriting. May include participation in local, state, regional, and/or national advertising competitions.
- 4308. Advertising Management and Account Planning (3:3:0).** Prerequisites: ADV 3312 and 3351 with a grade of C or higher. Prerequisites or Corequisite: MCOM 3380 with a grade of C or higher. Business management applied to advertising, with emphasis on account planning.
- 4312. Advertising Campaigns (3:3:0).** Prerequisites: ADV 3351, 3361, and MCOM 3380 with a grade of C or higher. 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).** Prerequisites: ADV 3310 with a grade of C or higher and at least sophomore standing. A study of the practices and procedures of advertising on the international market. Fulfills Core Social and Behavioral Sciences-Individual or Group Behavior requirement.

Graduate Courses

- 5326. Advertising and the Consumer (3:3:0).** Survey and analysis of current behavioral science findings as related to advertising. Restricted to fully admitted graduate students with a declared degree in any program.
- 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. Restricted to fully admitted graduate students with a declared degree in any program.
- 7000. Research (V1-12).**

Department of Electronic Media and Communications

L. Todd Chambers, Ph.D., Chairperson

Associate Professors: Chambers, Reeves, Wilkinson

Assistant Professors: Cummins, Kubik, Peaslee, Smith

Instructor: Galvez

About the Program

This department supervises the Bachelor of Arts in Electronic Media and Communications degree, which is designed to prepare students for careers in the creation, distribution, sales, and management of content for electronic media and digitally-based industries. The EMC program offers professional courses in electronic media and broadcasting, photocommunications, and writing to provide a broad and thorough liberal arts education.

Electronic Media and Communications is not simply a skills-oriented program. Instead, the program is devoted to preparing students for leadership positions in electronic media industries. A successful graduate of this program should be able to:

- Understand the historical development of electronic and visual media.
- Create audio, photographic, and video packages of information for distribution in electronic media industries.
- Evaluate the effectiveness and usability of electronic media content and programming.
- Use appropriate tools for analyzing electronic media audiences in multicultural markets.
- Demonstrate the ability to create, manage, and market a product for distribution in a wide variety of electronic media.

To develop a profound understanding of the historical and cultural dimensions of electronic media, the EMC core curriculum explores the social, technological, economic, and political contexts of mass communications. Students majoring in electronic media and communications may focus coursework in one of two concentrations:

- **Electronic Media Management and Economics (EMME).** Students in EMME will be prepared to work in careers related to electronic media industries, including radio, television, film, cable, Internet, advertising agencies, and others.



- **Visual Communications (VCOM).** Students specializing in VCOM will be prepared to work in careers related to electronic media industries such as photojournalism, commercial photography, video production, film, cable, Internet, advertising agencies, and others.

Students in the College of Mass Communications are not required to have a minor outside the college. Students majoring in one of the college's departments may take additional coursework from within or outside the college; however, the student must abide by any prerequisite requirements and other rules governing outside coursework.

Minor. Students selecting a minor in EMC 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 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 EMC 3300, 3315, 4320; JOUR 2310; 3 hours selected from EMC 3370, 4370, 4375; 3 hours of electives from EMC 3380, 4325, PHOT 3310; and 3 hours of electives from EMC or PHOT courses. Additional minors are listed in each supervising department and are available in advertising, general mass communications, journalism, and public relations

Electronic Media and Communications Curriculum

Electronic Media Management and Economics Concentration

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	EMC 3300	EMC writing	EMC 4320
ECO 2305 or 2301 and 2302	EMC 3315	EMC 3355 or 3358	6 hrs. Group A
MATH 2300 or 2345	MCOM 3300	MCOM 3320	6 hrs. Group B
	JOUR 2310	3 hrs. Group A	
	6 hrs. Group B	3 hrs. Group B	
	6 hrs. Group A		

Electronic Media Management and Economics Concentration. Students majoring in electronic media and communications with a concentration in electronic media management and economics are required to complete 39 hours within the college, including the following:

- MCOM 1300, 3300, 3320; JOUR 2310; EMC 3300, 3315, 3355 or 3358, 4320, EMC writing
- 15 hrs. from Group A (EMC 3310, 3340, 3345, 3390, 4300, 4301)
- 15 hrs. from Group B (ADV 3310, 3320, 3380, 4313, 4301, 4325; JOUR 3310, 3350, 4301; MCOM 3380, PR 3310, 4301, or approved courses in anthropology, communication studies, English, general business, history, music history, literature, sociology, and theatre arts)

Visual Communications Concentration

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	JOUR 2310	EMC 3308	EMC 4320
ECO 2305 or 2301 and 2302	EMC 3300	EMC 3355 or 3358	6 hrs. Group A
MATH 2300 or 2345	EMC 3315	EMC Writing	6 hrs. Group B
	MCOM 3300	MCOM 3320	
	6 hrs. Group B	3 hrs. Group A	
	3 hrs. Group A	3 hrs. Group B	

Visual Communications Concentration. Students majoring in electronic media and communications with a concentration in visual communications are required to take 39 hours within the college, including the following:

- MCOM 1300, 3300, 3320; JOUR 2310; EMC 3300, 3308, 3315, 3355 or 3358, 4320, EMC writing
- 12 hrs. from Group A (EMC 3333, 3335, 3345, 3390, 4301, 4370, 4375, 4380; PHOT 3310, 3330, 3335, 3390, 4300)
- 15 hrs. from Group B (ADV 3310, 3320, 4301, 4313; JOUR 3310, 3350, 4301; MCOM 3380; PR 3310, 4301; or approved courses in anthropology, communication studies, English, general business, history, music history, literature, sociology, or theatre arts)

Electronic Media and Communications (EMC)

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: Must have at least sophomore standing. Current and emerging electronic media technologies, their integration into modern society and impact on information transfer. Fulfills Core Technology and Applied Science requirement.
- 3308. Visual Communications (3:3:0).** Prerequisite: Must have at least 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. Fulfills Core Visual and Performing Arts requirement.
- 3310. Introduction to Electronic Media and Communications (3:3:0).** Prerequisite: Must have at least sophomore standing. Basic instruction in the origin, history, development, regulation, and social responsibilities of broadcasting and cable communications. Examines new technology and telecommunications systems. Fulfills Core Technology and Applied Science requirement.
- 3315. Principles of Digital Media Production (3:2:3).** Prerequisites: EMC 3300 and JOUR 2310 with a grade of C or higher, 2.75 GPA, and have at least sophomore standing. Corequisite: Non-credit lab. Provides students with the working knowledge required for basic production of digital graphics, video, and audio.
- 3333. Multimedia Development (3:3:0).** Prerequisites: EMC 3315, PR 3341, ADV 3361, JOUR 3314 or 3317 with a grade of C or higher. 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 (3:3:0).** Prerequisite: EMC 3315 with a grade of C or higher. Corequisite: Non-credit lab. 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: JOUR 2310 and either EMC 3300, 3310, ADV 3310, JOUR 2300 or PR 3310 with a grade of C or higher. 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).** Prerequisite: EMC 3300 or EMC 3308 with a grade of C or higher, must have at least sophomore standing. 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: EMC 3315 with a grade of C or higher. 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).** Prerequisite: Must have at least sophomore standing. Examines issues surrounding ethnic, racial, and gender differences in media production and content from historical and contemporary perspectives.
- 3358. International Electronic Media (3:3:0).** Prerequisite: At least sophomore standing. Examines the social, political, and economic effects of international media and other topics related to the globalization of media companies.
- 3370. Writing for Electronic Media (3:3:0).** Prerequisites: EMC 3300 and JOUR 2310 with a grade of C or higher. 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).** Prerequisites: EMC 3315 and MATH 2300 with a grade of C or higher. 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, EMC 3340 or 3380 for Prerequisite: Junior or senior standing, EMC 3380 for sales

or promotion or EMC 3315 for production with a grade of C or higher, 2.75 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.

- 4300. Senior Projects in Electronic Media and Communications (3).** Prerequisite: Junior or senior standing, 9 hours of EMC courses with a grade of C or higher, and consent of instructor. May be repeated once for credit with different emphasis.
- 4301. Special Topics in Electronic Media (3:3:0).** Prerequisite: Sophomore standing. Considers selected topics in electronic media. May be repeated for credit.
- 4315. Advanced Web Production (3:2:3).** Prerequisite: EMC 3315 or JOUR 3310 with a grade of C or higher. Corequisite: Non-credit lab. 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: Junior or senior standing, EMC 3335 or EMC 3380 or PHOT 3310 with a grade of C or higher. 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).** Prerequisites: Junior or senior standing. 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: EMC 3300 and JOUR 2310 with a grade of C or higher 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: EMC 3300 and JOUR 2310 with a grade of C or higher 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: EMC 3315 or JOUR 3314 with a grade of C or higher 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. 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).** Class restricted to fully admitted graduate students with a declared major in any program. 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).**

Photography (PHOT)

Undergraduate Courses

- 2310. [COMM 1318] Principles of Photography (3:3:0).** Prerequisite: Must have at least a sophomore standing. 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).** Prerequisites: EMC major, at least sophomore standing, and JOUR 2310 with a grade of C or higher. This class will cover the use of a 35mm digital SLR camera with manual capabilities.
- 3316. Photography II (3:3:0).** Prerequisite: PHOT 3310 with a grade of C or higher. 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: At least sophomore standing. 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 with a grade of C or higher. 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)**. Prerequisites: PHOT 3310 and 3316 with a grade of C or higher, 2.75 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 3310 with a grade of C or higher. 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 3310 with a grade of C or higher. 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)**. Prerequisites: Junior or senior standing, EMC 3335 or PHOT 3310 with a grade of C or higher. 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)**. Class restricted to fully admitted graduate students with a declared degree in any program. 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

Randolph Reddick, Ph.D., Chairperson

Professor: Johnson, Reddick

Associate Professors: Dean, Saathoff, Watts

Assistant Professors: Fontenot, Grimm

Instructors: Brewton, Edwards, Hensley, McAlavy, 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 journalism majors study the unique attributes of each media environment, and they take two classes in which they gain experience telling stories in all three environments.

Journalism majors are required to select an approved minor or take a minimum of 12 hours of political and social sciences, business and economics, science and technology, or arts and humanities.

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 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 three 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, and public relations.

Journalism Curriculum

News-Editorial Concentration

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	JOUR 2310	JOUR 3310	JOUR 3390
JOUR 2300	MCOM 3300	JOUR 3312	JOUR 4350
ECO 2305 or 2301 and 2302	MCOM 3320 PHOT 2310	JOUR 3380 JOUR elective	JOUR 4370
MATH 2300 or 2345	JOUR 3350		

News-Editorial Concentration. Students majoring in journalism with a news-editorial concentration are required to complete 42 semester hours within the college, including the following: JOUR 2300, 2310, 3310, 3312, 3350, 3380, 3390, 4350, 4370; three hours of journalism elective; 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	JOUR 3310	JOUR 3315
JOUR 2300	MCOM 3300	JOUR 3312	JOUR 4350
ECO 2305 or 2301 and 2302	MCOM 3320 JOUR 3350	JOUR 3314 JOUR 4370	JOUR 4390 JOUR or EMC elective
MATH 2300 or 2345			

Broadcast Journalism Concentration. Students majoring in journalism with a broadcast concentration are required to complete 42 semester hours within the college, including the following: JOUR 2300, 2310, 3310, 3312, 3314, 3315, 3350, 4350, 4370, 4390; three hours of journalism or electronic media elective; MCOM 1300, 3300, 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	JOUR 3310	JOUR 3390
JOUR 2300	MCOM 3300	JOUR 3312	JOUR 4350
ECO 2305 or 2301 and 2302	MCOM 3320 PHOT 2310	EMC 4315 JOUR or EMC elective	JOUR 4370
MATH 2300 or 2345	JOUR 3350		

Online Journalism Concentration. Students majoring in journalism with an online concentration are required to complete 42 semester hours within the college, including the following: JOUR 2300, 2310, 3310, 3312, 3350, 3390, 4350, 4370; EMC 4315; three hours of journalism or electronic media elective; MCOM 1300, 3300, 3320; 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 higher in ENGL 0301 (if required), 1301, and 1302; at least sophomore standing; and pass the grammar, spelling, and punctuation exam with a grade of 70 or higher. Corequisite: Non-credit lab. Evaluation of news, news gathering methods, and writing. Required lab. (Writing Intensive)
- 3310. News Presentation I (3:2:3).** Prerequisites: JOUR 2300 and 2310 with a grade of C or higher. Corequisite: Non-credit lab. Contemporary design and production of news package delivery, including newspaper, magazine, video and web formats.
- 3312. Reporting (3:2:3).** Prerequisites: JOUR 2310 with a grade of C or higher, 2.75 GPA. Corequisite: Non-credit lab. May be taken after or concurrent with JOUR 3310. 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 (may be taken concurrently with JOUR 3312) with a grade of C or higher. Corequisite: Non-credit lab. 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 with a grade of C or higher. 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: JOUR 3312, ADV 3361, EMC 3315, PR 3341 with a grade of C or higher. 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: Must have at least sophomore standing. Study of the development of journalism in America from its European roots to the present and its interrelation with society. Fulfills Core Humanities requirement.
- 3355. Media Ethics (3:3:0).** Prerequisite: At least sophomore standing. An exploration of the ethical principles and issues facing news media practitioners, philosophical and professional standards of reporting.
- 3380. Editing (3:2:3).** Prerequisites: JOUR 3310 and 3312 with a grade of C or higher. Corequisite: Non-credit lab. 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).** Prerequisites: Junior or senior standing, JOUR 3310 and 3312 with a grade of C or higher, 2.75 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: Junior or senior standing, 9 hours of journalism courses with a grade of C or higher, and consent of instructor.
- 4301. Special Topics in Journalism (3:3:0).** Prerequisite: At least junior standing. A rotating topics course examining unique relationships among news media organizations, employees, and the publics they serve. May be repeated twice.
- 4330. Public Opinion and Propaganda (3:3:0).** Prerequisite: Junior or senior 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. Fulfills Core Social and Behavioral Sciences - Individual or Group Behavior requirement.
- 4350. Multiplatform News Delivery (3:2:3).** Prerequisite: JOUR 3314 or 3380 or EMC 4315 with a grade of C or higher (may be taken concurrently). Capstone course on production of news in print, online, and broadcast environments. (Writing Intensive)
- 4370. Advanced Reporting (3:2:3).** Prerequisite: JOUR 3310 and 3312 with a grade of C or higher. Corequisite: Non-credit lab. 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. (Writing Intensive)
- 4390. Journalism Practicum (3).** Prerequisite: Junior or senior standing, JOUR 3312 and 3314 with a grade of C or higher, 2.75 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.

Graduate Courses

- 5315. Special Topics in Journalism (3:3:0).** Class restricted to fully admitted graduate students with a declared degree in any program. 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).** Class restricted to fully admitted graduate students with a declared degree in any program. 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

Coy Callison, Ph.D., Chairperson

Professors: Hudson

Associate Professor: Callison

Assistant Professors: Boyer, Seltzer, Wirtz, Zhang

Instructor: Rodriguez, Wofford

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 500 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 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; PR 3310, 3312, 3341, 4308, 4312; and MCOM 3380. Additional minors are listed in each supervising department and are available in advertising, electronic media and communications, general mass communications, and journalism.

Public Relations Curriculum

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	PR 3310	PR 3312	PR 4301
ECO 2305 or 2301 and 2302	PR 3311	PR 3341	PR 4312
MATH 2300 or 1330 and 1331 or 2345	JOUR 2310	PR 4301	6 hrs. Group A
	MCOM 3300	PR 4308	6 hrs. Group B
	MCOM 3320	MCOM 3380	
	3 hrs Group A	3 hrs Group A	

Students majoring in public relations are required to complete 51 hours within the college, including the following:

- PR 3310, 3311, 3312, 3341, 4308, 4312; MCOM 1300, 3300, 3320, 3380; JOUR 2310, and P R 4301 twice
- 12 hrs. Group A (ADV 3310, 3351, 4301, 4308, 4313; EMC 3300, 3308, 3310, 3315, 3340, 3345, 3355, 3358, 3380, 4301, 4325; JOUR 3310, 3312, 3317, 3380, 4301; PHOT 2310.
- 6 hrs. Group B* (ANTH 3300; BA 3301, 3302, 3305; COMS 3313, 3315; ECO 3305; ENGL 2311, 2351, 3365; PSY 3304; SOC 3391)
- ECO 2305 or both ECO 2301 and 2302; MATH 2300 or MATH 1330 and 1331 or MATH 2345

Total hours required for group electives are 18 hours. Hours required in Group A are 12-18 hours and Group B, 0-6 hours.

Public Relations (PR)

Undergraduate Courses

- 3310. Principles of Public Relations (3:3:0).** Prerequisite: Must have at least 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.
- 3311. Public Relations Strategies (3:3:0).** Prerequisite: PR 3310. Strategic management of public relations by analyzing the PR process as it relates to PR theory and practice.
- 3312. Public Relations Writing (3:2:3).** Prerequisites: PR 3310 and JOUR 2310 with a grade of C or higher, 2.75 GPA. Corequisite: Non-credit lab. 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 (3:2:3).** Prerequisite: PR 3312 with a grade of C or higher. Corequisite: Non-credit lab. 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; PR 3310. Prerequisite: Junior or senior standing, PR 3312 with a grade of C or higher, 2.75 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: 9 hours of public relations courses with a grade of C or higher.
- 4301. Special Topics in Public Relations (3:3:0).** Prerequisite: Sophomore standing or higher. Considers selected topics in public relations. May be repeated for credit.
- 4308. Public Relations Management (3:3:0).** Prerequisite: PR 3312 with a grade of C or higher. 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: PR 3312 and MCOM 3380 with a grade of C or higher. 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. (Writing Intensive)

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 Outreach and Distance Education

Mathew T. Baker, Ph.D., Dean

605 Indiana Ave. | Lubbock, TX 79409-2191
T 806.742.7200 | 800.692.6877 | F 806.742.7222
www.ode.ttu.edu | distlearn@ttu.edu

About the College

The College of Outreach & Distance Education (CODE) coordinates distance education offerings as well as programs offered at off-campus sites in Abilene, Amarillo, El Paso, Fredericksburg, Highland Lakes (Marble Falls), and Junction.

Additionally, CODE administers self-paced, independent study 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. CODE offers non-credit community outreach programs for both students and adults through the Outdoor School at TTU Center at Junction, Study with the Masters, and the Osher Lifelong Learning Institute at Texas Tech University. CODE also assists academic departments in developing and delivering non-credit short courses, certificate programs, customized training, and workshops for professionals.

The main office of the College of Outreach and Distance Education is located at 605 Indiana Avenue adjacent to the International Cultural Center.

Semester-Based Degrees, Certificates, Certification Preparation Programs

Degrees at a distance are delivered through a variety of methods, including online, interactive video conferencing (IVC), chat, and email. Some programs require students to attend face-to-face meetings or classes at a particular location.

Degrees

- Bachelor of General Studies
- Bachelor of Science in Horticultural and Turfgrass Sciences
- Master of Agriculture
- Master of Arts in Technical Communication
- Master of Education in Instructional Technology
- 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 Crop Science
- Master of Science in Family and Consumer Sciences Education*
- Master of Science in Horticultural and Turfgrass Sciences
- Master of Science in Human Development and Family Studies (emphasis on Gerontology)*
- Master of Science in Restaurant, Hotel, and Institutional Management
- Master of Science in Software Engineering

* Requires students to travel occasionally to the Lubbock campus.

- Master of Science in Systems and Engineering Management
- Ed.D. in Agricultural Education (joint program with Texas A&M)
- Ph.D. in Technical Communication and Rhetoric
- Eight additional undergraduate and graduate degrees are offered only at specific off-campus sites. See the next page for a detailed listing.

Graduate Certificates

- Autism (Texas Tech University)
- Crop Protection (Texas Tech University)
- Dual Sensory Impairments (Texas Tech University)
- Fibers and Textiles (Texas Tech University)
- Gerontology*
- Healthcare Change
- Horticultural Landscape Management (Texas Tech University)
- Soil Management (Texas Tech University)

Graduate Certificate Preparation Programs

- Deaf Education (Texas State Board for Educator Certification)
- Educational Diagnostician (Texas State Board for Educator Certification)
- Family and Consumer Sciences Education (FCSE) Teacher Education**
- Generic Special Education (Texas State Board for Educator Certification)
- Orientation and Mobility (National Certification in Orientation and Mobility through the Association for Education and Rehabilitation of the Blind and Visually Impaired [AER])
- Visual Impairment (Texas State Board for Educator Certification)

Self-Paced, Independent Study

- Bachelor of General Studies
- More than 60 courses



Off-Campus Educational Sites

Bob Hickerson, Chief Operation Officer

254 Red Raider Lane | Junction, TX 76849 |
T 325.446.2301 or 806.742.6434 | F 325.446.4011
<http://www.depts.ttu.edu/provost/offcampussites.php>
bob.hickerson@ttu.edu

Students pursuing degree 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 at the main campus. For general information on academic programs offered at off-campus sites, contact James Morris, Ph.D., Director of Academic Affairs, Texas Tech University Off-Campus Sites, 806.742.6434.

Texas Tech University at Abilene

Tom Dolan, Associate Director

302 Pine Street | Abilene, TX 79601
T 325.677.1112 or 806.742.6446 | F 325.677.1224
www.abilene.ttu.edu | info.abilene@ttu.edu

- Master of Science in Computer Science
- Master of Science in Software Engineering
- Ph.D. in Computer Science
- Ed.D. in Educational Leadership*

Students at TTU at Abilene also 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.

Texas Tech University at Amarillo

Dr. Milton Smith, Director

Wellington Square Building
1616 S. Kentucky Avenue, Suite C150 | Amarillo, TX 79102
T 806.742.6460 or 806.356.4702 | F 806.742.3411
www.amarillo.ttu.edu | info.amarillo@ttu.edu

- Master of Science in Systems and Engineering Management
- Ph.D. in Systems and Engineering Management
- Ed.D. in Educational Leadership*

Texas Tech University at El Paso

Dr. Nicholas Markovich, AIA, Director

7090 Viscount Ave., Ste. 625A | El Paso, TX 79924
T 915.831.7620
www.arch.ttu.edu/programs/elpaso/ | nicholas.markovich@ttu.edu

- Bachelor of Science in Architecture (offered in partnership with El Paso Community College)

Texas Tech University at Fredericksburg

Bob Hickerson, Chief Operation Officer

102 E. San Antonio Street | Fredericksburg, TX 78624
T 830.990.2717 or 806.742.6440 | F 830.990.1567
www.fredericksburg.ttu.edu | info.fredericksburg@ttu.edu

- Bachelor of General Studies
- Bachelor of Science in Multidisciplinary Studies with ESL and EC-6 Certification (Generalist) (offered in partnership with Austin Community College)
- Master of Education in Educational Leadership and Principal Professional Certification Preparation
- Master of Science in Multidisciplinary Science**
- Superintendent Professional Certification Preparation Program
- Ed.D. in Educational Leadership*

* Requires students to travel occasionally to the Lubbock campus.

** Requires students to attend TTU Center at Junction for two or three weeks during the summers.

Texas Tech University at Highland Lakes

Bob Hickerson, Chief Operation Officer

Frank Fickett Educational Center
806 Steve Hawkins Parkway, Suite 101 | Marble Falls, TX 78654
T 830.798.9548 or 806.742.6450 | F 830.798.8598
www.highlandlakes.ttu.edu | info.highlandlakes@ttu.edu

- Bachelor of General Studies
- Bachelor of Science in Multidisciplinary Studies with ESL and EC-6 Certification (Generalist) (offered in partnership with Central Texas College)
- Master of Education in Educational Leadership and Principal Professional Certification Preparation
- Master of Science in Multidisciplinary Science**
- Superintendent Professional Certification Preparation Program
- Ed.D. in Educational Leadership*

Texas Tech University Center at Junction

Dr. James Morris, Academic Director

254 Red Raider Lane | Junction, TX 76849
T 806.742.6434 or 325.446.2301 | F 325.446.4011
www.junction.ttu.edu | info.junction@ttu.edu

- Bachelor of General Studies
- Bachelor of Science in Multidisciplinary Studies with ESL and EC-6 Certification (Generalist) (offered in partnership with Howard College)
- Master of Art Education
- Master of Education in Educational Leadership and Principal Professional Certification Preparation
- Master of Science in Multidisciplinary Science**
- Superintendent Professional Certification Preparation Program
- Ed.D. in Educational Leadership*

TTU Center at Junction offers intensive two-week sessions during May (Intersession) and the holiday break (WinterSession) as well as two three-week summer sessions allowing students to take undergraduate and graduate coursework. 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. Recreational opportunities include river activities, hiking and nature trails, a sand volleyball court, and a swimming pool.

TTU Center at Junction is also home to the Llano River Field Research Station (Director, Tom Arsuffi, Ph.D.) and the Outdoor School (Coordinator, Dixie Mayer). The Llano River Field Research Station supports research focus on aquatic and watershed management. The Outdoor School is a real-world, hands-on program for K-12 teachers and students that stimulates imagination and understanding of difficult abstract concepts.



College of Visual and Performing Arts

Carol D. Edwards, Ph.D., Dean

224 Administration | Box 45060 | Lubbock, TX 79409-5060
T 806.742.0700 | F 806.742.0695 | www.vpa.ttu.edu

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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 120-128 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 distance learning 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 Admission to the University 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 a 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.

Distance Learning 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 College 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 Admission to the University 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 cata-

log. 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 distance learning 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 distance learning. 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 Admission to the University 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.	
Oral Communication	3
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 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 **6**

Natural Laboratory 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 sciences laboratory courses listed in the Core Curriculum.

Technology and Applied Science **3**

Courses must be selected from the list of Core Curriculum options.

Individual or Group Behavior **3-6**

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 **6**

Students normally enroll in HIST 2300 and 2301.

Political Science..... **6**

Students will enroll in POLS 1301 and normally in 2302. One course must be taken from a Texas college or university.

Humanities **3-6**

Courses must be selected from the list of Core Curriculum options.

Visual and Performing Arts **3-6**

Satisfied in the majors.

Multicultural Requirement **3**

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 **0-2**

If elected, hours may come from any two PFW 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 **minimum 120**

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 junior/senior 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.

Semester Hours

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.

Semester Hours

English	6
Political Science.....	6
History	6

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
• Visual Studies	67
(leading toward teacher certification)	
• Communication Design	82
• Studio Art	82
Professional Education	21
(teacher certification only)	
Total for Degree	120-127

* 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.



Graduate Program

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 coursework 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. The residence requirement for the fine arts doctoral program is fulfilled by satisfactory completion of 18 semester hours of graduate coursework during one 12-month period.

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)
THA 5310	Historical and Critical Perspectives in Theatre Arts (3:3:0)
THA 5314	Theatre Arts in Contemporary Context (3:3:0)

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.

	Semester Hours
English	6
Oral Communication	3
Mathematics and Logical Reasoning	6
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
Political Science.....	6
U.S. History	6
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	71-82
MUCP	84
MUTH	74
MUTC	65-66
Professional Education	21
(teacher certification only)	
Total for Degrees	
MUPF	120-126
MUCP	122
MUTH	121
MUTC	127-128

* 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. (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.law.ttu.edu/prospective/specialprograms/honors3/, and www.honr.ttu.edu.

Course Descriptions

Course descriptions for the college's various specializations can be found within the catalog information for each department. Those courses with a VPA prefix that are common to many disciplines within the college can be reviewed below.

Visual and Performing Arts (VPA)

(To interpret course descriptions, see page 13.)

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. Fulfills Core Humanities requirement.

Graduate Course

- 5300. Topics in the Visual and Performing Arts (3:3:0).** 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

Todd J. DeVriese, M.F.A., Director

Professors: Dingus, Edwards, Fuentes, Glover, Morrow, Tate, Waters, Wink

Associate Professors: W. Cannings, Check, Cortez, Fehr, Flueckiger, D. Fowler, Germany, Granados, Martin, Slagle, Steele, Tedeschi, Venhuizen,

Assistant Professors: Akins-Tillet, Blizard, Chua, Elko, Elliott, Erler, Lindsay, Orfila, Ortega, Tierney, Yoo

Adjunct Faculty: S. Cannings, C. Fowler, Hartsfield, Milosevich, B. Wheeler, J. Wheeler

About the Program

This school supervises the following degree and certificate 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
- Graduate Certificate in Art History, Criticism, and Theory

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.

Distance Learning Courses. Major or minor courses may not be taken by distance learning.

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. All art minors must be approved by the school. Declaration of an art minor must be made prior to completion of minor coursework and with the School of Art academic advisor. 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.

Specific requirements are as follows:

- **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 Arts 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 practice in public schools and community settings, as well as with alternative populations such as children from low socioeconomic environments and incarcerated youth, children, and adults with differing abilities.

The B.F.A. degree with a visual studies major requires 67 semester hours of studio art and art history, 33-39 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 126 credit hours. A minimum of 40 credit hours of junior- and senior-level courses are required for graduation. (See curriculum table on next page.)

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.

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 must select an area of emphasis from ceramics, jewelry design and metalsmithing, 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. Students must take each course in their area of emphasis at least once prior to graduation. Graduating studio art majors are required to participate in a group exhibition during the spring semester of their graduating year.

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.

Bachelor of Fine Arts in Visual Studies

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ART 1100, Introduction to Art	1	ART 2303, Design I: Introduction	3
ART 1302, Design I: Introduction	3	ART 2304, Drawing II: Introduction	3
ART 1303, Drawing I: Introduction	3	ART 2311, Art History Survey II	3
ART 1310, Art History Survey I	3	ENGL 1302, Advanced Coll. Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Oral Communication Credit	3
TOTAL	13	TOTAL	15
<i>Summer I</i>		<i>Summer II</i>	
Mathematics/Logical Reasoning Credit	3	Mathematics/Logical Reasoning Credit	3

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ART 3360, Intro to Theor.& Pract. in Art ¹ (fall only)	3	ART 3364, Found. of Art in Soc. Inst. ² (spring only)	3
ART 3362, Technology in the Visual Arts (fall only)	3	Studio Art Emphasis Credit	3
ART 3312, Art History Survey III	3	2-D or 3-D Distribution Credit	3
2-D or 3-D Distribution Credit	3	2-D or 3-D Distribution Credit	3
2-D or 3-D Distribution Credit	3	Natural Laboratory Science Credit	4
TOTAL	15	TOTAL	16
<i>Summer I</i>		<i>Summer II</i>	
HIST 2300, U.S. History to 1877 (or other U.S. History credit)	3	HIST 2301, U.S. History from 1877 (or other U.S. History credit)	3
TOTAL	3	TOTAL	3

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ART 4362, Curric. Theory & Instr. Meth. ³ (fall only)	3	ART 4361, Topics in Visual Studies (spring only)	3
EDSE 4310, Learning, Cog., & Instr. Des.*	3	EDLL4382, Read. & Writ.in Sec. Class* (spring only)	3
EDSE 4322, Diversity & Learn Environ.*	3	2-D or 3-D Distribution Credit	3
or EDSP 3300, Exceptional Child. & Yth*	3	Studio Art Emphasis Credit	3
2-D or 3-D Distribution Credit	3	POLS 1301, American Govt., Org.	3
Natural Laboratory Science Credit	4	TOTAL	15
TOTAL	16		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ART 4365, Visual Studies Seminar ⁴ (fall only)	3	ART 4000/4001, Student Teaching ⁵	6-12
Studio Art Emphasis Credit	3	TOTAL	6-12
Additional Art History Credit†	3		
POLS 2302 (or approved POLS credit)	3		
Humanities Credit	3		
TOTAL	15		

¹⁻⁵ ART 3360, 3364, 4362, 4365, and Student Teaching must be taken in sequence.

* EDSE 4310 & 4322 and EDLL 4382 are offered year-round, including summer sessions. Students must apply to the College of Education at the start of the semester prior to the semester they intend to enroll in these courses.

† ART 3311 and 4315 both satisfy the Core Curriculum Individual & Group Behavior requirement; however additional elective hours may be necessary to reach minimum graduation requirements.



Bachelor of Fine Arts in Communication Design

FIRST YEAR			
Fall		Spring	
ART 1100, Introduction to Art	1	ART 2303, Design II: Introduction	3
ART 1302, Design I: Introduction	3	ART 2304, Drawing II: Introduction	3
ART 1303, Drawing I: Introduction	3	ART 2311, Art History Survey II	3
ART 1310, Art History Survey I	3	ART 2388, Design Process	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
Oral Communication Credit	3		
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
ART 3385, Computer Design Methods I	3	ART 3386, Computer Design Methods II	3
ART 4359, Design History	3	ART 3381, Typography	3
ART 3312, Art History Survey III	3	ART 3382, Symbols	3
Studio Art Elective Credit	3	Humanities Credit	3
Mathematics/Logical Reasoning Credit	3	Mathematics/Logical Reasoning Credit	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
ART 3383, Type and Image	3	ART 4380, Publication Design	3
ART 3384, Visual Systems	3	ART 4381, Public and Soc. Serv. Design	3
ART 4357, Web Media Design	3	Studio Art Elective Credit	3
Additional Art History Credit*	3	POLS 2302 (or approved POLS credit)	3
POLS 1301, American Govt., Org.	3	Natural Laboratory Science Credit	4
TOTAL	15	TOTAL	16
FOURTH YEAR			
Fall		Spring	
Communication Design Elective Credit	3	ART 4382, Portfolio Development	3
Communication Design Elective Credit	3	Communication Design Elective Credit	3
Studio Art Elective Credit	3	Studio Art Elective Credit	3
HIST 2300 (or approved U.S. History credit)	3	HIST 2301 (or approved U.S. History credit)	3
Natural Laboratory Science Credit	4	TOTAL	12
TOTAL	16		

* ART 3311 and 4315 both satisfy the Core Curriculum Individual & Group Behavior requirement; however additional elective hours may be necessary to reach minimum graduation requirements.

