

TEXAS TECH
UNIVERSITY.

UNDERGRADUATE
and GRADUATE
CATALOG

2015 – 2016



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 Admissions

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

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

International Undergraduate Admissions

Texas Tech University
Box 45004 | Lubbock, Texas 79409-5004
T 806.742.3667
www.depts.ttu.edu/international/ieem/admission/newtrans.php
internationals@ttu.edu



TEXAS TECH
UNIVERSITY.

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Undergraduate Admission Priority Deadlines

Domestic Admission —

Submit application electronically at www.applytexas.org

- **Spring 2016 First-Time Freshman and Transfer**
Priority deadline to complete application process: November 1, 2015
- **Summer 2016 First-Time Freshman and Transfer**
Priority deadline to complete application process: May 1, 2016
- **Fall 2016 First-Time Freshman**
Priority deadline to complete application process: February 1, 2016
Final deadline to submit application: August 1, 2016
- **Fall 2016 First-Time Transfer**
Priority deadline to complete application process: June 1, 2016
- **Spring 2017 First-Time Freshman and Transfer**
Priority deadline to complete application process: November 1, 2016
- **Summer 2017 First-Time Freshman and Transfer**
Priority deadline to complete application process: May 1, 2017
- **Fall 2017 First-Time Freshman**
Priority deadline to complete application process: February 1, 2017
Final deadline to submit application: August 1, 2017
- **Fall 2017 First-Time Transfer**
Priority deadline to complete application process: June 1, 2017

International Admission —

Submit application electronically at www.applytexas.org

- **Spring 2016**
First-time Students: October 1, 2015
Transfer from US Institution: November 15, 2015
- **Summer 2016**
First-time Students: March 1, 2016
Transfer from US Institution: April 1, 2016
- **Fall 2016**
First-time Students: May 1, 2016
Transfer from US Institution: July 1, 2016

Former Texas Tech Student Admission —

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

- **Spring 2016**
Priority deadline to complete application process: December 1, 2015
- **Summer I 2016**
Priority deadline to complete application process: May 1, 2016
- **Summer II 2016**
Priority deadline to complete application process: June 1, 2016
- **Fall 2016**
Priority deadline to complete application process: August 1, 2016
- **Spring 2017**
Priority deadline to complete application process: December 1, 2016
- **Summer I 2017**
Priority deadline to complete application process: May 1, 2017
- **Summer II 2017**
Priority deadline to complete application process: June 1, 2017
- **Fall 2017**
Priority deadline to complete application process: August 1, 2017

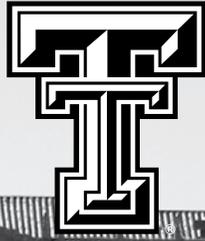
Graduate Admission Deadlines

Domestic Graduate Admission

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

International Graduate Admission

- **Spring 2016**
Deadline to complete application process: June 15, 2015
- **Summer 2016**
Deadline to complete application process: January 15, 2016
- **Fall 2016**
Deadline to complete application process: January 15, 2016



TEXAS TECH

UNIVERSITY®

From here, it's possible.

2015–2016

Undergraduate and Graduate Catalog

Volume XCII • May 2015 • Office of Official Publications • Lubbock, Texas

www.depts.ttu.edu/officialpublications

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Mission Statement

As a public research university, Texas Tech advances knowledge through innovative and creative teaching, research, and scholarship. The university is dedicated to student success by preparing learners to be ethical leaders for a diverse and globally competitive workforce. The university is committed to enhancing the cultural and economic development of the state, nation, and world.

The 2015-16 *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 next summer semester. 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 here 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 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: www.depts.ttu.edu/officialpublications/class_schedule/index.php.



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.

Texas Tech University

Bear Our Banners Far and Wide: Communicating in a Global Society

Texas Tech University has a long-standing commitment to enhance students' ability to communicate effectively, whether orally or in writing. The university also understands that to be effective leaders and workers—whether in government, health care, industry, information services, education, or anything else—our graduates need to be globally aware.

Bear Our Banners Far and Wide:

Communicating in a Global Society is a five-year Quality Enhancement Plan (QEP) that is designed to improve both the communication skills and global awareness of undergraduates. Given their shared dependence, that both concerns—communication skills and global literacy—should find themselves front and center of this project is no accident. To ensure that students are prepared to become “ethical leaders for a diverse and globally competitive workplace,” two specific areas of undergraduate education will be targeted: the three-hour Multicultural course requirement and the six-hour, upper-division Writing Intensive requirement.

Multicultural Course Requirement

Texas Tech University's three-hour Multicultural course requirement is unique among Texas universities. The Multicultural course focuses on U.S. subcultures or the cultures of other societies while responding to the Texas Higher Education Coordinating Board core curriculum objective of social responsibility. It asks faculty to include lessons that enable students to gain a greater understanding of intercultural competence and enhance their ability to engage effectively with global communities.

There are upwards of 53 different Multicultural courses students can choose from at Texas Tech, including “Introduction to Agricultural Education,” “World Dance Forms,” and “World of Egypt and the Near East.” These courses will be dispersed throughout the curriculum as well as taught through TTU Worldwide eLearning. Students can also fulfill the requirement by completing the approved Study Abroad Program, with assessments by the TTU Study Abroad Office

**QEP: COMMUNICATING
IN A GLOBAL SOCIETY**
BEAR OUR BANNERS FAR & WIDE



www.qep.ttu.edu

Writing Intensive Requirement

The six-hour Writing Intensive (WI) requirement has always had as its goal the preparation of students to communicate effectively in writing. However, the need for students to adapt to evolving communication technologies has prompted Texas Tech to expand WI to include other forms of communication. While writing will still retain its position as the primary focus of communication skills, students will have the opportunity to improve their oral, visual, aural, and corporeal communication skills as well. To do this, the WI requirement will become the Communication Intensive (CI) requirement.

The Communication Intensive requirement will give faculty the flexibility to emphasize different modes of communication that may be important to a discipline. For example, the ability to communicate orally face-to-face with clients or patients may be a vital skill for students in health or counseling professions, while business majors may need to learn the writing, organizational, and public speaking skills necessary for strong and effective oral presentations.

Communication Tutoring Center

While the University Writing Center at Texas Tech has long provided students with strategies and instruction they need to order to become more effective communicators in writing, the new Communication Tutoring Center (CTC) administered by the College of Media and Communication at Texas Tech will provide students with the supplemental instruction they need in other modes of communication. Texas Tech graduates must be prepared to communicate professionally in any platform, including social media and PowerPoint presentations, so that no matter the means of delivery, the meaning is clearly and coherently articulated.

Conclusion

The 2016-2020 Texas Tech University QEP *Bear Our Banners Far and Wide: Communicating in a Global Society* addresses the need for students to be learners for a diverse and globally competitive workforce. It marks a profound set of opportunities for students, as well as chances for institutional change, and ensures that the mission of the university will be forever strengthened by the work of faculty and students alike

Accrediting Organizations

Texas Tech University is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award baccalaureate, master's, and doctorate degrees and certificates. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097, or call 404.679.4500 for questions about the accreditation of Texas Tech University. (**Note:** *Inquiries regarding Texas Tech's education programs, admissions requirements, financial aid, etc. should be directed to the respective Texas Tech office, not to the Commission on Colleges.*) Other accrediting bodies with which the university is affiliated include:

- Association to Advance Collegiate Schools of Business (AACSB)
- Academy for Certification of Vision Rehabilitation and Education Professionals (ACVREP)
- Accreditation Commission for Dietetics Education
- Accreditation Council for Occupational Therapy Education
- Accreditation Review Commission on Education for the Physician Assistant
- Accreditation Commission for Midwifery Education (ACME) – initial accreditation
- Accrediting Commission for Programs in Hospitality Administration
- American Alliance of Museums
- American Association of Petroleum Land Management
- American Bar Association
- American Chemical Society
- American Nurses Credentialing Center (ANCC)
- American Psychological Association
- American Society of Landscape Architects (Landscape Architectural Accrediting Board)
- American Society of Mammalogists
- Association for Access Merit and Accreditation of Laboratory Animal Care, Intl.
- Association of American Law Schools
- 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 (CAHME)
- Commission on Collegiate Nursing Education (CCNE)
- Council for Accreditation of Counseling and Related Educational Programs
- Council for Accreditation of Educator Preparation
- Council for Exceptional Children
- Council for Interior Design Accreditation
- Council on Academic Accreditation in Audiology and Speech-Language Pathology of the American Speech-Language-Hearing Association
- Council on Rehabilitation Education
- Council on Social Work Education
- Engineering Accreditation Commission of ABET
- Human Factors and Ergonomics Society
- 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 Dance
- 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 on Family Relations
- Society for Range Management
- Southern Association of Colleges and Schools Commission on Colleges
- State Board for Educator Certification
- Supreme Court of Texas
- Technology Accreditation Commission of ABET
- Texas Board of Nursing
- Texas Education Agency

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 the ADA/Section 504 coordinator located in Student Disability Services, 335 West Hall, 806.742.2405.



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 Conduct, 211 Student Wellness Center, 806.742.1714, www.depts.ttu.edu/studentconduct.

Students with Disabilities

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

SDS personnel oversee and coordinate programs to ensure accessibility on an individual basis to students with disabilities. Texas Tech strives to provide all students 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.

2015-2016 Academic Calendar

	FALL 2015	SPRING 2016	SUMMER I 2016	SUMMER II 2016
Residence Halls Open for Occupancy	Aug. 16	Jan. 17	June 5	July 10
Last Day to Register or Withdraw Without Financial Penalty	Aug. 21	Jan. 20	June 6	July 11
Classes Begin	Aug. 24	Jan. 21	June 7	July 12
Last Day to Declare Pass/Fail Intentions	Oct. 26	March 31	June 27	Aug. 1
Advance Registration Begins	Nov. 5–23	April 7–25		
Open Registration Begins	Nov. 24	April 26		
No Exams Except Makeup or Scheduled Lab Exams	Nov. 23–Dec. 2	May 4–May 10		
Last Day of Classes	Dec. 2	May 10	July 7	Aug. 10
Individual Study Day	Dec. 3	May 11		
Final Examinations	Dec. 4–9	May 12–17	July 8–9	Aug. 11–12
Semester/Term Ends	Dec. 9	May 17	July 9	Aug. 12
Residence Halls Close (with exceptions*)	Dec. 10	May 18	July 9	Aug. 13
Commencement†	Dec. 11–12	May 20–21		Aug. 13
PAYMENTS AND REFUNDS‡				
95% Payment of Mandatory Tuition and Fees or Enrollment in a Payment Plan Due.	Aug. 17	Jan. 14	May 31	July 5
Last Day to Drop a Course and Have Charges Removed (students who drop to zero hours are considered to be a withdrawal)	Sept. 9	Feb. 5	June 10	July 15
Last Day to Withdraw and Receive Partial Financial Credit	Sept. 21	Feb. 17	June 22	
ADD/DROP (changes in schedule), WITHDRAWAL (dropping all courses)				
Last Day to Add a Course	Aug. 27	Jan. 26	June 8	July 13
Last Day to Drop a Course Without Academic Penalty	Sept. 9	Feb. 5	June 10	July 15
Last Day to Drop a Course With Academic Penalty (counts against drop limit)	Oct. 26	March 31	June 27	Aug. 1
Last Day to Transfer Between Colleges	Nov. 24	April 26	June 27	Aug. 1
Last Day to Withdraw from the University	Nov. 24	May 4	July 5	Aug. 8
DEADLINES RELATED TO GRADUATION				
Last Day for Undergraduate Degree Candidates to Remove I and PR Grades	Nov. 25	May 6	July 5	Aug. 8
Graduate School—Last Day to File Statement of Intent to Graduate	Sept. 14	Feb. 5	June 10	
Graduate School—Last Day to Submit Defense Notification	Sept. 25	Feb. 24	June 10	
Last Day to Order Invitations/Academic Regalia at Bookstore	Oct. 19	March 23	June 13	
Graduate School—Master's Non-Thesis Comps; Last Day to Defend Thesis/Dissertation	Oct. 16	April 1	June 27	
Graduate School—Comprehensive Exam Reports Due	Nov. 16	April 26		July 15
Graduate School—Last Day to Submit Final PDF of Thesis/Dissertation, Oral Defense and Thesis-Dissertation Approval Form	Oct. 30	April 8		July 11
Graduate School—Last Day to Pay Thesis/Dissertation Fee	Nov. 16	April 26		July 11
Graduate School—Last Day to Post Recital Program	Oct. 30	April 26		July 15
Graduate School—Last Day to Remove Grades of I, PR or CR	Nov. 16	April 15		July 15
Graduate School—Last Day to Submit Interdisciplinary Portfolio Reports	Nov. 16	April 26		July 15
HOLIDAYS AND VACATION DAYS				
Labor Day Holiday	Sept. 7			
Thanksgiving Vacation	Nov. 25–29			
Spring Vacation		March 12–20		
No Classes		March 28		
Independence Day			July 4	
INTERSESSION				
Fall Intercession	August 10–23			
Winter Intercession	Dec. 10–23, Jan. 4–8			
May Intercession			May 18–June 2	
FACULTY-RELATED INFORMATION				
Faculty on Duty	Aug. 19	Jan. 19	June 6	July 11
Mid-Semester Grades Due Via Raiderlink (5 p.m.)	Oct. 19	March 23		
Raiderlink Available for Grading	Nov. 30	May 9	July 6	Aug. 9
Grades Due for Graduating Students Via Raiderlink (noon)	Dec. 10	May 18		
Final Grades Due Via Raiderlink (noon)	Dec. 14	May 23	July 11	Aug. 15

* See detailed chronological calendar at www.depts.ttu.edu/officialpublications/calendar/index.php for explanation of exceptions.

† Schedule of commencement ceremonies can be found at www.depts.ttu.edu/provost/commencement/index.php.

‡ See www.depts.ttu.edu/studentbusinessservices or catalog Finance section for details of payment arrangements, dates, and refunds.

Administration and Regents

Office of the President

M. Duane Nellis, Ph.D.

President, Professor of Geosciences

Lawrence E. Schovanec, Ph.D.

Provost and Senior Vice President,
Professor of Mathematics and Statistics

Noel Sloan, J.D., CPA

Vice President for Administration and Finance and
Chief Financial Officer; Assistant Vice President,
Financial Services and Tax

Robert V. Duncan, Ph.D.

Senior Vice President for Research

Juan S. Muñoz, Ph.D.

Senior Vice President for Institutional Diversity,
Equity, and Community Engagement; Vice Provost
for Undergraduate Education and Student Affairs,
Associate Professor of Curriculum and Instruction

Academic Officers

Mark Sheridan, Ph.D.

Vice Provost for Graduate and Postdoctoral Affairs;
Dean, Graduate School; Professor of Biology

Darby Dickerson, J.D.

Dean, School of Law; W. Frank Newton Professor of Law

Michael L. Galyean, Ph.D.

Dean, College of Agricultural Sciences and Natural Resources;
Paul Whitfield Horn Professor and Thornton
Distinguished Chair, Animal and Food Sciences

Andrew D. Vernooy, M.Des.S.

Dean and Professor, College of Architecture

W. Brent Lindquist, Ph.D.

Dean, College of Arts and Sciences; Professor of
Mathematics

Lance A. Nail, Ph.D., CFA

Dean, Jerry S. Rawls College of Business Administration;
Professor of Business Administration

Scott Ridley, Ph.D.

Dean, College of Education; Professor of Education

Al Sacco, Jr., Ph.D.

Dean, Edward E. Whitacre Jr. College of Engineering;
Professor of Chemical Engineering

Michael San Francisco, Ph.D.

Dean, Honors College; Professor of Biology

Linda C. Hoover, Ph.D.

Dean, College of Human Sciences; Professor of Restaurant,
Hotel and Institutional Management

David D. Perlmutter, Ph.D.

Dean, College of Media and Communication; Professor
of Journalism and Electronic Media/Public Relations

Carol D. Edwards, Ph.D.

Dean, College of Visual and Performing Arts; Professor
of Art

Texas Tech University System Chancellor/Board of Regents

System Chancellor

Robert Duncan, J.D.

Chancellor

Board of Regents

Regents

Term Expires January 31, 2017

Larry K. Anders, Vice ChairDallas

Debbie MontfordSan Antonio

John SteinmetzLubbock

Term Expires January 31, 2019

John EsparzaAustin

L. Frederick "Rick" FrancisEl Paso

Tim LancasterAbilene

Term Expires January 31, 2021

Christopher M. HuckabeeFort Worth

Ronnie "Ron" HammondsHouston

Mickey L. Long, ChairMidland

Student Regent

Term Expires May 31, 2015

Coby RayPlano

About the University



Campuses

Texas Tech University is the largest institution of the Texas Tech University System. More than 35,000 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 El Paso, Fredericksburg, Highland Lakes, and Waco.

Location

With a population of more than 230,000, 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, and average annual rainfall of 18 inches. Winters are dry and moderate, 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 began in 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. Media and Communication became a college in 2004.

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), Guy Bailey (2008–2012), and M. Duane Nellis (2013–present).

The Texas Tech University School of Medicine was created by the 61st Legislature in 1969 as a multi-campus institution with Lubbock as the administrative center and with regional campuses in Amarillo, El Paso, and the Permian Basin. In 1979, the charter was expanded and the Texas Tech University Health Sciences Center was created with the addition of the School of Nursing, the School of Allied Health, and the Graduate School of Biomedical Sciences.

With the creation of the Texas Tech University System in 1996, the Texas Tech University Health Sciences Center became a separate university. Today it consists of Schools of Medicine, Nursing, Allied Health, and Pharmacy; and a Graduate School of Biomedical Sciences.

In 2007, Angelo State University in San Angelo joined the Texas Tech University System. The school was founded in 1928 as a two-year college and began offering four-year degrees in 1965.

In 2013, the Texas Legislature approved the creation of Texas Tech University Health Sciences Center at El Paso as the System's fourth institution. TTUHSC at El Paso hosts the Paul L. Foster School of Medicine and the Gayle Greve Hunt School of Nursing.

Financial Support

The university receives a portion 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, Inc., 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 Centers in Lubbock and El Paso. 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 who oversees the educational programs of the university; a Vice President for Administration and Finance who is responsible for the fiscal operations of the university and the physical plant; a Vice President for Research who directs the research efforts of the university; and a Vice President for Institutional Diversity, Equity, and Community Engagement who supports the institution's strategic diversity goals by providing programs, services, and resources.

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, Education, Engineering, Human Sciences, Media and Communication, and Visual and Performing Arts. Each college is administered by a dean and consists of a number of instructional departments or areas.



Academic Programs Leading to a Degree

Subject Areas	Departments	Degrees	Undergraduate Areas of Concentration
COLLEGE OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES			
Agribusiness	Agricultural and Applied Economics	B.S., M.A.B.	
Agricultural and Applied Economics	Agricultural and Applied Economics	B.S., M.S., Ph.D.	
Agricultural Communications	Agricultural Education and Communications	B.S., M.S.	
Agricultural Communications and Education	Agricultural Education and Communications	Ph.D.	
Agricultural Education	Agricultural Education and Communications	M.S., Ed.D.*	
Interdisciplinary Agriculture	Agricultural Education and Communications	B.S.	Agricultural Leadership, Teacher Certification
Animal Science	Animal and Food Sciences	B.S., M.S., Ph.D.	Animal Business, Animal Production, Animal Science, Equine Production, Equine Science, Equine Assisted Therapy, Meat Science, Meat Science Business
Food Science	Animal and Food Sciences	B.S., M.S.	Industry, Science
Landscape Architecture	Landscape Architecture	B.L.A., M.L.A.	
Conservation Law Enforcement	Natural Resources Management	B.S.	
Natural Resources Management	Natural Resources Management	B.S.	Wildlife Biology, Fisheries Biology, Conservation Science, Range Conservation, Ranch Management
Professional Science Master's in Environmental Sustainability and Natural Resources Management	Natural Resources Management	P.S.M.	
Wildlife, Aquatic and Wildlands Science and Management	Natural Resources Management	M.S., Ph.D.	
Horticulture Science	Plant and Soil Science	M.S.	
Plant and Soil Science	Plant and Soil Science	B.S., M.S., Ph.D.	Crop Science, Distance, Environmental Soil and Water Science, Horticulture and Turfgrass Science, Viticulture and Enology
* A distance-delivered degree awarded by both Texas Tech University and Texas A&M University			
COLLEGE OF ARCHITECTURE			
Architecture		B.S., M.S., M.Arch.	
Land-Use Planning, Management, and Design		Ph.D.	
COLLEGE OF ARTS AND SCIENCES			
General Studies	Dean's Office	B.G.S.	Various Areas of Concentration
Forensic Sciences	Dean's Office	M.S.	
Latin American and Iberian Studies*	Dean's Office	B.A.*	
Biology	Biological Sciences	B.S., M.S., Ph.D.	Ecology and Environmental Biology, Teacher Certification
Cell and Molecular Biology	Biological Sciences	B.S.	
Microbiology	Biological Sciences	B.S., M.S.	
Professional Science Master's in Environmental Sustainability and Natural Resources Management	Biological Sciences	P.S.M.	
Zoology	Biological Sciences	B.S., M.S., Ph.D.†	Teacher Certification
Biochemistry	Chemistry and Biochemistry	B.A., B.S.	Teacher Certification
Chemistry	Chemistry and Biochemistry	B.A., B.S., M.S., Ph.D.	Teacher Certification
Applied Linguistics*	Classical and Modern Languages and Literatures	M.A.	
Classics‡	Classical and Modern Languages and Literatures	M.A.	
French‡	Classical and Modern Languages and Literatures	M.A.	Teacher Certification
German*	Classical and Modern Languages and Literatures	M.A.	Teacher Certification
* Program being phased out. No new students.			
† Degree is being phased out by consolidation with Ph.D. in Biology, effective August 31, 2018. No new students.			
‡ Degree is being phased out by consolidation with Languages and Cultures August 31, 2016. No new students.			

Subject Areas	Departments	Degrees	Undergraduate Areas of Concentration
Languages and Cultures	Classical and Modern Languages and Literatures	B.A., M.A.	Classics, French, German, Russian Language and Area Studies
Romance Languages	Classical and Modern Languages and Literatures	M.A.	
Russian Language and Area Studies*	Classical and Modern Languages and Literatures	B.A.	
Spanish	Classical and Modern Languages and Literatures	B.A., Ph.D.	Teacher Certification
Economics	Economics	B.A., B.S., M.A., Ph.D.	
International Economics	Economics	B.S.I.E.	
English	English	B.A., M.A., Ph.D.	Literature and Language, Creative Writing, Teacher Certification
Technical Communication	English	B.A., M.A.	Professional Communication, Technical Communication, Teacher Certification
Technical Communication and Rhetoric	English	Ph.D.	
Environmental Toxicology	Environmental Toxicology	M.S., Ph.D.	
Atmospheric Science	Geosciences	M.S.	
Geography	Geosciences	B.A., M.S.	Teacher Certification
Geosciences	Geosciences	B.A., B.S., M.S., Ph.D.	Geology (B.A./B.S.), Geophysics (B.S. only)
Exercise and Sport Sciences	Kinesiology and Sport Management †	B.S., M.S.	Physical Education Teacher Education, Exercise and Health Promotion, Exercise Science, Sport Management, Teacher Certification
Sport Management †	Kinesiology and Sport Management †	B.S., † M.S. †	
History	History	B.A., M.A., Ph.D.	Teacher Certification
Mathematics	Mathematics and Statistics	B.A., B.S., M.A., M.S., Ph.D.	Teacher Certification
Statistics	Mathematics and Statistics	M.S.	
Philosophy	Philosophy	B.A., M.A.	Ethics
Physics	Physics	B.S., M.S., Ph.D.	Astrophysics, Applied Physics, Professional Concentration, Secondary Education
Physics – Applied Physics*	Physics	M.S.*	
Global Studies	Political Science	B.A.*	
Political Science	Political Science	B.A., M.A., Ph.D.	
Public Administration	Political Science	M.P.A.	
Psychology	Psychological Sciences	B.A., M.A.	
Psychology – Clinical	Psychological Sciences	Ph.D.	
Psychology – Counseling	Psychological Sciences	M.A., Ph.D.	
Psychology – General Experimental	Psychological Sciences	M.A., Ph.D.	
Anthropology	Sociology, Anthropology, and Social Work	B.A., M.A.	Forensic Anthropology
Social Work	Sociology, Anthropology, and Social Work	B.A.	
Sociology	Sociology, Anthropology, and Social Work	B.A., M.A.	Criminology

* Degree being phased out August 31, 2016. No new students.

† Pending Texas Higher Education Coordinating Board approval.

JERRY S. RAWLS COLLEGE OF BUSINESS

Business Administration	Dean's Office	M.S., Ph.D.	
General Business	Dean's Office	B.B.A., M.B.A.	Construction Management
International Business	Dean's Office	B.B.A.	
Accounting	Accounting	B.B.A., M.S.A.	
Energy Commerce	Energy, Economics, and Law	B.B.A.	Energy Transaction Analysis, Petroleum Land Management
Finance	Finance	B.B.A.	Real Estate
Management Information Systems	Information Systems and Quantitative Sciences	B.B.A., M.S.	Business Analytics, Telecommunications/Networking, Web Application Design
Management	Management	B.B.A.	Human Resource Management, Entrepreneurship and Innovation
Marketing	Marketing	B.B.A.	Sales, Supply Chain Management

Subject Areas	Departments	Degrees	Undergraduate Areas of Concentration
COLLEGE OF EDUCATION			
Bilingual Education	Curriculum and Instruction	M. Ed.	
Curriculum and Instruction	Curriculum and Instruction	M. Ed., Ph.D.	
Multidisciplinary Science	Curriculum and Instruction	B.S., M.S.	Biology, Chemistry, Physics, Geosciences, Life and Earth Sciences, Math/Physical Science/Engineering
Multidisciplinary Studies	Curriculum and Instruction	B.S.	Academic Major, Bilingual Education, Special Education, English as a Second Language, Elementary Math/Science, Middle-Level Math/Science, Middle-Level English Language Arts Reading/Social Studies
Elementary Education	Curriculum and Instruction	M.Ed.	
Language Literacy Education	Curriculum and Instruction	M.Ed.	
Secondary Education	Curriculum and Instruction	M.Ed.	
Counselor Education	Educational Psychology and Leadership	M.Ed., Ph.D.	
Educational Leadership	Educational Psychology and Leadership	M.Ed., Ed.D.	
Educational Psychology	Educational Psychology and Leadership	M.Ed., Ph.D.	
Higher Education	Educational Psychology and Leadership	M.Ed., Ed.D.	
Higher Education–Higher Education Research	Educational Psychology and Leadership	Ph.D	
Instructional Technology	Educational Psychology and Leadership	M.Ed., Ed.D.	
Special Education	Educational Psychology and Leadership	M.Ed., Ed.D.,* Ph.D.	
* Degree being phased out. No new students			
EDWARD E. WHITACRE JR. COLLEGE OF ENGINEERING			
Bioengineering	Dean's Office	M.S.Bio.	
Engineering	Dean's Office	M.Engr.	
Chemical Engineering	Chemical Engineering	B.S., M.S.Ch.E., Ph.D.	
Civil Engineering	Civil, Environmental and Construction Engineering	B.S., M.S.C.E., Ph.D.	
Construction Engineering	Civil, Environmental and Construction Engineering	B.S.	
Environmental Engineering	Civil, Environmental and Construction Engineering	B.S.Env.E., M.Env.E.	
Computer Science	Computer Science	B.S., M.S., Ph.D.	
Software Engineering	Computer Science	M.S.	
Computer Engineering	Electrical and Computer Engineering	B.S.	
Electrical Engineering	Electrical and Computer Engineering	B.S., M.S.E.E., Ph.D.	Analog VLSI, MEMS, Power Systems, Signal Processing, Communication Systems, Digital Systems, Control Systems, Electromagnetics
Industrial Engineering	Industrial Engineering	B.S., M.S.I.E, Ph.D.	
Systems and Engineering Management	Industrial Engineering	M.S.SYEM, Ph.D.	
Mechanical Engineering	Mechanical Engineering	B.S., M.S.M.E., Ph.D.	
Petroleum Engineering	Petroleum Engineering	B.S., M.S.P.E., Ph.D.	
HONORS COLLEGE			
Honors Arts and Letters		B.A.	Pre-Law, Health and Humanities, Art and Aesthetics, American Studies, Open Track, Western Civilization
Environment and the Humanities*		B.A.*	Environmental Writer/Educator; Pre-Law, Pre-Professional Health
* Degree being phased out. No new students.			
COLLEGE OF HUMAN SCIENCES			
Family and Consumer Sciences	Dean's Office	B.S.	Teacher Certification
Family and Consumer Sciences Education	Dean's Office	M.S., Ph.D.	
Human Sciences	Dean's Office	B.S.	Various Areas of Concentration
Community, Family, and Addiction Services	Community, Family, and Addiction Services	B.S.	
Marriage and Family Therapy	Community, Family, and Addiction Services	M.S., Ph.D.	
Apparel Design and Manufacturing	Design	B.S.	
Environmental Design	Design	M.S.	
Interior Design	Design	B.I.D.	
Interior and Environmental Design	Design	Ph.D.	
Hospitality Administration	Hospitality and Retail Management	Ph.D.	
Hospitality and Retail Management	Hospitality and Retail Management	M.S.	

Subject Areas	Departments	Degrees	Undergraduate Areas of Concentration
Restaurant, Hotel and Institutional Management	Hospitality and Retail Management	B.S.	
Retail Management	Hospitality and Retail Management	B.S.	
Early Childhood	Human Development and Family Studies	B.S.	Teacher Certification
Human Development and Family Studies	Human Development and Family Studies	B.S., M.S., Ph.D.	
Nutrition	Nutritional Sciences	B.S.	Nutrition, Health and Wellness; Teacher Certification; Pre-Professional Health
Nutritional Sciences	Nutritional Sciences	M.S., Ph.D.	
Nutritional Sciences and Dietetics	Nutritional Sciences	B.S.	Teacher Certification
Personal Financial Planning	Personal Financial Planning	B.S., M.S., Ph.D.	Personal Finance

COLLEGE OF MEDIA AND COMMUNICATION

Mass Communications	Dean's Office	M.A., Ph.D.	
Advertising	Advertising	B.A.	
Communication Studies	Communication Studies	B.A., M.A.	Communication and Public Affairs, Interpersonal Communication, Corporate-Organizational Communication, Teacher Certification
Electronic Media and Communications	Journalism and Electronic Media	B.A.	
Journalism	Journalism and Electronic Media	B.A.	Teacher Certification
Media Strategies	Public Relations	B.A.	
Public Relations	Public Relations	B.A.	