Bachelor of Arts in Art History

FIRST YEAR			
Fall		Spring	
ART 1100, Introduction to Art	1	ART 2303, Design II: Introduction	3
ART 1302, Design I: Introduction	3	ART 2304, Drawing II: Introduction	3
ART 1303, Drawing I: Introduction	3	ART 2311, Art History Survey II	3
ART 1310, Art History Survey I	3	ENGL 1302, Advanced Coll. Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Foreign Language Credit	3
Foreign Language Credit*	3	TOTAL	15
TOTAL	16		
SECOND YEAR			
Fall		Spring	
ART 3312 – Art History Survey III	3	Art History Breadth Credit†	3
Minor Credit	3	Art History Breadth Credit†	3
Foreign Language Credit*	3	Minor Credit	3
Oral Communication Credit	3	Foreign Language Credit*	3
Mathematics/Logical Reasoning Credit	3	Mathematics/Logical Reasoning Credit	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
Art History Breadth Credit†	3	Art History Focus Credit†	3
Art History Breadth Credit†	3	Art History Breadth Credit†	3
Minor Credit	3	Minor Credit	3
HIST 2300 (or approved U.S. Hist. credit)	3	HIST 2301 (or approved U.S. Hist. credit)	3
Natural Laboratory Science Credit	4	Natural Laboratory Science Credit	4
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
Art History Focus Credit†	3	ART 4311, Sr. Thesis in Art History	3
Art History Breadth Credit†	3	Art History Breadth Credit†	3
Minor Credit	3	Minor Credit	3
POLS 1301	3	POLS 2302 (or approved POLS credit)	3
Humanities Credit	3	Technology & Applied Science Credit	3
TOTAL	15	TOTAL	15

* Two semesters of the same Foreign Language at the sophomore level are required. Freshman-level Foreign Language coursework may be necessary and is dependent on Foreign Language credit completed in High School, but three or four semesters is typical.

† ART 3311 and 4315 both satisfy the Core Curriculum Individual & Group Behavior requirement; however additional elective hours may be necessary to reach minimum graduation requirements.

Bachelor of Fine Arts in Studio Art

FIRST YEAR			
Fall		Spring	
ART 1100, Introduction to Art	1	ART 2303, Design II: Introduction	3
ART 1302, Design I: Introduction	3	ART 2304, Drawing II: Introduction	3
ART 1303, Drawing I: Introduction	3	ART 2311, Art History Survey II	3
ART 1310, Art History Survey I	3	ENGL 1302, Advanced Coll. Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics/Logical Reasoning Credit	3
Mathematics/Logical Reasoning Credit	3	TOTAL	15
TOTAL	16		
SECOND YEAR			
Fall		Spring	
Emphasis Credit	3	Emphasis Credit	3
ART 3323, Drawing III: Life Drawing	3	ART 3324, Advanced Life Drawing or	3
ART 3312, Art History Survey III	3	ART 3329, Intro to Digital Imaging	3
2-D Distribution Credit	3	2-D Distribution Credit	3
Natural Laboratory Science Credit	4	3-D Distribution Credit	3
TOTAL	16	Natural Laboratory Science Credit	4
		TOTAL	16
THIRD YEAR			
Fall		Spring	
Emphasis Credit	3	Emphasis Credit	3
3-D Distribution Credit	3	3-D Distribution Credit	3
Additional Art History Credit*	3	Additional Art History Credit	3
HIST 2300	3	HIST 2301	3
(or approved U.S. History credit)	3	(or approved U.S. History credit)	3
Oral Communication Credit	3	Humanities Credit	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Emphasis Credit	3	Emphasis Credit	3
Emphasis Credit	3	Studio Art Elective Credit	3
Studio Art Elective Credit	3	Studio Art Elective Credit	3
ART 4335, Sr. Sem. for Studio Art Majors	3	POLS 2302 (or approved POLS credit)	3
POLS 1301, American Govt., Org.	3	TOTAL	12
TOTAL	15		

*ART 3311 and 4315 both satisfy the Core Curriculum Individual and Group Behavior requirement; however, additional elective hours may be necessary to reach minimum graduation requirements.

Art (ART)

(To interpret course descriptions, see page 13.)

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. Fulfills Core Visual and Performing Arts requirement.
- 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. Fulfills Core Visual and Performing Arts requirement.
- 1309. [ARTS 1301, 1313, 1413] 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. Fulfills multicultural requirement. Fulfills Core Visual and Performing Arts requirement.
- 1310. [ARTS 1303] Art History Survey I (3:3:0).** A survey of painting, sculpture, architecture, and the minor arts from prehistoric times to

Graduate Program / Art

Certificate in Art History, Criticism, and Theory

The Graduate Certificate in Art History, Criticism, and Theory comprises a minimum of 15 semester hours of graduate work that includes 6 semester hours of required courses and 9 semester hours of related courses in art history and criticism chosen in consultation with the graduate advisor for art history. Six semester hours in art history at the undergraduate or graduate level are a prerequisite (recommended) or corequisite for this certificate. Students who have met the minimum entrance requirements of the Graduate School should apply there for entry into the certificate program. The Graduate School will issue the certificate upon completion of the required 15 semester hours of coursework. Courses completed as requirements for another program (e.g., a minor field of study) can be applied toward the certificate.

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 in fine arts degree, 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 coursework may be undertaken; however, the State of Texas limits students to 99 hours of doctoral study.

The residence requirement for the fine arts doctoral program is fulfilled by satisfactory completion of 18 semester hours of graduate coursework during one 12-month period.

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 applicant's dossier must be reviewed by the graduate art education and art history-criticism faculty, and a personal interview is recommended. The faculty will submit recommendations to a three-member preview committee. If approved, the applicant will be recommended by the committee to the college's Graduate Committee for acceptance into the program. Acceptance also will be contingent upon satisfaction of all Graduate School requirements for admission. A specific degree plan will be determined after admission.

the 14th century. AP waiver possible. Fulfills multicultural requirement. Fulfills Core Visual and Performing Arts requirement.

- 2303. [ARTS 1312] **Design II: Introduction (3:0:6)**. 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 (or ARCH 1341). 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.
- 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. Fulfills Core Visual and Performing Arts requirement.
- 2388. **Design Process (3:0:6)**. Prerequisite: ART 1302, 1303 (or ARCH 1341). 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 1303 (or ARCH 1341), ART 2303, and ART 2304. Introduction to wheel throwing, glazing and firing. Outside assignments.
- 3301. **Ceramics I: Introduction to Handbuilding (3:0:6)**. Prerequisite: ART 1303 or ARCH 1341, ART 2303, and ART 2304. Introduction to handbuilding techniques, glazing, and firing. Outside assignments.
- 3308. **Printmaking I: Introduction (3:0:6)**. Prerequisite: ART 1302, ART 1303 (or ARCH 1341), and ART 2304. 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 1310 (or 1309), 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.

- 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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences–Individual or Group Behavior requirement.
- 3312. Art History Survey III (3:3:0).** Prerequisite: ART 2311 (or 1309), 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. (Writing Intensive)
- 3313. Latin American Art (3:3:0).** Prerequisite: ART 2311, 3312, or consent of instructor. Repeatable for credit.
- 3314. Art of the United States (3:3:0).** Prerequisite: ART 2311 (or 1309), 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.
- 3315. Ancient Near Eastern and Egyptian Art (3:3:0).** Prerequisite: ART 1310 (or 1309), 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.
- 3316. 19th Century Art (3:3:0).** Prerequisite: ART 2311 (or 1309), 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.
- 3317. Baroque Art (3:3:0).** Prerequisite: ART 2311 (or 1309), 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.
- 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.
- 3321. Painting I: Introduction (3:0:6).** Prerequisite: ART 1302, 1303 (or ARCH 1341), and 2304. Introduction to painting concepts and techniques with designated sections for watermedia or oil. Outside assignments. Repeatable for credit.
- 3322. Intermediate Painting (3:0:6).** Prerequisite: ART 3321 or consent of instructor. Emphasis on the historical progression of painting and varied approaches as well as initiating individual exploration of process and subject matter. Outside assignments.
- 3323. Drawing III: Life Drawing (3:0:6).** Prerequisite: ART 1302, 1303 (or ARCH 1341), and 2304. 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. 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 1302, 1303 (or ARCH 1341), and 2304. Introduction to creative black and white photography. Covers traditional and digital camera operation, exposure adjustment, printing, and presentation. Outside assignments.
- 3326. Intermediate Photographic Arts (3:0:6).** Prerequisite: ART 3325 or consent of instructor. Intermediate fine arts photography with topics that rotate between color and black and white. Outside assignments. Repeatable once for credit with different emphasis.
- 3328. Printmaking II (3:0:6).** Prerequisite: ART 1302, 1303 (or ARCH 1341), and 2304. 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 1302, 1303 (or ARCH 1341), and 2304. 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 3300. 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. 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).** Prerequisites: ART 1303 (or ARCH 1341), 2303, and 2304. 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 3333. Further study of techniques used in metalsmithing 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 1303 (or ARCH 1341), 2303, and 2304. 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 1303 (or ARCH 1341), 2303, and 2304. 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. 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. 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 1302, 1303 (or ARCH 1341), 2303, and 2304. 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 1302, 1303 (or ARCH 1341), 2303, and 2304. Instructional and studio emphases on technology in the visual arts. Outside assignments. Fulfills Core Technology and Applied Science requirement.
- 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: ART 2388. 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.
- 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.
- 4313. Medieval Art of Europe (3:3:0).** Prerequisite: ART 3312 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.
- 4314. History of the Book as Art (3:3:0).** Prerequisite: Art 1310 (or 1309), or consent of instructor. Historical investigations of books that have been regarded as visual art. Repeatable for credit.
- 4315. The Arts of Pre-Columbian America (3:3:0).** Prerequisite: Art 1310 (or 1309), or consent of instructor. 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. Fulfills multicultural requirement. Fulfills Core Social and Behavioral Sciences – Individual or Group Behavior requirement.
- 4318. The Art of the Renaissance (3:3:0).** Prerequisite: ART 2311 (or 1309), 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.
- 4320. Experimental Drawing (3:0:6).** Prerequisite: ART 3324 and consent of instructor. 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.
- 4321. Advanced Painting (3:0:6).** Prerequisite: ART 3322 or consent of instructor. Emphasizes student's concepts and exploration of subject matter. Students select technical approach with instructor consent. Outside assignments. Repeatable for credit.
- 4322. Senior Studio: Painting (3:0:6).** Prerequisite: ART 4321 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.
- 4325. Advanced Photographic Arts (3:0:6).** Prerequisite: ART 3325, 3326, or consent of instructor. Advanced fine art photography with topics that rotate each semester (e.g., studio still life, alternative cameras, documentary, book arts). Outside assignments. Repeatable for credit up to a maximum of 12 hours.
- 4326. Senior Studio Photography (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 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 3329 or consent of instructor. 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: ART 3330 or 3331 or 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: ART 3334 or 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: 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: ART 3337 or 3338 or 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 4380 and 4381, or consent of instructor. 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: ART 4380 and 4381, or 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: ART 4380 and 4381, or 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: ART 4380 and 4381, or 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. Web Media Design (3:0:6).** Prerequisite: ART 3381, 3382, and 3386. Fundamentals of web site design and authoring tools applied to information structure, project workflow, functionality, and interface experience related to the professional field of communication design.
- 4358. Motion Graphics (3:0:6).** Prerequisite: ART 4380 and 4381, or 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: ART 2388. Examination of the evolution of the graphic arts. Discusses design innovators as well as styles and movements. Emphasis on 20th century. (Writing Intensive)
- 4361. Contemporary Visual Studies (3:3:0).** Modern and postmodern socioeconomics, 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).** Prerequisite: ART 4362, or consent of instructor. 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: ART 4380 and 4381. Emphasizes resume development, final portfolio preparation and refinement, business procedures, self-promotion, and interviewing skills.

Graduate Courses

- 5100. Advanced Art Unit (1).** Prerequisite: Consent of instructor. Individual investigation in art. May be repeated for credit.
- 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.

5202. **Art Seminar Professional Topics (2:2:0)**. Prerequisite: Instructor approval required for all graduate students admitted to the M.F.A. program. Students gain ability and experience in a variety of general skills essential for professional artists. Pass-fail grading.
5304. **Advanced Studio: Two-Dimensional (3)**. Prerequisite: Consent of instructor. The development and execution of advanced two-dimensional studio problems. May be repeated for credit.
5305. **Advanced Studio: Three-Dimensional (3)**. Prerequisite: Consent of instructor. The development and execution of advanced three-dimensional studio problems. May be repeated for credit.
5309. **Theories of Contemporary Art (3:3:0)**. Prerequisite: Consent of instructor. 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.
5313. **18th and 19th Century Art (3:3:0)**. Prerequisite: Consent of instructor. 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: Consent of instructor. Examines art, culture, and architecture of North, Central, or South American Indians. Repeatable for credit.
5316. **Art Theory and Criticism (3:3:0)**. Prerequisite: Consent of instructor. 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: Consent of instructor. Examination focusing upon major developments in Renaissance or Baroque painting, sculpture, architecture, and art criticism. Repeatable for credit.
5318. **Arts of Medieval Europe (3:3:0)**. Prerequisite: Consent of instructor. Multiple critical, theoretical, and historical approaches to the art and architecture of Medieval Europe. May be repeated with change of topic up to 9 hours.
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: Consent of instructor. The development and execution of advanced problems in drawing. May be repeated for credit.
5322. **Graduate Painting (3:0:6)**. Prerequisite: Consent of instructor. The development and execution of advanced problems in painting. May be repeated for credit.
5326. **Graduate Photography (3:0:6)**. Prerequisite: Consent of instructor. Experimental investigation into varied aspects of photography as creative media. May be repeated for credit.
5328. **Graduate Printmaking (3:0:6)**. Prerequisite: Consent of instructor. The development and execution of advanced problems in printmaking. May be repeated for credit.
5330. **Graduate Ceramics (3:0:6)**. Prerequisite: Consent of instructor. The development and execution of advanced problems in ceramics. May be repeated for credit.
5331. **Ceramic Raw Materials (3:0:6)**. Prerequisite: ART 5330 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: Consent of instructor. Explores 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: Consent of instructor. 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)**. Introduction to curriculum materials and technology to develop awareness of and practice in innovative procedures for teaching visual arts disciplines. Offered online.
5363. **Research Methods in the Visual Arts (3:3:0)**. Prerequisite: Consent of instructor. 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: WS 5310 or consent of instructor. 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. (WS 5320)
6000. **Master's Thesis (V1-6)**. Prerequisite: Consent of instructor.
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)**. Prerequisite: Consent of instructor. Repeatable for credit.
7000. **Research (V1-12)**. Prerequisite: Consent of instructor.
8000. **Doctor's Dissertation (V1-12)**. Prerequisite: Consent of instructor.



School of Music

William L. Ballenger, M.A., Director

Horn Professors: Westney

Professors: Ballenger, Barber, Brumfield, Deahl, Dent, Dolter, Gilbert, Henry, Killian, Meek, Rogers, Shinn, Stoune, Strieder

Associate Professors: A.B. Anderson, C. Anderson, Arnold, Barnes-Burroughs, D. Dees, Dye, Fischer, Fried, Hughes, McKoin, McNeil, L. Santa, M. Santa, Shea, C.J. Smith, C.M. Smith, Wass, Wood, Yon

Assistant Professors: Berry, Cash, Cimarusti, Cruse, George, Hollins, Houck, Lastrapes, Martens, Morton, Skerik, A. Smith

Instructors: Barrick (Visiting), Berg (Visiting), J. Dees (Visiting)

About the Program

The school supervises the following degree programs and certificates:

- 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
- Graduate Certificate 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 (MUEN 3105); and Small/Medium Ensembles (MUEN 3106, 3110). Auditions are required for most of these ensembles; contact the ensembles office at 806.742.2272 for information about auditions.

The following courses are designed specifically for nonmajors:

MUAP 1113, 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 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 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 18 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 9 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 and aural skills 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 half-length junior recital and 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 (Consult advisor for specific courses)	Semester Hours
Written Communication	6
ENGL 1301 and 1302	
Oral Communication	3
Mathematics and Logical Reasoning	6
Natural Laboratory Sciences	8
Technology	3
U.S. History	6
Political Science	6
Individual or Group Behavior	3
See an advisor	
Humanities	3
Total Hours	44

Advanced Bachelors-to-Masters Degree. Advanced music education undergraduates may apply for admission to the B.M.+M.M.Ed. program. Admission allows qualified students to count 9 dual hours of specified undergraduate coursework toward a Master of Music Education degree (either the 30-hour thesis track or 36-hour nonthesis track). Application should be made during the first semester of the junior year following procedures available from School of Music graduate or undergraduate academic advisors. The program is designed for exceptional undergraduate music education majors who wish to complete the M.M.Ed. degree in full- or part-time graduate study during Texas Tech's summers-only program or in

some combination of the two. This allows educators to maintain a full-time teaching position while pursuing an advanced degree.

Bachelor of Music Curriculum

The curriculum tables that follow are provided as a recommended sequence to students and advisors. All music majors must plan their individual courses of study in consultation with a faculty advisor.

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

Diction I: MUAP 1303

Vocal Pedagogy: MUAP 4205

Conducting: MUAP 3206, and 3207

Piano: Must pass proficiency level equivalent to MUAP 2124 if not piano principal.

Music: MUSI 1101, 1200, 3216, 3237, and either MUSI 3238 or 3217

Music History and Literature: MUHL 2301, 2302, 2303

Music Theory: MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, 3303

Major Ensemble: 7 semesters

Instrumental Ensemble: MUEN 2101 (1 semester)

Total Track Hours: 66

Total Program Hours: 128

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 5)

Conducting: MUAP 3206, 3208

Piano: Must pass proficiency level equivalent to MUAP 2124 if not piano principal.

Music: MUSI 1101, 1200, 3237; either 3218 or 3325; take one of MUSI 3226, 3238, and 3219

Music History and Literature: MUHL 2301, 2302, 2303

Music Theory: MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, 3303

Major Ensemble: 7 semesters

Vocal Ensemble: 1 hour

Total Track Hours: 66

Total Program Hours: 128

All Level, Keyboard Track

Principal Instrument: MUAP 1001 (2), 1105, 1002 (2), 1106, 2001 (2), 2002 (2), 3001 (2), 3002 (1), 3190

Vocal Pedagogy: MUAP 4205

Conducting: MUAP 3206 and 3207 or 3208

Music: MUSI 1101, 1200, 3216, 3237, and either MUSI 3238 or 3217

Music History and Literature: MUHL 2301, 2302, 2303

Music Theory: MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, 3303

Major Ensemble: 7 semesters

Vocal Ensemble: 1

Total Track Hours: 65

Total Program Hours: 127

Performance—Piano Curriculum

FIRST YEAR			
Fall		Spring	
MUAP 1105, Keyboard Skills	1	MUAP 1106, Keyboard Skills	1
MUAP 1001, Piano	3	MUAP 1002, Piano	3
MUSI 1200, Intro. to Research & Style	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, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
TOTAL	14	MUHL Elective	3
		TOTAL	18
SECOND YEAR			
Fall		Spring	
MUAP 2001, Piano	3	MUAP 2002, Piano	3
MUHL 2302, History of Music	3	MUHL 2303, History 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	14	TOTAL	14
THIRD YEAR			
Fall		Spring	
MUAP 3001, Piano	3	MUAP 3002, Piano	2
Tech. & Applied Science	3	MUAP 3190, Junior Recital	1
MUTH 3303, Form Analysis & Synthesis	3	MUAP 3206, Conducting	2
MUAP 4301, Keyboard Literature	3	MUAP 4302, Keyboard Lit.	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
MUEN 3106-301, Accompanying	1	Natural Laboratory Science	4
TOTAL	16	MUEN 3106-301, Accompanying	1
		TOTAL	16
FOURTH YEAR			
Fall		Spring	
MUAP 4001, Piano	3	MUAP 4002, Piano	2
MUAP 4303, Piano Pedagogy	3	MUAP 4190, Senior Recital	1
MUHL 4300, Special Topics	3	MUTH 4307, Tonal Cpt. & Fugue	3
POLS 1301, American Govt., Org	3	Individual or Group Behavior	3
MUEN 3106-301, Accompanying	1	POLS 2302, American Public Policy	3
Mathematics	3	MUEN 3106-301, Accompanying	1
TOTAL	16	Natural Laboratory Science	4
		TOTAL	17

Total program hours—125

* 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			
Fall		Spring	
MUAP 1001, Organ	3	MUAP 1002, Organ	3
MUAP 1001, Piano*	1	MUAP 1002, Piano*	1
MUSI 1200, Intro. to Research & Style	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, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
TOTAL	14	TOTAL	15
SECOND YEAR			
Fall		Spring	
MUAP 2001, Organ	3	MUAP 2002, Organ	3
MUHL 2302, History of Music	3	MUHL 2303, History 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
MUHL Elective	3	TOTAL	14
TOTAL	17		
THIRD YEAR			
Fall		Spring	
MUAP 3001, Organ	3	MUAP 3002, Organ	2
MUAP 3203, Church Serv. Playing	2	MUAP 3190, Junior Recital	1
MUAP 3206, Conducting	2	MUAP 3207 or 3208, Chor. or Inst.	2
MUTH 3303, Form Analysis & Synthesis	3	HIST 2301, History of U.S. Since 1877	3
HIST 2300, History of U.S. to 1877	3	Mathematics	3
MUEN 3106-301, Accompanying	1	Natural Laboratory Science	4
Technology & Applied Science	3	MUEN 3106-301, Accompanying	1
TOTAL	17	TOTAL	16
FOURTH YEAR			
Fall		Spring	
MUAP 4001, Organ	3	MUAP 4002, Organ	2
MUTH 4305 or 4307, Counterpoint	3	MUAP 4190, Senior Recital	1
POLS 1301, American 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 Laboratory Science	4	POLS 2302, American Public Policy	3
TOTAL	17	MUEN 3106-301, Accompanying	1
		TOTAL	15

Total program hours—125

* Optional for students with extensive piano background.

Performance—Stringed Instrument Curriculum

FIRST YEAR			
Fall		Spring	
MUAP 1001, Major Instrument	3	MUAP 1002, Major Instrument	3
MUSI 1200, Intro. to Research & Style	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, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
MUEN 3104, Orchestra*	1	MUEN 3104, Orchestra	1
MUEN 3106, Chamber Music	1	MUEN 3106, Chamber Music	1
TOTAL	14	TOTAL	15
SECOND YEAR			
Fall		Spring	
MUAP 2001, Major Instrument	3	MUAP 2002, Major Instrument	3
MUHL 2302, History of Music	3	MUHL 2303, History 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, Orchestra	1	MUEN 3104, Orchestra	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 Instrument	3	MUAP 3002, Major Instrument	2
MUTH 3303, Form Analysis & Synthesis	3	MUAP 3190, Junior Recital	1
HIST 2300, History of U.S. to 1877	3	MUHL or MUTH elective	3
Natural Laboratory Science	4	Natural Laboratory Science	4
MUEN 3104, Orchestra	1	HIST 2301, History of U.S. Since 1877	3
MUEN 3106, Chamber Music	1	MUEN 3104, Orchestra	1
TOTAL	15	MUEN 3106, Chamber Music	1
		TOTAL	15
FOURTH YEAR			
Fall		Spring	
MUAP 4001, Major Instrument	3	MUAP 4002, Major Instrument	2
MUTH 4305, Modal Counterpoint or MUTH 4307, Count. & Fugue	3	MUAP 4190, Senior Recital	1
POLS 1301, American Govt., Org	3	MUCP 4207, Instrumentation	2
Mathematics	3	POLS 2302, American Public Policy	3
MUEN 3104, Orchestra	1	MUEN 3104, Orchestra	1
MUHL 4300, Special Topics	3	TOTAL	12
TOTAL	16		
Total program hours—122			

* Guitar students participate in ensemble and chamber music for six semesters each.

Performance—Wind Instrument or Percussion Curriculum

FIRST YEAR			
Fall		Spring	
MUAP 1001, Major Instrument	3	MUAP 1002, Major Instrument	3
MUSI 1200, Intro. to Research & Style	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, Essentials of Coll. Rhetoric	3
Ensemble*	1-2	Ensemble*	1-2
TOTAL	13-14	TOTAL	14-15
SECOND YEAR			
Fall		Spring	
MUAP 2001, Major Instrument	3	MUAP 2002, Major Instrument	3
MUHL 2302, History of Music	3	MUHL 2303, History 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, Advanced Coll. Rhetoric	3	Oral Communications	3
Ensemble	1-2	Ensemble	1-2
TOTAL	14-15	TOTAL	14-15
THIRD YEAR			
Fall		Spring	
MUAP 3001, Major Instrument	3	MUAP 3002, Major Instrument	2
MUTH 3303, Form Analysis & Synthesis	3	MUAP 3190, Junior Recital	1
HIST 2300, History of U.S. to 1877	3	MUAP 3206, Conducting	2
Humanities	3	MUCP 4207, Instrumentation	2
Ensemble	1-2	HIST 2301, History of U.S. Since 1877	3
Technology & Applied Science	3	Natural Laboratory Science	4
TOTAL	16-17	Ensemble	1-2
		TOTAL	15-16
FOURTH YEAR			
Fall		Spring	
MUAP 4001, Major Instrument	3	MUAP 4002, Major Instrument	2
MUTH 4305 or 4307, Counterpoint	3	MUAP 4190, Senior Recital	1
Individual or Group Behavior	3	MUHL or MUTH elective	3
POLS 1301, American Govt., Org	3	POLS 2302, American Public Policy	3
Ensemble	1-2	Ensemble	1-2
MUHL 4300, Special Topics	3	Natural Laboratory Science	4
TOTAL	16-17	TOTAL	14-15
Total program hours—120			

* Twelve registrations in ensemble required.

Music Theory Curriculum

FIRST YEAR			
Fall		Spring	
MUAP 1001, Instrument or Voice	2	MUAP 1002, Instrument or Voice	2
Applied Music, piano	1	Applied Music, 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, Advanced Coll. Rhetoric	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
Ensemble	1	Ensemble	1
TOTAL	16	TOTAL	17
SECOND YEAR			
Fall		Spring	
MUAP 2001, Instrument or Voice	2	MUAP 2002, Instrument or Voice	2
Applied Music, piano	1	MUHL 2303, History of Music	3
MUHL 2302, History 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	3
Foreign Language*	3	Ensemble	1
Mathematics	3	Technology & Applied Science	3
Ensemble	1	TOTAL	16
TOTAL	17		
THIRD YEAR†			
Fall		Spring	
MUAP 3001, Instrument or Voice	2	MUAP 3002, Instrument or Voice	1
MUTH 3303, Form Analysis & Synthesis	3	MUAP 3190, Junior Recital	3
MUCP 4207, Instrumentation	2	MUTH 3316, Analysis of Post-Tonal	3
Oral Communication	3	MUCP 4208, Orchestration	2
Humanities	3	MUAP 3206, Conducting	2
Ensemble	1	Natural Laboratory Science	4
TOTAL	14	Ensemble	1
		TOTAL	14
FOURTH YEAR			
Fall		Spring	
MUTH 4305, Modal Counterpoint	3	MUHL elective	3
MUHL 4300, Special Topics	3	MUTH 4307, Tonal Counterpoint & Fugue	3
Natural Laboratory Science	4	Individual or Group Behavior	3
POLS 1301, American Govt., Org	3	POLS 2302, American Public Policy	3
Ensemble	1	Ensemble	1
TOTAL	14	TOTAL	13

Total program hours—121

* 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-Voice Curriculum

FIRST YEAR			
Fall		Spring	
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, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
MUEN 3102, Music Theatre	1	Ensemble	1
Ensemble	1	TOTAL	16
TOTAL	16		
SECOND YEAR			
Fall		Spring	
MUAP 2001, Voice	2	MUAP 2002, Voice	2
MUHL 2302, History of Music	3	MUHL 2303, History 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. (German, French, Italian)	5
Oral Communications	3	Humanities	3
Ensemble	1	Ensemble	1
TOTAL	18	TOTAL	18
THIRD YEAR			
Fall		Spring	
MUAP 3001, Voice	2	MUAP 3002, Voice	1
MUAP 3303, Vocal Literature	3	MUAP 3190, Junior Recital	1
MUTH 3303, Form Analysis & Synthesis	3	For. Lang. (2nd yr. German, French., Ital.)	3
Natural Laboratory Science	4	Mathematics	3
For. Lang. (2nd yr.)	3	Natural Laboratory Science	4
Ensemble	1	Ensemble	1
TOTAL	16	Technology & Applied Science	3
		TOTAL	16
FOURTH YEAR			
Fall		Spring	
MUAP 4001, Voice	2	MUAP 4002, Voice	1
HIST 2300, History of U.S. to 1877	3	MUAP 4190, Senior Recital	1
POLS 1301, American Govt., Org	3	MUAP 3206, Conducting	2
Ensemble	1	POLS 2302, American Public Policy	3
MUAP 4305, Vocal Pedagogy	3	Ensemble	1
TOTAL	12	Individual or Group Behavior	3
		HIST 2301, History of U.S. Since 1877	3
		TOTAL	14

Total program hours—126

Music Composition Curriculum

FIRST YEAR			
Fall		Spring	
MUAP 1001, Prin. Instr. or Voice	2	MUAP 1002, Prin. Instr. or Voice	2
MUCP 1201, Intro. to Contemp. Music	2	MUCP 1202, Intro. to Contemp. Music	2
MUSI 1200, Intro. to Research & Style	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, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced Coll. Rhetoric	3
Ensemble	1	Ensemble	1
Individual or Group Behavior	3	TOTAL	15
TOTAL	17		
SECOND YEAR			
Fall		Spring	
MUAP 2001, Prin. Instr. or Voice	2	MUAP 2002, Prin. Instr. or Voice	2
MUCP 2201, Music Composition	2	MUCP 2202, Music Composition	2
MUHL 2302, History of Music	3	MUHL 2303, History of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Intermed. Aural Skills II	1
Mathematics	3	Ensemble	1
Ensemble	1	Humanities	3
TOTAL	15	TOTAL	15
THIRD YEAR*			
Fall		Spring	
MUAP 3001, Prin. Instr. or Voice	2	MUAP 3002, Prin. Instr. or Voice	2
MUCP 3201, Music Composition	2	MUCP 3202, Music Composition	2
MUTH 3303, Form Analysis & Synthesis	3	MUTH 3316, Analysis of Post-Tonal	3
MUCP 4207, Instrumentation	2	MUCP 4208, Orchestration	2
Tech. and App. Science	3	Oral Communication	3
Natural Laboratory Science	4	Natural Laboratory Science	4
Ensemble	1	Ensemble	1
TOTAL	17	TOTAL	17
FOURTH YEAR			
Fall		Spring	
MUCP 4201, Music Composition†	2	MUCP 4102, Music Composition	1
MUTH 4305, Modal Counterpoint	3	MUAP 4190, Senior Recital	1
HIST 2300, History of U.S. to 1877	3	MUTH 4307, Tonal Counterpoint & Fugue	3
POLS 1301, American Govt., Org.	3	HIST 2301, History of U.S. Since 1877	3
Ensemble	1	MUAP 3206, Conducting	2
TOTAL	12	POLS 2302, American Public Policy	3
		Ensemble	1
		TOTAL	14

Total program hours—122

* 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.

(Music) Student Teaching All-Level (MUAL)

(To interpret course descriptions, see page 13.)

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. Applied Music (V1-4). Prerequisite: MUAP 1001 for 1002. Instrument or Voice.

1103. Percussion (1:0:2). Introduction to fundamentals of playing and teaching percussion instruments. Laboratory ensemble experience.

1104. Percussion (1:0:2). Prerequisite: MUAP 1103. Advanced study of fundamentals of playing and teaching percussion instruments. Laboratory ensemble experience.

1105, 1106, 2105, 2106. Keyboard Skills (1:0:2 each). Prerequisite: MUAP 1105 for 1106. Sight reading and ensemble skills. Required of all piano majors for two semesters. Enrollment limited to piano majors, or by instructor consent.

Graduate Program / Music

The School of Music offers six Master's of Music degrees, a Doctor of Philosophy degree, and four Doctor of Musical Arts degrees.

Master's Programs

Master of Music. 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 degree in string pedagogy or keyboard pedagogy may be attained with a 36-hour program without thesis or recitals.

Master of Music Education. The Master of Music Education degree may be attained with a 30-hour program that includes 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.

Doctoral Programs

Doctor of Musical Arts. 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.

Doctor of Philosophy in Fine Arts. 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. The residence requirement for the fine arts doctoral program is fulfilled by satisfactory completion of 18 semester hours of graduate coursework during one 12-month period. This program is explained in the introductory catalog section to the College of Visual and Performing Arts.

Musicology. 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.

Certificate Program. The Graduate Certificate in Piano Pedagogy is designed for the professional piano teacher. The 13- to 17-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.

Admission. 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.

- 1113. [MUSI 1183]. Voice (1:0:2). 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).** Prerequisite: MUAP 1123 for 1124. Beginning instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques. Fulfill Core Visual and Performing Arts requirement.
- 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.
- 2001, 2002. **Applied Music (V1-4).** Prerequisite: MUAP 1002 for 2001; 2001 for 2002. Instrument or Voice.
- 2103. **Strings (1:0:2).** Fundamentals of playing and teaching high string instruments. Laboratory ensemble experience.
- 2104. **Strings (1:0:2).** Fundamentals of playing and teaching low string instruments. Laboratory ensemble experience.
- 2123, 2124 [MUSI 2114, 2115, 2181, 2182]. **Group Keyboard Instruction III and IV (1:0:2 each).** Prerequisite: MUAP 1124 for 2123; 2123 for 2124. Intermediate instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques. Fulfills Core Visual and Performing Arts requirement.
- 3001, 3002. **Applied Music (V1-4).** Prerequisite: MUAP 2002 for 3001; 3001 for 3002. Instrument or Voice
- 3101. **Dimensions of Performance (1:1:1).** An interactive course open to all performers. Expressive movement, group dynamics, and free improvisations are used to maximize the spontaneity, confidence, and creativity of performers. May be repeated for credit.
- 3103. **Brass Instruments (1:0:2).** Introduction to fundamentals of playing and teaching brass instruments. Laboratory ensemble experience.
- 3104. **Brass Instruments (1:0:2).** Prerequisite: MUAP 3103. Advanced study of fundamentals of playing and teaching brass instruments. Laboratory ensemble experience
- 3190. **Junior Recital (1).** Prerequisite: MUAP 2002 on the same instrument or voice; Corequisite: Concurrent enrollment in MUAP 3001 or 3002.
- 3205. **Jazz Improvisation (2).** Prerequisite: Consent of instructor. Study and application of techniques of improvisation in jazz performance. May be repeated for credit. Fulfills Core Visual and Performing Arts requirement.
- 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.
- 4001, 4002. **Applied Music (V1-4).** Prerequisite: MUAP 3002 for 4001; 4001 for 4002. Instrument or Voice.
- 4103. **Woodwinds (1:0:2).** Introduction to fundamentals of playing and teaching woodwinds. Laboratory ensemble experience.

4104. **Woodwinds (1:0:2)**. Prerequisite: MUAP 4103. Advanced study of fundamentals of playing and teaching woodwinds. Laboratory ensemble experience.
4190. **Senior Recital (1)**. Prerequisite: MUAP 3002 on the same instrument or voice; Corequisite: Concurrent enrollment in MUAP 4001 or 4002.
4205. **Vocal Pedagogy for Educators**. Course will emphasize functional vocal anatomy, breathing, phonation, and articulation. Repertoire appropriate for young singers will be emphasized.
- 4301, 4302. **Keyboard Literature I and II (3 each)**. Prerequisite: MUAP 4301 for 4302. A survey of keyboard literature from earliest times to the present. Class performance and listening.
- 4303, 4304. **Piano Pedagogy (3 each)**. Prerequisite: MUAP 4303 for 4304. 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.
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.
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.
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 13.)

Undergraduate Courses

- 1201, 1202 [MUSI 1286, 1326] (2). **Prerequisite: MUCP 1201 for 1202**. 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.)
2201. **Music Composition (2)**. For composition majors. Prerequisite: MUCP 1202 and instructor approval. Work in traditional forms and media, together with the principles of notation, layout, reproduction, and copyright.
2202. **Music Composition (2)**. For composition majors. Prerequisite: MUCP 2201 and instructor approval. Work in traditional forms and media, and also electronic media, together with the principles of notation, layout, reproduction, and copyright.
3201. **Music Composition (2)**. 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.
3202. **Music Composition (2)**. For composition majors. Prerequisite: MUCP 3201 and formal approval to continue in the Bachelor of Music program in music composition. Continued work in both traditional and electronic media.
4102. **Music Composition (1)**. For composition majors. Prerequisite: MUCP 4201. Advanced work on a larger scale, culminating in a senior recital (MUAP 4190) as noted in the curriculum.
4201. **Music Composition (2)**. For composition majors. Prerequisite: MUCP 3202. Advanced work on a larger scale, culminating in a senior recital (MUAP 4190) as noted in the curriculum.
4207. **Instrumentation (2:2:0)**. Prerequisite: MUTH 2304. 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.

Graduate Courses

5308. **Composition (3)**. Prerequisite: MUCP 4402 or MUTH 4303 with a grade of C or higher. Advanced writing for chamber ensembles, orchestra, band, chorus, or electronic media. May be individual study courses. May be repeated for credit.
5309. **Composition (3)**. Prerequisite: MUCP 5308 with a grade of C or higher. 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: MUAP 3206 (track appropriate section) Foundations, patterns, and issues in music curriculum development. Special emphasis on adolescent musicians. Transfer and application to the discipline of music. Field experiences required.
3312. **Methods in Education and Music (3:3:0)**. Prerequisites: MUED 3311, junior standing, and acceptance to teacher education program. Foundations of teaching techniques, evaluation, and classroom management. Application to the discipline of music. Field experiences required.

Graduate Courses

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).** Study of psychological and sociological foundations of music education. Emphasis given to the research that informs psychology of music as it applies to music teaching.
5333. **Tests, Measurements, and Evaluations in Music (3:3:0).** A study of general descriptive, statistical, qualitative and quantitative measures as applied to music. Emphasis is placed on reading and conducting original music education research.
5340. **Introduction to Graduate Studies in Music Education (3:3:0).** History of American music education and the philosophies that inform current practice. Emphasis is on the relationship between historical/philosophical thought and current music education issues.
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).** Auditions Required.
2101. **Secondary Instrumental Ensemble (1:0:2).** Introduction to instruments for choral educators. Includes performance on brass, woodwinds, percussion and string instruments.
3101. **Choir (1:0:3).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3102. **Music Theatre (1:0:3).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3103. **Band (1:0:3).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3104. **Orchestra (1:0:5).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3105. **Jazz Ensemble (1:0:3).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3106. **Small Ensemble (1:0:1).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3110. **Medium Ensemble (1:0:2).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3201. **University Choir (2:0:5).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3202. **Music Theatre (2:0:5).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3203. **Band (2:0:5).** Fulfills Core Visual and Performing Arts requirement. Auditions required.
3204. **Orchestra (2:0:5).** Fulfills Core Visual and Performing Arts requirement. Auditions required.

Graduate Courses

5101. **Choir (1:0:5).** Auditions required.
5102. **Music Theatre (1:0:5).** Auditions required.
5103. **Band (1:0:5).** Auditions required.
5104. **Orchestra (1:0:5).** Auditions required.
5105. **Jazz Ensemble (1:0:5).** Auditions required.
5106. **Small Ensemble (1:0:1).** Auditions required.
5110. **Medium Ensemble (1:0:2).** Auditions required.

Music History and Literature (MUHL)

Undergraduate Courses

1308. [MUSI 1306, 1307, 1308] **Music in Western Civilization (3:3:0).** Introductory course for non-music majors in the history of music and its role in western civilization from the Middle Ages through the 20th century and beyond. Fulfills Core Visual and Performing Arts requirement.
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. Fulfills multicultural requirement.
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. Fulfills multicultural requirement. (Writing Intensive)

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. Fulfills Core Visual and Performing Arts requirement.
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. Fulfills Core Visual and Performing Arts requirement.
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.

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.
5306. **Pedagogy of Music History (3:3:0).** Prepares graduate-level music students for the experience of teaching a college-level course in musicology or music history.
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 (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. Fulfills Core Visual and Performing Arts requirement.
- 3216, 3217. **Choral Techniques (2 each).** Prerequisite: MUSI 3216 for 3217. Materials, repertoire, and procedures for developing instructional programs in choir. Field experiences required.
- 3218, 3219. **Orchestra Techniques (2 each).** MUSI 3218 prerequisite to 3219. Materials, repertoire, and procedures for developing instructional programs in orchestra. Field experiences required.

- 3225, 3226. Band Techniques (2 each).** MUSI 3225 is prerequisite to 3226. Materials, repertoire, and procedures for developing instructional programs in band. Field experiences required.
- 3237, 3238. Music for Children (2 each).** Prerequisite: MUSI 3237 for 3238. Comprehensive study of musical skill development in primary grades. Contemporary pedagogical approaches to music teaching; skill development in children emphasized. Music majors only. Field experiences required.
- 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. Not for music majors.
- 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. Fulfills Core Technology and Applied Science requirement.
- 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.
- 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 13.)

Undergraduate Courses

- 1101. Developmental Aural Skills (1).** For music majors or with consent of instructor. Developmental dictation, sight singing, and keyboard skills.
- 1103. [MUSI 1116, 1216, 1316] Elementary Aural Skills I (1:0:2).** Prerequisite: Placement test; 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. Fulfills Core Visual and Performing Arts requirement.
- 1303. [MUSI 1311] Elementary Music Theory I (3:3:0).** Prerequisite: Placement test; 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.
- 4302, 4303. Fundamentals of Composition (3 each).** Prerequisite: MUTH 4302 for 4303. 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.
- 4316. 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. Restricted to music majors.

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 online. May be repeated for credit on different topic.
- 6000. Master's Thesis (V1-6).**

Department of Theatre and Dance

Frederick B. Christoffel, M.F.A., Chairperson

Professors: Bert, Christoffel, Marks

Associate Professors: Bilkey, Chansky, Donahue, Durham, Gelber, Merz

Assistant Professors: Bush, Mann

Adjunct Faculty: Ashby-Martin

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: THA 1101, 1102, 1103, 1104, 1301, 1303, 2302, 3105, 3303, 3304, 3305, 3308, 3309, 4300, 4302, 4308, two hours of dance, and 3 hours of theatre arts electives for a total of 43 hours.

Dance Major. Students accepted to Texas Tech University who wish to seek a B.A. degree in dance must also audition for the dance program. Auditions are held 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 complete the following requirements in addition to those required by the university and the College of Visual and Performing Arts. Major Requirements: DAN 1100 (3 semesters); 4 credit hours from: 1103, 3103, 4103; 4 credit hours from: 1105, 3105, 4105; 4 credit hours from: 1109, 3109, 4109; 2 additional credit hours from: 3103, 4103, 3105, 4105, 3109, 4109; 2202; 3208; 3301; 3309; 3313; 4210; THA

3304; 6-9 credit hours from: DAN 1101, 1106, 1108, 1206, 3000, 3101, 4000, 4202, 4208, 4301; and 3 credit hours from: MUAP 1113, MUHL 3304, 3308, 3310, 4321, MUSI 2301, THA 1104, 1303, 2302, 2306, 3303, 3305, 3308, 3309, 4208, VPA 3301.

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 must be admitted to the B.F.A. program 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. Continuation 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 127, 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 staff and faculty advisors for details.

Core Theatre Requirements (39 hours)

THA 1101, 1102, 1103, 1104, 1303, 2101, 2302, 3104, 3105, 3303, 3304, 3305, 3308, 3309, 4208, 4300, 4302, 4303.

Acting Courses (47 hours)

THA 1301, 1302, 2312, 3105 (two times additional to core), 3302, 3306, 3307, 3310, 3322, 3332. In addition, students must complete 18 hours from the following: THA 1301 (repeated), 1302 (repeated), 2306, 2312 (repeated), 3302 (repeated), 3306 (repeated), 3307 (repeated), 3322 (repeated), 3332 (repeated), 4000, 4303 (repeated), 4308; DAN 1100, 1101, 1103, 1105, 1106, 1109, 1206, 2202, 3000, 3101, 3103, 3105, 3109, 3208, 3313, 4103, 4105, 4109, 4301; MUAP (voice) 1001, 1002, 1113, 1114, 2001, 2002, 3001, 3002.

Design/Technology Courses (47 hours)

THA 2306, 3306, 3307, 4336, 4337, 4108 (twice), 4309 (twice), 4310 and 4311; ART 1303, 2304. Also 12 hours must be selected from THA 3100, 3101, 3102, 3103, 4000, 4308, 4309, 4310, 4311, 4336 (repeated), 4337 (repeated); ADM 3312; AGSM 2303; ART 1302, 1310, 2303, 2311, 3323; or PHYS 1406.



Theatre and Dance Minors

Students working toward one of the four minors in theatre or dance must complete a minimum of 18-22 hours. Hours applied to the minor area of study may not include courses used to fulfill requirements in the student's major. Because each minor takes at least four long semesters to complete, students should begin the minor in theatre or dance as early as possible in their academic career. Prospective minors should meet with the theatre and dance advisor as soon as possible for course information regarding prerequisites, availability, etc. Specific course requirements are as follows:

Dance Minor. Students who wish to minor in dance must also audition for the dance program. Auditions are held every spring semester and consist of prospective students learning and performing movement in three different technique styles. Solos will not be seen. Acceptance to Texas Tech does not ensure admission as a dance minor. Students accepted as a dance minor must complete the following 18 credit hours: DAN 1100 (2 semesters); 2 credit hours from DAN 1103, 3103, 4103; 2 credit hours from DAN 1105, 3105, 4105; 2 credit hours from DAN 1109, 3109, 4109; DAN 2202, 3208, 3309, and 3313.

Theatre Arts Minor – General. Students completing a theatre arts – general minor must complete 18 credit hours of courses, including THA 1303, 2302, 4300; 3 courses from the following with no course counted more than once: THA 1101, 1102, 1103, 1104, 3105, or 1 hour from any DAN course; either THA 3308 or 3309; and either THA 3303, 3304, or 3305.

Theatre Arts Minor – Acting. Students completing a theatre arts – acting minor must complete 22 credit hours, including THA 1301, 1302, 1303, 2302, 2312, 3105, 3310; and either THA 3302, 3322, or 3332.

Theatre Arts Minor – Design. Students completing a theatre arts – design minor must complete 21 credit hours, including THA 1303, 3303, 3304, 3305, 4336, and two courses from among THA 4309, 4310, and 4311.

Teacher Education

Students desiring all-level certification in theatre arts must include the following courses within their overall degree plan: THA 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), 2202, 3103, 3105, 3109, 3208, 3301, 3309, 3313, 4103, 4105, 4109, 4210, 4301 (or VPA 3301), and THA 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.

Dance (DAN)

(To interpret course descriptions, see page 13.)

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 repeat twice for credit.
1101. [DANC 1110, 1210] Tap I (1:0:3). A study of basic tap dance techniques, performance, and choreography. May repeat once for credit.
1103. [DANC 1147, 1247, 1347] Jazz I (1:0:3). A study of basic jazz dance techniques, performance, and choreography. May repeat once for credit.
1105. [DANC 1141, 1241, 1341] Ballet I (1:0:3). A study of basic ballet dance techniques, performance, and choreography. May repeat 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 repeat once for credit.
1108. Hip Hop (1:0:3). A study of basic hip hop dance techniques, performance, and choreography. May repeat once for credit.
1109. [DANC 1145, 1245, 1345] Modern I (1:0:3). A study of basic modern dance techniques, performance, and choreography. May repeat once for credit.
1206. Musical Stage Dance (2:1:2). Prerequisite: DAN 1103 or 3103. An introduction to basic principles of dance styles associated with musical theatre. May repeat once; only 2 hours of credit will be applied to the BA in Dance.

Graduate Program / Theatre and Dance

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. The residence requirement for the fine arts doctoral program is fulfilled by satisfactory completion of 18 semester hours of graduate coursework during one 12-month period.

Concentrations. 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.

Admission. 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.

Bachelor of Arts in Theatre Arts Recommended Curriculum

FIRST YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104, Practicum	1	THA 1101, 1102, 1103, or 1104, Practicum	1
THA 2302, Principles of Acting I	3	DAN Course	2
THA 1303, Introduction to Theatre	3	ENGL 1302, Advanced Coll. Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	HIST 2301 (or other U.S. history*)	3
HIST 2300 (or other U.S. history*)	3	Mathematics/Logic Required Course	3
Mathematics/Logic Required Course	3	Humanities Required Course*	3
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104, Practicum	1	THA 3105, Rehearsal & Performance	1
THA 1301, Voice for the Actor	3	THA 3303, Principles of Scenery	3
THA 4300, Script Analysis	3	POLS 2302 (or other approved POLS*)	3
POLS 1301, American Govt., Org.	3	Foreign Language Required Course	5
Foreign Language Required Course	5	Minor Required Course*	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
THA 3304, Principles of Lighting	3	THA 3305, Principles of Costuming	3
THA 3308, History of Theatre I	3	THA 3309, History of Theatre II	3
Foreign Language Required Course	3	Foreign Language Required Course	3
Minor Required Course*	3	Oral Communication Required Course*	3
Minor Required Course*	3	Minor Required Course*	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104, Practicum	1	Minor Required Course*	3
THA 4302, Stage Directing Methods	3	THA, Minor, or Core Elective*	2
Ind. or Group Behavior Required Course*	3	THA Elective	3
Natural Lab Science Required Course	4	Natural Lab Science Required Course	4
Minor Required Course*	3	THA 4308, Topics in Theatre History	3
TOTAL	14	TOTAL	15

* Requires 40 hours of upper-division classes; 25 hours are satisfied by the major; 15 must be satisfied by minor courses and/or core curriculum. Courses marked with an asterisk (*) are potential upper-division courses.



Bachelor of Fine Arts in Theatre Arts Recommended Curriculum—Acting Specialization

FIRST YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104, Practicum	1	THA 1101, 1102, 1103, or 1104, Practicum	1
THA 1303, Introduction to Theatre	3	THA 1302, Movement for the Actor	3
THA 1301, Voice for the Actor	3	THA 2312, Principles of Acting II	3
or THA 3310, Auditioning		B.F.A. Elective(s)*	2
THA 2302, Principles of Acting I	3	ENGL 1302, Advanced Coll. Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics/Logic Required Course	3
Mathematics/Logic Required Course	3	TOTAL	15
TOTAL	16		
SECOND YEAR			
Fall		Spring	
THA 2101, Stage Makeup	1	THA 3304, Principles of Lighting	3
THA 3303, Principles of Scenery	3	THA 3309, History of Theatre II	3
THA 3308, History of Theatre I	3	Oral Communication Required Course	3
Required B.F.A. Elective(s)*	2	POLS 2302 (or other approved POLS)	3
POLS 1301, American Govt., Org.	3	Humanities Required Course	3
THA 3310, Auditioning	3	TOTAL	15
or THA 1301, Voice for the Actor			
TOTAL	15		
SUMMER I			
THA 3306, Practicum in Summer Rep I	3		
THA 3307, Practicum in Summer Rep II	3		
TOTAL	6		
THIRD YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104, Practicum	1	THA 3305, Principles of Costuming	3
THA 3302, Acting Period Styles I	3	THA 3322, Acting Period Styles II	3
THA 4300, Script Analysis	3	Required B.F.A. Elective(s)*	2
Required B.F.A. Elective(s)*	2	Natural Lab Science Required Course	4
Ind. or Group Behavior Required Course	3	THA 4303, Theory & Prac. of Playwriting	3
THA 4208, Professional Career Mgmt.	2	TOTAL	15
TOTAL	14		
FOURTH YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104, Practicum	1	THA 3104, Adv. Activities: House Mgmt.	1
THA 3332, Acting Period Styles III	3	HIST 2301 or other U.S. history	3
HIST 2300 or other U.S. history	3	Required B.F.A. Elective(s)*	5
THA 4302, Stage Directing Methods	3	Natural Lab Science Required Course	4
Required B.F.A. Elective(s)*	5	TOTAL	13
TOTAL	15		

Total program hours—127 minimum^

* 18 hours of electives must be taken from the following: THA 1301, 1302, 2306, 2312, 3302, 3306/3307, 3322, 3332, 4000, 4303, 4308; DAN 1100, 1101, 1103, 1105, 1106, 1109, 1206, 2202, 3000, 3101, 3103, 3105, 3109, 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: THA 3105, Rehearsal and Performance, must be taken three times. THA 3105 should be taken during semesters the student is acting in or stage managing a departmental production.

2202. **Improvisation (2:1:2).** A study of basic movement improvisation techniques and skills.
3000. **Special Topics in Dance (V1-3).** Prerequisite: Consent of instructor. Introduction to special topics in dance for in-depth study. May repeat for up to 6 credit hours with different topics; only 3 hours of credit will be applied to the BA in Dance.
3101. **Tap II (1:0:3).** Prerequisite: DAN 1101 with a grade of B or higher or consent of instructor. A study of intermediate/advanced tap dance techniques, performance, and choreography. May repeat once for credit.
3103. **Jazz II (1:0:3).** Prerequisite: DAN 1103 or 3103 with a grade of B or higher or consent of instructor. A study of intermediate jazz dance techniques, performance, and choreography. May repeat twice for credit.
3105. **Ballet II (1:0:3).** Prerequisite: DAN 1105 or 3105 with a grade of B or higher or consent of instructor. A study of intermediate ballet dance techniques, performance, and choreography. May repeat twice for credit.
3109. **Modern II (1:0:3).** Prerequisite: DAN 1109 or 3109 with a grade of B or higher or consent of instructor. A study of intermediate modern dance techniques, performance, and choreography. May repeat twice for credit.

**Bachelor of Fine Arts in Theatre Arts
Recommended Curriculum—Design/Technology**

FIRST YEAR			
Fall		Spring	
THA 1101, 1102, or 1103, Theatre Activities	1	THA 1101, 1102, or 1103, Theatre Activities	1
THA 1303, Intro to Theatre	3	THA 3303, 3304, or 3305, Principles	3
THA 2101, Stage Makeup	1	ART 1303, Drawing I	3
THA 3303, 3304, or 3305, Principles	3	ENGL 1302, Advanced Coll. Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics/Logic Required Course	3
Mathematics/Logic Required Course	3	POLS 1301, American Govt., Org	3
TOTAL	14	TOTAL	16
SECOND YEAR			
Fall		Spring	
THA 1101, 1102, or 1103, Theatre Activities	1	THA 1104, House Management	1
THA 2302, Principles of Acting	3	THA 3309, History of Theatre II	3
THA 3303, 3304 or 3305, Principles	3	THA 4309, Scene Des or 4311, Light Des.	3
THA 3308, History of Theatre I	3	Required B.F.A. Elective(s)*	3
THA 2306 or 4336 or 4337	3	ART 2304, Drawing II	3
POLS 2302 (or other approved POLS)	3	Ind. or Group Behavior Required Course	3
TOTAL	16	TOTAL	16
SUMMER I			
THA 3306, Practicum in Rep Theatre I	3		
THA 3307, Practicum in Rep Theatre II	3		
TOTAL	6		
THIRD YEAR			
Fall		Spring	
THA 4310, Costume Design	3	THA 4303, Playwriting	3
THA 4300, Script Analysis	3	THA 4309, Scene Des. or 4311, Light Des.	3
THA 4108, Scene Painting	1	U.S. History Required Course	3
THA 2306 or 4336 or 4337	3	Oral Communication Required Course	3
THA 3104, Adv House Management	1	Natural Lab Sciences Required Course	4
Required B.F.A. Elective(s)*	3	TOTAL	16
TOTAL	14		
FOURTH YEAR			
Fall		Spring	
THA 4108, Scene Painting	1	THA 4309, Scene Des. or 4311, Light Des.	3
THA 4302, Stage Directing Methods	3	Required B.F.A. Elective(s)*	6
THA 4208, Professional Career Mgmt.	2	Humanities Required Course	3
THA 2306 or 4336 or 4337	3	U.S. History Required Course	3
Natural Lab Sciences Required Course	4	TOTAL	15
TOTAL	13		

Total program hours—127 minimum[^]

* 12 hours of electives must be taken from the following: THA 3100, 3101, 3102, 3103, 4000, 4308, 4309, 4310, 4311, 4336, 4337; AGSM 2303; ART 1302, 1310, 2303, 2311, 3323; PHYS 1406. Many of the above courses are repeatable for credit. Please see head of area for approved substitutions.

[^] Additional required coursework: THA 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			
Fall		Spring	
At least 2 technique classes from:	2	At least 2 technique classes from:	2
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	ENGL 1302, Advanced Coll. Rhetoric	3
DAN 3313, Dance History	3	Natural Lab Science Required Course	4
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics/Logic Required Course	3
Mathematics/Logic Required Course	3	Dance Electives**	2
Communications Required Course*	3	TOTAL	14
TOTAL	15		
SECOND YEAR			
Fall		Spring	
At least 2 technique classes from:	2	At least 2 technique classes from:	2
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
Ind. or Group Behavior Required Course*	3	Foreign Language Required Course	5
POLS 1301, American Govt., Org	3	Minor Required Course*	3
Dance (or other) electives**	3	TOTAL	15
TOTAL	14		
THIRD YEAR			
Fall		Spring	
At least 2 technique classes from:	2	At least 2 technique classes from:	2
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	THA 3304, Principles of Lighting	3
Foreign Language Required Course	3	Minor Required Course*	3
Minor Required Course*	3	Dance Electives**	2
TOTAL	15	TOTAL	16
FOURTH YEAR			
Fall		Spring	
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, 1206, 3000, 3101, 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.

- 3208. Principles of Choreography (2:1:2).** Prerequisite: DAN 1103 or 3103, and 1105 or 3105, and 1109 or 3109, and 2202 with a grade of B or higher or consent of instructor. An introduction to and practical application of basic principles and skills of dance making.
- 3301. Dance Aesthetics (3:3:0).** Prerequisite: DAN 3313 with a grade of C or higher. An investigation of history and trends in dance theory, research, and philosophy. (Writing Intensive)
- 3309. Pedagogy (3:3:0).** Prerequisite: DAN 3313 with a grade of C or higher. 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. Fulfills Core Visual and Performing Arts requirement.
- 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 repeat for up to 6 credit hours.

- 4103. Jazz III (1:0:3).** Prerequisite: DAN 3103 with a grade of A or consent of instructor. A study of advanced jazz dance techniques, performance, repertory, and choreography. May repeat three times for credit.
- 4105. Ballet III (1:0:3).** Prerequisite: DAN 3105 with a grade of A or consent of instructor. A study of advanced ballet dance techniques, performance, repertory, and choreography. May repeat three times for credit.
- 4109. Modern III (1:0:3).** Prerequisite: DAN 3109 with a grade of A or consent of instructor. A study of advanced modern dance techniques, performance, contemporary repertory, and choreography. May repeat three times for credit.
- 4202. Contact Partnering (2:0:3).** Prerequisite: DAN 2202; and 3103 or 4103; and 3105 or 4105; and 3109 or 4109 with a grade of A or consent of instructor. A study of contact partnering skills,

techniques, and improvisations as practiced in contemporary dance. May repeat once for credit.

4208. **Advanced Choreography Workshop (2:0:4).** Prerequisite: DAN 3208 with a grade of B or higher. An in-depth workshop focusing on creating, performing, and critiquing choreography. May repeat once for credit.
4210. **Senior Project (2).** Prerequisite: DAN 3208 with a grade of B or higher or consent of instructor. 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. Fulfills Core Visual and Performing Arts requirement.

Theatre Arts (THA)

(To interpret course descriptions, see page 13.)

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. May repeat once for credit. Enrollment in noncredit lab is required.
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. May repeat once for credit. Enrollment in noncredit lab is required.
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. **Introduction to Acting (3:3:0).** Fundamental principles of acting for nonmajors, with emphasis on establishing a working vocabulary and basic acting process. Fulfills Core Visual and Performing Arts requirement.
2302. **[DRAM 1351] 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. Enrollment in noncredit lab is required. Fulfills Core Visual and Performing Arts requirement.
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. Fulfills Core Visual and Performing Arts requirement.
2304. **[COMM 2366, DRAM 2366] Introduction to Cinema (3:3:1).** A study of the cinematic art form. Fulfills Core Visual and Performing Arts requirement.
2306. **Stage Management (3:3:0).** Prerequisite: THA 1303 (may be taken concurrently). 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: THA 2302. Explores representative acting theories in practice with emphasis on given circumstances and character development. Required of B.F.A. acting majors. Enrollment in noncredit lab is required. May repeat once for credit.
3100. **Advanced Theatre Activities: Stage Management (1).** Prerequisite: THA 2306. Opportunity to participate extensively in theatre activities in stage management in University Theatre productions. May repeat twice for credit.
3101. **Advanced Theatre Activities: Scenery and Properties (1).** Prerequisite: THA 3303. Opportunity to participate extensively in theatre activities in scenery and properties with emphasis on leadership experiences. May repeat once for credit.
3102. **Advanced Theatre Activities: Lighting and Sound (1).** Prerequisite: THA 3304. Opportunity to participate extensively in theatre activities in lighting and sound with emphasis on leadership experiences. May repeat once for credit.
3103. **Advanced Theatre Activities: Costume and Makeup (1).** Prerequisite: THA 3305. Opportunity to participate extensively in theatre activities in costume and makeup with emphasis on leadership experiences. May repeat once for credit.
3104. **Advanced Theatre Activities: House Management (1).** Prerequisite: THA 1104. 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 repeat twice for credit.
3302. **Acting Period Styles I (3:3:3).** Prerequisite: THA 2312. Scene study in a spectrum of periods and styles, from the Greeks to Renaissance theatre. Required of B.F.A. acting majors. Enrollment in noncredit lab is required. May repeat once for credit.
3303. **Principles of Theatrical Scenery (3:2:3).** Prerequisite: THA 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: THA 1303 or THA 2303 with a grade of C or higher. Study of the theory and practice of theatrical stage lighting. Elementary electricity, lighting control and instruments, lighting design. Enrollment in noncredit lab is required. Fulfills Core Technology and Applied Science requirement.
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).** Practical work in the organization, mounting, and presentation of plays in a repertory situation. May repeat twice 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)
3310. **Auditioning (3:1:4).** Prerequisite: THA 1301, 2302 (may be taken concurrently). A practicum for developing audition techniques and examining guidelines for audition procedures, with emphasis on resume organization and audition material selection and performance. Enrollment in noncredit lab is required.
3322. **Acting Period Styles II (3:3:3).** Prerequisite: THA 2312. Scene study in a spectrum of periods and styles from Restoration to contemporary theatre. Required of B.F.A. acting majors. Enrollment in noncredit lab is required. May repeat once for credit.
3332. **Acting Period Styles III (3:3:3).** Prerequisite: THA 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. Enrollment in noncredit lab is required. May repeat once for credit.
4000. **Projects in Theatre and Dance (V1-6).** Prerequisite: Consent of instructor. Individual study under the guidance of a faculty member. May repeat for up to 12 credit hours.
4108. **Scene Painting (1).** Prerequisite: THA 3303 and 3304. Study of the art and craft of scene painting styles and techniques. May repeat once 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.
4300. **Script Analysis (3:3:0).** A study of dramatic structure and methods of script analysis as a preparation for writing, directing, designing, performing, and criticizing plays. (Writing Intensive)
4302. **Stage Directing Methods (3:2:3).** Prerequisite: Junior or senior standing, THA 1303, 2302, 3303, 3304, and 3305. Study and practice of fundamental principles and techniques of directing. Student direction of representative plays. Enrollment in noncredit lab is required.
4303. **Theory and Practice of Playwriting (3:3:0).** Prerequisite: THA 4300. Study of the techniques of dramaturgy. Practical work in the writing of drama. May repeat once for credit. (Writing Intensive)
4308. **Topics in Theatre History (3:3:0).** Prerequisite: THA 4300 and either THA 3308 or 3309. Advanced topics course to integrate history, drama, production, and theory around a focused era or subject. May be repeated once for credit.
4309. **Scene Design (3:0:9).** Prerequisite: THA 1303, 3303, and 3304. Study of theory and practice of theatrical scene design. May repeat twice for credit.

4310. **Costume Design (3:0:9)**. Prerequisite: 1303 and 3305. Theory and practice of costume design for technical production. May repeat twice for credit.
4311. **Lighting Design (3:0:9)**. Prerequisite: THA 1303, 3303, and 3304. Study of the theory, process, and practice in lighting design for theatre, opera, and dance. May repeat twice for credit.
4336. **Computerized Drafting for the Theatre (3:2:3)**. Traditional and computer-aided drafting techniques for theatrical presentation. May repeat once for credit.
4337. **Computer Rendering for the Theatre (3:2:3)**. Computer-aided rendering techniques and portfolio tools for theatrical presentation. May repeat once 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: THA 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: THA 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)**. 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)**. 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 that 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, multicultural 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: THA 5301 with a grade of C or higher; may be taken concurrently. 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)**. 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)**. Prerequisite: Consent of instructor. Individual directing project on or off campus. Project must be approved by instructor before enrollment.
5328. **Special Problems in Playwriting (3)**. Prerequisite: THA 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 M.F.A. 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 neoclassic, 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)**. 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

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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 806.743.2764
D.N.P. Practice | T 800.851.8240 | T 806.743.2748

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 Paul L. Foster School of Medicine, School of Pharmacy, School of Allied Health Sciences, Graduate School of Biomedical Sciences, and the Anita Thigpen Perry (ATP) School of Nursing.

Texas Tech University Health Sciences Center programs are accredited by the Commission on the Colleges of the Southern Association of Colleges and Schools to award baccalaureate, master's, doctoral, and professional degrees. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, GA, 30033-4097 or call 404.679.4500 for questions about accreditation of Texas Tech University Health Sciences Center. The Commission should be contacted only if there is evidence that appears to support the institution's significant non-compliance with a requirement or standard.