COLLEGE OF VISUAL AND PERFORMING ARTS

General Studies	Dean's Office	B.G.S.	Various Areas of Concentration
Fine Arts (Art, Music, Theatre Arts)	Dean's Office	Ph.D.	
Art	School of Art	B.A., B.F.A., M.F.A.	Art History (B.A.); Communication Design (B.F.A.); Studio Art (B.A. and B.F.A.); Visual Studies (B.F.A. leading toward teacher education)
Art Education	School of Art	M.A.E.	
Art History	School of Art	M.A.	
Music	School of Music	B.A., B.M., M.M., D.M.A.	Music (B.M. leading toward teacher certification); Composition (B.M.); Performance (B.M.); Theory (B.M.)
Music Education	School of Music	M.M.Ed.	
Dance	Theatre and Dance	B.A.	
Theatre Arts	Theatre and Dance	B.A., B.F.A., M.A., M.F.A.	Acting (B.F.A.); Design/Technology (B.F.A.)

OFFICE OF THE PROVOST

Applied Arts and Sciences		B.A.A.S.	
University Studies		B.A., B.S.	Agricultural Leadership; Human Resource Development; Integrative Studies; Organizational Leadership; Journalism and Visual Media; Various Other Areas of Concentration
Wind Energy		B.S.	

INTERDISCIPLINARY PROGRAMS

Arid Land Studies	Graduate School	M.S.	
Biotechnology	Graduate School	M.S.	
Forensic Science	Graduate School	M.S.	
Interdisciplinary Studies	Graduate School	M.A., M.S.	
Land-Use Planning, Management, and Design	College of Architecture	Ph.D.	
Museum Science	Graduate School	M.A.	
Wind Science and Engineering	Graduate School	Ph.D.	

SCHOOL OF LAW

Doctor of Jurisprudence	School of Law	J.D.	
United States Legal Studies	School of Law	LL.M.	

DUAL DEGREE PROGRAMS

Architecture / Civil Engineering	College of Architecture / Civil and Environmental Engineering	B.S. / B.S.	
Computer Science / Mathematics	Computer Science / Mathematics and Statistics	B.S. / B.S.	

Subject Areas	Colleges / Schools / Departments	Degrees
General Business / Agricultural and Applied Economics	Jerry S. Rawls College of Business / Agricultural and Applied Economics	B.B.A. / B.S.
General Business / Architecture	Jerry S. Rawls College of Business / College of Architecture	B.B.A. / B.S.
General Business / Architecture	Jerry S. Rawls College of Business / College of Architecture	M.B.A. / M.Arch.
General Business / Biomedical Sciences	Jerry S. Rawls College of Business / Graduate School of Biomedical Sciences (TTUHSC)	M.B.A. / M.S.
General Business / Biotechnology	Jerry S. Rawls College of Business / Graduate School of Biomedical Sciences (TTUHSC)	M.B.A. / Ph.D.
General Business / Languages and Cultures (German)	Jerry S. Rawls College of Business / Classical and Modern Languages and Literatures	M.B.A. / M.A.
General Business / Environmental Toxicology	Jerry S. Rawls College of Business / Environmental Toxicology	M.B.A. / M.S.
General Business / Medicine	Jerry S. Rawls College of Business / School of Medicine (TTUHSC)	M.B.A. / M.D.
General Business / Pharmacology	Jerry S. Rawls College of Business / Pharmacology and Neuroscience (TTUHSC)	M.B.A. / Pharm.D.
General Business / Romance Languages (either French or Spanish)	Jerry S. Rawls College of Business / Classical and Modern Languages and Literatures	M.B.A. / M.A.
Law / Accounting	School of Law / Jerry S. Rawls College of Business	J.D. / M.S.A.
Law / Agricultural and Applied Economics	School of Law / Agricultural and Applied Economics	J.D. / M.S.
Law / Biotechnology	School of Law / Graduate School	J.D. / M.S.
Law / Business Administration	School of Law / Jerry S. Rawls College of Business	J.D. / M.B.A.
Law / Engineering	School of Law / Edward E. Whitacre Jr. College of Engineering	J.D. / M.Engr.
Law / Environmental Toxicology	School of Law / Environmental Toxicology	J.D. / M.S.
Law / Medicine	School of Law / School of Medicine (TTUHSC)	J.D. / M.D.
Law / Personal Financial Planning	School of Law / Personal Financial Planning	J.D. / M.S.
Law / Public Administration	School of Law / Political Science	J.D. / M.P.A.

INTERNATIONAL DUAL DEGREE PROGRAM*

Institution	Country	Initiating Academic Unit	Degree
Jade Hochschule - Wilhelmshaven (in progress)	Germany	Edward E. Whitacre Jr. College of Engineering	M.S.

*Texas Tech offers a dual degree with an international partner in Whitacre College of Engineering. This program results in Texas Tech students receiving a degree from Texas Tech and the international partner institution. This degree is based on a reciprocal exchange. Texas Tech students pay tuition and fees at Texas Tech, and international students pay tuition and fees at their home institution. After the first year, the students exchange places for a semester or year.



Undergraduate Fields of Study

Majors are the primary undergraduate fields of study.

Minors are fields studied in addition to the major.

Concentrations (or Specializations within Art, Music, and Theatre) focus on a specific and often highly specialized area of study within a major. For instance, there is a concentration in criminology within a sociology major. Concentrations are listed along with their parent major or area of study; more information regarding specific concentrations can be found in the area of the catalog referencing those majors.

For information on teacher certification, pre-professional fields, and temporary designations for students who have not declared a major, see page 22.

Field of Study	Major	Minor	Concentration/ Specialization	Parent Major/ Area of Study
Accounting (ACCT)	•			
Actuarial Science (AS)		•		
Addictive Disorders and Recovery Studies (ADRS)		•	•	
Advertising (ADV)	•	•		
Agribusiness (AGBS)	•			
Agribusiness Management (AMGT)		•		
Agricultural and Applied Economics (AAEC)	•			
Agricultural and Applied Eco./Gen. Business (AGGB)	•			
Agricultural Communications (ACOM)	•	•		
Agricultural Leadership (AGLS)		•	•	
American Sign Language (ASL)		•		
American Studies (AMST)			•	Honors Arts and Letters
Analog VLSI (VLSI)			•	Electrical Engineering
Animal Business (ANBU)			•	Animal Science
Animal Production (ANPR)			•	Animal Science
Animal Science (ANSC)	•	•	•	
Animal Science, Science Option (ASCI)			•	Animal Science
Anthropology (ANTH)	•	•		
Apparel Design and Manufacturing (ADM)	•	•	•	
Applied Arts and Science (AAS)	•			
Applied Physics (APPH)			•	Physics
Arabic (ARAB)		•		
Architecture–Bachelor of Science (ARBS)	•			
Architecture (ARCH)		•		
Art (ART)	•			
Art and Aesthetics (ARAE)			•	Honors Arts and Letters
Art History (ARTH)		•	•	Art
Asian Studies (ASIA)		•		
Astronomy (ASTR)		•		
Astrophysics (ASPH)			•	Physics
Athletic Coaching (ATCO)		•		
Atmospheric Science (ATMO)		•		
Bassoon (BSN)			•	Music
Biochemistry (BCHE)	•			
Bioengineering (BIOE)		•		
Biology (BIOL)	•	•		
Book History and Digital Humanities (BHDH)		•		
Business Analysis (BSAN)			•	Mgmt. Info. Systems
Cell and Molecular Biology (CMBI)	•			
Cello (VLC)			•	Music
Ceramics (CERM)			•	Art

Field of Study	Major	Minor	Concentration/ Specialization	Parent Major/ Area of Study
Chemical Engineering (CHE)	•	•		
Chemistry (CHEM)	•	•		
Chinese (CHIN)		•		
Civil Engineering (CE)	•	•		
Clarinet (CLAR)			•	Music
Classics (CLAS)		•	•	Languages and Cultures
Communication and Public Affairs (CPA)			•	Communication Studies
Communication Design (ARTC)			•	Art
Communication Studies (COMS)	•	•		
Communication Systems (CMSY)			•	Electrical Engineering
Community and Urban Studies (CUS)		•		
Community, Family and Addiction Services (CFAS)	•		•	
Comparative Literature (CLT)		•		
Composite Minor in Geosciences (COGS)		•		
Computer Engineering (CMPE)	•			
Computer Science (CS)	•	•		
Conservation Law Enforcement (CNLE)	•			
Conservation Science (CNSC)			•	Natural Resources Mgmt.
Construction Engineering (CONE)	•	•		
Construction Management (CNMG)			•	General Business
Control Systems (CTRL)			•	Electrical Engineering
Corporate-Organizational Communication (COC)			•	Communication Studies
Corporate Research (CRRS)			•	Retail Management
Creative Writing (CWRT)			•	English
Criminology (CRIM)			•	Sociology
Crop Science (CRSC)			•	Plant and Soil Sciences
Dance (DAN)	•	•		
Digital Media Photo (DIPH)			•	Art
Digital Media Printmaking (DIPR)			•	Art
Digital Systems (DSYS)			•	Electrical Engineering
Distance (DIST)			•	Plant and Soil Sciences
Dramatic Writing (DRMW)		•		
Drawing (DRAW)			•	Visual Studies
Early Childhood (EC)	•			
Ecology and Environmental Biology (ECOL)			•	Biology
Economics (ECO)	•	•		
Electrical Engineering (EE)	•	•		
Electromagnetics (EM)			•	Electrical Engineering
Electronic Media and Communications (EMC)	•	•		
Energy Commerce (ENCO)	•			
Engineering (ENGR)		•		
English (ENGL)	•	•		
English as a Second Language (ESL)			•	Multidisciplinary Studies
Entrepreneurship and Innovation (MGTE)			•	Management
Environment and the Humanities (EVHM)		•		
Environmental Engineering (ENVE)	•	•		
Environmental Soil and Water Sciences (ENWS)			•	Plant and Soil Sciences
Environmental Studies (ENST)		•		
Equine Assisted Therapy (EQTH)			•	Animal Science
Equine Production (EQPR)			•	Animal Science
Equine Science (EQSC)			•	Animal Science
Ethics (CETH)			•	Philosophy
Ethnic Studies (ESTU)		•		
Euphonium (EUPH)			•	Music
European Studies (EURO)		•		
Exercise and Sport Sciences (ESS)	•			

Field of Study	Major	Minor	Concentration/ Specialization	Parent Major/ Area of Study
Exercise Science (ESSI)		•		
Family and Consumer Sciences (FCS)	•			
Family and Consumer Sciences Ext. Educ. (FCSE)		•	•	
Family Life Studies (FLST)		•		
Film and Media Studies (FLMS)		•		
Finance (FIN)	•			
Fine Arts Photography (PHTA)		•	•	Art
Fisheries Biology (FSBI)			•	Natural Resources Mgmt.
Flute (FL)			•	Music
Food and Beverage (FDBV)			•	Rest., Hotel & Inst. Mgmt.
Food Industry (FDTI)			•	Food Science
Food Science (FDTS)	•	•	•	Food Science
Forensic Anthropology (FORA)			•	Anthropology
Forensic Sciences (FSCI)		•		
French (FREN)		•	•	Languages and Cultures
French Horn (HORN)			•	Music
General Business (GB)	•	•		
General Studies (GST)	•			
Geographic Information Science and Technology (GIS)		•		
Geography (GEOG)	•	•		
Geology (GEOL)		•	•	Geosciences
Geophysics (GEOP)		•	•	Geosciences
Geosciences (GEOS)	•			
German (GERM)		•	•	Languages and Cultures
Global Studies (GLST)	•			
Greek (GRK)		•		
Guitar (GUIT)			•	Music
Harp (HARP)			•	Music
Health (HLTH)		•		
Health and Humanities (HLHU)			•	Honors Arts and Letters
Health Professions (HLPR)		•		
History (HIST)	•	•		
Honors Arts and Letters (HAL)	•			
Horticulture and Turfgrass Science (HOTR)			•	Plant and Soil Sciences
Hospitality Management (HOSP)			•	Rest., Hotel & Inst. Mgmt.
Human Development and Family Studies (HDFS)	•	•	•	
Human Resource Development (HRDV)		•	•	University Studies
Human Resources Management (HRMG)			•	Management
Human Sciences (HS)	•			
Humanities (HUM)		•		
Industrial Engineering (IE)	•	•		
Integrative Studies (INTS)		•	•	University Studies
Interdisciplinary Agriculture (INAG)	•			
Interior Design (ID)	•	•	•	
International Business (IB)	•			
International Economics (IECO)	•			
International Engineering (INEG)		•		
International Studies (INST)		•		
Interpersonal Communication (IPC)			•	Communication Studies
Italian (ITAL)		•		
Japanese (JAPN)		•		
Jewelry and Metals (JEWL)			•	Art
Journalism (JOUR)	•	•		
Journalism and Visual Media (JRVM)			•	University Studies
Landscape Architecture (LA)	•			
Landscape Studies (LDST)		•		

Field of Study	Major	Minor	Concentration/ Specialization	Parent Major/ Area of Study
Languages and Cultures (LACU)	•			
Latin (LAT)		•		
Legal Studies (LGST)		•		
Linguistics (LING)		•		
Literature and Language (ENLL)			•	English
Literature of Social Justice and Environment (LSJE)		•		
Lodging (LODG)			•	Rest., Hotel & Inst. Mgmt.
Management (MGT)	•			
Management Information Systems (MIS)	•			
Marketing (MKT)	•			
Mathematics (MATH)	•	•		
Meat Science (ANMS)			•	Animal Science
Meat Science Business (AMSB)			•	Animal Science
Mechanical Engineering (ME)	•	•		
Media Strategies (MDST)	•	•		
Microbiology (MBIO)	•			
Microelectromechanical Systems (MEMS)			•	Electrical Engineering
Military History (MHST)		•		
Military Studies (MIST)		•		
Multidisciplinary Science (MSCI)	•			
Multidisciplinary Studies (MDS)	•			
Music–Bachelor of Arts (MUBA)	•			
Music–Bachelor of Music (MUS)	•			
Music (MUTC)			•	Music
Music Composition (MUCP)			•	Music
Music Performance (MUPF)			•	Music
Music Theory (MUTH)			•	Music
Natural Resources Management (NRM)	•			
Natural Resources Management (NRMG)		•		
Nuclear Engineering (NCEN)		•		
Nutrition (NTRN)	•	•		
Nutrition, Health, and Wellness Careers (NHW)			•	Nutrition
Nutritional Sciences and Dietetics (NSCD)	•			
Oboe (OBOE)			•	Music
Open Track (OPTR)			•	Honors Arts and Letters
Organ (ORGN)			•	Music
Organizational Leadership (ORGL)			•	University Studies
Painting (PNTG)			•	Art
Percussion (PERC)			•	Music
Personal Financial Planning (PFP)	•	•	•	
Petroleum Engineering (PETR)	•			
Philosophy (PHIL)	•	•		
Photography (PHOG)			•	Art
Physics (PHYS)	•	•		
Piano (PNO)			•	Music
Piano Pedagogy (PEDP)			•	Music
Plant and Soil Science (PLSS)	•	•		
Political Science (POLS)	•	•		
Polymers and Materials (PMSE)		•		
Portuguese (PORT)		•		
Power Systems (POWR)			•	Electrical Engineering
Preprofessional Health (PPHC)			•	General Business
Preprofessional Health (NPPH)			•	Nutrition
Printmaking (PRNT)			•	Art
Professional Communication (TCPC)			•	Technical Communication
Professional Physics (PRPH)			•	Physics

Field of Study	Major	Minor	Concentration/ Specialization	Parent Major/ Area of Study
Psychology (PSY)	•	•		
Public Health (PBHL)		•		
Public Relations (PR)	•	•		
Quantitative Methods (QUAN)		•		
Ranch Management (RNMG)			•	Natural Resources Mgmt.
Range Conservation (RNGC)			•	Natural Resources Mgmt.
Real Estate (REST)			•	Finance
Religion Studies (RELG)		•		
Restaurant, Hotel and Institutional Mgmt. (RHIM)	•	•	•	
Retail Management (RTLTM)	•	•	•	
Russian (RUSN)		•		
Russian Language and Area Studies (RLAS)		•	•	Languages and Cultures
Sales (SALE)			•	Marketing
Saxophone (SAX)			•	Music
Sculpture (SCUL)			•	Art
Secondary Education (EDSE)		•		
Signal Processing (DSP)			•	Electrical Engineering
Social Work (SW)	•	•		
Sociology (SOC)	•	•		
Spanish (SPAN)	•	•		
Sport Management (SPMN)	•*	•		
Store Management (STMG)			•	Retail Management
String Bass (BASS)			•	Music
Studies in Personal Finance (SPF)		•		
Studio Art (SART)			•	Art
Studio Art – Ceramics (SACR)		•		
Studio Art – Drawing (SADR)		•		
Studio Art – Metal and Jewelry Design (SAMJ)		•		
Studio Art – Painting (SAPT)		•		
Studio Art – Printmaking (SAPR)		•		
Studio Art – Sculpture (SASC)		•		
Supply Chain Management (GLSC)			•	Marketing
Technical Communication (TCRC)	•	•	•	
Telecommunications and Network Mgmt. (MSTN)			•	Mgmt. Info. Systems
Theatre Arts (THA)	•	•		
Theatre Arts–Acting (THAA)		•	•	Theatre Arts
Theatre Arts–Design Technology (THDS)		•	•	Theatre Arts
Trombone (TBN)			•	Music
Trumpet (TPT)			•	Music
Tuba (TUBA)			•	Music
University Studies (UNST)	•			
Viola (VLA)			•	Music
Violin (VLN)			•	Music
Visual Studies (ARVS)			•	Art
Viticulture and Enology (VITI)			•	Plant and Soil Sciences
Voice (VOIC)			•	Music
Web Application Design (MSWD)			•	Mgmt. Info. Systems
Western Civilization (WEST)			•	Honors Arts and Letters
Wildlife Biology (WFB)			•	Natural Resources Mgmt.
Wind Energy (WNEN)	•	•		
Wind Energy (WNDE)			•	Various
Wine (WINE)			•	Rest., Hotel & Inst. Mgmt.
Women’s Studies (WS)		•		
Youth Development (YTDV)		•	•	
Zoology (ZOOL)	•			

* Pending THECB approval

Teacher Certification

Texas Tech University offers a wide variety of programs that can provide certification for students desiring careers in education. Teacher certification concentrations are available in the following areas:

All Level Art (AART)
All Level Music (AMUS)
All Level Physical Education (APED)
All Level Theatre Arts (ATHE)
Elementary Bilingual Spanish Generalist* (EBSP)
Elementary ESL Generalist* (EESL)
Elementary Generalist† (EGNL)
Elementary Math/Science* (MSEL)
Language Literacy Education (EDLL)
Middle-Level English, Language Arts, and Reading* (MELR)
Middle-Level English, Language Arts, and Reading/Social Studies* (MERS)
Middle-Level Math* (MMAT)
Middle-Level Math/Science* (MMSE)
Middle-Level Science* (MSC)
Middle-Level Social Studies* (MSST)
Secondary Agricultural Science and Technology (SAST)
Secondary Biology‡ (MLBI)
Secondary Chemistry (SCHE)
Secondary Chemistry‡ (MLCH)
Secondary Dance (SDNC)
Secondary English, Language Arts, and Reading (SELR)
Secondary Family Consumer Sciences (SFCS)

Secondary French (SFRE)
Secondary Geosciences‡ (MLGS)
Secondary German (SGER)
Secondary History (SHIS)
Secondary Hospitality, Nutrition, and Food Sciences (SHNF)
Secondary Human Development and Family Studies (HDFS)
Secondary Journalism (SJOU)
Secondary Latin (SLAT)
Secondary Life Earth Science‡ (RLEM)
Secondary Life Science (SLFS)
Secondary Math/Physical Science/Engineering‡ (MPSE)
Secondary Math (SMAT)
Secondary Physical Science (SPSC)
Secondary Physics/Math‡ (SPHM)
Secondary Physics‡ (MLPY)
Secondary Science‡ (SSCI)
Secondary Spanish (SSPA)
Secondary Speech (SSPE)
Special Education* (AGSE)

* As part of Multidisciplinary Studies major.

† As part of Multidisciplinary Studies or Early Childhood majors.

‡ As part of Multidisciplinary Science major.

Pre-Professional Fields

Pre-Professional fields are a designation, not a major. For example, pre-law and pre-medicine are not majors. They designate a career path that will require a professional school after graduation. Pre-professional students who plan to earn a baccalaureate degree must choose a major in an academic discipline by their junior year and complete the courses required for admission into the professional school (e.g., law school). A program advisor can guide you in meeting the specific requirements for entry into a professional school (www.depts.ttu.edu/pphc, www.prelaw.ttu.edu). Available pre-professional fields include the following:

- Clinical Laboratory Science (PMDT)
- Occupational Therapy (POCP)
- Physical Therapy (PPHT)
- Physician Assistant (PHPA)
- Pre-Dentistry (PDEN)
- Pre-Engineering (PREN)
- Pre-Law (PLAW)
- Pre-Medicine (PMED)
- Pre-Nursing (PNUR)
- Pre-Optometry (POPT)
- Pre-Pharmacy (PPAR)
- Speech, Language and Hearing Sciences (PRCD)

Temporary Designations for Students Who Have Not Declared a Major

Special temporary designations are intended to provide appropriate advisement to students who have not yet declared a major. Students declaring a temporary designation will take courses to complete core curriculum and GPA requirements in preparation for entering a major. Academic advisors from the supervising college or department will assist students to choose appropriate courses and a best-fit degree program.

To file a degree plan, students must declare a major. Students normally change from the temporary designation and declare a major by the time they have earned 45 to 60 semester credit hours.

Students who have not decided on a major should consider one of the following alternatives for a temporary designation:

- An undecided student can be designated initially as University Undecided and Exploratory. **The Exploratory designation is most appropriate for students who are exploring majors in a variety of academic disciplines and colleges.** Through the university's Discovery! process (see page 74), students can explore best-fit majors by aligning values, interests, skills, and abilities. Exploratory status allows students the freedom to explore best-fit academic majors while staying on track in progress toward a degree. For more information on the University

Undecided and Exploratory designation, contact Texas Tech University Advising, 79 Holden Hall, T 806.742.2189, F 806.742.2200, advising@ttu.edu, www.advising.ttu.edu.

- Students who are only **exploring majors that fall within one particular academic college** should check with advisors in that specific college.
- Students who aspire to apply to a **law, dental, medical, nursing, optometry, or pharmacy school or to one of a full range of health career professional schools (e.g., physical therapy, physician assistant)** should consult the Pre-Professional Programs section of this catalog (page 93) and seek appropriate advisement as recommended.
- Students who aspire to pursue **pre-veterinary medicine** should refer to page 169 and seek advisement from the College of Agricultural Sciences and Natural Resources.
- Students who desire to obtain an engineering degree should refer to page 93, begin with a **temporary pre-engineering designation**, and seek advisement through Texas Tech University Advising, 79 Holden Hall, T 806.742.2189, F 806.742.2200, advising@ttu.edu, www.advising.ttu.edu.

Reader's Guide to Catalog

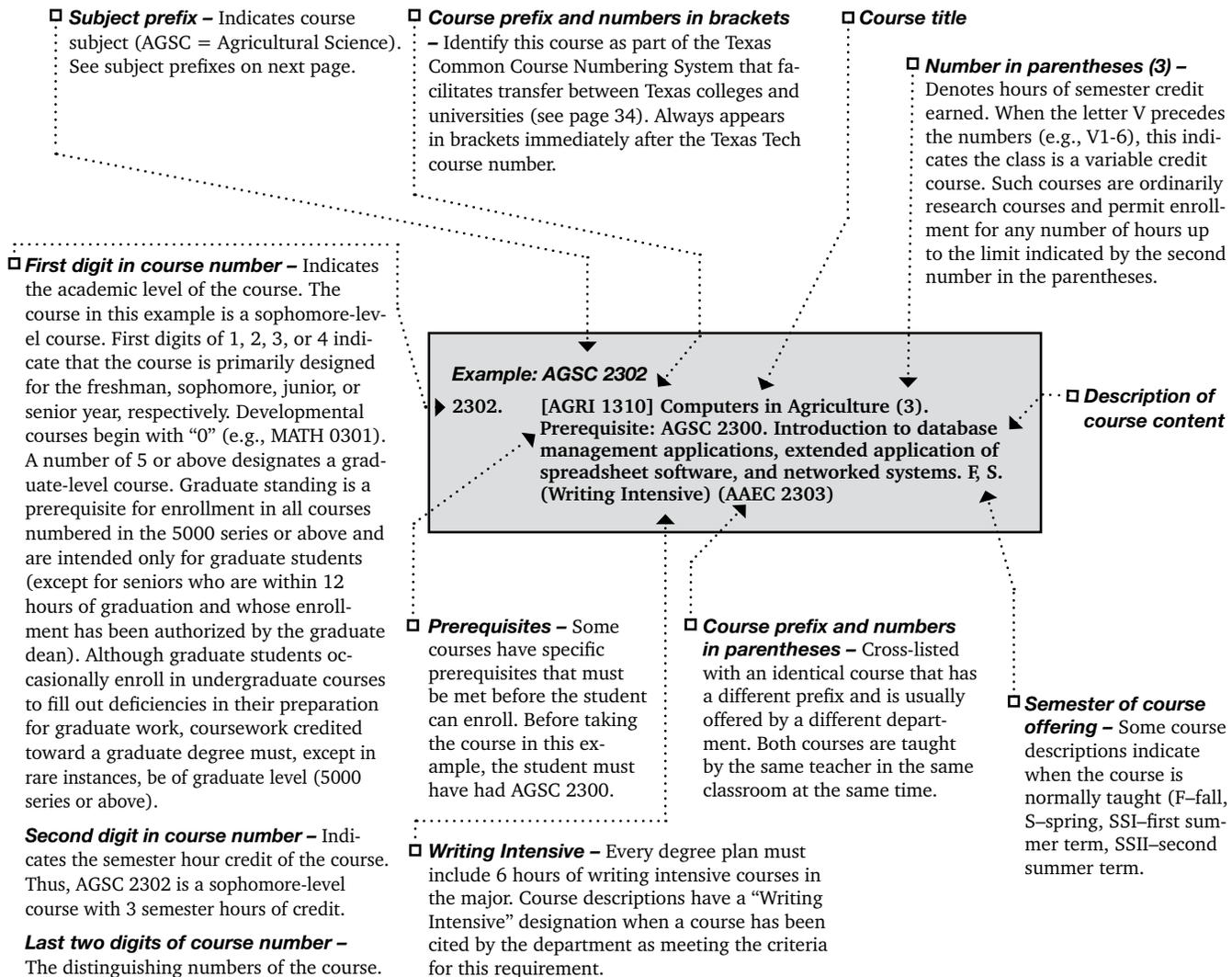
How to Read Catalog Course Descriptions

Texas Tech offers nearly 5,000 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/class_schedule/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.



Subject Prefixes Used in Course Descriptions

AAEC	Agricultural and Applied Economics	EDSP	Special Education	MBIO	Microbiology
ACCT	Accounting	EGR	Engineering Graphics	MCDR	Military Conflict, Diplomacy, and Reconciliation
ACOM	Agricultural Communications	EMC	Electronic Media and Communications	MCOM	Mass Communications
ADM	Apparel Design and Manufacturing	ENCO	Energy Commerce	ME	Mechanical Engineering
ADRS	Addictive Disorders and Recovery Studies	ENGL	English	MFT	Marriage and Family Therapy
ADV	Advertising	ENGR	Engineering	MGT	Management
AERS	Aerospace Studies	ENTX	Environmental Toxicology	MILS	Military Science
AGED	Agricultural Education	ENVD	Environmental Design	MKT	Marketing
AGLS	Agricultural Leadership	ENVE	Environmental Engineering	MRST	Medieval and Renaissance Studies
AGSC	Agricultural Science	EPCE	Counselor Education	MUAL	Student Teaching for Music
AGSM	Agricultural Systems Management	EPSY	Educational Psychology	MUAP	Applied Music
ANSC	Animal Science	ESL	English as a Second Language	MUCP	Music Composition
ANTH	Anthropology	ESS	Exercise and Sports Science	MUED	Music Education
ARAB	Arabic	ESTM	STEM Education	MUEN	Music Ensemble
ARCH	Architecture	EVHM	Environment and the Humanities	MUHL	Music History and Literature
ART	Art	FCSE	Family and Consumer Sciences Education	MUSI	Music
ARTH	Art History	FDSC	Food Science	MUSM	Museum Science
ARTV	Art-Visual Studies	FIN	Finance	MUTH	Music Theory
ASL	American Sign Language	FREN	French	NCBO	Non-Course Based Option
ASTR	Astronomy	FSCI	Forensic Sciences	NRM	Natural Resources Management
ATMO	Atmospheric Science	FSCJ	Forensic Sciences	NS	Nutritional Sciences
BA	Business Administration	GCH	Geochemistry	PADR	Programs for Academic Development and Retention
BCOM	Business Communication	GEOG	Geography	PETR	Petroleum Engineering
BECO	Business Economics	GEOJ	Geology	PFI	Personal Finance
BINF	Biological Informatics	GERM	German	PFP	Personal Financial Planning
BIOE	Bioengineering	GIST	Geographic Information Science and Technology	PFW	Personal Fitness and Wellness
BIOL	Biology	GLST	Global Studies	PHIL	Philosophy
BLAW	Business Law	GPH	Geophysics	PHOT	Photography
BOT	Botany	GRK	Greek	PHYS	Physics
BTEC	Biotechnology	GST	General Studies	PLAW	Pre-Law
CE	Civil Engineering	HDFS	Human Development and Family Studies	POLS	Political Science
CFAS	Community, Family, and Addiction Services	HIST	History	PORT	Portuguese
CHE	Chemical Engineering	HLTH	Health	PR	Public Relations
CHEM	Chemistry	HMGJ	Heritage Management	PRAG	Pragmatism
CHIN	Chinese	HOM	Health Organization Management	PSS	Plant and Soil Science
CLAS	Classics	HONS	Honors Studies	PSY	Psychology
CLT	Comparative Literature	HRDV	Human Resource Development	PUAD	Public Administration
CMLL	Classical and Modern Languages and Literatures	HUM	Humanities	REF	Refresher for TSI Workshop
COIN	Cooperative Internship	HUSC	Human Sciences	RHIM	Restaurant, Hotel, and Institutional Management
COMS	Communication Studies	IB	International Business	RTL	Retailing
CONE	Construction Engineering	ID	Interior Design	RUSN	Russian
CS	Computer Science	IE	Industrial Engineering	SLAV	Slavistics
DAN	Dance	INTS	Integrative Studies	SOC	Sociology
ECE	Electrical and Computer Engineering	IS	Interdisciplinary Studies	SPAN	Spanish
ECO	Economics	ISQS	Information Systems and Quantitative Sciences	STAT	Statistics
EDBL	Bilingual Education	ITAL	Italian	SW	Social Work
EDCI	Educational Curriculum and Instruction	JAPN	Japanese	THA	Theatre Arts
EDEC	Early Childhood Education	JOUR	Journalism	TSI	Texas Success initiative
EDEL	Elementary Education	LAIS	Latin American and Iberian Studies	TURK	Turkish
EDHE	Higher Education	LARC	Landscape Architecture	VIET	Vietnamese
EDIT	Educational Instructional Technology	LAT	Latin	VPA	Visual and Performing Arts
EDLD	Educational Leadership	LAW	Law	WE	Wind Engineering
EDLL	Language Literacy Education	LIBR	Library Research	WS	Women's Studies
EDML	Education Middle Level	LING	Linguistics	ZOOL	Zoology
EDSE	Secondary Education	LPMD	Land-Use Planning, Management, and Design		
		MATH	Mathematics		