The School of Allied Health Sciences offers degree programs in athletic training; clinical laboratory science; clinical services management; occupational therapy; physical therapy; physician assistant studies; speech-language pathology; audiology; communication sciences and disorders; speech, language, and hearing sciences; molecular pathology; clinical practice management; and rehabilitation counseling. Programs are currently offered at the master's and doctor's level within the Graduate School of Biomedical Sciences in biotechnology, cell and molecular biology, biochemistry and molecular genetics, medical microbiology, pharmaceutical sciences, pharmacology and neuroscience, and physiology. The ATP School of Nursing offers bachelor's, master's, and doctoral programs and collaborates with the Texas Woman's University College of Nursing to offer a Doctor of Nursing Practice.

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 Physical Therapy
- 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 Healthcareers at Texas Tech University, Room 340, Chemistry Building, 806.742.3078.



Department of Clinic Administration and Rehabilitation Counseling

C. Robin Satterwhite, Ed.D., Chairperson

Professor: Brooke

Associate Professor: Coppola

Assistant Professors: Aliff, Byers, Harpster, Hooten, House, 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)

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.
4308. **Organizational Behavior (3:3:0).** Organizational dimensions of goals and values of organization and managers; perspectives on corporate social responsibility; influence of government, history, and culture on organizations; effective management roles; dynamics of formal and informal groups; and understanding and working with people.
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, benchmarking, 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).** An overview of the nursing home industry and the managerial requirements associated with long-term care institutions. 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).** 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.
- 4360, 4361. **Special Topics (3:3:0).** Guided independent research projects with focus upon a management problem in the clinical support service setting.

Graduate Program / Clinic Administration and Rehabilitation Counseling

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, healthcare 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. 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.

4363. **Long-Term Care Practicum (3:3:0).** Permission of instructor required. Supervised work experience in an approved long-term care facility (nursing home). Two semesters of this internship are required for those who are seeking licensure as a licensed nursing home administrator. Students must meet all the requirements listed for AIT Qualifications and Requirements as listed in the Administrator-In-Training Manual (09/01/2004), or most recent version, Texas Nursing Facility Administrator Program, and Department of Aging and Disability Services. May be repeated up to three times.
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).** Provides a review and application of the principles studied within the CSM curriculum. Emphasizes 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. **Healthcare Foundations (3:3:0).** Focuses on stakeholder dynamics in healthcare. Emphasis is placed on payer, provider, patient and employer relationships as they relate to issues of cost, quality and access in the healthcare delivery system. As a class capstone project, students use an assigned healthcare theoretical model, or an environmental issue, and are asked to forecast stakeholder behavior in the practice setting.
5302. **Consumer Dimensions of Healthcare (3:3:0).** 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).** 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. **Leadership in Healthcare Organizations (3:3:0).** Emphasizes the fundamentals of leadership as it applies to leading allied health personnel in healthcare organizations. A heavy emphasis is placed on understanding the seminal concepts of leadership as it applies to organizational behavior and theory in practice. Several leadership, personality and ability-job-fit diagnostic tests are given to students to discern natural leadership tendencies. These competencies and skills are later applied to case studies in leading and managing change in organizations. Measurement of leadership performance is evaluated.
5306. **Healthcare Delivery System (3:3:0).** 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).** 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. **Decision Making with Statistics (3:3:0).** A unique blend of statistics, research methods, theory, and decision-making practices applied to real world healthcare issues in the practice setting. Designed to give students experience working with large data sets and confidence in selecting appropriate quantitative tools in management analysis using SPSS.
5310. **Coding and Healthcare Law (3:3:0).** 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).** Concentrates on the fundamentals of Business Case Analysis (BCA). Assists the student in developing the necessary analytical ability, attitudes and decision making skills required of the clinical practice manager in a changing environment. Provides in-depth knowledge of the business case analysis approach to decision-making in the ambulatory setting.
5312. **Marketing and Strategic Planning (3:3:0).** Integrates key aspects of marketing and strategic planning into a blended class that results in the completion of an integrated Business Plan for a new capital venture. Examines strategic planning techniques, concepts, and practices as they apply to organizational survival. Leadership responsibilities regarding the creation of mission, vision, goals and objective statements are explored. The second half of the course integrates marketing with strategic planning such that the "Five P's" of marketing, and the complementary roles of public relations, advertising, and sales (the marketing mix) are captured in the organizational analysis.
5315. **Professional Development and Healthcare Ethics (3:3:0).** 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).** 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.
5320. **Long-Term Care Management (3:3:0).** Overview of the nursing home industry and the managerial requirements associated with long term care institutions. Topics of study focus on an introduction to state and federal regulatory aspects of facility management, care delivery systems, reimbursement, and personnel administration.
5321. **Regulatory Aspects of Long-Term Care (3:3:0).** Analysis and application of regulatory requirements in the daily operational environment of a certified and licensed long term care facility. Topics include; Texas, Federal and JCAHO regulatory requirements in the care, architectural, and life safety code compliance issues of long term care facility operations.
5363. **Long-Term Care Practicum (3:3:0).** Prerequisite: Consent of the instructor. Supervised practical work experience conducted in an approved long-term care facility. Prepares the student for a career as a Licensed Long Term Care Administrator through practical application of the didactic curriculum. Two semesters of this practicum are required to take the nursing home administrator licensure examination.

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 particular emphasis on the impact of the disability experience from the perspective of the VR services consumer. (Writing Intensive)
5307. **Career Counseling Theory and Practice (3:3:0).** Covers career guidance, career development, career theory and development of employment, and placement options of persons with disabilities. Includes review of major career theories and approaches to career development and exploration. Practical skills covered include job analysis, job development, work-site modification, role of assistive technology, job placement, employer contacts, labor market surveys, supported employment, post-placement support, job coaching, and building of natural supports. Emphasis will be placed on relevant legislation and its impact on the employment of people with disabilities.
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) is also included. (Writing Intensive)
5309. **Group Counseling Theory and Practice (3:3:0).** 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.
5310. **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 multidisciplinary 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).** Provides 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).** 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 rehabilita-

tion 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.
5360. **Seminar in Professional Development (3:3:0).** Provides opportunities for synthesis, integration, and application of prior and concurrent coursework in the Master of Rehabilitation Counseling program. It is designed to focus on professional orientation issues related to rehabilitation counseling. Such issues will include, but are not limited to, legal and ethical issues, licensure and certification, counseling issues, conflict mediation, and consultation.
5398. **Practicum I / Microcounseling (3:3:0).** Practicum I provides an understanding of the philosophic bases of the helping process with an emphasis on helper self-understanding and self-development. The purpose of the course is to provide an onsite-clinical observation experience, experiential role plays, and practical application exercises to enable students to learn and practice the skills basic to the counseling process, to integrate and structure skills to meet client needs, and to gain an understanding of the ethical standards of the profession. Attention is given to understanding the psychological significance of the rehabilitation counseling relationship and to the development of the specific skills of counseling. This course is a prepracticum experience designed to help students gain knowledge of the basic communication and relationship development skills required of a professional rehabilitation counselor and to gain competence in applying those skills in a supervised laboratory setting. Through feedback provided by the instructor and peers, students will have the chance to develop and enhance their counseling skills. The class will strive for a mutually supportive environment that will promote both professional and personal growth and development.
5399. **Practicum II (3:3:0).** Supervised rehabilitation counseling practicum fosters personal growth, skills development, and insights

into the rehabilitation counseling process and issues that affect service delivery. Includes both online and off-line experiences in settings that facilitate the development of basic rehabilitation counseling and practice skills. May be repeated if the 100-hour requirement is not met. Completion of this course is prerequisite for the internship phase of the program.

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/video and individual/group interactions) and off-campus experiences in settings that facilitate the development of basic rehabilitation counseling and practice skills. May be repeated if the 100-hour requirement is not met.



Department of Laboratory Sciences and Primary Care

Hal S. Larsen, Ph.D., Chairperson

Professors: Larsen, Sawyer

Associate Professors: Hubbard, Maxwell, Rice-Spearman, Taylor

Assistant Professors: Butler, Christensen, Diemer, Hamilton, Jankowski, Kemp, O'Brien, Redman, Tatum

Faculty Associate: Chestnutt

Academic Instructor: Hendrix

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 ZOOL 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	ZOOL 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	NS 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)

- 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.

Graduate Program / Laboratory Sciences and Primary Care

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	9
Behavioral Science		3
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) and a national certification in CLS 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) and a national certification in CLT 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 and Physiology.....	4
College Algebra	3
General Biology	8
Organic Chemistry.....	8

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 and principles of educational methodologies will also be discussed.
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. **Management of the Molecular Laboratory (3:3:1).** Business and management principles relative to laboratory management and administration will be presented. The purpose, function, and utilization of laboratory services in coordination with specimen procurement, patient education and consent, regulatory issues, and quality assurance are discussed. Specific requirements regarding certification of molecular pathology clinical laboratories will be reviewed and discussed.

5309. **Human Molecular Genetics (3:3:0)**. 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/Clinical Laboratory Science (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. Survey of the clinical laboratory that includes common laboratory assays in Hematology, Clinical Chemistry, and Microbiology and addresses the purpose, function, and utilization of laboratory services. Specimen procurement, patient education and consent, and quality assurance are discussed.
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)**. 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)**. 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)**. Lecture series that 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)**. Lecture series that 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)**. Lecture series that 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)**. Lecture series that 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.
5307. **Pharmacology II (3:3:0)**. Lecture series that 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.
5308. **Neuroscience (3:3:0)**. Lecture series that details the human nervous system, with emphasis on the recognition of neuroanatomical arrangement. The course explores neurophysiology and concepts of neurochemistry.
5309. **Pediatrics (3:3:0)**. Lecture series that 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)**. 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)**. Lecture series that 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.
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)**. Lecture series that 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)**. Lecture series that 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)**. Lecture series that 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).** Lecture series that 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. 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).** Lecture series that 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.
6304. **Healthcare Management (4:4:0).** Lecture series that 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).** Lecture series that 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).** 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).** Lecture series that 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. 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

Steven F. Sawyer, Ph.D., Chairperson

Professors: Brooke, Sizer
Associate Professors: Brismee, Daniel, Domenech, James, Sawyer
Assistant Professors: Apte, Dedrick, Geddie, K. Gilbert, Hooper, J. Jackson, Kumar, McGalliard, Potter, Poulsen, Ramey, Rushing, Scott, Smith, Steadman, Stickley, Taylor, Tiongco, Whisner, Wilkinson

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 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 of Athletic Training (MAT) program is accredited by the Commission on Accreditation of Athletic Training Education (CAATE), 2201 Double Creek Drive, Suite 5006, Round Rock, TX 78664, 512.733.9700, www.caate.net.

Upon graduation students will be eligible to sit for the Board of Certification, Inc. (BOC) 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. **A felony conviction may affect a graduates’ ability to attain BOC certification or a state credential.**

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 at least 50 hours of observation under a certified and/or licensed athletic trainer. 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 ECCC 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. The entry-level master’s degree in athletic training is offered on the TTUHSC Lubbock campus only. For more information, contact Admissions

and Student Affairs, MS 6294, 3601 4th Street, Lubbock, TX 79430, 806.743.3220, allied.health@ttuhsc.edu, www.ttuhsc.edu/sah.

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 January 15 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.ttuhsc.edu/sah or contact Admissions and Student Affairs, MS 8310, 3601 4th Street, Lubbock, TX 79430, 806.743.3220, allied.health@ttuhsc.edu.

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 and/or Kinesiology	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 Physical Therapy program has transitioned from a Master of Physical Therapy (M.P.T.) program to a Doctor of Physical Therapy (D.P.T.) program. The D.P.T. degree will be offered at three of the four Texas Tech University Health Sciences campuses: Amarillo, Lubbock, and Odessa. Applications are no longer accepted for the M.P.T. program.

The Office of Admissions and Student Affairs accepts applications each year between September 1 and January 15 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.

Prerequisites for entry into the D.P.T. program include the completion of a bachelor's degree and the courses listed below or their approved equivalents. These courses may be completed at any accredited college or university.

Semester Hours

English or Technical Writing	6
Psychology (one course must be developmental)	6
Math (College Algebra)	3
Statistics	3
General Biology (for majors, lab required)	8
Anatomy and Physiology (for majors, lab required)	6-8
General Chemistry (for majors, lab required)	8
General Physics (for majors, lab required)	8

Recommended courses: additional English, technical writing, speech, exercise physiology, kinesiology, biomechanics, and motor control

Upon successful completion of the professional program, students are eligible to take the national licensure examination that is required to practice as a physical therapist within a given state.

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 (Sc.D.) in Physical Therapy 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.

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, master's, or doctorate (D.P.T.) 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)

5098. **Practicum in Athletic Training (V1-6).** A hands-on athletic training-related experience designed to meet the individual needs of the student.
5099. **Independent Study in Athletic Training (V1-6).** Involves an independent project designed to meet the individual student's needs and/or interests. May include, but is not limited to, a research project, course/skill review, or laboratory teaching assistants (anatomy or other courses).
5105. **Research Seminar (1:1:0).** 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).** A case-based approach to research design that incorporates the management, reduction, and analysis of data sets. Covers applying for jobs, interviewing, and writing cover letters and resumes.
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).** Focuses on the interpretation of current research in athletic training and other related medical and health areas and the ability to apply the results to the daily practice of athletic training.
5130. **Athletic Training Review (1:1:0).** 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 responsibilities, 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 (2:2:0).** 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 (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.
- 5300. **Advanced Human Anatomy for Sports Medicine (3:2:3).** NOT FOR MASTER OF ATHLETIC TRAINING STUDENTS. 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, and circulatory systems of the extremities.
- 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).** Covers topics such as cell biology, psychosocial concerns, and pharmacology as they relate to the athletic training profession.
- 5305. **Biomechanics (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 and 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 I (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. **Human 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).** 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. Student levels of learning in this course focus on the following: knowledge/comprehension, application, analysis, and synthesis/evaluation.
- 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.
- 5101. **Clinical Reasoning for Practice (1:1:0).** Prepares students for their level II fieldwork rotations and will require students to utilize advanced clinical reasoning skills. Addresses 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. Student levels of learning in this course focus on the following: knowledge/comprehension, application, analysis, synthesis, and evaluation.
- 5105. **Clinical Reasoning for Fieldwork (1:1:0).** Focuses on preparing students for their first fieldwork rotations. Professional behavior, ethics, supervision, clinical reasoning, and tools/strategies for a successful fieldwork experience will be utilized in this course. Student levels of learning in this course focus on application and analysis.
- 5106. **Fieldwork I: 1 (1:0:3).** One-week (40 hours) supervised opportunity to observe clinical practice and to participate, within limits, in the occupational therapy process with individuals and groups. Student levels of learning in this course focus on knowledge/comprehension, application, and analysis.
- 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. Introduces students to OT professional practice, OT framework, and prepares them for learning theoretical foundations and performing activity analysis. Student levels of learning in this course focus on knowledge and comprehension.
- 5112. **Research Seminar (1:0:3).** Offers the student hands-on experience with the research process. Students will complete the IRB approval process and begin process of data collection and analysis as part of collaborative research project conducted by a research team (consisting of students, a faculty member, and occupational therapy clinicians in the community). This course is writing intensive. Student levels of learning in this course focus on the following: knowledge/comprehension, application, analysis, and synthesis/evaluation.
- 5113. **Research Seminar II (1:0:3).** A continuation of Research Seminar I. Students will complete data gathering and analysis and will prepare results and discussion of topics for dissemination of information. This course is writing intensive. Student levels of learning in this course focus on the following: knowledge/comprehension, application, analysis, and synthesis/evaluation.
- 5200. **Fieldwork I: 2 (2:0:3).** Two-week (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 "nontraditional" or "role emerging" settings. Student levels of learning in this course focus on knowledge/comprehension, application, and analysis.
- 5207. **Psychosocial Interventions in Occupational Therapy (2:2:0).** Introduces students to concepts and methods for providing individual and group-based intervention for persons with mental illness and persons experiencing psychosocial stressors. Topics include, but are not limited to, crisis intervention, therapeutic use of self, specific intervention strategies (i.e., stress management, relaxation, living skills training), group dynamics, types of groups, and group protocol development. Student levels of learning in this course focus on knowledge/comprehension, application, and analysis.
- 5209. **Applied Kinesiology in Occupational Therapy (2:1:3).** Looks at analysis of normal human movement, including explanations of how movements are produced at specific joints and their influence on occupation. Student levels of learning in this course focus on knowledge/comprehension, and application.

- 5212. Occupational Therapy Practice: Assistive Technology (2:1:3).** Includes assessments and interventions involving assistive technology. Topics include, but are not limited to, assistive devices, seating systems, various switches, communication augmentative systems, environmental controls, home assessments, ergonomic assessments, and computer systems. Student levels of learning in this course focus on knowledge/comprehension, application, analysis, synthesis, and evaluation.
- 5213. Psychosocial Group Process (2:1:3).** Focuses on the application of evaluation, intervention (e.g., individual and group), and outcome processes utilized in a variety of psychosocial practice settings. Instruction and lab experiences provide opportunities for students to practice therapeutic group skills as they develop and implement session plans for a group of individuals. Student levels of learning in this course focus on the following: application, analysis, synthesis, and evaluation.
- 5217. Planning Occupational Therapy Research (2:2:0).** 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 that proposal. This course is writing intensive. Student levels of learning in this course focus on knowledge/comprehension, application, and analysis.
- 5226. Professional Development in Occupational Therapy (2:2:0).** Students will identify current policy issues in the various contexts in which occupational therapy services are provided and how to advocate for the profession. Students will be introduced to the grant-writing process and benefits of securing a grant. Addresses ongoing professional development and responsibilities including the benefits of professional state and national organizations. Student levels of learning in this course focus on the following: knowledge/comprehension, application, analysis, synthesis, and evaluation.
- 5227. Introduction to Clinical Reasoning (2:2:0).** 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. Student levels of learning in this course focus on knowledge/comprehension, and application.
- 5229. Conditions in Occupational Therapy: Part 1 (2:2:0).** Provides an overview of the etiology, epidemiology, signs and symptoms, associated conditions/complications, prognosis, and medical management of disorders and injuries in children and adults relevant to occupational therapy practice. Focuses on conditions commonly encountered in pediatric and mental health practice settings. Students examine areas of occupation, occupational performance, and occupational roles potentially affected as a result of the condition or complications of the condition. Student levels of learning in this course focus on knowledge/comprehension, application, and analysis.
- 5309. Applying Neuroanatomy in Occupational Therapy (3:3:0).** A study of the structure and function of the human nervous system. Discussion of neurological diagnoses and theories for treatment. Student levels of learning in this course focus on knowledge/comprehension and application.
- 5310. Theory and Foundations of Occupational Therapy (3:3:0).** Examines the philosophical, theoretical, and professional concepts that are foundational to occupational therapy. Students learn and apply several occupation-based theories, frames of references, and treatment approaches utilized in occupational therapy practice. Student levels of learning in this course focus on the following: knowledge/comprehension, application, analysis, synthesis, and evaluation.
- 5311. Overview and Analysis of Occupational Therapy Assessment (3:2:3).** Provides the student with an overview and analysis of various assessment measures used in occupational therapy practice. Students learn components of critiquing tests and measures that include the type of assessment (e.g., norm-referenced, criterion referenced), format (e.g., interview, self-report), applicable population, psychometric properties (e.g., reliability, validity), and utility (e.g., eligibility, outcomes). Students also practice the administration of both standardized and non-standardized assessments as well as the interpretation and documentation of assessment results. Student levels of learning in this course focus on knowledge/comprehension, application, and analysis.
- 5313. Introduction to Evaluation and Intervention in Occupational Therapy (3:2:3).** Introduction to key OT practice skills, including basic evaluation techniques, clinical documentation, clinical safety, physical handling techniques, interventions, and splinting. Student levels of learning in this course focus on knowledge/comprehension and application.
- 5314. Health and Community Settings (3:2:3).** 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. Student levels of learning in this course focus on knowledge/comprehension, application, and analysis.
- 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. Student levels of learning in this course focus on the following: knowledge/comprehension; application; analysis; synthesis; and evaluation.
- 5316. Research Process in Occupational Therapy (3:3:0).** 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, qualitative and quantitative design and analysis (including inferential statistics) methods. Student levels of learning in this course focus on knowledge/comprehension and application.
- 5317. Hand and Upper Extremity Rehabilitation (3:2:3).** 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. Student levels of learning in this course focus on application and analysis.
- 5319. Occupational Performance Throughout the Lifespan (3:3:0).** Focus is on the skill progressions in typical and atypical development and its impact on occupational performance across the lifespan. Students will be introduced to various occupational therapy practice settings that individuals may encounter throughout their lifespan when experiencing challenges in areas of occupation. Student levels of learning in this course focus on knowledge/comprehension and application.
- 5320. Occupational Therapy Practicum (3:2:3).** Allows students to select an area of focus (adult rehab, pediatrics, mental health, neuro, or hand rehab) and spend lab hours in the specific area. Students will meet weekly as a group in a seminar format to discuss their individual lab experiences. Case studies will be used to integrate clinical reasoning and professional practice. Student levels of learning in this course focus on the following: knowledge/comprehension, application, analysis, and synthesis/evaluation.
- 5329. Conditions in Occupational Therapy: Part 2 (3:3:0).** 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. 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. Students will apply documentation skills to begin differentiating anticipated therapy outcomes and long and short-term goals for a variety of conditions. Student levels of learning in this course focus on knowledge/comprehension, application, and analysis.
- 5449. Occupational Assessment and Intervention in Children and Adolescents (4:3:3).** Focus is on how typical and atypical sequences are used in pediatric occupational therapy assessment and treatment. Lab experiences involve the observation and assessment of children. Clinical reasoning and occupational therapy processes focus on documentation of assessment findings, goal development, and determination of therapy interventions based on assessment findings. Student levels of learning in this course focus on the following: knowledge/comprehension, application, analysis, and synthesis/evaluation.
- 5450. Occupational Assessment and Intervention in Adults and Older Adults (4:3:3).** Builds on student knowledge in earlier

courses, applying specific OT techniques to diagnostic areas and individual conditions found in adults and older adults. Instruction and laboratory practice incorporates active learning to cultivate critical thinking skills needed in practice. Through competency checklists and treatment plans completed in class and in the clinic, students will utilize clinical reasoning skills, occupational therapy processes, and professionalism required for fieldwork. Student levels of learning in this course focus on the following: knowledge/comprehension, application, analysis, and synthesis/evaluation.

5500. **Human Anatomy (5:3:6)**. 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. Student levels of learning in this course focus on knowledge/comprehension.
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. Student levels of learning in this course focus on knowledge/comprehension, application, analysis, and synthesis/evaluation.
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. Student levels of learning in this course focus on knowledge/comprehension, application, analysis, and synthesis/evaluation.

Physical Therapy (AHPT)

Master of Physical Therapy

5099. **Independent Study in Physical Therapy (1-6 hours)**. Prerequisite: instructor approval. 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)**. 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. 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. 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. Focuses on the development of writing skills and students make contributions to the scientific literature.
5152. **Seminar in Physical Therapy 1 (1:1:0)**. A seminar course examining issues in the field of physical therapy. Specific subject matter varies.
5202. **Principles of Kinesiology (2:1:3)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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 online supplementary review of information in preparation for a successful licensure examination process.
5232. **Clinical Reasoning 2 (2:1:3)**. Prerequisite: AHPT 5231. 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 online supplementary review of information in preparation for a successful licensure examination process.
5233. **Clinical Reasoning 3 (2:1:3)**. Prerequisite: AHPT 5232. 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 online supplementary review of information in preparation for a successful licensure examination process.
5234. **Graduate Seminar (2:2:0)**. Prerequisite: AHPT 5233. Designed to prepare graduates for the licensure examination and entering the work force. The course includes an online 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. 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. 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. Includes the study of exercise physiology, including normal physiological responses to acute and chronic exercise, and physical training principles. Also emphasizes concepts of health promotion and wellness.
5305. **Clinical Kinesiology (3:2:3)**. Prerequisite: AHPT 5202. 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).** 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. 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).** 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.)** 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. 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. 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. 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).** 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. 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. 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. 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 neurological 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. 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. Focuses on examination, tests and measures, and interventions used in a variety of settings. The course emphasizes the use of physical agents and modalities. Includes the care of burns and wounds.

Doctor of Science in Physical Therapy

- 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 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.
6317. **Radiologic Anatomy (3:3:0).** Examines the technology and applications of imaging for understanding normal and pathological human anatomy. Plain-film imaging, MRI, CT, and diagnostic ultrasound will be appropriately applied to this discussion. A

systematic approach to understanding various images across different joint systems will be provided. In addition, specific normal and pathological anatomy for the spine and extremities will be viewed on x-ray, MRI, and CT, along with special topics in diagnostic ultrasound. Emphasis will be placed on defining normal and pathological anatomy associated with various joint systems as it relates to musculoskeletal condition. These topics will be related to evidence-based clinical practice of musculoskeletal disorders that is appropriate for the physical therapist. Evidence-based readings and web-supported tutorials will be utilized.

- 6318. Musculoskeletal Management of Chronic Pelvic Pain (3:3:0).** Designed to integrate the understanding of orthopedic musculoskeletal diagnosis with knowledge of the visceral systems to improve management of patients with chronic pelvic pain. Screenings of the urogenital, gastrointestinal, and gynecological systems will be incorporated into the musculoskeletal examination of related joint regions along with understanding of traditional medical evaluation. Additionally, this course will enhance the knowledge of peripheral and central pain mechanisms for both the somatic and autonomic systems. At the conclusion of this course, the student will have developed a rationale for physical therapy interventions targeted at each of these systems as well as the ability to effectively communicate this information to the team of medical practitioners managing these conditions.
- 6319. Seminar in Contemporary Topics for Autonomous Practice (3:3:0).** Addresses selected special topics in modern orthopaedic Physical Therapy practice. Emphasize special topics not covered in the other courses within the Sc.D. curriculum. Selected special topics will serve as the cornerstone of the course, including modern soft tissue examination and management, while other topics will change in pace with changes in contemporary Physical Therapy clinical practice. Patient examination and management strategies derived from these principles will be discussed.
- 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.P.T. 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.
- 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.
- 7404. Educational Evaluation in Allied Health (4:4:0).** 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.
- 7406. Advanced Statistics in Allied Health Sciences (4:4:0).** Familiarizes the student with various tools used in the parametric and non-parametric statistical analyses. Parametric tools will include Pearson r correlation, regression, t-test, analysis of variance, and selected multivariate designs. Non-parametric tools will include one, two, and k-sample designs; as well as Spearman, phi, and point biserial correlation coefficients. The course will include single-subject design, sequential clinical trials, and survey methodology. Emphasis will be placed on research findings that evaluate specific clinical populations. Track: Research.

Doctor of Physical Therapy

- 8100. Professional Development (1:1:0).** Focuses on the principles that govern ethical decisions, profession roles, and professional behaviors as they specifically relate to the practice of physical therapy. Additional emphasis will focus on the development of skills related to the following: (1) the effective management of time and stress, (2) effective study and test taking strategies, and (3) conflict management skills. This course will incorporate discussion-based didactic lecture, individual and group assignments and online instruction.
- 8110. Health and Wellness Promotion (1:1:0).** Focuses on guiding students in the development of a personalized fitness and wellness program as a means to enhance their patients' health and

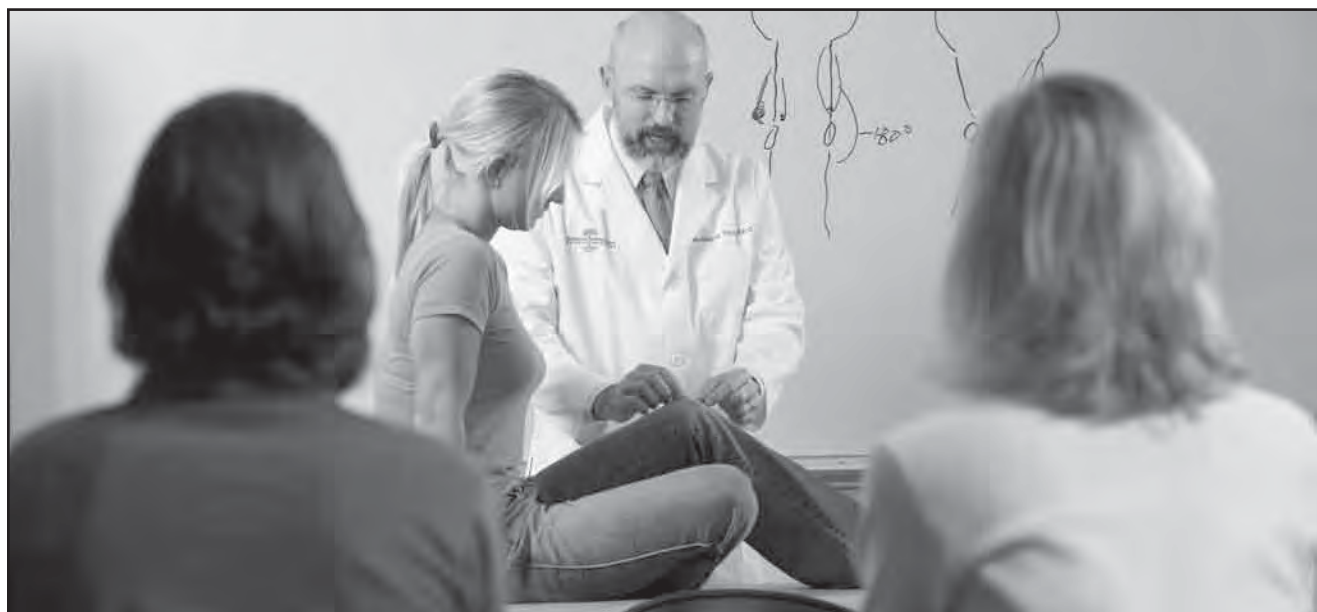
wellbeing in addition to providing them the knowledge and skills they need to guide others in developing health and wellness promotion programs, both at individual and organizational levels. Students will complete fitness and wellness modules on major health and wellness topics, such as principles of nutrition and physical fitness, disease prevention, risk factor reduction, and disease management, and learn to use behavior modification techniques to achieve healthy lifestyle habits in their patients. Students will learn concepts and techniques for health and fitness assessment, behavior modification counseling, nutrition and physical activity analysis and tracking, and program design and implementation across the lifespan for patients.

- 8114. Critique and Interpretation of Research (1:1:0).** Teaches students how to read the scientific literature critically in preparation for becoming an evidence-based practitioner. The focus of the course will be on becoming a consumer of scientific literature.
- 8120. Communication and Clinical Education (1:1:0).** Designed to improve the students' communication through written, verbal and nonverbal forms, enhance professional behaviors and address issues concerning clinical education. Topics discussed are related to documentation styles, teaching and learning, components of respectful interaction with cultural and generational differences, difficult patients and various age groups. Professional behaviors as they relate to the generic abilities and clinical education will also be addressed, along with using the PT MACS on clinical internships.
- 8123. Clinical Reasoning 1 (1:0:3).** Clinical Reasoning 1 is designed to explore the nature of clinical reasoning in the profession of Physical Therapy and to examine strategies for assisting learners to develop their reasoning expertise. Focuses on clinical problem solving used in minimally to moderately complex case studies to including the following practice patterns across the life span: general, cardiopulmonary, musculoskeletal, and neuromuscular. Knowledge and skills from the curriculum taught to this point will be incorporated. The laboratory course places less emphasis on didactic learning and more toward case competence, problem solving and patient care management ability. Also incorporated are quizzes with licensure type test items covering material presented in the curriculum thus far and that are representative of the categories in the content outline of the licensure exam.
- 8142. Assistive and Adaptive Technology (1:1:0).** Study of assistive technology including manual and powered mobility, postural control, environmental controls, augmentative communication, and transportation.
- 8144. Professional Project (1:1:0).** Prerequisites: Research Design and Statistics; Critique and Interpretation of Research. The culmination of the research courses in which students will perform a scholarly literature review of a physical therapy-related topic. Provides the instruction to perform this task.
- 8146. Special Topics (1:1:0).** Includes selected topics of interest to the profession of physical therapy. Topics may include, but are not limited to, the healthcare of women, especially during the childbearing years; incontinence; pelvic/vaginal pain; prenatal and postpartum musculoskeletal pain; osteoporosis; rehabilitation following breast surgery; and lymphedema. Other topics of current interest will be presented.
- 8160. Graduate Seminar (1:1:0).** This integrative capstone seminar course format designed to prepare graduates for the licensure examination and entering the work force. Learning method includes online supplementary review and seminar format.
- 8200. Physiology of Body Systems (2:2:0).** Provides a survey of human physiology and covers key concepts related to the function and biological control of cells, tissues, organs, and body systems. Basic principles of physiology are addressed with focus on the coordinated functions and activities of specific body systems: nervous, musculoskeletal, cardiorespiratory, immune, endocrine, gastrointestinal, and other body systems. Emphasis is given to normal system function, interaction, and homeostasis and the ways that these contribute to the functions of the body as a whole. Abnormal function and interaction will also be addressed.
- 8201. History and Systems Screening (2:1:3).** Presents an important responsibility of physical therapists, specifically, the recognition of co-morbid medical conditions. Accurate diagnosis depends on three major clinical indices: the subjective information obtained from the patient, the signs identified on physical examination, and the results obtained from diagnostic tests (imaging and laboratory tests). Examines the relative value and importance of the subjective data obtained from the medical history as related to physical examination and imaging/labora-

tory investigations in the establishment of a diagnosis. Included is information regarding the knowledge and processing skills necessary to enhance physical therapists' medical screening and clinical judgments regarding when to treat and when to refer their patients. Combined with students' existing knowledge and skills, this medical screening course will provide a more comprehensive evaluation scheme that will facilitate safe, effective and efficient patient management within the context of a collaborative practice paradigm.