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 life and physical sciences; social and behavioral sciences; mathematics, language, philosophy, and culture; creative 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.

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.

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.

Resources and Facilities

Athletic Facilities, NCAA Programs

As a member of the National Collegiate Athletic Association (NCAA) 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.

Female 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. A 2003 renovation added a new west side building, complete with 54 luxury suites, a club level, and press and camera levels. In 2010, an east side stadium building opened featuring 29 luxury suites and over 500 outdoor club seats. The addition increased stadium capacity to over 60,000.

Dan Law Field at Rip Griffin Park hosts the university's baseball team and has been voted as one of the best places in the nation to watch a college baseball game. Track events are held at the Terry and Linda Fuller Track Complex, and soccer events are held at the John Walker Soccer Complex. Basketball games tip off in the 15,098-seat United Supermarkets Arena, one of the finest on-campus basketball-volleyball facilities in the nation.

The Texas Tech softball and tennis programs enjoy the Don and Ethel McLeod Tennis Complex and Rocky Johnson Field. The university's golf teams 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 the third best on-campus course in the nation in 2014 by *Golfweek 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, the official university bookstore, is located in the Student Union Building. As the supplier for all required and recommended textbooks and supplies for students, the bookstore offers a large selection of used, rental, and digital books with services that include special orders and textbook reservations. The bookstore will also 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, study guides, bestsellers, and Nook devices and accessories. In addition, the bookstore carries a variety of Texas Tech apparel and giftware, school supplies, convenience items, and much more. The bookstore also houses a Barnes and Noble Café that serves Starbucks coffee and treats.

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

Contact: 806.742.3816, www.texastech.bncollege.com, [@BNTexasTech](http://www.facebook.com/barnesandnobletextastech)

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.

Information Technology (Computing) Services

The Information Technology (IT) Division (www.infotech.ttu.edu), managed by the Texas Tech University 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 educational and research mission. Some of the key services provided to the university community are open-access student computing facilities, cloud-based printing (WEPA), computing short courses, self-paced/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, identity federation, videoconference facilities, Unified Communication/VoIP, Texas Tech application support, mobile application support, online and distance education support, high performance computing, and IT consulting. As part of the Safe Computing Practices Campaign (www.safecomputing.ttu.edu), the Office of the CIO hosts educational events each semester and provides other educational resources to raise IT security awareness mainly for the Texas Tech community.

Technology Assessment provides timely and objective information and analysis of current and emerging technologies. This area keeps current with technology news and trends and provides customers with the appropriate information necessary to make decisions regarding technology investments. Various levels of assessments of technology and technology-related issues are available, ranging from short briefs to comprehensive studies. For more information visit: www.depts.ttu.edu/infotech/techassessment.php

Technology Support (www.itts.ttu.edu) provides a variety of IT services and operates the Advanced Technology Learning Center (ATLC) in the west basement of the Texas Tech Library building and five remote student computing labs located throughout the campus (www.depts.ttu.edu/itts/labs). Some of the IT services provided include computing short courses, university software site licenses, mission critical university systems (e.g., BlackBoard, Mediasite, OmniUpdate, SharePoint, etc.), and lab management consulting. Technology Support also manages university websites, including www.ttu.edu (in partnership with Communications and Marketing). Technology Support provides periodic campus training sessions on efficient lab management strategies and safe computing practices.

IT Help Central (www.ithelpcentral.ttu.edu) provides students, faculty, and staff with friendly IT “front line support” for the multitude of IT services. IT Help Central is the primary point of contact for anyone needing assistance regarding technology issues, as well as secondary support for campus IT professionals. In addition to resolving questions quickly, Help Desk services are also structured to escalate questions, problems, and concerns from the user community to the proper IT staff member. All incidents are tracked online until they are resolved. Faculty, staff, and students may contact IT Help Central at 806.742.HELP or ithelpcentral@ttu.edu or utilize the self-support feature through askIT (www.askit.ttu.edu).

Telecommunications (www.net.ttu.edu) architects and manages the Texas Tech data and video network, Unified Communication/VoIP (the university’s telephone system), TTUnet, secure wireless network, and wide-area Internet and Internet2 connections. Telecommunications plans and administers the development, acquisition, repair, maintenance, and delivery of network services. Telecommunications also manages eRaider network authentication account services that provide secure access to various campus resources and other select non-TTU resources via identity federation. The IT Security Team works to continually improve IT security by proactively scanning devices and applications for vulnerabilities. The department is also responsible for the university’s electronic mail services and domain name services.

High Performance Computing Center (www.hpcc.ttu.edu) designs and manages several research computing clusters and resources, allowing campus researchers to efficiently leverage IT resources. The center also operates the TechGrid, harnessing idle compute cycles from a grid of participating campus areas and units. The High Performance Computing Center participates in regional, national, and international initiatives to bring expertise and resources to Texas Tech University researchers.

Application Development and Support (ADS) (www.ads.ttu.edu) analyzes, designs, and provides high-quality applications, reports, and solutions to support academic and business processes, such as web-based learning, eCommerce transactions, data security, and institutional reporting. These solutions improve student services, enhance operational visibility, streamline strategic decision-making, and reduce costs. ADS also leads and assists the Texas Tech community in protecting applications, both internally-developed and third party-provided, using appropriate authentication and security measures.

Institutional Research (IR) (www.irs.ttu.edu) provides precise and timely reporting for state and federal agencies. IR also provides information, research, and decision support to university leaders. Historical information regarding enrollment statistics and student demographics is available from the IR website.

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

- **Communication Services** (www.itcs.ttu.edu) assists those needing a new telephone (office or cellular), an additional legacy telephone line, or voice mail; telephone repair services; and provides on-campus directory assistance. For any of these needs contact Communications Services at 806.742.2000.
- **Information Systems** (www.texastech.edu/it/infosys) supports the Banner enterprise human resources, student, finance, and financial aid systems.
- **Technology Operations and Systems Management (TOSM)** (www.tosm.ttu.edu) staff members are available to answer questions concerning server administration, management, or support. As the University Data Center, TOSM provides data back-up services to the university community, an important component of disaster recovery and business continuity planning. TOSM provides a production-grade data center and encourages areas and units to house servers and data in this facility. For additional information, call 806.742.2900.

Landmark Arts Galleries

The mission of Landmark Arts: The Galleries of Texas Tech University School of Art is to promote contemporary visual arts awareness 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 practice.

The galleries of Landmark Arts are Landmark Gallery, Studio Gallery, Folio Gallery, SRO Photo Gallery, and Satellite Gallery at CASP/LHUCA in downtown Lubbock. The Landmark Gallery exhibits contemporary art by nationally and internationally recognized 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 exhibitions of work by alumni and student-driven exhibitions such as the capstone exhibitions of the M.F.A. M.A.E., B.A., and B.F.A., and the annual undergraduate-juried competition. The SRO-Photo Gallery presents the viewer with wide-ranging solo exhibitions of fine art photography by professional artists from around the country. The Satellite Gallery presents current creative research by students and faculty.

The galleries are open from 10 a.m. to 5 p.m. weekdays, 10 a.m. to 5 p.m. on Saturday, and noon to 4 p.m. on Sunday. During university holidays the galleries are closed. More information is available at www.landmarkarts.org.

Libraries

Ranked among the top third of research libraries nationally, Texas Tech University Libraries serve as a vital partner with students and faculty in their learning endeavors. Six campus libraries comprise the University Libraries system: (1) University Library, (2) Southwest Collection/Special Collections Library, (3) Architecture Library, (4) Law Library, (5) Preston Smith Library of the Health Sciences, and (6) Vietnam Archive.

The 2.75 million physical volumes in the libraries’ collections and the allied services of the various libraries support research activity in the humanities, social sciences, and science-technology disciplines. Patrons may access materials from the various campus libraries.

Making services available to students is the central focus of University Libraries. A state-of-the-art recording studio provides a free facility to students and university employees for practice, performance, podcasts, music, theater, and oral presentations. 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, and thousands of American and international film titles, music and audio books on DVD and CD.

The main floor contains GroupWorks, an interactive group study environment enabled by the latest digital equipment. Additionally, patrons have access to more public computers than any other campus building. Computers are equipped with the full Microsoft Office Suite and Adobe Creative Suite (Photoshop, Illustrator, InDesign, etc.), AutoCAD, and other project/product and publishing tools. The award-winning 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 the latest software in 3D art, modeling, and animation.

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. The website library.ttu.edu 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, the libraries make their digital collections available to Texas higher education students and faculty via the Internet through a consortium of research libraries. Work done by honors students, for example, can be shared with other campuses and universities worldwide.

The university offers a 1 credit-hour course (LIBR 1100) to convey effective library research methods and strategies for scholastic success. The University Library is open 24/5 during each semester and 24/7 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 New 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 University

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 Alliance 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, and Lubbock Lake Landmark. A 40-foot mural, created in India ink by Peter Rogers, dominates the lobby. Galleries showcase long-term and temporary exhibitions drawn from the museum's own collections and traveling exhibits.

The Moody Planetarium is a 71-seat and two wheelchair area auditorium with a full-domed digital mirror projection system. It has daily astronomy and laser programs for the public at 2:00 and 3:30 p.m., Wednesday through Friday; 11:30 a.m., 2:00, and 3:30 p.m. on Saturday; and 2:00 and 3:30 p.m. on Sunday.

A Master of Arts in Museum Science or Heritage Management is offered as an academic component of the museum.

Although the chief source of funding for the museum is legislative appropriation, additional support comes from endowments and granting agencies. The Museum of Texas Tech University Association supports traveling exhibits. 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 other activities for major exhibitions. Volunteers from the community and Texas Tech University are always needed and welcome. The museum is a military-friendly, Blue Star museum.

The museum is closed on Monday but open free of charge from 10 a.m. to 5 p.m. Tuesday through Saturday, 1 to 5 p.m. Sunday, and until 9 p.m. on the first Friday of every month.

National Ranching Heritage Center

The National Ranching Heritage Center is a 27-acre museum with seven galleries, 38 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 schoolhouse, half-dugout, train, depot, blacksmith shop, barn, windmills, and more—date from the late 1780s to the early 1950s and have been authentically restored. They illustrate the development of the ranching industry in the Southwest. Dedicated on July 4, 1976, the NRHC hosts Ranch Day in the Spring, Heritage Halloween and Candlelight at the Ranch in late Fall, along with exhibits and education-based seminars and programs. Community and student volunteers help with these events. The National Ranching Heritage Center is open to the public free of charge from 10 a.m. to 5 p.m. Monday through Saturday and 1 to 5 p.m. on Sunday. The historical park closes daily at 4 p.m. The NRHC is closed on all major holidays. For additional information, see www.nrhc.ttu.edu or call 806.742.0498.

Office of International Affairs

The Office of International Affairs integrates the global vision of Texas Tech University by fostering international leadership, awareness, education, research, and outreach for the university and the greater community. Working with and through the colleges, the Office of International Affairs (OIA) coordinates international activities at Texas Tech and is composed of the following divisions:

- International Education and Enrollment Management
- International Student and Scholar Services
- International Research and Development
- International Outreach and Operations
- Vietnam Center

Contact: Office of International Affairs, www.international.ttu.edu, Vice Provost Ambassador Tibor Nagy or Associate Vice Provost Sukant Misra, Ph. D., 806.742.3667.

International Education and Enrollment Management (IEEM) Division. The International Education and Enrollment Management

(IEEM) division brings together all international education activities at Texas Tech University under one umbrella. Comprised of International Student Recruiting, International Undergraduate Admissions, International Student Life, Sponsored Students, Study Abroad, and International Agreements, the IEEM team provides a one-stop shop for international undergraduate students seeking a degree at Texas Tech University, and for all Texas Tech students interested in a study abroad experience.

Contact: Division of International Education and Enrollment Management, www.depts.ttu.edu/international/ieem/index.php, Sr. Director of IEEM Elizabeth McDaniel (elizabeth.mcdaniel@ttu.edu).

For Study Abroad information, contact Rebecca Schwartz at rebecca.schwartz@ttu.edu, www.studyabroad.ttu.edu.

International Student and Scholar Services (ISSS). ISSS operates the university's international 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.

Contact: Division of International Students and Scholars, www.depts.ttu.edu/international/iss/index.php, Director of ISSS Richard Porter (richard.porter@ttu.edu).

International Research and Development (IRD) Division. The International Research and Development division facilitates, in collaboration with the Office of Vice President for Research, the development of multi-investigator, multidisciplinary international research and development programs at Texas Tech University. Through the services of the International Center for Arid and Semi-arid Land Studies (ICASALS), IRD promotes the university's special mission of the interdisciplinary study of arid and semiarid environments and the human relationship to these environments from an international perspective. The Grants Administration unit works with faculty to identify and disseminate international research and development grant opportunities and to help develop and submit large, multidisciplinary proposals to funding agencies.

Contact: International Research and Development, www.depts.ttu.edu/international/intlrsh/index.php, Sr. Director of IRD Gad Perry, PhD. (gad.perry@ttu.edu).

For Grants Administration information, contact Reagan Ribordy at reagan.ribordy@ttu.edu.

International Outreach and Operations Division. Comprised of K-12 Global Education Outreach (K-12 GEO), Community Outreach (art exhibits, speakers, etc.), ICC Room Rental, and the Passport Office, the International Outreach and Operations division exists to serve public, private, and home schools throughout the region; to bring cultural programming to the multiple and diverse South Plains and TTU communities; to provide for facility rental; and to offer full Passport services to the public.

Contact: Division of International Outreach and Operation, www.depts.ttu.edu/international/intopr/index.php; Sr. Director of International Outreach and Operations Jane Bell (jane.bell@ttu.edu).

For K-12 Global Education Outreach information, contact Kelley Coleman at kelley.coleman@ttu.edu.

For ICC rental information, contact Christi Felton at christi.felton@ttu.edu.

Vietnam Center. The Vietnam Center and Archive collects and preserves the documentary record of the Vietnam War and supports and encourages research and education regarding all aspects of the American Vietnam Experience. For more information about the archive see page 31.

Contact: Vietnam Center, www.vietnam.ttu.edu, Director Steve Maxner, PhD. (steve.maxner@ttu.edu).

Psychology Clinic

The Texas Tech Psychology Clinic has a long history of providing quality services to the Lubbock area and university community. The clinic is located on the first floor of the Psychology Building and is operated by faculty from the clinical and counseling psychology programs. The purpose of the clinic is threefold: 1) to provide multi-disciplinary, evidence-based training to doctoral students under the supervision of program faculty; 2) to provide high quality, affordable psychological services to the university and the Lubbock community; and, 3) to advance theory-based mental health research. The Psychology Clinic provides a range of outpatient services to children, adolescents, and adults, including individual, family, marital or couples therapy, behavioral parent training, parent-child-interaction therapy, vocational counseling, and psychoeducation. Therapists address a broad range of issues such as depression, anxiety, relationship and interpersonal problems, emotional and behavioral problems, eating disorders, and problems with stress and coping. The clinic also provides psychological and vocational assessment services to the Texas Tech and Lubbock communities.

Radio and TV Stations

Texas Tech Public Radio/KTTZ-FM. Licensed and owned by Texas Tech University, KTTZ-FM is a classical music and public radio news station that broadcasts on a frequency of 89.1 MHz at 70,000 watts. KTTZ-FM operates 24 hours a day, seven days a week, providing service to South Plains listeners within a 75-mile radius of Lubbock. KTTZ-FM offers programming from National Public Radio, American Public Media, Public Radio International networks, and locally-produced classical music and arts features. The station is supported by listeners, and additional funding is supplied by grants, underwriting, and financial support from the Texas Tech University System. KTTZ-FM also features Lubbock's first digital broadcast radio signal using HD radio technology and adding two additional stations to its existing frequency. The station also operates FM 90.1 KNCH in San Angelo, Texas.

Texas Tech Public Television/KTTZ-TV. A noncommercial educational television station, KTTZ-TV (Channel 5.1 in HD) is licensed by the Federal Communications Commission (FCC) to the university's Board of Regents and operates as a division within Texas Tech University.

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 thirteen surrounding counties and serves 157,000 households.

KTTZ-TV is a member of the Public Broadcasting Service (PBS), a noncommercial network of 356 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.

Texas Tech Public Television produces local programming and holds educational and entertaining events for viewers of all ages.

KTXT-FM. The campus radio station, KTXT-FM (The Raider 88.1), is the student radio station that broadcasts on a frequency of 88.1 MHz at 35,000 watts. Staffed by students and administered by the College of Media and Communication, KTXT-FM provides the university community with diverse programming including BBC World Service, Texas Tech news and information, weather, live play-by-play broadcasts of Texas Tech soccer, volleyball and softball, alternative music, and a variety of student-produced radio programs. Students from the campus community can serve as members of the staff and gain valuable educational experiences related to management, marketing, producing, and entrepreneurship.

Recreational Sports

The Department of Recreational Sports serves the leisure needs of Texas Tech faculty, staff, and students through open recreation, aquatics, fitness and wellness, outdoor pursuits, intramurals, and sport clubs. 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; three weight rooms, including a free, selectorized, and circuit weight room; 105 cardiovascular machines; and a four-lane, one-ninth mile elevated jogging track. The center also provides three fitness/dance studios, a 53-foot climbing center, 12 racquetball/squash courts, a fitness/wellness center, locker rooms, an outdoor pursuits center, an indoor Olympic-size swimming pool, and an outdoor leisure pool. Equipment checkout for a variety of sports and fitness equipment is available during open recreation.

Texas Tech's aquatic facilities are first-rate, including a regulation-sized indoor Olympic pool and an outdoor leisure pool designed by students for students. The aquatics program also provides many water sports and activities such as long-course swims, lifeguard instruction classes, and Learn to Swim programs. A staff of certified lifeguards and instructors assures maximum fun whenever students use the lazy river, the hot tub, the lap swim lanes, or the diving board and drop chute.

The Fit/Well Program offers everything needed for the person striving to be healthier. Certified personal trainers, licensed massage therapists, and fitness instructors lead the Texas Tech community in fun-filled and heart pumping workouts. Current offerings include more than 101 fitness, dance, and mind/body weekly classes; 14 personal trainers; and three licensed massage therapists. The Fit/Well also holds numerous special events throughout the year, including runs, triathlons, healthy living seminars, and screenings.

The Outdoor Pursuits Center offers climbing, camping, biking, backpacking, canoeing, kayaking, and almost anything outdoors. The center also provides trip information, equipment rental, bike checkout, and bike maintenance. The Recreation Center houses one of the tallest rock wall in the Big 12 Conference.

The Intramural Program is one of the largest in the country, with flag football having the largest number of participants. More than 350 teams compete on recreation fields in the fall on Sunday through Thursday nights. Intramural competitions are split into team, individual/dual, and special sports with Greek and open divisions. All team sports offer men's, women's, and co-rec teams. Fall team sports include flag football, softball, outdoor soccer, and volleyball. Spring sports include basketball, softball, indoor soccer, and four-on-four flag football. Additional competitions are available in activities such as racquetball, tennis, golf, ping-pong, and dodge ball.

The Sport Clubs Federation offers a unique diversion from academic life through instruction or intercollegiate athletic competition on a club basis. Clubs can compete for national championships within their sport. Sport Clubs offer 30 clubs ranging from traditional sports such as soccer and rugby to niche sports such as quidditch and paintball. Sport Clubs also has three martial arts clubs. All sport clubs receive funding and oversight from the Department of Recreational Sports.

Research Opportunities

Texas Tech University is making great strides toward a goal of growing its research enterprise and advancing its mission to be recognized ultimately as a great public research university eligible for consideration as an Association of American University (AAU) Tier One institution.

In 2012 the university was designated a National Research University by the state of Texas. With the designation comes additional funding to support the university's research enterprise. As the university's research grows, so do the opportunities for graduate and undergraduate students to participate in research, scholarship and creative activity with faculty who are internationally known in their fields. Texas Tech values all forms of discovery and new knowledge generation.

Texas Tech has chosen eight broad research themes that will guide its program development and resource investment strategies for the next 10 years. Each of the themes is evaluated with respect to increasing support to the institution, advancing knowledge, improving quality of life, and enhancing global and economic competitiveness.

The eight strategic research themes are as follows:

- **Sustainable Society** – Texas Tech is on the cutting edge of research involving energy, water, agriculture and the built environment, including focus areas in food safety and quality, sustainable energy and communities, water resources and law, and animal health and well-being.
- **Innovative Education and Assessment** – Texas Tech researchers are finding new ways to educate and assess special needs and special education; bilingualism and English as a Second Language (ESL); science, technology, engineering and math (STEM) training and certification; and social issues and critical pedagogy in public schools.
- **Computational and Theoretical Sciences and Visualization** – Texas Tech researchers work nationally and internationally studying high-energy particle physics, molecular dynamical simulation, business intelligence, systems engineering, and information systems.
- **Advanced Electronics and Materials** – Providing immeasurable benefits to both the state and nation economically and defensively, Texas Tech is an innovator in advanced electronics and materials research, including nanotechnology, nanophotonics, and pulsed power.
- **Integrative Biosciences** – Texas Tech research collaborations extend across departmental boundaries in areas of biodefense law, addiction and recovery, and cancer research.
- **Culture and Communications** – From the study of military law and policy to the cognitive and social effects of new media, researchers at Texas Tech cover a broad area of culture, communication, entrepreneurship, and leadership.
- **Community Health and Wellness** – Texas Tech is dedicated to research addressing the needs of rural West Texas community health issues, including family health and wellness, addiction and recovery, family outreach, health care law, and health care design.
- **Creative Capital** – The university supports and embraces creative scholarship through arts and design technologies such as geospatial analysis and visualization, gaming and technology, and music perception and cognition.

Undergraduate and graduate students are encouraged to enhance their classroom activities with research faculty in all areas of the university (creative arts, social sciences, humanities, agriculture, engineering, mathematics, and the sciences) to prepare them for successful careers.

Southwest Collection/ Special Collections Library

The Southwest Collection/Special Collections Library includes the Southwest Collection; the University Archives; Rare Books; the James Sowell Family Collection in Literature, Community and the Natural World; the Archive of Turkish Oral Narrative; and the Crossroads of Music Archive.

The Southwest Collection is the regional repository for historical information pertaining to West Texas and the Southwest. The library collects and makes available for research more than 1,800 collec-

tions of personal papers; more than 5,000 hours of oral history interviews; noncurrent business and institutional records; and a non-circulating library of Texana, Western Americana, maps, periodicals, photographs, newspapers, interviews, films, videotapes, and microfilm.

The University Archives serves as the institutional memory for Texas Tech University by collecting, preserving and making accessible to researchers such materials as administrative and faculty records, publications, photographs, memorabilia, and video and audio recordings. These materials document the legal, historical, fiscal, administrative, and intellectual aspects of the university, as well as the cultural and social aspects of student life.

Consisting of some 38,000 volumes, Rare Books is a rich resource for research. Its holdings provide a wide breadth of materials, including rare and early printed books and maps; artists' books; and limited edition, illustrated and finely bound books. Areas of strength include the history of science and medicine, European and American literature, book history and book arts, Russian and Eastern European history and culture, Mesoamerican and illuminated Medieval manuscript facsimiles, Greek and Roman classical authors, and dowsing.

The James Sowell Family Collection in Literature, Community and the Natural World contains the personal papers of award-winning contemporary American writers whose work deals with the natural world, the significance of communities, and questions of social justice. In addition to published books, materials available for research include correspondence, drafts of manuscripts, research notebooks, diaries, calendars, photographs, and film. A complete list of writers in the Sowell Collection can be found on the website www.swco.ttu.edu/Sowell/SowellCollectionSWC.php.

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. The archive's website (<http://aton.ttu.edu>) offers a comprehensive view of Turkish culture.

The Crossroads of Music Archive is quickly becoming the premier music archive in Texas. The university is the only state institution actively pursuing musicians and their associates to collect and preserve the state's vast musical heritage. Additionally, the archive is working outside the state to obtain important music collections that have been overlooked.

All materials may be used by both the university community and the general public for research or reference. The Southwest Collection/Special Collections Library building is located north of the University Library. Reading Room service is provided during regular semesters 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 during the fall and spring semesters. All hours are subject to change; please call to confirm hours. Inquiries and donations are welcome. Tours are available.

Contact: 806.742.3749 or <http://swco.ttu.edu>

Speech–Language and 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 dollar renovation and expansion that has created one of the finest facilities in the United States. The expansion included additional space for the official Barnes and Noble campus bookstore, the Student Organization Involvement Center, 62 registered student organization cubicles, TV and study lounges, Student Government Association office suite, Student Union & Activities Administration offices, Dean of Students, the Center for Campus Life offices, Student Legal Services, and West Plaza Courtyard between the SUB and the library. In 2007 the Office of Parent and Family Relations was added along with a game room in the lower west lounge. The renovation encompasses a five-concept food service court, a casual dining area with seating for 600 patrons, eight reflection and study rooms, 25 technologically capable meeting rooms for events, the 968-seat Allen Theatre, the courtyard, and the east entrance ATM hub. In 2014 the Student Union added the Stars and Stripes military, veteran, and family lounge. The Red Raider Ballroom is in the process of being renovated to improve lighting, sound, and visual technologies. The room will also be more multipurpose with the addition of dividing walls.

The retail and service corridor on the first floor houses a variety of businesses such as the University ID Office, Prosperity Bank, a University Police sub-station, Sam's Place Mini-market, CopyMail service center, the Union Bistro, and Smart Choices. The Student Union Ticket Booth, located at the Welcome Center on the first floor of the east side, serves as a major outlet for advanced tickets sales for many campus functions as well as being a Select-A-Seat location for events in Lubbock and throughout the region.

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

Texas Tech 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 413 Flint Avenue 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 56 officers and 38 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 Crime Prevention Specialists 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, these officers will discuss crime prevention with any student, faculty or staff member.

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

Texas Tech University Ethics Center

The mission of the Texas Tech University Ethics Center is to enhance the overall ethical culture of the university by promoting ethics education; facilitating ethics research; providing outreach; and fostering discourse on ethical issues among students, faculty, staff, alumni, and others with an interest in ethics.

The Ethics Center is a continued effort of the 2005-2010 campus-wide Quality Enhancement Plan, "Do the Right Thing: A Campus Conversation on Ethics." This plan operationalized the university's mission by executing core values (mutual respect, cooperation and communication, creativity and innovation, community service and leadership, pursuit of excellence, public accountability, and diversity) and assisting students to develop personal ethical standards that guide lifelong decision-making.

The Ethics Center significantly emphasizes academic integrity and Responsible Conduct of Research (RCR). Every program promotes the "Campus Conversation on Ethics," as well as the university's mission of "preparing ethical leaders for a diverse and globally competitive workforce." Ongoing programming and events include, but are not limited to, the annual Responsible Conduct of Research Conference, TLPDC/Ethics Lunch Series, and Coffee Break Ethics Series. Many of the events and workshops meet part of the National Science Foundation requirements for RCR training. The Ethics Center also participates in a campus-wide Arbor Day celebration each April at the university's Memorial Circle, where an academic integrity survey is administered. Another activity on Arbor Day is "Ethics... Speak Up!" during which blank paper tablets are set up and students are asked to respond to a prompt question in their own words.

For additional information, see www.ethics.ttu.edu

Texas Tech University Independent School District

Texas Tech University Independent School District (TTUISD) is an accredited kindergarten through 12th grade school established by the State Board of Education in 1993. TTUISD is accredited by the Texas Education Agency (TEA), and all courses and Credit by Exams align with the Texas Essential Knowledge and Skills (TEKS). TTUISD offers flexible educational opportunities for students, schools and school districts, as well as international programs for partner schools abroad. The elementary, middle, and high school options meet the same rigorous standards as traditional schools, but TTUISD students have the opportunity to choose when and where to study. Students can begin at anytime as there are no enrollment deadlines. TTUISD students have the option to take self-paced courses and/or Credit by Exams to supplement their school or homeschool curriculum or to become a full-time student and pursue a Texas high school diploma. TTUISD also offers educational solutions to schools and districts, including dropout prevention, credit recovery, and testing services.