- 8203. Functional Anatomy (2:1:3).** Focuses on the study of anatomy with respect to function. Emphasis will be placed on joint orientation and description of normal osteokinematic and arthrokinematic components of movement of the upper extremity, lower extremity and spine. Laboratory experiences focus on surface anatomy palpation and visualization of kinematic motion.
- 8205. Research Design and Statistics.** Provides the student with an introduction to statistics and research design. Students will obtain the requisite knowledge about the research process and experimental designs commonly used in pre-clinical and clinical studies. The course will present the fundamental concepts of descriptive statistics and statistical inference.
- 8207. Clinical Pathology (2:2:0).** Provides a survey of clinical pathology and covers key concepts related to the structural and functional changes in cells, tissues and organs that underlie human disease. Basic principles of pathology are addressed with focus on the cause, development, progress, and consequences of diseases related to the nervous, musculoskeletal, cardiorespiratory, immune, endocrine, gastrointestinal, and other body systems. In each system, normal structure, function, and the symptoms and signs that arise from pathologic changes are discussed. Emphasis is given to pathologies that are more likely to be encountered in physical therapy practice and to developing an understanding of how disease affects functional abilities, patient safety, and treatment outcomes.
- 8209. Exercise Physiology (2:2:0).** Designed to provide students an understanding of basic exercise physiology with a focus on the acute physiological responses and adaptive changes to exercise across systems, between genders, and over the lifespan. Students will develop their understanding of the body's ability to perform physical work, adapt to stressful situations, and improve its physiological capacities for health and exercise performance. Laboratory sessions will allow students the opportunity to develop knowledge and skills in the application of principles of exercise physiology to the assessment and prescription of physical activity and exercise in the clinical rehabilitation setting. Also emphasizes concepts of health and wellness promotion.
- 8210. Therapeutic Exercise (2:1:3).** Includes lecture and lab components exploring the principles guiding therapeutic exercise prescription by the physical therapist. The major therapeutic exercise domains that will be explored include flexibility training, resistance training, cardio-respiratory/aerobic training, relaxation, aquatic exercise, proprioceptive neuromuscular facilitation, balance, coordination, stabilization training. The course will place special emphasis on health and wellness of the general population and exercise principles related to women's health.
- 8212. Pharmacology (2:2:0).** Provides a survey of pharmacology and covers key concepts related to the cellular actions, therapeutic uses, and side effects of major drug classes used in humans. Basic principles of pharmacology are addressed with focus on the mechanisms of action of classes of drugs and effects of specific drugs on the nervous, musculoskeletal, cardiorespiratory, immune, endocrine, gastrointestinal, and other body systems. Basic principles of pharmacology and their relation with pathophysiology are addressed with focus on and relevant applications to the practice of physical therapy.
- 8214. General Practice Patterns (2:1:3).** Presents material essential to a Physical Therapist's role in patient/client management in diverse practice settings. Using didactic lecture and clinical laboratory practice, material associated with the five elements of the patient/client management by the physical therapist are acquired. These elements include the examination, evaluation of examination results, diagnosis, establishing a prognosis, and instituting appropriate interventions. Discusses the assessment process and interventions involved with the care of the patient/client encountered in general medicine and surgical practice.
- 8216. Physical Agents and Modalities (2:1:3).** Presents material that allows development of clinical skills fundamental to patient management for the physical therapist. Course content includes theory, scientific principles, and clinical applications associated with a physical therapy evaluation, assessment, and intervention with physical agents and modalities. Emphasizes instruction in physical agents and modalities available to the practicing physical therapist. These will include electrophysiology, thermal agents, laser, application of traction, electromyographic (EMG) biofeedback, biomedical compression, alternative and palliative care, soft tissue modalities, and the practical usage of each agent or modality. Both classroom and laboratory learning will be included.
- 8222. Clinical Internship 1 (2:0:6).** Four weeks of full-time clinical experience (approximately 160 hours) in a physical therapy practice setting. During Clinical Internship 1, the student has the opportunity to integrate patient evaluation and management skills in a clinical setting to develop entry-level competencies for entry-level physical therapists as defined in the *Physical Therapist Manual for the Assessment of Clinical Skills (PT MACS)*.
- 8224. Clinical Reasoning 2 (2:1:3).** Clinical Reasoning 2 is designed to explore the nature of clinical reasoning in the profession of Physical Therapy and examine strategies for assisting learners to develop their reasoning expertise. Focuses on clinical problem solving used in moderate to complex case studies to including the following practice patterns across the life span: general, cardiopulmonary, musculoskeletal, and neuromuscular to include pediatrics. Knowledge and skills from the curriculum taught to this point will be incorporated. The laboratory course places less emphasis on didactic learning and more toward case competence, problem solving and patient care management ability. Also incorporated are quizzes with licensure type test items covering material presented in the curriculum thus far and that are representative of the categories in the content outline of the licensure exam.
- 8228. Motor Behavior (2:2:0).** The course focuses on the principles of the current theories of motor control, motor learning, and recovery of function. Application to neurologic physical therapist practice using a theoretical framework. The focus is on normal and pathological postural control, mobility, and upper extremity function.
- 8231. Diagnostic Imaging (2:2:0).** Covers the basic science behind multiple imaging modalities (e.g., x-rays, magnetic resonance imaging [MRI], computed tomography [CT], doppler, arthrograms, diagnostic ultrasound [DUS]) the benefits of each imaging method, as well as how to refer for imaging services or consultation. Anatomy of bone, joint, cartilage, soft tissue, central nervous system (CNS) structure, and gastrointestinal and genitourinary systems for the appropriate imaging devices will be discussed by joint/region along with clinical reasoning algorithms for assistance with imaging selection and interpretation. Special features and views will be discussed as applicable for each imaging device. Vascular modalities and special bone scans will also be discussed.
- 8240. Differential Diagnosis (2:1:3).** Provides education and training in differential diagnosis of conditions that may require referral to or examination by a physician. Using basic to complex case studies from a variety of practice patterns, the course will educate the student about proper screening for medical disease to make an informed diagnosis. Students will be required to draw upon their comprehensive knowledge of all body systems to distinguish musculoskeletal and neuromuscular pathology from systemic conditions involving medical pathology. Utilizes complex case studies in the laboratory setting and formal student presentations in the lecture setting to enhance student learning.
- 8301. Fundamental Skills and Assessment (3:2:3).** Presents foundational tests and measures for physical therapy practice. Using didactic lecture and clinical laboratory practice, basic physical therapy skills and assessments are covered, including but not limited to, goniometry, manual muscle testing, postural assessment and gait assessment. General assessment techniques and foundational test and measures will be covered.
- 8303. Biomechanics (3:3:0).** Provides students with a fundamental understanding of the biomechanics of the musculoskeletal system and integrated human movement with clinically relevant applications.
- 8324. Orthotics and Prosthetics (3:2:3).** Designed to provide the physical therapy student knowledge of orthotic and prosthetic prescription, parts components, and physical therapy application. Includes exercise prescription for amputees, evaluative procedures for orthotics and prosthetics, gait analysis, device checkouts and case studies. The course also will involve interactions with prosthetists and orthotists and prosthetic and orthotic device users.

8327. **Healthcare and Business Management (3:3:0).** The course provides an understanding of basic organizational, fiscal, payer, and accessibility issues pertinent to the administration and management of rehabilitative services as well as initial business management perspectives needed by the entry-level physical therapist, concentrating on supervision, staffing, planning, and administration.
8329. **Human Development (3:3:0).** Study of human growth and development issues and theories relevant to the practice of physical therapy. The course focuses on typical development from conception to senescence within the physical, cognitive, social, and emotional domains.
8414. **Cardiopulmonary Practice Pattern (4:3:3).** Designed to focus on the primary and secondary cardiopulmonary impairments that limit therapeutic and patient outcomes in various settings, which include intensive care units, long term care, outpatients, school setting and home care. The physiological and evidence basis of intervention will primarily focus on practical aspects relating to all patients and client. Current medical diagnosis and treatment of common cardiac and pulmonary disorders seen by physical therapy practice will be incorporated in this course. *The Guide to Physical Therapist Practice* will be used to discuss the process of selecting appropriate tests and measures, establishing a diagnosis, prognosis and plan of care, and selecting interventions for patients with cardiovascular and pulmonary impairments.
8418. **Neuroscience (4:4:0).** Provides students with a fundamental understanding of the functions and pathologies of the central nervous system (CNS) as a basic science course in the neurorehabilitation curriculum. The emphasis will be on “systems-level neuroanatomy” (i.e., functional neuroanatomy [e.g., motor and sensory pathways] and regional neuroanatomy [e.g., organization of spinal cord, brainstem, cerebral cortex]). In addition, information processing by neurons will be addressed by coverage of axon physiology, synaptic neurotransmission and plasticity. The course will first survey the anatomical organization of the CNS, then sensory and motor functions of the CNS, and finish with a description of a number of neurological disorders that have clinical relevance to physical therapists.
8422. **Pediatric Practice Patterns (4:3:3).** Focuses on physical therapy examination, evaluation, interventions, and expected outcomes for pediatric patients with musculoskeletal, neuromuscular, cardiopulmonary, or general medical impairments and functional limitations. The course includes discussion of physical therapy practice in specialized setting such as neonatal intensive care, early childhood intervention programs, and public schools.
8425. **Musculoskeletal Practice Pattern 1: Extremities (4:2:6).** An in-depth study of the principles of orthopedic examination, evaluation and intervention aimed at incorporating a detailed working knowledge of pathologic anatomy as it relates to dysfunction of the extremities. Teaches the basis for orthopedic intervention utilizing modalities, joint mobilization/manipulation, therapeutic exercise, functional and post surgical rehabilitation principles.
8426. **Musculoskeletal Practice Pattern 2: Spine (4:2:6).** An in-depth study of the principles of orthopedic examination, evaluation and intervention aimed at incorporating a detailed working knowledge of pathologic anatomy as it relates to dysfunction of the spine. Teaches the basis for orthopedic intervention utilizing modalities, joint mobilization/manipulation, therapeutic exercise, functional, chronic pain, and post surgical rehabilitation principles.
8453. **Clinical Internship 2 (4:0:12).** Eight weeks of full-time clinical experience (approximately 320 hours) in a predetermined specific PT clinical setting (acute care, musculoskeletal, neuromuscular, or elective). The student has the opportunity to integrate patient management and evaluation skills and to develop entry-level and advanced competencies for entry-level physical therapists as defined in the *Physical Therapist Manual for the Assessment of Clinical Skills (PT MACS)*.
8455. **Clinical Internship 3 (4:0:12).** Eight weeks of full-time clinical experience (approximately 320 hours) in a predetermined specific PT clinical setting (acute care, musculoskeletal, neuromuscular, or elective). The student has the opportunity to integrate patient management and evaluation skills and to develop entry-level and advanced competencies for entry-level physical therapists as defined in the *Physical Therapist Manual for the Assessment of Clinical Skills (PT MACS)*.
8456. **Clinical Internship 4 (4:0:12).** Eight weeks of full-time clinical experience (approximately 320 hours) in a predetermined specific PT clinical setting (acute care, musculoskeletal, neuromuscular, or elective). The student has the opportunity to integrate patient management and evaluation skills and to develop entry-level and advanced competencies for entry-level physical therapists as defined in the *Physical Therapist Manual for the Assessment of Clinical Skills (PT MACS)*.
8458. **Clinical Internship 5 (4:0:12).** Eight weeks of full-time clinical experience (approximately 320 hours) in a predetermined specific PT clinical setting (acute care, musculoskeletal, neuromuscular, or elective). The student has the opportunity to integrate patient management and evaluation skills and to develop entry-level and advanced competencies for entry-level physical therapists as defined in the *Physical Therapist Manual for the Assessment of Clinical Skills (PT MACS)*.
8500. **Gross Anatomy (5:3:6).** An 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 systems.
8521. **Neuromuscular Practice Patterns (5:3:6).** Examines the pathology, medical diagnosis process, and medical and surgical interventions of neuromuscular conditions in adults that are commonly seen by physical therapists. It focuses on physical therapy examination, evaluation, and intervention for adult clients with neurological disorders based on current research, evidence, and practice guidelines.



Department of Speech, Language and Hearing Sciences

Rajinder K. Koul, Ph.D., Chairperson

Professor: Koul

Associate Professors: Hicks, Paschall, Sancibrian

Assistant Professors: Aoyama, Bogschutz, Corwin, Dembowski, Flores, Garner, Gustafson, Keller, Reel, S. Zupancic

Clinical Instructors: Arnold, Dendle, Dragga, Holland, LaFave, Perry, Sims, Young

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	One biological/life science, one physical science required. Suggested courses are BIOL 1402, ZOOL 2402, PHYS 1401	12
Social and Behavioral Sciences	Any courses from anthropology, communication, education, human development and family studies, health, philosophy, psychology, or sociology.	12
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.

Speech, Language and Hearing Sciences (AHSL)

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 to 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 differ-

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.

ent language backgrounds. The student will gain proficiency with pure-tone, speech, and impedance testing techniques.

- 4280. **Clinical Practicum: SLP (2).** A supervised clinical experience. May be repeated for credit.
- 4290. **Clinical Practicum: Audiology (2).** A supervised clinical experience. 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. 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 in Speech-Language Pathology (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).** Presents advanced diagnostic techniques for children and adults, including those from diverse populations or with special needs.

Speech-Language Pathology (AHS�)

- 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).** This laboratory course will allow students the opportunity to obtain hands-on experiences in aural rehabilitation. Course will include hands-on experience related to the use, management, and troubleshooting of hearing aids and FM systems. Cochlear implants, vibrotactile devices, and assistive listening devices will also be introduced.
- 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).** 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).** Overview of normal speech acquisition and current approaches to assessment and management of pediatric speech sound disorders.
- 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, 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.
7010. **Independent Study (V1-3).** A variable credit course used for individualized leveling plans created by the program director.
7020. **AuD Independent Study (V1-3).** Independent study for advanced students in the fourth year of the AuD program. Two enrollments required before graduation (typically fall and spring of fourth year unless prior approval has been obtained from the department). May not be taken before all courses and comprehensive examinations are successfully completed. May be repeated for credit.
7110. **Special Topics in Audiology (1:1:0).** A capstone course taken in the third year of the AuD program. This course will allow for integration of knowledge in a case-based format.
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.
7150. **Pediatric Audiology Lab (1:0:1).** Designed to provide hands-on experiences in audiological testing of pediatric patients, along with expanding knowledge related to audiological issues in the pediatric population.
7164. **Auditory Electrophysiology Lab (1:0:1).** Designed to provide hands-on experiences with equipment utilized during electrophysiological testing.
7165. **Balance Function Lab (1:0:1).** Designed to provide hands-on experiences with equipment utilized in assessment and management of balance function.
7170. **Cochlear Implants Lab (1:0:1).** Designed to provide hands-on experiences with cochlear implant equipment.
7180. **Implications of Pharmacology in Audiology (1:1:0).** Provides the basic information necessary to understand the effects of prescription and nonprescription medications on the auditory and balance systems. Topics will include mechanisms of drug actions, side effects, how age and disease affect these mechanisms, specific effects of certain drugs on the hearing and balance system, and herbal medications.
- 7198–7199. **Clinical Practicum (1:1:0).** Supervised clinical practicum in audiology.
7225. **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 lifespan.
7247. **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.
7249. **Auditory Neuroscience (2:2:0).** Assists 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 (2:2:0).** An introduction to counseling the communicatively disordered and their families. Emphasis will be placed on special educational, vocational, and emotional issues surrounding hearing impairment. Considerations of special populations and lifespan issues will be included.
7270. **Cochlear Implants (2:2:0).** Electrophysiology of implantable devices. Also includes processor strategies, and speech/language learning in prelingually deafened listeners.
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).** 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 symptomatology of other disabilities versus auditory processing disorders as the primary diagnosis.
7330. **Speech and Language Development and Disorders (3:3:0).** An overview of speech and language development and the basic principles of assessment and treatment for speech sound and language disorders. Includes a review of phonetics and a special focus on speech and language problems in persons with hearing loss.
7340. **Auditory Anatomy and Physiology (3:3:0).** 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.
7345. **Advanced Amplification (4:3:1).** Advanced topics in clinical amplification including programmable instruments, digital processing and digital amplification, multimicrophone technology, and other noise reduction systems will be presented.
7348. **Educational Audiology (3:3:0).** Audiological considerations in educational settings. The incidence, treatment, and educational sequela of hearing impairment in the auditory-verbal classroom will be covered.
7350. **Pediatric Audiology (3:3:0).** A study of behavioral and objective audiological evaluation, as well as the habilitation and rehabilitation, of infants and children.
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 and lowering areas; (2) etiology and pathology of auditory disorders; and (3) audiological and otologic evaluation/management of auditory disorders.
7355. **Advanced Concepts and Instrumentation (3:3:0).** Provide training on using additional testing and techniques to expand the diagnostic and rehabilitative focus of audiologist. Instrumentation associated with the measurement of noise across multiple environments will be a central aspect of the course.
7363. **Advanced Electrophysiology (3:3:0).** Elective course focusing on advanced electrophysiological techniques.
7364. **Auditory Electrophysiology (3:3:0).** Covers clinical and theoretical knowledge and applied skills of normal and pathological auditory systems. Provides 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.
7365. **Balance Function (3:3:0).** Covers theoretical knowledge and applied skills of normal and pathological vestibular system.
7375. **Professional Issues in Audiology (3:3:0).** 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. Will present effects of noise exposure and hearing conservation programs.
7390. **Clinical Practicum—Individualized Experience (3:3:0).** The course is intended to allow for individualized student instruction of clinical procedures and protocols. May be repeated for credit.
- 7392–7399. **Clinical Practicum (3:3:0).** Supervised clinical practicum in audiology.
7442. **Psychoacoustics and Auditory Perception (4:3:1).** Presents the physiological bases of auditory perception and the corresponding behavioral manifestations including higher-level cognitive and developmental aspects of speech perception. Includes laboratory.
7444. **Amplification (4:3:1).** A comprehensive introduction of amplification devices, methods, and techniques. Consideration of special populations and their diverse needs will also be included.

7446. **Diagnostic Audiology (4:3:1).** Presents advanced diagnostic techniques for children and adults including those from diverse populations or with special needs.

Ph.D. in Communication Sciences and Disorders (AHSL)

Courses also may include curriculum from graduate programs in the Department of Speech, Language, and Hearing Sciences. Individualized degree programs also include courses from departments at Texas Tech University and the Texas Tech University Health Sciences Center.

8000. **Doctoral Research Seminar (6 hours).** 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).** Studies 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).** 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.
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.
8330. **Seminar in Healthcare Policy and Administration (3:3:0).** Seminar devoted to the study of major issues facing U.S. healthcare in the 21st century. Topics will include an overview of U.S. healthcare organizations and delivery systems, economics of healthcare policy, issues of access to care, managed care, quality assessment, and healthcare finance.
8332. **Seminar in Neural Bases of Adult Communication Disorders (3:3:0).** Seminar devoted to the study of the impact of neurological impairments on the speech, language, cognition, and swallowing abilities of adults. Topics will include the neural basis of dysarthria, apraxia of speech, aphasia, dementia, and dysphagia in adults. Links will be made between neural basis and clinical behavior, as well as evidence based practice interventions.
8333. **Seminar in Neural Bases of Pediatric Communication Disorders (3:3:0).** Seminar devoted to the study of the impact of neurological impairments on the speech, language, cognitive, social, and swallowing abilities of children. Topics will include the neural basis of common pediatric communication disorders, childhood apraxia of speech, and others. Links will be made between the neural basis and clinical behavior, as well as evidence based practice interventions.
8334. **Seminar in Cross-Disciplinary Research in Speech and Hearing (3:3:0).** Selected studies in communication sciences, offering the opportunity for cross-disciplinary interaction between faculty and students. Studies can include speech-language pathology, audiology, speech science, hearing science, or related fields.
8335. **Seminar in Treatment for Adult Neurogenic Disorders (3:3:0).** Seminar devoted to discussing and critically evaluating strategies for people with neurogenic communication disorders. Emphasis will be placed on evaluating efficacy of contemporary intervention techniques with individuals who have adult neurogenic communication disorders.
8336. **Seminar in Advanced Vestibular Issues (3:3:0).** Seminar devoted to the area of understanding vestibular and balance issues. Topics include discussion about the physiological basis of the vestibular/balance system, pathophysiology of disorders, methods and evaluation of vestibular rehabilitation, and research in these areas.
8337. **Seminar in Brain and Language (3:3:0).** The focus of this seminar is to learn about central issues in brain and language research. Emphasis will be placed on what is known about neurological basis of aphasia. Students will focus on the relationship between brain and language in terms of their scientific and methodological aspects.
8338. **Seminar in Clinical Phonetics: Acoustic and Articulatory Studies of Speech Disorders (3:3:0).** Seminar devoted to the area of acoustic phonetic and physiological phonetic characteristics of speech disorders, such as: dysarthria, aphasia, apraxia, and developmental articulation disorders. Emphasis will be placed 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 addressed selectively. The course will include laboratory exercises in the acoustic analysis of normal and disordered speech.
9000. **Doctoral Dissertation (9 hours).** 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

Luis Reuss, M.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.

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)

- 5101. Responsible Conduct of Research (1:1:0).** Addresses the regulatory and ethical environment of today's biomedical research as well as such topics as authorship and data management. The class format is lectures and case discussions. Course is required for all GSBS students.
- 5201. Scientific Writing in the Biomedical Sciences (2:2:0).** Tactics for effective writing and communication in the biomedical sciences. Instruction will focus on the process of writing and publishing scientific manuscripts and writing fellowship applications. Students will complete short writing and editing exercises that focus on tactics of effective, clear, and concise writing, and prepare a manuscript or application in their area of study.

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.

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.



Department of Cell Biology and Biochemistry

Harry M. Weitlauf, M.D., Chairperson

Professors: Chilton, Everse, Faust, Hutson, Reid, Reynolds, Stocco, Weitlauf

Associate Professors: Coates, Cornwall, Hardy, Lee, Little, MacDonald, Maurer, Pelley, Sridhara, Whelly, Schneider Williams, Wright

Assistant Professors: Dufour, Kang, 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 Structure and Function, 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, development and regeneration of the nervous system, genetics of human cancer and congenital human disorders, diagnosis and treatment of human cancer, molecular basis of sex differences in maintenance and repair of connective tissues, morphogenesis, developmental genetics, actin cytoskeleton, embryonic development, cellular genetics, cell biology of epithelia, immune privilege and transplantation, molecular mechanisms of ABC transporters in cholesterol homeostasis and multidrug resistance of cancer cells.

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 Terri Lloyd at 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, 6323, 6333, 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.

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 complementary 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 at 806.743.2053 for more information regarding admission to the program.

Cell and Molecular Biology (GANM)

- 5112, 5212, 5312, 5612. **Laboratory Methods (1:0:2, 2:0:4, 3:0:6, 6:0:12)**. 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.
5121. **Surgical Gross Anatomy (1:1:0)**. This block will provide an introduction and overview to surgical approaches to different regions of the human body from a clinical perspective. Students will observe and assist surgeons with surgical dissections of cadavers. The experience in surgical anatomy will provide students with a relevant correlation of anatomy to applied surgical procedures.
5331. **Advanced Training in Histology (3:0:3)**. Students will participate in the histology laboratories as teaching assistants and attend all pre-laboratory meetings in preparation for the laboratory sessions. The students will also assist in preparing the practical exams. Prerequisites include successful completion of the first year course work of the Masters Track Program in Anatomy.
5332. **Advanced Training in Anatomy (3:0:3)**. Students will participate in the gross anatomy laboratories as teaching assistants and attend all pre-laboratory meetings in preparation for the laboratory sessions. The students will also assist in preparing the practical exams. Prerequisites include successful completion of the first year course work of the Masters Track Program in Anatomy.
5340. **Educational Project in Biomedical Sciences (3:0:0)**. A requirement of the Masters Track in Anatomy, students will design and carry out an educational project in either Anatomy or Histology. The project will be designed according to the needs of these courses and matched to the interest of the student. Projects might include self-directed learning units/sessions, or upgrading or creation of educational materials as presented on WebCT.
5510. **Biology of Cells and Tissues (5:5:5)**. Biology of Cells and Tissues is designed to provide students with fundamental information concerning the traditional areas of biochemistry, genetics, and cell biology. The principles presented in this course will proceed from molecules to cells and then to tissues integrating structure and function.
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 Structure and Function (3:3:0)**. Topics include structure/function relationships involved in DNA replication, transcrip-

tion, protein tracking, cytoskeletal organization and function, cell division, and adhesion.

6620. **Advanced Cell Biology (6:6:0)**. Prerequisite: GANM 6340. Covers 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 (4:4:0)**. 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.
6121. **History of Biochemistry (1:1:0)**. Discussion of highlights in the advancement of biochemical knowledge.
- 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.
6323. **Molecular Genetics and Nucleic Acids (3:3:0)**. Based on readings and discussions of primary literature in the areas of nucleic acid biology. As such, the students will read and discuss a single historic or illustrative peer-reviewed paper during each session for each of the topics listed below. Successful completion of this course will give the student a firm foundation in nucleic acid biology and prepare the student to read, discuss, and understand literature from the disciplines of DNA and RNA structure and function, gene expression, molecular biology, molecular genetics, and genomics.
6333. **Advanced Protein Biochemistry (3:3:0)**. Teaches advanced concepts in the field of protein biochemistry with emphasis on the fundamentals of protein biosynthesis, structure, and folding; methods of characterizing protein structural properties and conformation; and techniques for purifying proteins with diverse properties. Prerequisite: Successful completion of the GSBS common first year curriculum or consent of the course director.
7000. **Research (V1-12)**.
7101. **Biochemistry Seminar (1:1:0)**.
8000. **Doctor's Dissertation (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)**.
6001. **Biotechnology Internship (V1-9)**. Research and training in a private-sector or government biotechnology laboratory (by prior arrangement with program director).
6101. **Biotechnology Seminar (1:1:0)**.
6202. **Biomedical Informatics (2:0:2)**. Prerequisite: GBTC 6301. Provides a broad introduction to the field of bioinformatics in medical research. Emphasizes use of modern software packages and internet-based genomic and other databases to solve research problems.
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

Ronald C. Kennedy, Ph.D., Chairperson

Professors: Chaffin, Fralick, Hamood, Kennedy, Rolfe, Siddiqui, Straus

Associate Professors: Bright, San Francisco

Assistant Professors: Filleur, Reilly, Colmer-Hamood

Joint Faculty: Brackee, Cobos, Frezza, Griswold, Jumper, Lampe, Lyte, 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.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.
5340. **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 Medical 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).**
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.
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

Quentin R. Smith, Ph.D., Chairperson

Professors: Bickel, Mehvar, Smith, Thekkumkara, Wang

Associate Professors: Abbruscato, Ahsan, Gunaje, Rao, Srivastava, Srivenugopal, Stoll, Weidanz, Weis,

Assistant Professors: Karamyan, Kwon, Liu, Lockman, Mark, Moridani

Joint Faculty: Siddiqui, Wright

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), 213 (electronic), or 79 (internet-based) for international students. Teaching and research assistantships are awarded on a competitive basis. The departmental courses are listed below. For more information contact Teresa Carlisle, graduate program coordinator, 806.356.4015 ext. 287 or email pharmsci.gradadv@ttuhs.edu.

Pharmaceutical Sciences (GPSC)

5101. **Topics in Pharmaceutical Sciences (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 Pharmaceutical Sciences (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 (2:3:0).** Covers various pharmaceutical dosage forms and drug delivery systems.
5211. **Graduate Pharmaceutics Part 2 (2:3:0).** Covers the basic principles of pharmaceutics for the development of formulations that are stable and therapeutically effective.
5301. **Topics in Pharmaceutical Sciences (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.
5326. **Cancer Biology and Therapeutics (3:3:0)**. Designed for graduate students studying molecular and cellular basis of cancer. It offers principles of cancer biology from origin of cancer to therapeutic intervention principles. Admission to the Pharmaceutical Sciences Graduate Program and basic knowledge of biochemistry and cell biology are required. Permission from the advisor and the team leader are also required.
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. (3:3:0)**. 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. (3:3:0)**. 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.
5430. **Graduate Immunology (4:4:0)**. The student will be required to express complicated immunological concepts in written and oral form. It is expected that the student will make significant intellectual contributions to the development of the specific aims of the team members' grants and will demonstrate independent thinking in regards to several focused areas in immunology.
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

Reid L. Norman, Ph.D., Chairperson

Professors: Lombardini, Norman, Strahlendorf, Syapin, Tenner, Young
Associate Professors: Bergeson, 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 aging, biochemical and behavioral pharmacology, circadian pharmacology, neuropharmacology and molecular pharmacology. In addition, the department houses the South Plains Alcohol and Addiction Research Center (SPAARC), a team of graduate faculty and other investigators with research interests focused on all aspects of drug use.

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. **Medical Pharmacology I (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. Consists 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 (V1-8)**.

- 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. Enhances student skills in scientific public speaking through a series of seminars that are critiqued by the Department of Pharmacology and Neuroscience faculty. Weekly seminars are designed to provide training in research data presentation and analysis or critical evaluation and presentation of a manuscript in press. A required course for pharmacology and neuroscience graduate students, it is taken during the fall and spring semesters. It is designed such that students must interact by participating in the question and answer component of all seminars as well as during lunch with invited speakers. Grades are determined by faculty evaluation of seminar presentation, and by participation during seminars.

8000. Doctoral Dissertation (V1-12).

Department of Cell Physiology and Molecular Biophysics

Luis Reuss, M.D., Chairperson

Professors: Lutherer, Orem, Pressley, Reuss, Strahlendorf

Associate Professors: Altenberg, 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.

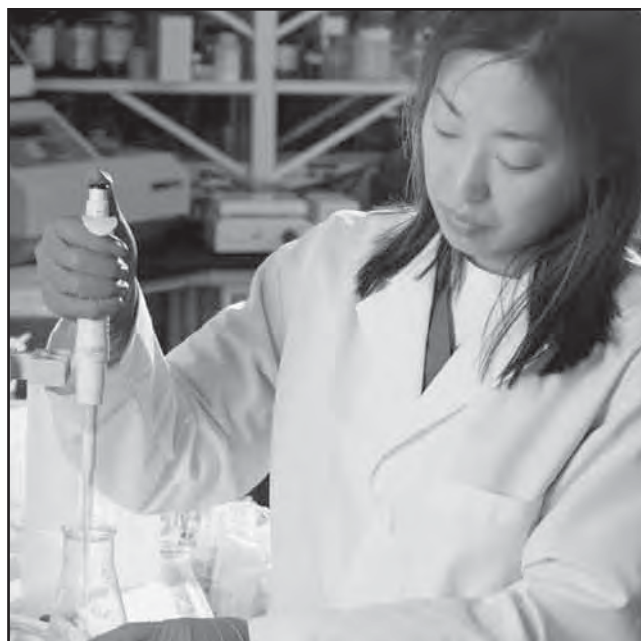
GPHY 5302 is normally a prerequisite for all courses in or above the 6000 level but may be waived for students in other programs with approval of the instructor. Enrollment in GPHY 5302 is limited to students admitted to degree programs and requires approval by the course director.

Physiology (GPHY)

- 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 (V1-8).**
- 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.
- 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 Series (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).**



Anita Thigpen Perry School of Nursing

Alexia Green, RN, Ph.D., Dean

Regional Dean: Myrna L. Armstrong, Ed.D.

Medical Center Hospital Regional Dean Endowed Chair: Sharon Cannon, Ed.D.

Associate Dean for Practice and Research Program: Christina Esperat, Ph.D.

Associate Dean for Outcomes Management and Evaluation: Yondell Masten, Ph.D.

CH Foundation Professor: Esperat

Garrison Professor: Owen

Horn Professor: Ketner

UMC Health System Endowed Chair for Patient Safety: Hicks
Professors: Allen, Armstrong, Boswell, Cannon, Covington, Decker, Fenton, Green, Harmon, Hicks, Marriott, Masten, McBride, Saunders, Valadez, Yoder-Wise

Associate Professors: Andersen, Ashcraft, Cherry, Cookman, Dadich, Gabbert, Gary, Lujan, Mahoney, Merrill, V. Miller, Rogge, Sridaromont, Varnell, Weiss, Young

Assistant Professors: Acton, Anderson, Barrington, Bell, Billings, Blizzard, Boyd, Branham, Brice, Bridges, Bruce, Collins, Compton, Dawson, Durst, Edwards, Esquibel, Gregory, Hanley, Hernandez, Jackson, Johnson, Jones, Lacy, Little, Moore, Norton, O'Neal, Petr, Silvers, Thal, B. Thomas, Utterback, Vasquez, Wilkinson, Wingate
Instructors: Alexander, Cabellero, Chavez, Coates, Cottom, Curran, Davenport, Dettmann, Faz, Fleming, Flores, Gallegos, Harkness, Hildebrand, Hillin, Hogan, Hust, Litterer, Maya, McMurry, Mello, Morris, Moseley, Opton, Platner, Rake, Richburg, Schneider, Scoggins, Stone, Stoughton, Tawney, L. Thomas, Tombs, Tyler-McCord

About the Program

The Anita Thigpen Perry (ATP) 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 ATP School of Nursing offers the following degrees:

- Bachelor of Science in Nursing
- Master of Science in Nursing
- Doctor of Nursing Practice

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 ATP 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 ATP School of Nursing are committed to excellence in nursing education, research, practice, and service.

The ATP School of Nursing offers a Bachelor of Science in Nursing (B.S.N.) 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, targeting students from both the Austin/Hill Country and West Texas regions. 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 offers the Master of Science in Nursing (M.S.N.) degree with a focus on the following specialties: education, administration, family nurse practitioner, acute care nurse practitioner, pediatric nurse practitioner, and geriatric nurse practitioner. The online RN–M.S.N. and B.S.N.–M.S.N. program focuses on the rural nurse educator educator and is designed as a “bridge” program for registered nurses with an associate degree or diploma in nursing to move directly from bachelor’s level courses to master’s level courses and graduate with the M.S.N. degree. At the doctoral level, the school offers the Doctorate of Nursing Practice (D.N.P.) degree with a focus on advanced practice nursing and executive leadership for nurse administrators. The Ph.D. in nursing is offered as a collaborative program with Texas Woman’s University College of Nursing.

Program Accreditation: The ATP School of Nursing program is accredited by the Commission on Collegiate Nursing Education (CCNE). For questions about accreditation of the School of Nursing program, contact the CCNE at One Dupont Circle, NW Suite 530, Washington, DC, 202.887.6791, www.aacn.nche.edu. Additionally, the School of Nursing is accredited by the Texas Board of Nursing (BON). For questions about accreditation of the School of Nursing program, contact the BON at 333 Guadalupe #3-460, Austin, Texas 78701, 512.305.7400.

Undergraduate Program

Bachelor of Science in Nursing. A student may earn the Bachelor of Science in Nursing (B.S.N.) degree at TTUHSC through one of three tracks:

- Traditional or unlicensed track
- Second degree Web-based B.S.N. track (first baccalaureate in another field of study)
- Licensed RN–B.S.N. track (current RN without B.S.N. degree)

For each of the three tracks, the program is designed to produce graduates who can achieve the following:

Pre-Nursing Course Requirements for All Undergraduate B.S.N. Tracks, Graduate RN–M.S.N. Track

- Pass/fail grades are not accepted for credit toward degree requirements.
- Applicants may choose to request that grades given more than 10 years ago for all non-nursing courses should not be considered in the GPA for admission. If this option is selected, those credits excluded are not eligible for prerequisite course consideration. The applicant must have at least 34 credit hours within the past 10 years to use this option.
- Courses taken at Texas Tech University or any other college/university are not used in calculating the TTUHSC grade point average once a student has been admitted to the School of Nursing. However, all grades earned at all schools attended are calculated in the admission grade point average. The quality points and semester credit hours used to calculate the cumulative grade point average for admission to the School of Nursing are taken from the official transcripts submitted during the application process.
- The ATP School of Nursing accepts courses completed via classroom, internet, correspondence, CLEP (College Level Examination Program), or advanced placement examination for which credit has been awarded and posted on an official transcript from an accredited college or university when determining completion of prerequisite non-nursing course requirements.

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

Cynthia O'Neal, Ph.D., RN, Interim 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 ATP 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 ATP 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
- Bilingual
- 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. To view the ATP School of Nursing policy, students should see "Criminal Background Checks" section of the *TTUHSC Student Affairs Handbook*. The Health Sciences Center policy may be found at HSC OP 10.20.

The Texas Board of Nursing 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 *ATP School of Nursing Catalog* or access the BON Web site (www.bon.state.tx.us) for declaratory order information.

Required Non-Nursing Prerequisite Courses for Traditional and RN-B.S.N. Tracks

Texas Tech University Health Sciences Center (TTUHSC) is compliant with the intent of state law and Texas Higher Education Coordinating Board (THECB) regulations regarding the Texas Success Initiative (TSI), formerly known as the Texas Academic Skills Program (TASP). TSI is a state-required program that is designed to help ensure undergraduate students' success in their college studies. All students seeking an undergraduate degree from the Texas Tech University Health Sciences Center must satisfy the TSI requirement before enrollment. For TSI details, go to the Web site www.theccb.state.tx.us/Rules/tac3.cfm?Chapter_ID=4&Subchapter=C.

The THECB requires every public institution of higher education in Texas to establish a core curriculum of at least 42 semester credit hours. Students who will be earning their first baccalaureate degree from TTUHSC must satisfy the requirements of the Texas Core Curriculum.

TTUHSC Core Curriculum. The TTUHSC Core Curriculum reflects all of the THECB Texas Core Curriculum requirements. Each of the baccalaureate programs at the TTUHSC has identified prerequisite coursework that meets the TTUHSC Core Curriculum and additional discipline-specific requirements.

The Texas Tech University Health Sciences Center core curriculum for undergraduate nursing degrees incorporates the field of study requirements in nursing and is comprised of 55 semester credit hours. The pre-nursing course requirements listed below should be completed with a grade of C or better in each course. These requirements can be taken at any regionally accredited college or university and should be completed prior to enrollment in the first nursing course.

Course numbers listed are based on the Texas Common Course Numbering System (TCCNS). Students should check with their academic institution to verify the course number that corresponds with the TCCNS number.

Semester Hours

COMMUNICATION

English (ENGL 1301, 1302) 6

MATHEMATICS ^

Statistics (MATH 1342, 1442, 2342, or 2442) 3

NATURAL SCIENCES

Anatomy and Physiology (BIOL 2401 and 2402) 8

Chemistry (CHEM 1305 and 1105 or CHEM 1406 or CHEM 1411) 4

Microbiology (BIOL 2420 or BIOL 2421) 4

Food and Nutrition (HECO 1322 or BIOL 1322) 3

HUMANITIES AND VISUAL PERFORMING ARTS

Visual/Performing Arts (any art, music, drama, or theatre arts course) 3

Humanities (any literature, philosophy, modern or classical language/literature, or cultural studies course) 3

SOCIAL AND BEHAVIORAL SCIENCES

United States History* (HIST 1301, 1302) 6

Political Science+ (GOVT 2301 & 2302 or GOVT 2305 & 2306) ... 6

Psychology (PSYC 2301) 3

Sociology or Cultural Anthropology (SOCI 1301 or ANTH 2351) .. 3

Life Span Growth and Development (PSYC 2314) 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.

* Students may substitute 3 credit hours of Texas history for 3 credit hours of American history.

+ 3 credit hours in upper-division GOVT may be substituted for GOVT 2302 if an A or B was earned in GOVT 1301.

Bachelor of Science in Nursing Curriculum for Traditional B.S.N. Track

Once students have applied and been accepted to the ATP 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

Summer II—1st Semester

Semester Hours

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 Pharmacological 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/Leadership	2
NURS 4405, The Nurse as a Manager/Management	4
NURS 4430, Medical Surgical Nursing III	4
TOTAL	12

Students must enroll in 3 credit hours of nursing electives.

Second Degree Web-Based B.S.N. Track

Cathleen Collins, M.S.N., Department Chair Non-Traditional Undergraduate Programs

Texas Tech Health Sciences Center ATP School of Nursing offers a second degree Web-based accelerated baccalaureate nursing program for students with previous baccalaureate degrees. This program targets students from both the Austin/Hill Country and West Texas regions. Program goals are derived from the mission of the ATP 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 ATP School of Nursing through one entry point in the school's curriculum.

NOTE: Application is an online process available at the ATP School of Nursing Web site (<https://www.ttuhschool.edu/merlin>). Admission require-

ments 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.

Required Non-Nursing Prerequisite Courses for the Second Degree Web-Based B.S.N. Track

Students who will be earning their first baccalaureate degree from the Texas Tech University Health Sciences Center must satisfy the coursework requirements of the Texas Core Curriculum.

The Texas Tech University Health Sciences Center Core Curriculum for undergraduate nursing degrees, which also incorporates field of study requirements in nursing, is comprised of 39 semester hours as detailed in the table below. Each course must be completed with a grade of C or better. These requirements can be taken at any regionally accredited college or university and should be completed prior to enrollment in the first nursing course. Students can view the Texas Tech Health Sciences Center Core Curriculum at the Web site: <http://sonapp.ttuhschool.edu/catalog/corecurriculum.html>.

Course numbers listed are based on the Texas Common Course Numbering System (TCCNS). Students should check with their academic institution to verify the course number that corresponds with the TCCNS number.

	<i>Semester Hours</i>
NURS 3302, Pathophysiology	3
BIOL 2420 or 2421 w/lab, 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, 2442, Statistical Methods	3
HECO 1322 or BIOL 1322, Science of Nutrition	3
SOC 1301 or ANTH 2351, Introduction to Sociology	3
HIST 1301 and 1302, American History	6
GOVT 2301 or 2305, American Government, Organization	3
GOVT 2302 or 2306, American Public Policy	3
TOTAL	39

All general education courses must be completed prior to taking the first nursing course.

Sample Degree Plan for Second Degree with B.S.N. Track

1st Semester	<i>Semester Hours</i>
NURS 3205, Clinical Comp. I: Basic Skills for Nursing Practice	2
NURS 3380, Foundational Concepts of Nursing Practice	3
NURS 3630, CL, Clinical Foundations of Nursing Practice	6
NURS 3307, Health Assessment	3
NURS 3308, Pharmacology	3
NURS 3315, Nursing of the Developing Family	3
NURS 3211, Clinical Competence II: Practicum in Obstetrical	2
Nursing Care, Dev. Families and Additional Foundation Skills	
TOTAL	22

2nd Semester	
NURS 3385, Concepts of Chronic Care Nursing	3
NURS 3640, CL, Chronic Care Nursing	6
NURS 4312, Child Health Nursing	3
NURS 4314, Mental Health Nursing	3
NURS 4214, Nursing Research	2
NURS 4216, Clinical Competence III: Practicum, Mental Health	
Nursing 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 4398, Concepts of Acute Care Nursing	9
NURS 4219 CL, Nursing Integration: Clinical Comp. IV: Practicum	
in Integration of Nursing	2
TOTAL	20

Graduate Program / ATP School of Nursing

Barbara Cherry, D.N.Sc., M.B.A., RN, NEA-BC
Department Chair for Leadership Studies

Emily Merrill, Ph.D., RN, FNP-BC
Department Chair for Nurse Practitioner Studies

The ATP School of Nursing Graduate Program offers the Master of Science in Nursing (M.S.N.) degree and the Doctor of Nursing Practice (D.N.P.) degree. The School of Nursing also offers the M.S.N. with preparation as a nurse practitioner through a collaborative arrangement with Angelo State University and a Doctor of Philosophy in Nursing through a collaborative program with Texas Woman's University (TWU). The Ph.D. degree is granted by TWU. The ATP School of Nursing also offers post-M.S.N. certification in the following nurse practitioner specialty areas: family nurse practitioner, pediatric nurse practitioner, acute care nurse practitioner, and geriatric nurse practitioner.

Master of Science in Nursing (M.S.N.) Program

The purpose of the M.S.N. 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.

All M.S.N. graduates acquire expertise to meet the above objectives through a combination of supervised clinical experiences; Web-based technologies; and HealthNet, a two-way interactive video system that links the school's campuses in Lubbock, Odessa, El Paso, and Hill Country (Fredericksburg/Kerrville, Marble Falls/Highland Lakes).

The ATP School of Nursing offers the following tracks for M.S.N. education: nursing administration, nursing education and nurse practitioner.

Administration Track. Students who complete the M.S.N. with a nursing administration focus are prepared to assume nursing leadership and management positions in a variety of healthcare settings. The B.S.N. is the required entry level for the M.S.N. in nursing administration. Students complete the program via a combination of online courses and practicum experiences.

Education Track. The M.S.N. with a focus on leadership in nursing education is designed for the B.S.N. entry-level student who desires a career in nursing education. Students complete the program via on-line courses and practicum experiences. Further information about the M.S.N. in nursing education is located in the Graduate Program section of this catalog.

The RN to M.S.N.* Rural Educational Leadership program is a collaboration of the School of Nursing's Graduate and Undergraduate Programs. It is designed for registered nurses who have an associate degree or diploma in nursing and wish to pursue a

graduate degree focused on nursing education in rural communities. This rigorous "bridge" program moves the student directly from bachelor's level courses to master's level courses and is completed through on-line course offerings and practicum experiences. The associate degree/diploma student does not receive the B.S.N. degree but instead progresses toward graduating with the M.S.N. degree.

Family Nurse Practitioner (FNP) and Post-Master's FNP Track. This track prepares graduates to assume a primary care provider role for the family (infants, children, adolescents, adults, and older adults). FNP's practice primarily in ambulatory care settings including rural and underserved areas.

Acute Care Nurse Practitioner (ACNP) and Post-Master's ACNP Track. This track prepares graduates to assume responsibilities for promoting, maintaining, and restoring health to adults who are acutely or critically ill. While most ACNP's practice in acute care and hospital-based settings, including emergency care and intensive care settings, the continuum of care includes urgent care and ambulatory care.

Pediatric Nurse Practitioner (PNP) and Post-Master's PNP Track. This track prepares graduates to assume a primary care provider role for children, adolescents, and young adults in multiple healthcare delivery settings, including rural and underserved areas.

Geriatric Nurse Practitioner (GNP) and Post-Master's GNP Track. This track prepares graduates to assume a primary care provider role for older adults in multiple healthcare delivery settings, including private practice, ambulatory clinics, acute care, long-term facilities, and the patient's home.

Upon completion of course requirements, graduates of the master's and post-master's programs are eligible to sit for one or more of the following certification exams:

- 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 (AANP) Exam (FNP, GNP)
- National League for Nursing Nurse Educator Exam (CNE)

Application Information. The minimum requirements for all applicants to the M.S.N. program are the following:

- Valid Texas RN license.
- Baccalaureate nursing degree from a regionally accredited college or university with nursing program accreditation from the Commission on Collegiate Nursing Education (CCNE) or the National League for Nursing Accrediting Commission (NLNAC).
- Successful completion of an undergraduate research and statistics course.
- Minimum 3.0 GPA or better (on a 4.0 scale) in upper-division undergraduate nursing courses.
- BLS certification
- Personal Essay

(continued on next page)

* Applicants to the RN-MSN program are not required to have a baccalaureate in nursing degree or an undergraduate research course but must meet other specific requirements, including the general education requirements as outlined in the *School of Nursing Catalog* (available online at www.ttuhsu.edu/son).

Graduate Program / School of Nursing (continued from page 389)

- References (3)
- Signature Page
- Oath of residency
- Official transcripts from all nationally accredited colleges and universities.
- Immunizations
- International students: appropriate documentation–TOFL score
- Applicants to the Acute Care practitioner (ACNP) track must have worked in an acute care intensive care or emergency department setting within the past five (5) years and have at least one (1) year of experience working as a registered nurse in critical care prior to admission.

Please note that applicants to the Pediatric Nurse Practitioner track are required to have one (1) year pediatric experience prior to sitting for the National Certification Board of Pediatric Nurse Practitioners (PNCB) exam. Applicants to the RN-M.S.N. program are not required to have a baccalaureate in nursing degree or an undergraduate research course but must meet other specific requirements including general education requirements as outlined in the *ATP School of Nursing Catalog* (available online at www.ttuhschool.edu/son).

Although academic criteria are the most important factors in admission consideration, additional information considered for 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, see the Web site at www.ttuhschool.edu/son, or email songrad@ttuhschool.edu.

NOTE: Application to the M.S.N. program is an online process available through the School of Nursing Web site at <https://www.ttuhschool.edu/merlin>. Application deadlines are listed in the *ATP School of Nursing Catalog* available at this same Web site. Admission requirements for all campuses should be mailed to the Lubbock campus: Registrar's Office, ATP School of Nursing Admissions Evaluator, Texas Tech University Health Sciences Center, 3601 4th St., MS 8310, Lubbock, TX 79430-8310.

Doctorate of Nursing Practice (D.N.P.) Program

The purpose of the Doctor of Nursing Practice is to provide the highest level of professional nursing education via a terminal degree in nursing practice (D.N.P.). The degree will prepare graduates to deliver the highest quality patient-centered care as leaders and members of interdisciplinary teams emphasizing evidence-based practice, patient safety, quality improvement approaches, and informatics.

The program is designed for master's-prepared nurses who are working; classes are offered through a combination of Web-based technologies and "executive sessions" over three to four days on-campus at three times during the semester. The TTUHSC program is 48 credit hours over six semesters with the following two tracks:

- Post-Master's Advanced Practice Nursing
- Post-Master's Executive Leadership

The D.N.P. is similar in concept to practice doctorates in other professions such as pharmacy (Pharm.D.) and physical therapy (D.P.T.). D.N.P.-prepared nurses are equipped for leadership roles in nursing practice, business, administration, clinical research, and academia. Individuals with practice doctorates are the most highly educated and qualified practitioners in their fields. Instead of focusing primarily on research and teaching, those with practice

doctorates use their education and expertise in leadership roles on the front lines of their professions. They are also highly qualified to teach the next generation of clinicians and leaders.

D.N.P. Admission Requirements. Applicants must submit the following requirements for full admission:

- Current licensure as a registered nurse in the United States.
- Master of Science in Nursing degree from a nationally discipline accredited college or university with nursing program accreditation from the Commission of Collegiate Nursing Education (CCNE).
- GPA of 3.0 for master's degree.
- Graduate-level nursing research course.
- Three letters of reference attesting to the applicant's academic ability and leadership potential, including one from a current professional colleague.
- Personal statement.
- An interview with D.N.P. faculty.
- BLS certification.
- Immunizations.
- Current CV or resume.
- Oath of residency
- Official college transcripts (B.S.N. or B.S.N.–M.S.N. degree or equivalent, M.S.N., Post-Master's Certificate)
- Application signature page.
- Application fee.

All D.N.P. Advanced Practice Nursing applicants must meet the following additional requirements:

- Approval by a state nursing board to practice as a Nurse Practitioner.
- Current certification by a nationally recognized credentialing body as a Nurse Practitioner.
- Minimum of one year's experience as a nurse practitioner.

All D.N.P. Executive Leadership applicants must meet the following additional requirements:

- Minimum of one year of experience in a healthcare leadership position.

Applicants with unique credentials will be considered on an individual basis. The D.N.P. application is available at the Web site www.ttuhschool.edu/son/doctorate.

Collaborative Programs

Angelo State University. 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, or pediatric nurse practitioner.

Texas Woman's University. A Ph.D. in nursing is a collaborative program with Texas Woman's University (TWU) College of Nursing and the ATP School of Nursing. The primary goal of the PhD program is to develop leaders and scholars who will make a significant contribution to the nursing profession in the discovery, integration, application, and dissemination of knowledge. There are three sites for doctoral course offerings: Denton, Houston, and Lubbock. The Ph.D. degree is awarded by TWU in accordance with program policies of the TWU Graduate School and the TWU College of Nursing. Visit the TWU website for further information at www.twu.edu.

Registered Nurse–Bachelor of Science in Nursing (RN–B.S.N.) Track

Cathleen Collins, M.S.N., Department Chair Non-Traditional Undergraduate Programs

Students who are licensed as RNs can apply to the RN–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 ATP 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 120 credit hours, including the following: 55-58 credits of general education requirements, 30 credits of RN–B.S.N. course sequence, and 35 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	Semester Hours
NURS 4378, Management and Leadership I.....	3
NURS 4380, Nature of Scientific Inquiry.....	3
NURS 4381, Issues and Trends in Nursing	3
NURS 4382, Aspects of Nursing Research	3
NURS 4383, Legal and Ethical Issues for RNs	3
TOTAL	15
2nd Semester	
NURS 4379, Management and Leadership II	3
NURS 4387, Community Health Practice	3
NURS 4389, Pharmacology Across the Life Span	3
NURS 4390, Baccalaureate Nursing Practice	3
NURS Elective	3
TOTAL	15

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 ATP School of Nursing is an online process. An application is available at www.ttuhschool.edu/son. Admission requirements for all campuses should be mailed to the Registrar's Office, ATP School of Nursing Admissions Evaluator, Texas Tech University Health Sciences Center, 3601 4th St., MS 8310, Lubbock, TX 79430-8310.

Nursing (NURS) Courses

For all courses offered in the ATP 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 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

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).** (Traditional B.S.N.) Prerequisite: Consent of instructor and Department Chair for Undergraduate Traditional Track. 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. Semester hours and course may be repeated as topic and/or objective of study change.
3040. **Special Topics in Nursing (V1-6 WE).** (Traditional B.S.N.) Prerequisite: Consent of instructor and Department Chair for Undergraduate Traditional Track. Designed to focus on subjects of special interest to groups of students. May be repeated for credit as topics vary.
3115. **Concepts of Pathophysiology/ Pathology I (1:1:0 WE).** (Traditional B.S.N.) Prerequisite: NURS 3420; 3206 or consent of the Department Chair for Undergraduate Traditional Track. 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. Major concepts addressed are elimination, sensory stimulation and perception, rest and sleep, immune process, homeostasis, reproduction, gas exchange, and nutritional dysfunctions.
3205. **Basic Skills for Nursing Practice: Clinical Competence I Practicum (CL 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. 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 (CL 2:1.75:75 WE).** (Traditional B.S.N.) Prerequisite: Admission to Nursing Major or consent of the Department Chair for the Undergraduate Traditional Track. 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. Definition and comprehension of nursing education and nursing research are also included.
3211. **Clinical Competence II: Practicum in the Developing Family and Selected Foundational Nursing Skills (CL 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 Pathophysiology/Patho II (2:2:0 WE).** (Traditional B.S.N.) Prerequisite: NURS 3115 or consent of the Department Chair for the Undergraduate Traditional Track. 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).** (Second Degree) Prerequisite: Previous Baccalaureate degree and acceptance as a Special Student at TTUHSC SON. 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.
- 3307. Health Assessment (CL 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).** (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 (CL 3:1.5:4.5 WE).** (Traditional B.S.N.) Prerequisite: NURS 3500, 3313, 3314, 3315. Pre/co-requisite: NURS 3216, 3530, 3312 or consent of the Department Chair for the Undergraduate Traditional Track. 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 Families (CL 3:1.5:4.5 WE).** (Traditional B.S.N.) Prerequisites: NURS 3500, 3313, 3314, 3315. Pre/corequisites: NURS 3216, 3530 or consent of the Department Chair for the Undergraduate Traditional Track. 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 variances. Common problems affecting family dynamics are emphasized.
- 3313. Nursing Care of the Healthy Aging Adult/Healthy Aging (CL 3:2:3 WE).** (Traditional B.S.N.) Pre/corequisites: NURS 3206, 3420, or consent of the Department Chair for the Undergraduate Traditional Track. 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/Pharm I (CL 3:1:6 WE).** (Traditional B.S.N.) Prerequisite: NURS 3206, 3420. Co/prerequisite NURS 3500 or consent of the Department Chair for the Undergraduate Traditional Track. Introduces the concepts of pharmacotherapeutics and pharmacological treatment of humans experiencing altered states from adaptation through dysfunction to pathological processes. Includes calculation of dosages and therapeutic ranges, techniques of medication administration by all routes commonly used by nurses with practice in simulation, legal/ethical concepts related to pharmacological therapy, and pharmacotherapy across the life span.
- 3315. Developing Family Nursing (3:3:0 WB).** (Second Degree) Prerequisite: NURS 3205; corequisite: NURS 3906, 3307, 3308. 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 (CL 3:1.4:4.8 WE).** (Traditional B.S.N.) Prerequisite: Consent of instructor and Department Chair for the Undergraduate Traditional Track. 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. The importance of interdisciplinary collaboration in the care of the patient experiencing cardiac dysrhythmias is stressed. The course incorporates a variety of teaching modalities including interactive computer technology, computer assisted instruction, video, seminars, and clinical observation.
- 3357. Holistic Health Practices in Stress Management (3:3:0 WE).** (Traditional B.S.N.) Prerequisite: Consent of the instructor and Department Chair for the Undergraduate Traditional Track. An introduction to holistic health in stress management. Includes the role of the mind, body and universe in attaining high level wellness; stress and its relationship to health; and the interaction of holistic health practices in the management of stress.
- 3365. Introduction and Exploration into the Multiple Aspects of Forensic Science (3:3:0 WE).** (Traditional B.S.N.) Prerequisite: Consent of the instructor and Department Chair for the Undergraduate Traditional Track. Forensic science has multiple, significant procedures and guidelines which contribute to the medicolegal analysis in the criminal justice system. It also provides support and treatment for victims and family members. Multiple disciplines, such as nursing, medicine, law, psychology, and the sciences necessary to make forensic science operate, will be explored. Content to be addressed includes assessment, intervention, and utilization of community resources; legal issues; and evaluation of forensic evidence. The course will give the student a general understanding and appreciation of forensic sciences.
- 3366. Hospice and Palliative Care (CL 3:2.5:1.5 WE).** (Traditional B.S.N.) Prerequisite: Consent of the instructor and Department Chair for the Undergraduate Traditional Track. Utilizes 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. Clinical and experimental techniques will be utilized to promote thought and discussion in order to explore death in its personal, general, and professional significance.
- 3367. Violence in Families (CL 3:2:3 WE).** (Traditional B.S.N.) Prerequisite: Consent of the instructor and Department Chair for the Undergraduate Traditional Track. 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 (CL 3:2.5:1.5 WE).** (Traditional B.S.N.) Prerequisite: NURS 4403 or consent of the Department Chair for the Undergraduate Traditional Track. Explores 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 (CL 3:2:3 WE).** (Traditional B.S.N.) Prerequisite: Consent of the instructor and Department Chair for the Undergraduate Traditional Track. Uses various readings and case studies to explore the psychiatric nurse's role in community healthcare. Clinical experiences will be used 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).** (Traditional B.S.N.) Prerequisite: Consent of the instructor and Department Chair for the Undergraduate Traditional Track. 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).** (Traditional B.S.N.) Prerequisite: Consent of the instructor and Department Chair for the Undergraduate Traditional Track. Exploration of different avenues of approaching philosophical dilemmas in providing care to clients whose behaviors and value systems are difficult to accept. Examines select issues from the standpoints of philosophy and nursing.
- 3376. Advanced Cardiac Life Support (CL 3:1:6 WE).** (Traditional B.S.N.) Prerequisite: Consent of the instructor and Department Chair for the Undergraduate Traditional Track. Expands the student's cognitive knowledge and psychomotor skills necessary to provide nursing care to individuals experiencing acute life-threatening physiological dysfunctions. The course is designed to prepare the student for participation in an Advanced Cardiac Life Support provider's class according to the standards set

- by the American Heart Association. Concepts included are advanced pathological processes, critical thinking/clinical reasoning and judgment, legal/ethical issues, collaboration, and professional role development.
- 3380. Foundational Concepts of Nursing Practice (3:3:0 WB).** (2nd Degree) Prerequisite: NURS 3205; corequisites: NURS 3307, 3308, 3315, 3630. 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.
- 3385. Concepts of Chronic Care Nursing (3:3:0 WB).** (2nd Degree) Prerequisite: NURS 3211; corequisites: NURS 4312, 4314, 4214, 3640. Emphasizes chronic care nursing concepts essential for professional nursing practice in a variety of settings. Special focus is on the concepts of aging, health promotion, and disease prevention as well as illness management. Clinical judgment and reasoning and the integration of therapeutic nursing skills will be demonstrated through case study analysis and weekly critical thinking activities.
- 3420. Health History and Physical Assessment/History and Physical (CL 4:1:9 WE).** (Traditional B.S.N.) Pre/corequisite: NURS 3206 or consent of the Department Chair for the Undergraduate Traditional Track. An introduction to the nursing process emphasizing therapeutic communication, health history, and physical exam. Concepts to be explored will include an introduction to growth and development, legal/ethical issues related to health assessment, data collection, and documentation of health history and physical examination across the life span.
- 3500. Fundamentals of Nursing Profession/Fundamentals (CL 5:2:9 WE).** (Traditional B.S.N.) Prerequisite: NURS 3206, 3420. Pre/corequisites: NURS 3115, 3314 or consent of the Department Chair for the Undergraduate Traditional Track. An introduction into acute and long-term healthcare systems, health-wellness-illness continuum, health promotion, nursing process, and decision making. Concepts to be explored include legal/ethical aspects of care, cultural variances, holism, life span variances, communication, spirituality, asepsis, basic care and comfort measures, stress and coping, physical assessment, patient advocacy and nursing process.
- 3530. Medical Surgical Nursing 1/MS I (CL 5:2:9 WE).** (Traditional B.S.N.) Prerequisites: NURS 3500, 3314, 3115, 3313. Pre/or corequisite: NURS 3216 or consent of the Department Chair for the Undergraduate Traditional Track. Applies nursing process and critical thinking in the care of persons with altered health states. Concepts included are adaptation, immune response, alteration in gas exchange, metabolism, sensory stimulation and perception, violence, grief and loss, and fluid and electrolyte balance.
- 3640. Chronic Care Nursing Clinical 6 SCH (CL 6:0:18 WE).** (2nd Degree) Prerequisite: NURS 3211; corequisites: NURS 4312, 4314, 4214, 3385. Provides opportunities for students to integrate knowledge and theory essential to the care of clients experience chronic health problems, focusing on needs of aging population. Clinical judgment and reasoning and therapeutic nursing skills necessary for chronic care delivery are demonstrated in the application of evidence based nursing care through case studies and weekly clinical experiences.
- 3906. Foundations of Nursing Practice (CL 9:3:6 WB).** (Second Degree) Prerequisite: NURS 3205, corequisite: NURS 3307, 3308, 3309, 3315. 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 (CL 9:2:18 WB).** (Second Degree) Prerequisite: NURS 3210 and satisfactory completion of all first semester courses. Corequisite: NURS 4312, 4313, 4314. 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/Synthesis (CL 2:1:3 WE).** (Traditional B.S.N.) Pre/corequisite: all NURS 4000 level courses must be completed or in progress or consent of the Department Chair for Undergraduate Traditional Track. 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 /Leadership (CL 2:1:3 WE).** (Traditional B.S.N.) Pre/corequisite: all 4000 level courses must be completed or in progress or consent of the Department Chair for the Undergraduate Traditional Track. Summarizes the concepts of the profession of nursing with emphasis in nursing leadership. Includes anticipatory socialization to the professional nursing role. Content is presented via small group discussions and applications. Clinical includes experiences with professional organizations and political processes.
- 4208. Complex Pharmacological Therapy/Pharmacology II (CL 2:1.5:1.5 WE).** (Traditional B.S.N.) Prerequisites: NURS 4403, 4404 or consent of the Department Chair for the Undergraduate Traditional Track. 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. Additionally, includes a discussion related to potential weapons of biologic, radiologic, and chemical terrorism and the pharmacological implication of care of individuals related to bioterrorism, disasters, and life threatening emergencies. Clinical includes simulation.
- 4210. The Nurse as a Consumer of Research /Research (2:2:0 WE).** (Traditional B.S.N.) Prerequisite: NURS 4403, 4404 or consent of the Department Chair for the Undergraduate Traditional Track. Addresses basic research concepts and explores the relationship of research to theory and evidence based practice. Prepares the student as a consumer of research to enhance clinical judgment/reasoning when reading research studies and applying research to clinical practice.
- 4214. Research (2:2:0 WB).** (Second Degree) Prerequisite: NURS 3211; corequisite: NURS 3911, 4312, 4314. Addresses 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 (CL 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 (CL 2:0:6 WB).** (Second Degree) Prerequisite: Satisfactory completion of all first, second and third semester courses. 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 integration 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. 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. 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 (CL 3:2:3 WB).** (Second Degree) Prerequisite: NURS 4216; corequisite: NURS 4316, 4318, 4919. 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, 4998, 4690. 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, 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 healthcare delivery system and policy issues for effective management of human and material resources.
 4330. **Medical Surgical Nursing II Theory/MS II (3:3:0 WE).** (Traditional B.S.N.) Prerequisite: NURS 4403, 4404. Pre/corequisite: NURS 4208 or consent of the Department Chair for the Undergraduate Traditional Track. Combines an emphasis on the critical thinking and clinical reasoning/judgment process as a major role in professional nursing practice with detailed study of the problems of care which are predominant in acute and critical care setting with clients across the life span.
 4378. **Management and Leadership I (3:3:0 WB).** (RN-B.S.N.) Builds on management and leadership concepts essential in professional nursing practice in the 21st century. Management and leadership theories, roles and functions serve as the foundation for course. Key concepts covered include managing quality using informatics tools and systems, patient safety, staffing, fiscal planning and decision making.
 4379. **Management and Leadership II (3:3:0 WB).** (RN-B.S.N.) Prerequisite: Completion of Management and Leadership I. Building on Management and Leadership I, this course presents concepts related to managing and leading in the changing healthcare environment. Interdisciplinary team building in a culturally diverse environment, delegation, conflict management, organizational structures and leading planned change in a variety of healthcare settings will be presented.
 4380. **Nature of Scientific Inquiry (3:3:0 WB).** (RN-B.S.N.) 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 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.) Focuses on current issues and trends relevant to the professional nursing role on a local, state, national and international level relevant to the professional nursing role.
 4382. **The Nurse as a Consumer of Research (3:3:0 WB).** (RN-B.S.N.) Addresses basic research concepts through an evidence based practice approach. Students are prepared as consumers 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.) Surveys major legal and ethical issues in the delivery of care. It focuses on basic principles and language of law and ethics. The role of state nursing boards in regulating practice is reviewed. The course provides an understanding of value development and its influence on ethical theories.
 4386. **Leadership in Nursing (CL 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 (3:3:0 WB).** (RN-B.S.N.) Emphasizes public health and community nursing concepts essential for professional nursing practice. Focus is on the concepts of community health nursing, epidemiology and disease transmission, comprehensive assessment of risk factors and health problems, program planning and intervention, environmental health, and collaboration with the interdisciplinary team.
 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. **Applied Pharmacology for Nursing Practice (3:3:0 WB).** (RN-B.S.N.) Builds on the pharmacological knowledge established in the student's prior nursing program. The course examines current emphasis on the reduction of medication errors through the use of SBAR as well as root cause analysis in determining factors which lead to adverse medication events. Resources at the organizational, federal, state and private level are reviewed in developing strategies that ensure care for vulnerable populations.
 4390. **Baccalaureate Nursing Practice (3:3:0 WB).** (RN-B.S.N.) Prerequisite: completion of NURS 4378, 4379, 4380, 4381, 4382, 4383, 4389. A capstone course that requires students to integrate principles of patient centered care, interdisciplinary teams, evidence-based practice, quality improvement, informatics, and patient safety through discussion, personal reflection, and development of a professional portfolio.
 4395. **Gateway to Advanced Professional Practice (CL 2:1:6 WB).** (RN-M.S.N.) This is a transition class for the RN-M.S.N. 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.
 4398. **Concepts of Acute Care Nursing (3:3:0 WB).** (2nd Degree) Prerequisite: 4216; corequisites: 4316, 4317, 4318, 4690. Emphasizes acute care nursing concepts essential for professional nursing practice in complex adult medical/surgical environments. Advanced clinical judgment, reasoning and therapeutic nursing skills are demonstrated in the application of evidence based nursing care in case studies and critical thinking activities.
 4403. **Nursing Care of the Childbearing Family/OB (CL 4:2:6 WE).** (Traditional B.S.N.) Prerequisite: NURS 3530, 3216, 3311, 3312 or consent of the Department Chair for the Undergraduate Traditional Track. Nursing processes with individuals in the childbearing process. 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, techniques of nursing intervention, and evaluation.
 4404. **Mental Health Nursing/Psych (CL 2:2:6 WE).** (Traditional B.S.N.) Prerequisite: NURS 3530, 3216, 3311, 3312 or consent of the Department Chair for the Undergraduate Traditional Track. 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/Management (CL 4:2:5:4.5 WE).** (Traditional B.S.N.) Prerequisite: NURS 4330, 4630, 4208 or consent of the Department Chair for the Undergraduate Traditional Track. 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. Emphasizes prioritization and delegation of patient care in multiple settings.
 4430. **Medical-Surgical Nursing III/Internship (CL 4:1:9 WE).** (Traditional B.S.N.) Prerequisite: NURS 4330, 4630, 4208, or consent of the Department Chair for the Undergraduate Traditional Track. Focuses on the role of the professional nurse using selected models of case delivery for the complex client and family. Emphasis is on the evaluation of the multifaceted nursing care as it relates to the pathological state of the clients experiencing complex problems.
 4630. **Medical-Surgical Nursing II Clinical/MS II (CL 6:0:18 WE).** (Traditional B.S.N.) Pre/corequisite: NURS4330 or consent of the Department Chair for the Undergraduate Traditional Track. 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.
 4690. **Acute Care Nursing Clinical (CL 6:0:18 WE).** (2nd Degree) Prerequisite: 4216; corequisites: 4316, 4317, 4318, 4398. Provides opportunities for students to synthesize generalist nursing roles of provider, manager, and member of profession in clinical and simulated acute care settings. Clinical judgment and reasoning and therapeutic nursing skills necessary in the acute care delivery are demonstrated in the application of

evidence based nursing care through case studies and weekly clinical experiences.