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 and/or graduate students. The department selects plays to give each student generation an opportunity to see a representative selection of the great works of the past as well as works by modern playwrights. These plays are presented on the main stage of the Charles E. Maedgen Jr. Theatre, which seats 385 patrons in a comfortable, continental arrangement, and sometimes in the more intimate lab theatre.

A program of contemporary and original student-directed productions are presented in the Maedgen's Laboratory Theatre, an inti-

mate, thrust-stage performance space. All Texas Tech students are eligible to audition for roles in plays or to work on production crews. Works are also developed in Texas Tech's innovative summer program, Wildwind Performance Lab.

Transportation and Parking Services

All vehicles parked on campus must have a valid Texas Tech ePermit in the commuter lots on weekdays from 7:30 a.m. to 5:30 p.m. and in the residence hall parking lots 24 hours a day, seven days a week.

By using "My Parking Account" on the Transportation and Parking Services website (www.parking.ttu.edu), viewers can access and update account information, register motor vehicles and bicycles, purchase a permit, and explore other ways to simplify their on-campus parking experience. The website also provides maps, citation appeals procedures, traffic and parking 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 on campus. Call 742.6277 (MAPP).

To contact Transportation and Parking Services, call 742.7275 (PARK) or visit Room 145 of the Administrative Support Center, 407 Flint Ave., 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 14,000 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. Created in 2001, The Virtual Vietnam Archive now provides access to more than 3 million pages of materials, all of which are accessible free of charge through the Internet. These online materials include documents; photographs and slides; and thousands of maps, audio recordings, oral history interviews, films, and more. The Vietnam Archive adds approximately 150,000 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 website is www.vietnam.ttu.edu.

Undergraduate Admissions

Ethan Logan, Ph.D., Executive Director
Jamie Hansard, Managing Director

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

Texas Tech accepts the ApplyTexas Application for Admission to Four-Year Institutions available online at www.apply-texas.org. Essays and letters of recommendation are strongly recommended for students who do not qualify for assured admission. Please see the inside front cover of this catalog for 2015-2016 admission deadlines.

Admission to the Graduate School. See the Graduate School section of this catalog (page 100) for information about graduate admission.

International Admission. See page 39 for information regarding admission of international students.

Residency Status Determination. For rules governing the determination of residency status as defined by the Texas Higher Education Coordinating Board, visit www.collegefortexans.com or www.admissions.ttu.edu/residency-requirements.

Meningitis Vaccine. The Texas Education Code, Section 51.9192 requires all students under the age of 22 years entering a public institution of higher education in Texas to provide documentation that they have had a meningococcal (bacterial meningitis) vaccine within the last five years. Visit www.admissions.ttu.edu/meningitis for more information.

Admission Requirements

Applicants are considered for admission to the undergraduate divisions of the university by graduation from an accredited high school or equivalent or by transfer from an accredited college. 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. Texas Tech reserves the right to assign a major if applicants do not meet the qualifications for their major of choice; please refer to Undergraduate Admission Requirements for Specific Colleges on page 49.

First-Time Freshman Admission

Applicants must complete the following:

1. Submit a freshman application and pay a non-refundable application fee. The ApplyTexas Application is available on the website www.applytexas.org. The fee may be paid by check, money order, or online at www.admissions.ttu.edu/tools/payment/default.asp with a credit card (Visa, MasterCard,

American Express, Diners Club, or Discover). If payment of the fee creates financial hardship, students may submit verification or qualifying documentation of need for a fee waiver along with the application and supporting documents for admission. Refer to Undergraduate Admissions website for Fee Waiver guidelines (www.admissions.ttu.edu/index.php/application-fee/). Applications will not be complete without either the application fee or fee waiver documentation. No waiver of the international application fee is available.

2. Have an official high school transcript showing GPA and class rank sent directly to the Office of Undergraduate Admissions. The transcript must state the diploma type or further documentation may be required. 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 official GED scores as well as a partial high school transcript. If no rank is provided on the high school transcript, one will be assigned.
3. Have college entrance test scores, either the SAT or the ACT, sent from the testing agency at the time the test is taken. If it has been five years or more since high school graduation, the requirement to take the SAT or ACT test will be waived.
4. Individuals who are not high school graduates but who have submitted evidence of a high school equivalency diploma from the Texas Education Agency (or equivalent agency in other states) may be eligible for admission to Texas Tech University when they have submitted all of the following items to the Office of Undergraduate Admissions:
 - Application for Admission
 - Scores on the ACT or the SAT (scores cannot be more than five years old); and
 - Current Application Fee

Applicants currently enrolled in their first semester of college after high school graduation and wanting to transfer to Texas Tech should apply as transfer students but must also meet freshman admission requirements, submit SAT or ACT scores, and provide a high school transcript showing a graduation date. Applicants must have one of the following:

1. Successfully completed the curriculum requirements for either the Recommended High School Program, the Advanced High School Program, the Distinguished Endorsement High School Program, the Foundation diploma, or Foundation diploma with an endorsement.
2. Satisfied ACT's College Readiness Benchmarks (English 18, Math 22, Reading, 22, and Science 23) on the ACT assessment 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 to be considered for admission:

<u>High School Subjects</u>	<u>Units Required</u>
English	4
Mathematics ¹	4
Laboratory Science ²	4
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 may 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. Homeschool transcripts must bear a notarized signature of the parent attesting to the authenticity of the record. See www.admissions.ttu.edu/homeschool.

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 recommended.

Early College High School. College transcripts should be provided as part of the student's admissions packet.

Assured Admission

Students who graduate from an accredited high school and have completed the Texas Recommended High School Program (RHSP), or Advanced High School Program, or the Distinguished Endorsement of the Foundation School Program, or a high school diploma with endorsement, or Distinguished Diploma, or their 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 10 Percent†	No Minimum	
First Quarter (other than top 10 percent)	25	1140
Second Quarter	28	1230
Third Quarter	29	1270
Fourth Quarter	Application Review	

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

† Students must complete the Distinguished Endorsement High School Diploma Program or its equivalent to be considered for top 10 percent.

Admission will be granted to students who hold competitive scholarships awarded by an official Texas Tech scholarship committee if the recipient otherwise meets the freshman admission requirements.

Admission Review

Academic performance, standardized test scores, and educational preparation are specifically considered for admission. Additional information used to evaluate a student's potential for success includes, but is not limited to, the following:

- High school coursework, including advanced rigor
- Dual credit (on an official college transcript)
- Extracurricular activities
- Leadership experiences
- Civic or other service activities
- Socioeconomic background
- Family educational background
- Bilingual proficiency
- 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.

Provisional Admission

Applicants who are provisionally admitted can become fully admitted by completing six qualifying credit hours through the Texas Tech Gateway Program, earn at least a 2.5 GPA at an accredited community college, and provide a final transcript of the qualifying college credit. Because Undergraduate Admissions will continue to

review applications until April 1, provisional admits also can provide additional items for consideration, such as updated test scores and revised/updated high school transcripts.

Admission Alternatives

Freshman applicants who have been denied admission for the summer or fall semester are eligible to participate in alternative programs. Visit www.admissions.ttu.edu/first-time-freshman for details.

Transfer Admission

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

1. Submit a transfer application and pay a non-refundable application fee. The ApplyTexas Application is available at www.applytexas.org. The fee may be paid by check, money order, or online with a credit card (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. Refer to Undergraduate Admissions website for Fee Waiver guidelines: www.admissions.ttu.edu/index.php/application-fee/. 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.

In order to apply high school foreign language credits toward the basic foreign language requirements of Texas Tech University, students must provide an official copy of their high school transcript.

Assured Admission

Transfer applicants will be assured admission if they meet the following requirements (cumulative GPA is calculated with transferable credit only):

Transferable Credit Hours	Transfer GPA
12-23	2.5
24+	2.25

- 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 meet freshman admission requirements.
- Transfer applicants with 45 or more transferable hours must choose a major.
- The university reserves the right to modify its admission requirements to manage enrollment in high-demand areas.
- Some majors have additional admission requirements in addition to the university admission requirements. Please refer to the Undergraduate Admission Requirement for Specific Colleges on catalog page 49.

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. An essay explaining any extenuating circumstances is highly recommended.

Conditional Admission

Transfer applicants who are currently in attendance at another institution may be conditionally admitted to Texas Tech if they meet the following requirements:

- Texas Tech must receive official transcripts for all work completed up to the point of application.
- After evaluation of their completed work, applicants must meet guidelines for assured admission.
- Applicants whose transfer GPA is at least 2.0 will be reviewed for possible conditional admission.
- Applicants whose transfer GPA is less than 2.0 will be placed in pending status until a final transcript is received for evaluation.

Applicants will be conditionally admitted pending receipt of a final transcript. Once the final transcript is received and the work is evaluated, applicants meeting university GPA requirements may be fully admitted to the university. Admission for applicants who do not meet university guidelines will be rescinded.

Transient Applicants

Students who are not seeking degrees at Texas Tech University but wish to take courses at the university should use the Transient Application in ApplyTexas.

Second Degree-Seeking Applicants

Individuals seeking a second bachelor's degree who have not previously attended Texas Tech should provide the following:

- Transfer application through ApplyTexas.org (indicate you are seeking a second degree)
- Application fee
- Official transcript showing the date and type of bachelor's degree that was conferred

An academic dean must approve admission to any program. Admissions will request this approval after the applicant's file is complete.

Applicants who have a degree from Texas Tech should use the former student application found at www.admissions.ttu.edu/index.php/former-tech-readmission/ (on the third question, indicate graduation with a bachelor's degree).

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 Undergraduate 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 deter-

mines 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 72 semester credit hours from two-year colleges may be applied toward Texas Tech University degree requirements. Courses that are accepted for transfer do not necessarily apply toward college, departmental, or program degree requirements. Transfer requirements are as follows:

- Texas Tech University may accept up to 80 degree-applicable credit hours from any accredited two- or four-year institution.
- Students may apply to bring in up to 90 degree-applicable credit hours provided that a minimum of ten degree-applicable hours are upper division (3xxx/4xxx) and from a four-year institution. The student's home department, college, and the Associate Vice Provost for Academic Affairs must approve the request.
- The last 30 hours of the degree must be taken in residence, defined as instructed by Texas Tech University.
- A minimum of 40 credit hours must be upper division.

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 (1) complete 30 semester credit hours of work in residence at Texas Tech with at least a 2.0 GPA and (2) 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.
- Texas Tech University will not accept WECM (Workforce Education) courses for academic credit, except in the following circumstances:
 1. The student has transferred in a complete Applied Associates degree from an accredited, two-year institution and is enrolled in the B.A.A.S. program in University Studies, or
 2. The student is enrolled in a degree program as part of an Articulation Agreement with another institution and WECM courses are an approved component of that Agreement, or
 3. The student obtains approval from the home department, college, and Senior Vice Provost to transfer in individual WECM courses. To request permission, the student must provide syllabi for all requested transfers, document the credentials of the instructor of record for the course(s) in question, obtain departmental approval for the transfer, and obtain college-level recommendation for the transfer.
- 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 non degree-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.
- Transfer courses that have received an equivalent evaluation by the Texas Tech academic department will be honored and are degree applicable. Changes to the equivalent may be requested annually by the department.

Texas Common Course Numbering System (TCCNS)

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.

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
ACCT 2401	ACCT 2300
ACCT 2402	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

TCCNS	TTU Equivalent
AGRI 2322	ANSC 2301
AGRI 2330	NRM 2301
ANTH 2101	ANTH 2100
ANTH 2301	ANTH 2300
ANTH 2302	ANTH 2301
ANTH 2346	ANTH 2302
ANTH 2351	ANTH 2302
ANTH 2401	ANTH 2300 + 2100
ARAB 1311	ARAB 1501
ARAB 1312	ARAB 1502
ARAB 1411	ARAB 1501
ARAB 1412	ARAB 1502
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 1311	ARCH 1311
ARCH 1403	ARCH 1412
ARCH 1404	ARCH 2501
ARCH 2312	ARCH 2351
ARTS 1301	ART 1309
ARTS 1303	ARTH 1301
ARTS 1304	ARTH 2302
ARTS 1311	ART 1302
ARTS 1312	ART 2303
ARTS 1313	ART 1309
ARTS 1316	ART 1303
ARTS 1317	ART 2304
ARTS 1413	ART 1309
ASTR 1303+1103	ASTR 1401
ASTR 1304+1104	ASTR 1400
ASTR 1403	ASTR 1401
ASTR 1404	ASTR 1400
BCIS 1305	ISQS 2340
BCIS 1405	ISQS 2340
BIOL 1306+1106	BIOL 1403
BIOL 1307+1107	BIOL 1404
BIOL 1311+1111	BIOL 1401
BIOL 1313+1113	BIOL 1402
BIOL 1322	NS 1325
BIOL 1323	NS 1325
BIOL 1406	BIOL 1403
BIOL 1407	BIOL 1404
BIOL 1411	BIOL 1401
BIOL 1413	BIOL 1402
BIOL 2106	BIOL 1113
BIOL 2206	BIOL 1113
BIOL 2301+2101	ZOOL 2403
BIOL 2302+2102	ZOOL 2404
BIOL 2306	BIOL 1305
BIOL 2401	ZOOL 2403
BIOL 2402	ZOOL 2404
BIOL 2406	BIOL 1305 + 1113
CHEM 1105	CHEM 1105
CHEM 1107	CHEM 1106
CHEM 1111	CHEM 1107
CHEM 1112	CHEM 1108
CHEM 1305	CHEM 1305
CHEM 1307	CHEM 1306
CHEM 1311	CHEM 1307
CHEM 1312	CHEM 1308
CHEM 1405	CHEM 1305 + 1105
CHEM 1407	CHEM 1306 + 1106
CHEM 1411	CHEM 1307 + 1107
CHEM 1412	CHEM 1308 + 1108
CHEM 1414	CHEM 1308 + 1108
CHEM 1419	CHEM 2303 + 2103
CHIN 1311	CHIN 1501
CHIN 1312	CHIN 1502
CHIN 1411	CHIN 1501
CHIN 1412	CHIN 1502
CHIN 1511	CHIN 1501
CHIN 1512	CHIN 1502
CHIN 2311	CHIN 2301
CHIN 2312	CHIN 2302