4919. **Acute Care Nursing (CL 9:2:21 WB)**. (Second Degree) Prerequisite: NURS 4216; corequisite: NURS 4316, 4317 4318. 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 (CL 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.
5242. **Administrative Role Development (CL 2:0:6 T)**. Prerequisite: NURS 5231. Emphasizes 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 3:2:3 WB)**. Prerequisite or corequisite: NURS 5330. Focuses on study of the major concepts foundational to advanced community/population health nursing practice. Included in this study is an examination of the challenges and controversies involved in the emergence of advanced practice nursing roles in contemporary population health. Clinical practice focuses on the application of ecological theory, public health theory, nursing theories, epidemiological concepts, public policy, multi-disciplinary, multi-system approaches to population health, community health advocacy and community health evidence-based practice related to the social processes of health promotion, health maintenance, health restoration and disease prevention.
5301. **Community Health II: Role Design and Implementation (3:2:3 WB)**. Prerequisite: Successful completion of NURS 5300. Builds on the content, knowledge and community health advanced practice skills acquired in Community Health I and examines how the core content concepts, community health assessment, planning, implementation and evaluation, are influenced by nursing theory and population health concepts. Population health concepts foundational to collaborative community health assessment and reflective of place-based, ecological community health analysis are introduced. Course assignments provide the student with the opportunity to gain collaborative community health assessment experience, using place-based assessment tools, to identify community strengths, enhance traditional community assessment methods and build evidenced based community/population health nursing practice.
5302. **Community Health Foundation for Advanced Practice (CL 3:1:6 WB)**. Prerequisite: NURS 5330. 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)**. Focuses 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. **Advanced Gerontological Nursing in the Aging Network (CL 3:2:3 WB)**. Focuses on assessment, diagnosis, and management of selected common acute and chronic health problems and potential health problems of older adults. The impact of illness and loss on the older client's developmental stage and family role is emphasized alongside health promotion, maintenance, and restoration. Epidemiology, nutrition, pharmacology, non-pharmacological interventions, mental health principles, and professional/legal/ethical parameters are integrated. Application of research findings and clinical reasoning skills are required.
5311. **Practicum in Advanced Gerontological Nursing in the Aging Network (CL 3:1:6 WB)**. Prerequisite: NURS 5310. Focuses on comprehensive management of health of the older adults and their caregivers in a selected population in the aging network. Provides an opportunity for synthesis and application of theory and research to effectively implement advanced Gerontological nursing practice.
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 (CL 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 (CL 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)**. 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 (CL 3:1:6 WB)**. Prerequisites: NURS 5343, 5345, 5444 (or ACLS certification). 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 (CL 3:1:6 WB)**. Prerequisite: NURS 5333. 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 (CL 3:1:6 WE).** Prerequisites: NURS 5343, 5345, 5444 (or ACLS certification). 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 (CL 3:1:6 WE).** Prerequisite: NURS 5340. 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 (CL 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).** Focuses on application of pharmacokinetic and pharmacodynamic principles to medication regimens for patients across the life span. Students will utilize assessment data and evidence-based protocols to guide safe prescriptive decision-making in an advanced nursing role. Students are expected to integrate cultural, ethical, legal, and regulatory considerations in the planning process. Evaluation of the therapeutic effects and potential adverse effects of classes of medications is included.
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. 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.
5346. **The Nursing Administrator: Standards for Excellence (3:3:0 WE).** Prerequisite: Admission to the graduate program. Provides an overview of the current, major forces driving nursing services toward quality and nursing administrators toward competence. Focuses on developing an appreciation for the numerous quality initiatives that influence how nursing leaders lead their areas of accountability toward better patient care.
5347. **Administrative Role Development (3:3:0 WE).** Prerequisite NURS 5346. Focuses on creation of an effective workplace in which safe patient care can occur. The traditional elements of managing are the avenues through which learners gain insight into the effectiveness and influence of the administrative role.
5348. **Administrative Role Development: The Nurse Administrator as Leader (3:3:0 WE).** Prerequisite NURS 5347. Centers on interpreting the social and political impact on the organization and the issues that influence how the nurse administrator enacts the role of leader.
5362. **Statistics for Nurses (3:0:0).** Designed to be a general but comprehensive introduction to statistical methods used in the health, social, behavioral and other sciences. Statistics are the tools of researchers who seek to make sense of scientific data. Introduces the student to the three main types of statistical analyses. Course is quantitative in nature; knowledge of algebraic principles is important.
5371. **Professional Nursing Issues and Public Policy (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).** Elective. 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).** Elective. 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).** Elective. 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).** Elective. This interdisciplinary course is designed to explore solutions and practices that promote safer patient care and reduce risk in a variety of healthcare settings.
5377. **Humanities in Professional Life (3:3:0 T).** Elective. 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 Healthcare for Women (CL 3:1.5:1.5 WE).** Elective. 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 healthcare screening, preventive healthcare, and healthcare promotion. Selected health problems common to women across the age continuum are addressed.
5380. **Pediatric Primary Healthcare I (CL 3:1:6 WE).** Prerequisite: NURS 5111, 5302, 5222, 5330, 5342, 5343, 5345, PALS certifications. 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 Healthcare II (CL 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).** Elective. Designed to provide graduate students with information and Elective. skills for developing budgets and managing financial issues in healthcare facilities, clinics, independent practice or a nursing unit.
5387. **Palliative Care for APNs (3:3:0 WB).** Explores end-of-life (EOL) care and the role of Advanced Practice Nurses as members of interdisciplinary teams providing EOL care. Synthesis of advanced health assessment, advanced pharmacotherapeutics, advanced pathophysiology, and evidence based practice in the provision of palliative care will be emphasized.
5389. **Knowledge Development through Evidence-Based Practice and Informatics (3:3:0 WB).** Elective. Combines the essentials of nursing informatics with the theory and methods of evidence

based practice to explore clinical nursing questions, synthesize research findings, and analyze clinical practice guidelines.

5391. **Principles of Advanced Research (3:3:0 WB)**. Prerequisites: NURS 5330, Graduate Statistics . Course addresses components of the research process including the scientific method in quantitative and qualitative research design.
5392. **Application of Advanced Research (CL 3:2:3 WB)**. Prerequisites: NURS 5391. Examines relationship of research to outcome measures in practice, education, and administrative role.
5450. **Acute Care Nurse Practitioner Concepts and Diagnostic Skills I: Adult (CL 4:2:6 WE)**. Prerequisites: NURS 5343, 5345, 5444 (or ACLS certification). 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.
5551. **Acute Care Nurse Practitioner Concepts and Diagnostic Skills II: Adult (CL 5:2:9 WE)**. Prerequisites: NURS 5450. 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, that implements a quantitative or qualitative design and contributes to nursing's body of knowledge.
6001. **Graduation Station (0)**. Prerequisite: Student must be in their last semester of enrollment prior to graduation. Students are required to enroll in this course in the semester in which they are scheduled to graduate. Serves as the vehicle for students to pay their graduation fee and complete the School of Nursing's Graduation Assessment. There is no tuition charged for this course, the student does not generate semester credit hours for the course, and the course is not graded.
6010. **Application of Administrative Practice (CL) (3:0:9)**. Prerequisites: successful completion of the administrative course sequence; authorization from a clinical agency willing to support the practice experience. Provides learners with the opportunity to implement ideas into a practice setting. Designed to allow learners to use ideas from the literature, their peers, conferences and other approved sources to create an application project designed to change practice from a clinical or administrative perspective.
6030. **Leadership in Education IV: Role and Practicum (CL 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.
6050. **Acute Care Nurse Practitioner IV: Role and Practicum (CL 6:0:36 WE)**. Prerequisite: NURS 5551. 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 (CL 3:0:18 WE) (CL 6:0:36 WE)**. Prerequisite: NURS 5341. 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 a portion 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 (CL 3:0:18 WE) (CL 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 a portion of practicum in underserved areas.
6090. **Gerontological Nurse Practitioner Practicum (CL 3:0:18 WE) (CL 6:0:36 WE)**. Prerequisite: NURS 5334. 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.

6101. **D.N.P. Role Transition II (1:1:0 WE)**. (D.N.P.) Prerequisite: Core Leadership: NURS 6200. As a follow-up to Role Transition I, the course will engage students in a reassessment of their leadership strengths and emotional intelligence after completing two full semesters of course work. Students will revisit their plans for personal growth and self-directed learning in an on-going process of personal leadership development as well as identify ways to promote leadership development for future health care leaders.
6200. **D.N.P. Role Transition I (2 :2:0 WE)**. (D.N.P.) Prerequisite: D.N.P. program student. Designed to provide students with the opportunity to engage in extensive self-assessment of leadership strengths and emotional intelligence and develop action plans for personal growth through self-directed learning. Self-knowing and reflective leadership are essential attributes of transformation leaders in complex health care systems.
6310. **Practical Application of Statistics in Healthcare (3:3:0 WE)**. (D.N.P.) Provides the basics of statistical analysis, measurement theory and data management. The course will focus on the application of statistics to health services research and to clinical healthcare settings. The student will have hands-on experience using SPSS statistical software in computer labs with data preparation, statistical analysis, and data display. Statistical tests covered in the course will range from simple T-test through multiple regression with an introduction to statistical modeling.
6320. **Systems Leadership for Effectiveness, Quality and Safety (3:3: 0 WE)**. (D.N.P.) Prerequisite: Doctor of Nursing Practice program student. Explores the scientific underpinnings of leadership, organizational effectiveness and quality improvement. Students will be provided with strategies and tools for transformational leadership and systems thinking in complex adaptive systems including effective communication, process analysis, measuring and tracking quality and safety data, and facilitating change to improve health outcomes
6325. **Informatics and Technology to Improve Healthcare (3:3:0 WE)**. (D.N.P.) Prerequisite: D.N.P. program student. Evaluates health care informatics and methods to apply information technology to clinical care for improving patient safety, quality and the health of the population. Students will appraise information technology and research methods that collect appropriate and accurate data and will guide the design of databases to generate meaningful evidence for nursing practice.
6330. **Evidence Based Inquiry I (3:3:0 WE)**. (D.N.P.) Prerequisite: Doctor of Nursing Practice program student Prepares students to integrate evidence based practice in clinical settings after careful evaluation of best evidence. Emphasis will be placed on synthesizing and evaluating a specific body of evidence for merit and generalizability to the clinical setting and transforming practice problems into answerable questions. Students will begin developing their capstone project in this course.
6340. **Advancing Policy and Politics in Healthcare (3:3:0 WE)**. (D.N.P.) Prerequisite: Doctor of Nursing Practice program student. Provides opportunities for nursing leaders to value the political processes that influence policy decisions through analyzing public policies, health policies, and legislation at the organizational, local, state, national, and international level. Includes opportunities to advocate and participate in political and policy-making processes for an issue in the student's area of interest and career trajectory.
6344. **Advanced Practice Development (CL) (3:1:6 WE)**. Prepares the D.N.P. student to gain a deeper understanding of emerging knowledge and issues in a distinct specialty area related to the Capstone Project topic. The student will have the opportunity to engage in collaboration with other experts and specialists in the topic area and to develop advanced reasoning skills. Students will determine with faculty guidance specific goals for individualized advanced practice experiences.
6345. **Population Health and Epidemiology (3:3:0 WE)**. (D.N.P.) Prerequisite: Doctor of Nursing Practice program student. Provides a comprehensive investigation into the application of public health and epidemiology principles. Emphasis will be placed on using technologically advanced clinical information systems that aggregate patient data so that group and/

- or population-based clinical profiles, practice patterns and variations, genetic problems, and health disparities can be identified, analyzed and compared to regional and national benchmark norms and data bases
- 6350. Financial Operations and Budget Management (3:3:0 WE).** (D.N.P.) Prerequisite: Doctor of Nursing Practice program student. Designed to increase the nurse leader's understanding of health care economics and financing mechanisms as well as to advance skills in managing financial issues, developing budgets, making sound financial decisions, and managing projects to achieve strategic goals in health care. Students will gain hands-on experience in analyzing financial statements, developing business plans, establishing procedures for accurate charging mechanisms, and educating patient care teams on financial implications of patient care decisions.
- 6351. Advanced Interprofessional Role Immersion (CL 3:1:2 WE).** Elective. (D.N.P.) Prerequisites: Doctor of Nursing Practice program student. The course will provide students with an in depth experience in a health professional role that provides an alternate perspective on patient-centered care, transparency and leadership in healthcare, evidence-based practice, quality improvement, technology, and interdisciplinary team collaboration. Students will be partnered with one or more interprofessional team member(s) (e.g., pharmacist, physical therapist, physician) and will participate in the partners' work environment to establish a unique appreciation of the interprofessional nature of healthcare and its significance in improving health outcomes.
- 7310. Promoting Health Through Behavior Change (CL 3:1:6 WE).** (D.N.P.) Prerequisites: Concurrent enrollment in or completion of core leadership courses and core evidence-based science courses. Provides the opportunity for advanced exploration of theory and evidence-based research underlying the adoption of healthy lifestyle behaviors in the prevention, management and palliative care of chronic disease. Students will apply and evaluate theories and principles of healthy behavior change in individuals, families and/or communities in rural and urban settings.
- 7311. Leading Teams in Complex Healthcare Environments (CL 3:1:6 WE).** (D.N.P.) Prerequisites: Concurrent enrollment in or completion of core leadership courses and core evidence-based science courses. The course provides nursing leaders the opportunity to enhance skills to lead and manage groups. Strategies are included for managing professional development, implementing creative and effective staffing models, and affecting positive change using data to inform productivity and performance. Key trends and their relationship to workforce issues will be discussed. Forecasting, team building and coaching functions are explored as key concepts/tools.
- 7320. Integrating Complementary and Alternative Modalities (CAM) into Healthcare Systems (CL 3:1:6 WE).** (D.N.P.) Prerequisites: Concurrent enrollment in or completion of core leadership courses and core evidence-based science courses. Uses the field of complementary and alternative health care as a venue for developing the student's role to improve health care by introducing change within existing health care systems. Students are provided with the opportunity to gain knowledge, analyze, observe and experience various CAM modalities. Critical reviews of the application of evidenced based research approaches to examine the effectiveness and safety of CAM in advanced nursing practice will be synthesized within an analysis of health care systems.
- 7321. Healthcare Economics and Finance (CL 3:1:6 WE).** (D.N.P.) Prerequisites: Concurrent enrollment in or completion of core leadership courses and core evidence-based science courses. The course will provide an in-depth exploration of healthcare economics and the impact of current and proposed reimbursement mechanisms on delivery systems as well as global economies. The course will explore innovative business models for healthcare organizations and methods of cost-benefit analysis for practice initiatives accounting for risk and improvement of outcomes.
- 7330. Integrating Community Mental Health Concepts into Healthcare Systems (CL 3:1:6 WE).** (D.N.P.) Prerequisites: Concurrent enrollment in or completion of core leadership courses and core evidence-based science courses. The course uses the field of integrative healthcare as a venue for developing the student's role to improve healthcare for rural and vulnerable populations who have limited access to conventional health services by introducing change within existing healthcare systems. Students are provided the opportunity to observe, analyze, and experience various culturally based modalities and non-traditional health practices. Critical reviews of the application of evidenced based research approaches to examine the effectiveness and safety of CAM in advanced nursing practice will be synthesized within an analysis of healthcare systems.
- 7331. Population Health at the Organizational and Public Policy Level (CL 3:1:6 WE).** (D.N.P.) Prerequisites: Concurrent enrollment in or completion of core leadership courses and core evidence-based science courses. The course provides nurse leaders in the D.N.P. role with the skills to evaluate care delivery models and strategies related to community, environmental, occupational, cultural and socioeconomic dimensions of health. Students will learn to access and analyze population-level health data, design evidence-based interventions at the organizational and public policy level, and predict and analyze outcomes to improve population health.
- 7332. Evidence Based Inquiry II (3:3:0 WE).** Prerequisite: NURS 6330. Builds on Evidence Based Inquiry I, refining the student's ability to evaluate and synthesize evidence for integration into clinical practice. Emphasis is placed on translating the evidence into actual clinical or management practice as well as creating an environment for the integration of evidence based practice within an organization. Students will further develop their capstone project in this course
- 7350. Capstone Project (CL 3:1:6 WE).** (D.N.P.) Prerequisite: Concurrent enrollment in or completion of advanced APN or executive leadership specialization courses. The capstone project incorporates evidence-based strategies for implementing and achieving health care outcomes such as a significant pilot study, a program evaluation project, a quality improvement project, or a practice change initiative derived from translational science and the D.N.P. role. The capstone project serves as a foundation for future scholarly practice and is reviewed and evaluated by an academic community. Students share issues in a seminar format as the project nears completion
- 7351. D.N.P. Practicum and Seminar (CL 3:0:9 WE).** (D.N.P.) Prerequisite: Completion of advanced APN or executive leadership specialization course. The course provides an end of program practice immersion experience to integrate and synthesize the essentials necessary to demonstrate competency in an area of specialized nursing practice in the D.N.P. role. Proficiency may be acquired through a variety of methods such as in depth case studies, patient or practice contact hours, completing and demonstrating specified projects or competencies, or a combination of these elements. Students share issues related to implementation of the D.N.P. role in a seminar format.



Faculty Directory

Horn Professorships

(Date following departmental affiliation indicates calendar year of Horn Professorship appointment.)

Henry Shine, Chemistry and Biochemistry, 1968
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
Janet W. Pérez, Classical and Modern Languages and Literatures, 1986
David B. Knaff, Chemistry and Biochemistry, 1987
Richard A. Bartsch, Chemistry and Biochemistry, 1988
Allan J. Kuethe, History, 1990
Clyde F. Martin, Mathematics and Statistics, 1991
Kishor C. Mehta, Civil Engineering, 1991
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
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
Warren Ballard, Natural Resources Management, 2008
Daniel Cooke, Computer Science, 2008
David Larmour, Classical and Modern Languages and Literatures, 2008
Susan Saab Fortney, Law, 2008

Teaching Faculty

(Date following departmental affiliation indicates calendar year of Horn Professorship appointment.)

A

Abbruscato, Thomas J., Associate Professor and Graduate Program Advisor of Pharmaceutical Sciences; Associate Dean of Graduate School of Biomedical Sciences, 2000. B.S., Arizona, 1992; Ph.D., Arizona (School of Medicine), 1997.
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.
Abi-Hamad, Saad, Assistant Professor of History, 2008. B.A., Texas, 1998; M.A., 2001; Ph.D., 2007.
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.
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, Associate Professor of History, 2002. B.A., Oregon, 1994; M.A., 1996; Ph.D., New Hampshire, 2001.
Agnello, Mary Frances, Associate Professor of Curriculum and Instruction, 2004. B.A., Texas 1976; M.Ed., 1991; 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, Fakhru, Associate Professor of Pharmaceutical Sciences, 2001. B.S., Dhaka (Bangladesh), 1990; M.S., 1992; Ph.D., Madrid (Spain), 1999.

Akay, Ozzy, Assistant Professor of Personal Financial Planning, 2008. B.S., Middle East.Tech.U., 1999; M.S., Texas Tech, 2002; Ph.D., 2008.

Akchurin, Nural, Professor of Physics and Engineering Physics and Chairperson, Department of Engineering, 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.

Akrofi, Amma K., Associate Professor of Curriculum and Instruction, 2002. B.A., U. of Ghana, 1972; Ed.D., Texas Tech, 2002.

Al Ajlouni, Rima, Assistant Professor of Architecture, 2007. B.S., U. of Jordan, 1994; M.S., 1999; Ph.D., Texas A&M, 2005.

Alayyan, Sudqi, Associate Professor of Engineering Technology, 1984. B.S., Texas Tech, 1977; M.S., West Texas A&M, 1993.

Alexander, Karen L., Assistant Professor of Family and Consumer Sciences Education, 2005. B.S., Ohio State, 1991; M.S., 1997; Ph.D., 2000.

Alexander, Kim, Adjunct Faculty in Agricultural Education and Communications, 2007. B.S., Angelo State, 1976; M.Ed., Abilene Christian, 1985; Ed.D., Texas Tech and Texas A&M, 2007.

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.

Aliff, Michelle M., Assistant Professor of Rehabilitation Counseling, 2007. B.A., Arizona, 1997; M.A., Texas Tech HSC, 2005.

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, 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, Adjunct Faculty in Plant and Soil Science, 2008. B.S., Southwestern Adventist Coll., 1978; M.A., Texas (Arlington), 1982; 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, 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.

Allison, Barbara, Associate Professor of Family and Consumer Sciences Education, 2007. B.S., Indiana U. of Penn., 1972; M.Ed., 1977; Ph.D., Ohio State, 1998.

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 Z., Associate 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 and Environmental Design; Chairperson, Department of 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, Reg. Prog. Engr. (Texas).

Andersen, Susan, Associate Professor of Nursing, 2000. B.S.N., Lubbock Christian, 1994; M.S.N., F.N.P., Texas Tech HSC, 1997; Ph.D., Texas (HSC), 2003.

Anderson, Amy, Assistant Professor 2007. B.S.N. Abilene Christian, 1994; M.S.N., 2001.

Anderson, Amy Brisco, Associate Professor of Music, 1995. B.M., North Texas, 1978; M.M., 1982; P.C., Eastman School of Music, 1993.

Anderson, Christopher M., Associate Professor of Music, 2003. B.M.E., Abilene Christian, 1995; M.M., Northwestern, 1996.

Anderson, Connie A., Associate Professor of Curriculum and Instruction, 2001. B.S., Northeastern State, 1973; M.Ed., 1975; Ed.D., Oklahoma State, 1998.

Anderson, Edward E., Professor of Mechanical Engineering and Ray Butler Distinguished Educator, 1986. B.S.M.E., Iowa State, 1964; M.S.M.E., 1966; Ph.D., Purdue, 1972; Reg. Prof. Engr. (Iowa).

Anderson, Rachel, Instructor in Apparel Design and Manufacturing, 2004. B.S., Texas Tech, 1992.

Anderson, Todd A., 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.

Apte, Gail, Assistant Professor of Physical Therapy, 2006; B.A., San Francisco State, 1979; Sc.D., Texas Tech HSC, 2006.

Aranha, Joseph Leslie, Professor of Architecture, 1981. B.Arch., Indian Inst. of Tech. (India), 1978; M.Arch., Iowa State, 1981; Reg. Arch. (India).

Arioli, Tony, Adjunct Faculty in Plant and Soil Science, 2008. B.S., Australian National, 1987; Ph.D., 1982.

Armstrong, Myrna L., Professor of Nursing and Regional Dean, 1994. B.S.N., De Paul, 1969; M.S., 1972; Ed.D., East Texas State, 1986.

Arnett, Dennis B., Malouf Professor and 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.

Ashby-Martin, Christina M., Adjunct Assistant Professor in Theatre and Dance, 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.

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.

Awal, M. Rafiqul, Assistant Professor of Petroleum Engineering, 2007. B.S., Indian School of Mines, (Dhanbad, India), 1983; M.S. King Fahd U. of Petroleum and Minerals, (Dhahran, Saudi Arabia), 1988; Ph.D., Oklahoma, 1991.

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.

Bagley, Penelope, Assistant Professor of Accounting, 2007. B.S. North Carolina State, 1998; M.A., 1999; Ph.D., Georgia, 2007.

Bailey, Guy, President, Professor of English, 2008. B.A., Alabama, 1972; M.A., 1974; Ph.D., Tennessee, 1979.

Bains, Christopher, Assistant Professor of Classical and Modern Languages and Literatures, 2008. B.A., Texas, 1991; M.A., Kansas, 1998; DEA, Université de la Sorbonne Nouvelle - Paris III, 1998; Ph.D., 2005.

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, 1989. B.S., Texas Tech, 1983; M.S., 1985; Ph.D., Texas (Arlington), 1988.

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Vanapalli, Siva A., Assistant Professor of Chemical Engineering, 2008. B. Tech., Indian Inst. of Tech. Kharagpur, 1998; M.S., Penn State, 2001; Ph.D., Michigan, 2006.

Van der Schyf, Cornelis (Neels) J., Associate Professor of Pharmaceutical Sciences, 2002. B.Pharm., Potchefstroom (South Africa), 1978; M.Sc., 1981; D.Sc., 1983.

VanPatten, Bill, Professor of Classical and Modern Languages and Literatures, 2007. B.A., U. of Santa Clara, 1976; M.A., Texas, 1981; Ph.D., Texas, 1983.

Vargas, Andres J., Assistant Professor of Economics, 2005. B.A., Los Andes (Colombia), 1997; M.A., 1998; M.A., Toulouse (France), 2001; M.S., Texas, 2003; Ph.D., 2006.

Varnell, Gayle, Associate Professor of Nursing, 2007. B.S.N., Texas, 1970; M.S.N., 1978; Ph.D., Texas Woman's, 1989.

Vaughn, Mark W., Associate Professor of Chemical Engineering and Engineering Physics, 2001. B.S., Arkansas, 1974; Ph.D., Texas A&M, 1995.

Vela, Carmen, Instructor in Nursing, 2007. B.S.N., Lubbock Christian, 2004.

Velten, Jeff, Adjunct Faculty in Plant and Soil Science, 1999. B.S., California State (Fullerton), 1973; M.S., California (San Diego), 1976; Ph.D., 1981.

Venhuizen, Von, Associate Professor of Art, 2002. B.A., Central U. of Iowa, 1990; M.F.A., Indiana (Bloomington), 1996.

Vermeire, Lance T., Adjunct Faculty in Natural Resources Management, 2003. B.S., Oklahoma State, 1994; M.S., 1997; Ph.D., Texas Tech, 2002.

Vernooy, D. Andrew, Professor and Dean, College of Architecture, 2002. B.S., Princeton, 1970; M.Arch., Texas, 1978; M.S., 1990; M.D.S., Harvard, 1991.

Vestal, Tom A., Associate Professor of Agricultural Education and Communications, 2002. B.S., Tarleton State, 1977; M.Ed., Texas Tech, 1982; Ph.D., Texas A&M, 1998.

Viator, Ralph E., Webster Professor of Accounting, 2000. B.S., Houston, 1973; M.B.A., Lamar, 1976; Ph.D., Texas A&M, 1986.

Victory, Harold Dean Jr., Professor of Mathematics and Statistics, 1974. B.A., Rice, 1968; M.S., Purdue, 1970; Ph.D., 1974.

Villalobos, Carlos, Associate Professor of Natural Resources Management, 1996. B.S., Chihuahua (Mexico), 1980; M.S., 1988; Ph.D., Texas Tech, 1995.

Volobouev, Igor, Assistant Professor of Physics, 2006. M.S., Moscow Inst. of Physics and Tech. (Russia), 1993; Ph.D., Southern Methodist, 1997.

Von Ende, Eleanor Theresa, Associate Professor of Economics, 1990. B.A., Kansas, 1979; M.A., 1982; Ph.D., 1990.

Vozlyublennai, Nadezhda, Assistant Professor of Finance, 2007. B.A., Novosibirsk State Academy (Russia), 1999; M.A., Western Michigan, 2001; Ph.D., Michigan State, 2007.

W

Wagner, Tillmann, Assistant Professor of Marketing, 2005. B.A., U. of Applied Sciences (Germany), 1998; M.B.A., Texas (Pan American), 1999; Ph.D., St. Gallen (Switzerland), 2005.

Walden, Eric, Jerry S. Rawls Professor of MIS and Associate Professor of Information Systems and Quantitative Sciences, 2003. B.A., New Mexico State, 1993; M.S., Louisiana State, 1997; Ph.D., Minnesota, 2002.

Waldren, Terry, Visiting Professor of Health, Exercise, and Sport Sciences, 2007. B.S., Kansas State, 1967; M.S., 1970; Ph.D., Texas Tech, 1986.

Walker, Donald Roy, Professor of History, 1987. B.A., Texas, 1969; M.A., Lamar, 1974; Ph.D., Texas Tech, 1983.

Walker H. Jack, Assistant Professor of Management, 2009. B.S., Georgia Tech, 2000; M.B.A., Auburn, 2002; M.S.B.A., 2006; Ph.D., 2007.

Wallace, Mark C., Associate Professor of Natural Resources Management, 1996. B.S., Washington, 1981; M.S., Arizona, 1984; Ph.D., 1991.

Wallace, Russell, Adjunct Faculty in Plant and Soil Science, 2006. B.S., Californai State, 1985; M.S., Cornell, 1985; Ph.D., 1993.

Walter, Tamra, Associate Professor of Anthropology, 2000. B.A., Texas, 1991; M.A., Montana, 1997; Ph.D., Texas, 2000.

Wan, William, Associate Professor of Management, 2006. B.A., Hong Kong, 1986; M.B.A., California State (Sacramento), 1994; Ph.D., Texas A&M, 2000.

Wang, Alex, Professor of Mathematics and Statistics, 1989. B.S., Northwest Telecommunication Engineering Inst. (China), 1982; M.S., 1984; Ph.D., Arizona State, 1989.

Wang, Chenggang, Assistant Professor of Agricultural and Applied Economics, 2007. B.E., Northeast Univ. (China), 1996; Ph.D., Oregon State, 2007.

Wang, Eugene, Assistant Professor of Educational Psychology and Leadership, 2005. B.S., East Texas State, 1987; M.S., 1993; Ph.D., Texas A&M (Commerce), 1998.

Wang, Ming-Hai, Professor and Amarillo Community Endowed Chairperson in Pharmaceutical Sciences, 2004. M.D., Zhejiang (China), 1982; Ph.D., Joint Program of the Inst. of Infectious Disease, Zhejiang (China) and the Med. U. of Luebeck (Germany), 1989.

Wang, Shiren (Edward), Assistant Professor of Industrial Engineering, 2007. B.S., Beijing U. (China), 1995; M.S., 1998; M.S., Singapore-Massachusetts Inst. of Technology Alliance, 2002; Ph.D., Florida State, 2006.

Wang, Shu, Assistant Professor of Nutritional Sciences, 2008. B.S., Norman Bethune U. of Med. Sciences (China), 1993; M.S., Capital Med. U. (China), 1999; Ph.D., Tufts, 2007.

Wanjura, Donald F., Adjunct Faculty in Plant and Soil Science, 1986. B.S., Texas A&M, 1961; M.S., Clemson, 1963; Ph.D., Arizona, 1971.

Ward, J. B., Instructor in Restaurant, Hotel, and Institutional Management, 2001. B.S., Texas Tech, 1993; M.S., 2001.

- Warner, Ronald D.**, Associate Professor of Clinical Preventive Medicine, 1998. D.V.M., Ohio, 1971; Ph.D., Ohio, 1989.
- Wass, Kevin**, Associate Professor of Music, 2001. B.S., Dana Coll., 1993; M.M., Indiana, 1995; D.M.A., Michigan, 2002.
- Wasserman, Jason**, Assistant Professor of Sociology, 2007. B.A., U. of Alabama, 2001; M.A., 2004; Ph.D., 2007.
- Waters, Sara**, Professor of Art, 1977. B.F.A., Spalding, 1974; M.F.A., Indiana (Bloomington), 1977.
- Watkins, James C.**, Horn Professor of Architecture, 1983. B.F.A., Kansas City Art Inst., 1974; M.F.A., Indiana, 1977.
- Watson, Pat**, Associate Professor of Curriculum and Instruction, 2003. B.S.Ed., Southwest Missouri State, 1976; M.S.Ed., 1978; Ph.D., Missouri, 2000.
- Watson, Marshall C.**, Instructor in Petroleum Engineering, 2005. B.S., Cornell, 1981; M.S., Texas Tech, 2005, Reg. Prof. Engr. (Texas, New Mexico, Wyoming, and Louisiana).
- Watson, Richard G.**, Associate Professor of Computer Science, 1999. B.S., Texas (El Paso), 1990; M.S., 1994; Ph.D., 1999.
- Watts, Elizabeth A.**, Associate Professor of Journalism, 1992. B.A., Adams State Coll., 1970; Ed.S., Northern Colorado, 1976; Ph.D., Ohio, 1992.
- Watts, John L.**, Associate Professor of Law, 2008. B.A., Maryland, 1992; J.D., Harvard, 1996. Admitted to practice in Virginia and District of Columbia and before the U.S. Fourth Circuit Court of Appeals.
- Webb, Mark O.**, Associate Professor of Philosophy, 1994. B.A., Texas Tech, 1982; M.A., 1985; M.A., 1986; Ph.D., Syracuse, 1991.
- Weber, Joachim**, Associate Professor of Chemistry and Biochemistry, 2004. M.S., Technical U. of Hannover (Germany), 1980; Ph.D., Medical U. of Lübeck (Germany), 1990.
- Webster, Daniel R.**, Assistant Professor of Cell Biology and Biochemistry, 1993; B.A., DePauw, 1978; Ph.D., Miami, 1984.
- Weeks, Brandon L.**, Associate Professor of Chemical Engineering, 2004. B.S., California (Riverside), 1993; Ph.D., Cambridge (England), 2000.
- Weidanz, Jon A.**, Associate Professor of Pharmaceutical Sciences, 2000. B.S., West Virginia, 1985; M.P.H., Alabama, 1987; Ph.D., 1992.
- Weinberg, David A.**, Associate Professor of Mathematics and Statistics, 1980. B.S., Chicago, 1974; Ph.D., Wisconsin (Madison), 1980.
- Weinlich, Barbara P.**, Assistant Professor of Classical and Modern Languages and Literatures, 2007. Ph.D., Johann-Wolfgang-Goethe, 1998.
- Weis, Margaret T.**, Associate Professor of Pharmaceutical Sciences, 1999. B.S., Loyola, 1970; Ph.D., Medical U. of South Carolina, 1983.
- Weiss, Christopher C.**, Assistant Professor of Atmospheric Science, 2004. B.S., Michigan, 1997; M.S., Oklahoma, 2000; Ph.D., 2004.
- Weiss, Cynthia**, Associate Professor of Nursing, 2007. B.S.N., Youngstown, 1975; M.S.N., Texas Woman's, 1981; Ph.D., 1986.
- Weitlauf, Harry M.**, Chairperson and Professor of Cell Biology and Biochemistry, 1982. B.S., Washington, 1961; M.D., 1963.
- Weninger, Robert A.**, J. Hadley Edgar Professor of Law, 1974. B.B.A., Wisconsin, 1955; LL.B., 1960; LL.M., Chicago, 1964. Admitted to practice in Wisconsin and California.
- Wenthe, William J.**, Professor of English, 1992. B.A., Holy Cross, 1979; M.A., Virginia, 1985; Ph.D., 1992.
- Wernsman, Robert**, Instructor in Journalism, 1999. B.S., Peru State Coll. (Nebraska), 1974; M.A., Northern Arizona, 1982.
- Wester, David B.**, Professor of Natural Resources Management, 1983. B.S., Colorado State, 1976; M.S., Texas Tech, 1979; Ph.D., 1984.
- Westfall, Peter**, Horn Professor of Statistics, 1983. B.S., California (Davis), 1979; M.S., 1981; Ph.D., 1983.
- Westney, Emilia**, Instructor in Management, 2004. B.A., Queens Coll. (City U. of New York), 1970; M.M., Yale, 1974; M.B.A., Texas Tech, 1989.
- Westney, William F.**, Horn Professor of Music, Browning Artist in Residence, 1978. B.A., Queens Coll. (City U. of New York), 1968; M.M.A., Yale, 1971; D.M.A., 1976.
- Wetherbe, James C.**, Stevenson Chair and Professor of Management Information Systems, 2000. B.B.A., New Mexico State, 1971; M.B.A., Texas Tech, 1974; Ph.D., 1976.
- Wheeler, Brian**, Adjunct Faculty in Art, 2005. B.F.A., Montana, 1997; M.F.A., Texas Tech, 2001.
- Wheeler, Jeff**, Adjunct Faculty in Art, 2005. B.F.A., Montana, 1997; M.F.A., Texas Tech, 2001.
- Wheeler, Terry A.**, Adjunct Faculty in Plant and Soil Science, 1994. B.S., Worcester Polytechnic Inst., 1982; M.S., Texas A&M, 1987; Ph.D., North Carolina State, 1990.
- Wheeler, Thomas L.**, Adjunct Faculty in Animal and Food Sciences, 1999. B.S., Texas Tech, 1984; M.S., 1986; Ph.D., Texas A&M, 1989.
- Whelly, Sandra M.**, Associate Professor of Cell Biology and Biochemistry, 1981; A.B., Salve Regina Coll., 1968; Ph.D., Nebraska, 1973.
- Wherry, Jeffrey N.**, Professor of Human Development and Family Studies, 2008. B.S./B.Ed., Abilene Christian, 1977; M.S., Texas (Tyler), 1979; Ph.D. Southern Mississippi, 1982.
- Whisner, Sandra M.**, Assistant Professor of Occupational Therapy, 2003. B.B.A., Texas Tech, 1992; B.S., 1997; M.A., Texas Woman's, 2003.
- Whitby, Ryan J.**, Assistant Professor of Finance, 2007. B.A., Weber State University, 1998; M.S. Utah, 2005; Ph.D., 2007.
- White, James Edmund**, Professor of Architecture, 1971. B.Arch., Texas, 1957; M.S., Texas Tech, 1973; Reg. Arch. (Texas).
- White, John Poston**, Professor of Architecture, 1973. B.Arch., Texas, 1957; M.Arch., Nebraska, 1973; Reg. Arch. (Texas).
- Whitebread, Alan**, Instructor in Marketing, 1999. B.B.A., Eastern New Mexico, 1971; M.B.A., 1974.
- Whiting, Jason, B.**, Assistant Professor of Marriage and Family Therapy, 2007. B.S., Brigham Young, 1995; M.S., 1997; Ph.D., Michigan State, 2001.
- Whitlark, James S.**, Professor of English, 1979. B.A., Wayne State, 1971; M.A., 1973; Ph.D., Chicago, 1976.
- Whittlesey, Bruce Rodman**, Associate Professor of Chemistry and Biochemistry, 1987. B.A., New Coll. of the U. of South Florida, 1978; Ph.D., Texas, 1985.
- Wiedenfeld, Heidi E.**, Instructor in Health, Exercise, and Sport Sciences, 2007. B.S., Nebraska, 1990; M.A., 1994; M.S.Ed., Toledo, 1999.
- Wiens, Kyle C.**, Assistant Professor of Atmospheric Science, 2007. B.S., New Mexico Institute of Mining and Technology, 1997; M.S., 2000; Ph.D., Colorado State, 2005.
- Wiesner, Theodore F.**, Associate Professor of Chemical Engineering, 1996. B.S., Kansas State, 1977; M.S., Houston, 1985; Ph.D., Georgia Tech, 1994.
- Wigmans, Richard**, Professor and Bucy Chairperson in Physics, 1992. B.S., Vrije (Netherlands), 1968; M.S., 1971; Ph.D., 1975.
- Wigmans, Nazzi**, Visiting Assistant Professor of Health Organization Management, 2006. B.A. Allameh Tabatabai (Iran), 1984; M.B.A., Texas Tech, 1995; M.S., Texas Tech, 1997; Ph.D., Texas Tech, 2006.
- Wilcox, James B.**, Alumni Professor of Marketing and Professor Business Administration, 1975. B.S., Penn State, 1967; M.B.A., Indiana, 1970; D.B.A., 1972.
- Wilde, Gene R.**, Professor of Biological Sciences, 1995. B.S., Nevada (Las Vegas), 1978; M.S., 1984; Ph.D., Oklahoma State, 1994.
- Wilhelm, Jennifer A.**, Associate Professor of Curriculum and Instruction, 2001. B.S., Bowling Green State, 1988; M.S., Michigan State, 1991; Ph.D., Texas, 2002.
- Wilhelm, Ronald Joseph**, Associate Professor of Honors and Physics, 2002. B.S., Bowling Green State, 1985; M.S., 1989; Ph.D., Michigan State, 1995.
- Wilkes, Robert Edward**, Professor of Marketing, 1976. B.S.B.A., Samford, 1963; M.B.A., Alabama, 1969; Ph.D., 1971.
- Wilkins, Thea**, Bayer CropScience Regents Endowed Professor of Plant and Soil Science, 2006. B.S., Georgia, 1983; Ph.D., Michigan State, 1990.
- Wilkinson, Kenton**, Associate Professor of Electronic Media and Communications, Regents Professor in International and Hispanic Communication, 2006; B.A. Colorado, 1986; M.A., California (Berkeley), 1991; Ph.D., Texas, 1995.
- Wilkinson, William J.**, Assistant Professor of Physical Therapy, 2006. B.S., Texas State, 1984; M.S., North Texas, 1988; M.D., Texas HSC (San Antonio), 1994.
- Willett, Julie A.**, Associate Professor of History, 1997. A.B., Missouri (Columbia), 1989; M.A., 1992; Ph.D., 1996.
- Williams, George Brock**, Associate Professor of Mathematics and Statistics, 2001. B.S., Mississippi State, 1993; Ph.D., Tennessee, 1999.
- Williams, James S.**, Associate Professor of Health, Exercise, and Sport Sciences, 2000. B.S., Lamar, 1979; M.S., Texas (Tyler), 1983; Ph.D., Texas A&M, 1997.
- Williams, Jeffrey P.**, Professor of Anthropology and Chairperson, Sociology, Anthropology, and Social Work, 2006. B.A., Texas, 1980; M.A., 1984; Ph.D., 1987.
- Williams, Simon C.**, Associate Professor of Cell Biology and Biochemistry and Joint Faculty in Microbiology and Immunology, 1995; B.A., Trinity Coll. (Ireland), 1983; Ph.D., Roswell Park Mem. Inst. (New York), 1989.
- Wilson, Dolly Smith**, Assistant Professor of History, 2005. B.A., Northeastern, 1992; M.A., 1997; Ph.D., Boston Coll., 2004.
- Wilson, Kristopher R.**, Assistant Professor of Animal and Food Sciences, 2006. B.S., Texas A&M, 2000; M.S., 2003; Ph.D., Texas Tech, 2006.

Winer, Jane Louise, Special Assistant to the President, Professor of Psychology, 1975. B.A., State U. of New York (Albany), 1969; M.L.S., 1970; M.A., Ohio State, 1971; Ph.D., 1975.

Wingate, Lori, Assistant Professor of Nursing, 2006. B.S.N., Texas Tech HSC, 1990; M.S.N., Texas (El Paso), 1998.

Wingenbach, Gary J., Associate Professor of Agricultural Education and Communications, 2002. B.S., Oregon State, 1991; M.Ag., 1992; M.A.T., 1993; Ph.D., Iowa State, 1995.

Wink, Jon (Don), Professor of Art, 2002. B.F.A., Texas, 1960; M.F.A., Washington, 1963.

Winslow, Jerome C., Assistant Professor of Natural Resources Management, 2000. B.S., Michigan, 1971; B.S., Penn State, 1981; Ph.D., Wyoming, 1999.

Winters, Drew, Jerry S. Rawls Professor and Area Coordinator of Finance, 2004. B.S., Duke, 1982; M.B.A., Georgia, 1986; Ph.D., 1990.

Wirtz, John, Assistant Professor of Public Relations, 2009. B.S., Valley Forge Christian Coll., 1988; M.A., Minnesota (Twin Cities), 2004; Ph.D., 2009.

Wofford, Melissa, Instructor in Public Relations, 2007. B.A., Texas Tech, 1997.

Won, Moon C., Associate Professor of Civil and Environmental Engineering, 2008. B.S., Seoul National, 1984; M.S., Texas, 1987; Ph.D., 1989; Reg. Prof. Engr. (Texas).

Wong, Aliza S., Associate Professor of History, 2001. B.A., Amherst Coll., 1994; M.A., Colorado, 1997; Ph.D., 2001.

Wood, Bruce Wilton, Associate Professor of Music, 2002. B.M.E., Morningside Coll., 1977; M.M., Wisconsin (Madison), 1980; Ph.D., 2002.

Wood, Diane Sylvia, Professor of Classical and Modern Languages and Literatures, 1976. B.A., Northern Iowa, 1968; M.A., 1971; Ph.D., Wisconsin, 1975.

Woodward, Jason, Assistant Professor of Plant and Soil Science, 2006. B.S., Southwestern Oklahoma State, 1999; M.S., Oklahoma State, 2002; Ph.D., Georgia, 2006.

Wright, Robert J., Associate Professor of Plant and Soil Science, 2002. B.S., Brown, 1990; M.S., Arkansas, 1993; Ph.D., Texas A&M, 1997.

Wright, Stephen E., Professor of Pharmaceutical Sciences (joint appointment), 1987; B.A., Hendrix Coll., 1963; M.D., Arkansas School of Medicine, 1967.

Wu, Guoyao, Adjunct Faculty in Animal and Food Sciences, 2003. B.S., South China Agricultural, 1982; M.S., Beijing Agricultural (China), 1984; Ph.D., Alberta (Canada), 1989.

Wyrick, David A., Professor of Industrial Engineering and Bryan Pearce Bagley Regents Chair, 2007. B.S.M.E., Wyoming, 1979; M.S.E.M., Alaska, 1984; M.S.M.E., Wyoming, 1987; Ph.D., Missouri-Rolla, 1989; Reg. Prof. Engr. (Minnesota).

X

Xie, Zhixin, Assistant Professor of Biological Sciences, 2005. B.S., Zhejiang Agricultural (China), 1984; M.S., 1987; Ph.D., Idaho, 2000.

Xu, Wenwei, Associate Professor of Plant and Soil Science, 1998. B.S., Gansu Agriculture (China), 1982; M.S., Chinese Academy of Ag. Science, 1985; Ph.D., Missouri (Columbia), 1992.

Y

Yadav, Surya B., James and Elizabeth Sowell Professor of Telecom-Technology, 1981. B.Sc.E.E., Banaras (India), 1972; M.Tech., Indian Inst. of Tech. Kanpur (India), 1974; M.B.I.S., Georgia State, 1978; Ph.D., 1981.

Yang, Hae Kyung, Assistant Professor of Political Science, 2007. B.A., Seoul National, 1998; M.A., 2001; Ph.D., Cornell, 2007.

Yang, Jingzhou (James), Assistant Professor of Mechanical Engineering, 2008. B.E., Jilin (China), 1989; M.E., 1992; Ph.D., Iowa, 2003.

Ybarra, Priscilla Solis, Assistant Professor of English, 2006. B.A., North Texas, 1997; M.A., 2005; Ph.D., Rice 2006.

Yoder-Wise, Patricia S., Professor of Nursing, 1979. B.S.N., Ohio State, 1963; M.S.N., Wayne State, 1968; Ed.D., Texas Tech, 1984.

Yon, Kirsten A., Associate Professor of Music, 2003. B.M., Michigan, 1997; M.M., Cleveland Inst. Music, 2001; D.M.A., Rice, 2004.

Yoo, Sang-Mi, Assistant Professor of Art, 2004. B.F.A., Seoul National (South Korea), 1992; M.F.A., Ohio State, 2001.

Yoshinobu, Aaron, Associate Professor of Geosciences, 1999. B.S., San Diego State, 1992; M.S., 1994; Ph.D., Southern California, 1999.

Youn, Eunseog, Assistant Professor of Computer Science, 2006. B.S., Hanyang (Korea), 1994; M.S., U. of Wisconsin, 1998; Ph.D., U. of Florida, 2004.

Young, Alice McGaugh, Professor of Pharmacology and Neuroscience and Psychology, 2004. B.S., Tennessee, 1971; Ph.D., Minnesota, 1976.

Young, Cathy L., Associate Professor of Nursing, 2007. B.S.N., Webster, 1989; M.S.N., Missouri, 1992; D.N.Sc., 2002.

Young, Monica G., Clinical Instructor in Speech, Language, and Hearing Sciences, 2007. B.S., Texas Tech HSC, 2002; M.S., 2004.

Yuan, Jingxue, Assistant Professor of Institutional Management, 2004. B.S., Second Foreign Language Inst. (China), 1994; M.S., Texas Tech, 2000; Ph.D., Purdue, 2004.

Z

Zak, John C., Chairperson and Professor of Biological Sciences, 1986. B.S., Pittsburgh, 1974; M.S., 1976; Ph.D., Calgary (Canada), 1981.

Zamora, Jorge, Associate Professor of Classical and Modern Languages and Literatures, 2001. J.D., U. Nacional Autonoma De Mexico, 1984; M.A., Texas Tech, 1994; Ph.D., 1999.

Zartman, Richard E., Leidigh Professor of Plant and Soil Science, 1974. B.S., Ohio State, 1968; Ph.D., Kentucky, 1974.

Zdenek, Sean, Associate Professor of English, 2003. B.A., California (Berkeley), 1994; M.A., California State, 1998; Ph.D., Carnegie Mellon, 2001.

Zhang, Dongmei, Instructor in Chemistry and Biochemistry, 2008. B.S., Shanghai Jiao Tong, 1999; Ph.D., Texas Tech, 2006.

Zhang, Hong, 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, Weiwu, Assistant Professor of Public Relations, 2007. B.A., Nanjing Normal (China), 1989; M.A., Cleveland State, 1996; Ph.D., Wisconsin, 2000.

Zhang, Yuanlin 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.

Zhou, Hua-Wei, Pevehouse Chair and Professor of Geosciences, 2007. B.S., China U. of Geosciences, 1980; M.S., California State, 1984; Ph.D., California Institute of Tech., 1989.

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.

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.

Zugay, Brian C., Assistant Professor of Architecture, 2007. B.A., Carnegie Mellon, 1992; A.M., Brown, 1995; Ph.D., 2004.

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., Johns Hopkins, 2003; Ph.D., 2005.

Zupancic, Steven, Assistant Professor of Speech, Language, and Hearing Sciences, 2006. B.S., Eastern New Mexico, 1999; Au.D., Texas Tech HSC, 2003; Ph.D., 2007.

Zvonkovic, Anisa, Chairperson and Professor of 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.

Ainsworth, Charles Leonard, Professor of Educational Psychology and Leadership and Vice Provost For Academic Affairs, Emeritus, 1967-1995.

Albin, Robert Custer, Professor of Animal and Food Sciences, Emeritus, 1964-2002.

Allen, Archie Cornelious, Associate Professor of Biological Sciences, Emeritus, 1963-1986.
Allen, Bonnie, Rockwell Professor of Plant and Soil Sciences, Emeritus, 1969-2004.
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, M. M., 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.
Alwyn Barr, Professor of History, Emeritus, 1969-2005.
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 Home Economics Education, 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.
Bliese, John Ross Edward, Professor of Communication Studies, Emeritus, 1986-2002.
Bogle, James, Professor of Music, Emeritus, 1976-2005.
Borrelli, John, Professor of Civil and Environmental Engineering and Dean, Graduate School, Emeritus, 1984-2007.
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.
Bredeson, Jon, Professor of Electrical and Computer Engineering, Emeritus, 1996-2007.
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.
Carlson, Paul H., Professor of History, Emeritus, 1985-2008.
Carper, Herbert Jackson Jr., Professor of Mechanical Engineering, Emeritus, 1978-1997.
Caskey, Owen Laverne, Professor of Educational Psychology and Leadership, Emeritus, 1947-1983.
Cebull, Stanley Edward, Professor of Geosciences, Emeritus, 1969-1999.
Ceniza, Sherry, Associate Professor of English, Emeritus, 1991-2004.
Cepica, Marvin, Professor of Agricultural Education and Communications and Dean, College of Agricultural Sciences and Natural Resources, Emeritus, 1977-2007.
Chamberlain, Valerie Meyer, Professor of Home Economics Education, Emeritus, 1971-1985.
Chanda, Kamal C., Professor of Mathematics and Statistics, Emeritus, 1973-2005.
Chandler, Charles Ray, Associate Professor of Sociology, Anthropology and Social Work, Emeritus, 1966-2000.
Chao, Kwong Shu, Professor of Electrical and Computer Engineering, Emeritus, 1968-2008.
Christian, Aubry Duane, Associate Professor of Curriculum and Instruction, Emeritus, 1971-1994.
Claborn, Billy Joe, Professor of Civil Engineering, Emeritus, 1963-1992.
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.
Cochran, Clarke, Professor of Political Science, Emeritus, 1970-2008.
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, Kenneth Waldron, Professor of English, Emeritus, 1955-1994.
Day, John J., Professor and Chairperson, Department of Petroleum Engineering, Emeritus, 1990-1999.
Deahl, Robert Waldo, Professor of Music, Emeritus, 1966-1994.
Deethardt, John Fred Jr., Professor of Communications Studies, Emeritus, 1968-1989.

Dennis, Philip A., Professor of Anthropology, Emeritus, 1974-2007.
Dietz, Donald Thaddeus, Professor of Classical and Modern Languages and Literatures, Emeritus, 1978-1993.
Dixon, Kenneth, Professor of Art, Emeritus, 1977-2005.
Dowell, C. Dwayne, Professor of Accounting, Emeritus, 1991-2008.
Downes, John Dixon, Professor of Plant and Soil Science, Emeritus, 1970-1984.
Drew, Leslie, Professor of Biological Sciences, Emeritus, 1977-2000.
Dudek, Richard A., Horn Professor of Industrial Engineering, Emeritus, 1958-1988.
Dunn, Jerry R., Associate Professor in Mechanical Engineering and Engineering Physics, Emeritus, 1975-2005.
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.
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.
Ethridge, Don E., Professor of Agricultural and Applied Economics, Emeritus, 1981-2008.
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.
Foerster, Eugene Paul, Associate Professor of Agricultural 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.
Freeman, Robert J., Professor of Accounting, Emeritus, 1979-2007.
Funk, Verne James, Professor of Art, Emeritus, 1977-1997.

G

Gately, Mary Sue, Professor of Accounting, Emeritus, 1981-1998.
Geer, Charles P., Associate Professor of Curriculum and Instruction, Emeritus, 1979-2009.
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.
Gregory, James M., Professor in Civil Engineering, Emeritus, 1985-2007.
Grub, Walter, Professor of Agricultural 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.
Güven, Necip, Professor of Geosciences, Emeritus, 1972-2008.

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.
Hatfield, Lynn, Professor and Chairperson of Physics, Emeritus, 1968-2007.
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.
Holwerda, Robert, Professor of Chemistry and Biochemistry, Emeritus, 1974-2007.
Hopkins, Patricia, Professor of Classical and Modern Languages and Literatures, Emeritus, 1969-2007.
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.
Hunt, Gerald, Horn Professor of Management and Trinity Company Professor in Leadership, Emeritus, 1981-2005.

J

Jobe, Evan Kermit, Associate Professor of Philosophy, Emeritus, 1976-1991.
Johnson, Melvin Hamilton, Associate Professor of Architecture, Emeritus, 1980-1994.
Jones, Clyde, Horn Professor of Biological Sciences and Museum Science and Curator of Mammals, Emeritus. 1982-2004.
Jonish, James E., Professor of Economics, Emeritus, 1973-1998.
Jordan, Duane Paul, Associate Professor of Mechanical Engineering, Emeritus, 1964-2002.

K

Keho, Cliff Hutchinson, Associate Professor of Civil Engineering, Emeritus, 1957-1988.
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.
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.
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L

Lamb, Mina Marie Wolf, Margaret W. Weeks Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1940-1975.
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Lawrence, James, Professor of Mechanical Engineering, Emeritus, 1962-2004.
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 Family Management, Housing, and Consumer Science, 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

Maki, Ruth Hipple, Professor of Psychology, Emeritus, 1997-2008.
Maki, William S., Professor of Psychology, Emeritus, 1997-2008.
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.
Masten, Larry B., Chairperson and Professor of Engineering Technology, Emeritus, 2000-2007.
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.
McDonald, James, Professor and Chairperson of Civil Engineering, Emeritus, 1958-2003.
McDonald, Walter Robert, Horn Professor of English, Emeritus, 1971-2002.
McGlynn, Richard Patrick, Professor of Psychology, Emeritus, 1969-2008.

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.

Minor, Joseph, Horn Professor of Civil Engineering, Emeritus, 1969-1988.

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.

Mollhagen, Tony, Associate Professor of Civil Engineering, Emeritus, 1967-2003.

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.

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.

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.

Parten, Micheal E., Professor of Electrical and Computer Engineering, Emeritus, 1983-2008.

Pasewark, William Robert, Professor of Educational Psychology and Leadership, Emeritus, 1956-1982.

Payne, Henry David III, Associate Professor of Music, Emeritus, 1967-2002.

Pearson, Neale J., Professor of Political Science, Emeritus, 1969-1996.
Peffley, Ellen B., Professor of Plant and Soil Science, Emeritus, 1984-2008.
Peterson, Arlin, Professor of Educational Psychology and Leadership, Emeritus, 1972-2001.
Peterson, Richard, Professor and Chairperson, Department of Geosciences, Emeritus, 1973-2007.
Peterson, Richard Lewis, Professor of Finance, Emeritus, 1982-1999.
Pettit, Russell Dean, Associate Professor of Natural Resources Management, Emeritus, 1969-1989.
Phillips, Robert L., Associate Professor of Management, Emeritus, 1986-2006.
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.
Price, Robert V., Associate Professor of Educational Psychology and Leadership, Emeritus, 1982-2006.
Proctor, Vernon Willard, Professor of Biological Sciences, Emeritus, 1956-1992.

Q

Queen, John William, Associate Professor of Art, Emeritus, 1960-1991.

R

Ramsey, C. Boyd, Professor in Animal and Food Sciences, Emeritus, 1968-1998.
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.
Redington, Richard, Professor of Chemistry and Biochemistry, Emeritus, 1968-2005.
Reeves, Corwin C. Jr., Professor of Geosciences, Emeritus, 1957-1995.
Reid, Maryanne, Associate Professor of Educational Psychology and Leadership, Emeritus, 1963-1995.
Reis, Lavern A., Associate Professor of Mechanical Engineering, Emeritus, 1957-1990.
Reynolds, Lee, Associate Professor of Engineering Technology, Emeritus, 1982-2007.
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 Ivan, 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, Horn 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.
Skilern, 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.
Sosebee, Ronald Eugene, Professor of Natural Resources Management, 1969-2005.
Stein, Susan Isabel, Associate Professor of Classical and Modern Languages and Literatures, Emeritus, 1992-2009.
Steinhart, Edward I., Professor of History, Emeritus, 1984-2008.
Stem, Carl Herbert, Dean of Business Administration, Emeritus, 1975-1997.
Stephen, Francis B., Professor of Art, Emeritus, 1967-1983.
Stinespring, John, Associate Professor of Art, Emeritus, 1990-2004.
Street, Betty Ann, Associate Professor of Art, Emeritus, 1967-1995.
Sweazy, Robert, Professor of Civil Engineering and Vice President for Research, Graduate Studies and Technology Transfer, Emeritus, 1970-2004.

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.
Trost, Thomas F., Professor of Electrical and Computer Engineering and Engineering Physics, Emeritus, 1970-2008.
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 Agricultural Engineering, Emeritus, 1961-1984.
Urban, Lloyd, Professor of Civil Engineering, Emeritus, 1968-2004.

V

Vallabhan, C.V. Girija, Professor of Civil Engineering, Emeritus, 1966-2002.
Van Appledorn, Mary Jeanne, Horn Professor of Music, Emeritus, 1950-2008.
Vann, W. Pennington, Associate Professor of Civil Engineering, Emeritus, 1972-2004.
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.
Wampler, Karen, Professor of Human Development and Family Studies, Emeritus, 1989-2007.
Wampler, Richard, Professor of Human Development and Family Studies, Emeritus, 1989-2007.
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.
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 Agricultural 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

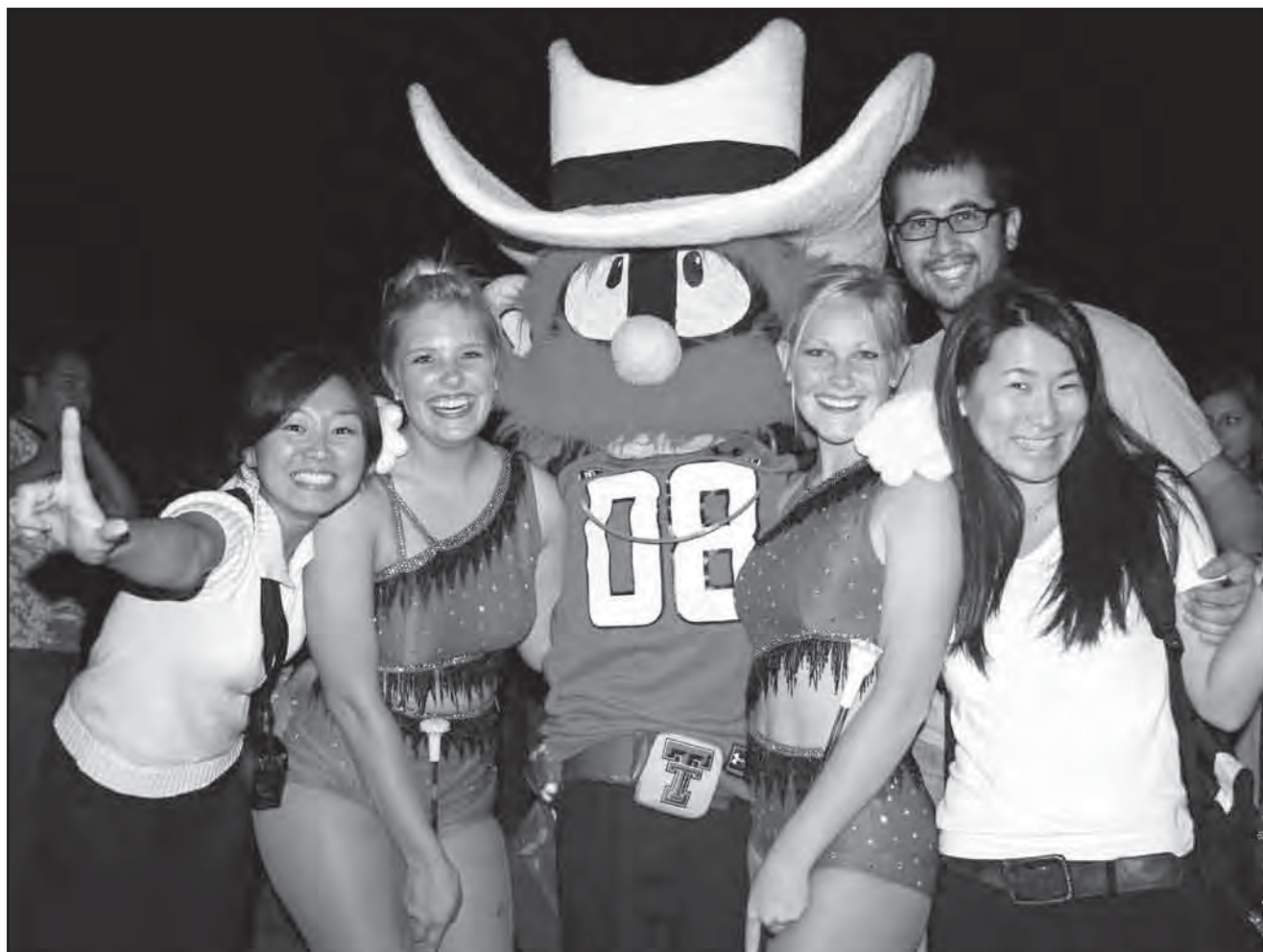
Yang, Shiang Ping, Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1969-1988.

Z

Zieher, Klaus W., Associate Professor of Electrical and Computer Engineering, Emeritus, 1986-2005.

Zintgraff, Paul Edward, Professor of Educational Psychology and Leadership, Emeritus, 1974-1984.

Zukauckas, Edward William Jr., Associate Professor of Plant and Soil Science, Emeritus, 1952-1984.



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