TCCNS.....	TTU Equivalent
COMM 1307.....	MCOM 1300
COMM 1318.....	PHOT 2310
COMM 2302.....	JOUR 2300
COMM 2366.....	THA 2304
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 1415.....	CS 1411
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 1411.....	CMLL 1501
CZEC 1412.....	CMLL 1502
CZEC 1511.....	CMLL 1501
CZEC 1512.....	CMLL 1502
CZEC 2311.....	CMLL 2301
CZEC 2312.....	CMLL 2302
DANC 1110.....	DAN 1101
DANC 1141.....	DAN 1105
DANC 1142.....	DAN 2105
DANC 1145.....	DAN 1109
DANC 1146.....	DAN 2109
DANC 1147.....	DAN 1103
DANC 1148.....	DAN 2103
DANC 1210.....	DAN 1101
DANC 1241.....	DAN 1105
DANC 1245.....	DAN 1109
DANC 1247.....	DAN 1103
DANC 1341.....	DAN 1105
DANC 1345.....	DAN 1109
DANC 1347.....	DAN 1103
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
DRAM 2367.....	THA 2304
ECON 2301.....	ECO 2302
ECON 2302.....	ECO 2301
EDUC 1301.....	EDEL 2300
EDUC 1325.....	EDEL 2300
ENGL 1301.....	ENGL 1301
ENGL 1302.....	ENGL 1302
ENGL 2307.....	ENGL 2351
ENGL 2308.....	ENGL 2351
ENGL 2311.....	ENGL 2311
ENGR 1201.....	ENGR 1315
ENGR 1204.....	EGR 1206
ENGR 2301.....	CE 2301
ENGR 2304.....	CS 1305
ENGR 2401.....	CE 2301
ENGT 2310.....	CONE 2330
ENVR 1101.....	BIOL 1113
ENVR 1301.....	BIOL 1305
ENVR 1401.....	BIOL 1305 + 1113
FREN 1411.....	FREN 1501
FREN 1412.....	FREN 1502
FREN 1511.....	FREN 1501
FREN 1512.....	FREN 1502
FREN 2311.....	FREN 2301

TCCNS.....	TTU Equivalent
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 1411.....	GERM 1501
GERM 1412.....	GERM 1502
GERM 1511.....	GERM 1501
GERM 1512.....	GERM 1502
GERM 2311.....	GERM 2301
GERM 2312.....	GERM 2302
GOVT 2305.....	POLS 1301
GOVT 2306.....	POLS 2302
GREE 1311.....	GRK 1301
GREE 1312.....	GRK 1302
GREE 1511.....	GRK 1301
GREE 1512.....	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 2301.....	HIST 2310
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
HUMA 2323.....	ANTH 2302
ITAL 1411.....	ITAL 1301
ITAL 1412.....	ITAL 1302
ITAL 1511.....	ITAL 1301
ITAL 1512.....	ITAL 1302
ITAL 2311.....	ITAL 2301
ITAL 2312.....	ITAL 2302
JAPN 1411.....	JAPN 1501
JAPN 1412.....	JAPN 1502
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 1411.....	LAT 1501
LATI 1412.....	LAT 1502
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

TCCNS.....	TTU Equivalent
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 2312.....	MATH 1350
MATH 2318.....	MATH 2360
MATH 2342.....	MATH 2300
MATH 2412.....	MATH 1350
MATH 2413.....	MATH 1451
MATH 2414.....	MATH 1452
MATH 2415.....	MATH 2450
MATH 2417.....	MATH 1451
MATH 2418.....	MATH 2360
MATH 2419.....	MATH 1452
MATH 2442.....	MATH 2300
MUSI 1114.....	MUAP 1123
MUSI 1115.....	MUAP 1124
MUSI 1116.....	MUTH 1103
MUSI 1117.....	MUTH 1104
MUSI 1181.....	MUAP 1123
MUSI 1182.....	MUAP 1124
MUSI 1183.....	MUAP 1113
MUSI 1188.....	MUAP 1103
MUSI 1189.....	MUAP 1104
MUSI 1195.....	MUAP 2103
MUSI 1196.....	MUAP 2104
MUSI 1211.....	MUTH 1203
MUSI 1212.....	MUTH 1204
MUSI 1216.....	MUTH 1103
MUSI 1217.....	MUTH 1104
MUSI 1286.....	MUCP 1201
MUSI 1287.....	MUCP 1202
MUSI 1304.....	MUSI 2301
MUSI 1306.....	MUHL 1308
MUSI 1307.....	MUHL 1308
MUSI 1308.....	MUHL 1308
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 2188.....	MUAP 1104
MUSI 2211.....	MUTH 2203
MUSI 2212.....	MUTH 2204
MUSI 2216.....	MUTH 2103
MUSI 2217.....	MUTH 2104
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 2144
PHED 2255.....	PFW 2144
PHIL 1301.....	PHIL 2300
PHIL 1304.....	PHIL 2350
PHIL 2303.....	PHIL 2310
PHIL 2306.....	PHIL 2320
PHYS 1301 + 1101.....	PHYS 1403
PHYS 1302 + 1102.....	PHYS 1404
PHYS 1303 + 1103.....	ASTR 1401
PHYS 1304 + 1104.....	ASTR 1400
PHYS 1305 + 1105.....	PHYS 1401
PHYS 1310 + 1110.....	PHYS 1401
PHYS 1401.....	PHYS 1403
PHYS 1402.....	PHYS 1404
PHYS 1403.....	ASTR 1401
PHYS 1404.....	ASTR 1400

TCCNS.....	TTU Equivalent
PHYS 1405.....	PHYS 1401
PHYS 2325 + 2125.....	PHYS 1408
PHYS 2326 + 2126.....	PHYS 2401
PHYS 2425.....	PHYS 1408
PHYS 2426.....	PHYS 2401
PHYS 2427.....	PHYS 2402
PORT 1411.....	PORT 1501
PORT 1412.....	PORT 1502
PORT 1511.....	PORT 1501
PORT 1512.....	PORT 1502
PORT 2311.....	PORT 2301
PORT 2312.....	PORT 2302
PSYC 2301.....	PSY 1300
PSYC 2307.....	PSY 2305
PSYC 2308.....	PSY 2301
PSYC 2314.....	HDFS 2303
RUSS 1411.....	RUSN 1501
RUSS 1412.....	RUSN 1502
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
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.....	WS 2331
SOCW 2361.....	SW 2301
SOCW 2362.....	SW 2301
SPAN 1411.....	SPAN 1501
SPAN 1412.....	SPAN 1502
SPAN 1511.....	SPAN 1501
SPAN 1512.....	SPAN 1502
SPAN 2311.....	SPAN 2301
SPAN 2312.....	SPAN 2302
SPAN 2313.....	SPAN 2303
SPAN 2315.....	SPAN 2304
SPCH 1311.....	COMS 1300
SPCH 1315.....	COMS 2300
SPCH 1318.....	COMS 1301
TECA 1311.....	HDFS 2311
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:

- 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.
- 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.

- The two institutions and the student shall attempt to resolve the transfer of the course credit in accordance with Coordinating Board rules and guidelines.
- 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 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 freshman or transfer (where appropriate) 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 Undergraduate International Students

The applications of prospective students from countries other than the United States are reviewed on an individual basis. Prospective students who have an application pending for permanent residency as well as prospective students who are undocumented should apply through www.applytexas.org and select the U.S. Freshman or Transfer option, as appropriate. These applications will be reviewed by the Office of Undergraduate Admissions. All other applicants, including international applicants attending high school in the United States, must apply through www.applytexas.org and select the International Freshman or Transfer option, as appropriate. These applications will be reviewed by the Undergraduate International Admissions unit in the Office of International Affairs. Students who hold F-1 visas must use the International Student option even if they have already studied in the U.S. Applications for international undergraduate admission must be submitted by the following deadlines:

- **Fall–First-time Students:** May 1
- **Fall–Transfer from U.S. Institution:** July 1
- **Spring–First-time Students:** October 1
- **Spring–Transfer from U.S. Institution:** November 15
- **Summer–First-time Students:** March 1
- **Spring–Transfer from U.S. Institution:** April 1

Students interested in competing for merit scholarships should check the scholarship website (www.depts.ttu.edu/scholarships/) for deadlines.

The procedures stated below should be followed carefully for international applicants to be considered for freshman or transfer admission to Texas Tech University. Applications will not be evaluated until all admission requirements have been met. All materials become the property of Texas Tech University and are not returnable or refundable. Required documents must be provided in English. If official English translations are not supplied by the applicant's institution(s), the applicant must provide a translation done by an American Translators Association-certified translator. A list of ATA-certified translators is available online at www.atanet.org/onlinedirectories.

- 1. Application**—Prospective international undergraduate applicants may apply for admission to Texas Tech University by submitting the electronic application available at www.ApplyTexas.org. All institutions attended, including name and location, must be included on the application. Falsification of application information will void admission to Texas Tech.
- 2. Nonrefundable Application Fee**—A nonrefundable application fee (\$60) is required for the application to be complete. Application fees cannot be waived. Acceptable methods of payment are checks drawn on a U.S. bank, cashier's checks, U.S. or international postal money orders, international money orders, traveler's checks, or credit cards. The application fee may be paid through the ApplyTexas application (www.ApplyTexas.org), online (https://secure.touchnet.net/C20210_ustores/web/store_main.jsp?STOREID=14&SINGLESTORE=true), or by sending payment to:

International Undergraduate Admissions
Texas Tech University
601 Indiana Ave. Box 45004
Lubbock, TX 79409-5004 USA

3. Official Transcripts and Related Documents

- For Freshman Admission – The applicant must submit documentation (transcripts, school leaving examinations, school leaving certificates, etc.) showing completion of a secondary school equivalent to that of a U.S. high school. Applicants must submit transcripts of all secondary schoolwork, including subjects taken and grades/marks earned, in addition to secondary school leaving examinations, if applicable. Applicants currently in secondary school should send transcripts from grade 9 – 11 for application consideration. Upon completion of

grade 12, an additional transcript must be submitted. Unofficial copies are acceptable for evaluation purposes, but official documentation is required before registration for classes.

- For Transfer Admission – In addition to the required secondary school documents (see above), the applicant must submit a record of all post-secondary schoolwork, including subjects taken and grades earned. Unofficial copies are acceptable for evaluation purposes, but official documentation is required upon admission. International transfer students will not be allowed to register for classes without providing all secondary and post-secondary credentials.
4. **Official Diploma/Degree Certificates**—The applicant must submit an official copy of any secondary school completion/leaving certificates and any post-secondary diplomas/degree certificates earned.
 5. **Official Proof of English Proficiency**—All international applicants must provide proof of English proficiency before their applications can be considered for admission. This test is waived only for citizens of an English proficiency-exempt country, for graduates of U.S. high schools, or for those applicants who have completed at least two consecutive years at a high school or college/university in the U.S. or in an English proficiency-exempt country. Texas Tech University considers the following countries to have English as their native language: Australia, Canada (except the Province of Québec), Commonwealth Caribbean countries, Ireland, Liberia, New Zealand, United Kingdom, and the United States. Applicants may submit one of the following measures of English proficiency:
 - **TOEFL** (Test of English as a Foreign Language; www.toefl.org). The minimum TOEFL score required is 550 (paper-based version) or 79 (internet-based version). The TOEFL score must be received directly from the Educational Testing Service (ETS). Texas Tech University's institutional code is 6827. TOEFL scores are valid for two (2) years. Applicants may provide a copy of their Examinee Score Report for application evaluation purposes; screenshots of the TOEFL results from the ETS website are not acceptable.
 - **IELTS** (International English Language Testing Service; www.ielts.org). The minimum IELTS required score is an overall band score of 6.5 on the academic version. IELTS General Training results are not acceptable. There is no IELTS institution code for Texas Tech. IELTS scores are valid for two (2) years.
 - **PTE Academic** (Pearson Test of English Academic; www.pearsonpte.com/pteacademic). The minimum required PTE Academic score is 60. PTE General and PTE Young Learners results are not acceptable. There is no PTE Academic institution code for Texas Tech University. PTE Academic scores are valid for only two (2) years.
 - **Cambridge Certificate of Proficiency in English** The minimum required Cambridge CPE grade is C. There is no institutional code for the Cambridge CPE. The Cambridge CPE is valid for life. For more information visit the website www.cambridgeenglish.org/exams-and-qualifications/proficiency/.
 - **Cambridge Certificate of Advanced English** The minimum required Cambridge CAE grade is B. There is no institutional code for the Cambridge CAE. The Cambridge CAE is valid for life. For more information visit the website www.cambridgeenglish.org/exams-and-qualifications/advanced/.
 - **ELS Intensive English Program** (www.els.edu). Texas Tech will accept completion of Level 112 of ELS' English for Academic Purposes program. An official copy of the ELS transcript and certificate of completion must be submitted to meet this requirement.
 - **SAT I** – a minimum of at least 500 on BOTH the critical reading and writing sections
 - **ACT** – a minimum score of 21 on the English section
 - **AP English Language and Composition Exams** – 3.0 or higher on BOTH sections.
 - For applicants transferring from a U.S. college or university – completion of the equivalent to Texas Tech's ENGL 1301 and ENGL 1302 with a grade of C or better. Applicants currently

enrolled in ENGL 1302 (or its equivalent) may apply for admission but will not be allowed to register if admitted until providing a final transcript reflecting the required grade.

6. **SAT/ACT Scores**—International applicants applying for freshman admission who have completed secondary school in the United States must submit either SAT or ACT scores. These scores are not required for international applicants who have completed secondary school outside the United States, but are required for consideration for merit-based scholarships.

See the Prospective Student page at www.depts.ttu.edu/international/ieem/prosadmited.php for more information.

Conditional Admission for English Proficiency. Prospective international students who meet the minimum academic requirements for admission consideration except for proof of English proficiency may apply for conditional admission through ELS University Admissions (www.els.edu/en/UniversityAdmissions). International undergraduate students admitted conditionally must complete Level 112 of ELS English for Academic Purposes program before beginning an academic program at Texas Tech University. An official copy of the ELS transcript and certificate of completion must be submitted before registration for Texas Tech coursework will be allowed.

Submitting Applications and Required Application Documents.

Applicants should provide their full names on the envelope return address. An application Document Cover Sheet is available at www.depts.ttu.edu/international/attachments/ieem/admissions/DocumentCoverSheet.pdf. Correspondence should include the applicant's full name, date of birth and the ApplyTexas application number. All entries into the records system are made by family name (last name), first name(s), middle name(s); if any). Send all official documents to the following address:

- **Regular Airmail**
Office of International Affairs
Undergraduate International Admissions
Texas Tech University
PO Box 45004
Lubbock, TX 79409-5004 USA
- **Express Mail**
Office of International Affairs
Undergraduate International Admissions
Texas Tech University
601 Indiana Ave., PO Box 45004
Lubbock, TX 79409-5004 USA

Evaluating Applications. Applications will not be evaluated until all of the above requirements have been met. Applicants will be notified by the Office of International Affairs when an admissions decision has been made. Applicants may check their application status on the Raiderlink portal.

Acts of Dishonesty. All international undergraduate prospective students applying to Texas Tech University are expected to adhere to the university's Statement of Academic Integrity (www.depts.ttu.edu/studentconduct/academicinteg.php). This includes entering all secondary and post-secondary institutions attended on your application for admission as well as submitting official academic credentials from all secondary and post-secondary institutions attended. Not providing that information on your application or not submitting all academic credentials is considered falsification of academic records and will result in the voiding of your application or to other disciplinary action.

Application Appeals. International undergraduate applicants whose applications have been denied may submit an appeal to be reconsidered. Every application denied has already been through an extensive review. For an appeal to have merit, it must present new compelling academic and/or personal information, as well as details pertaining to extenuating circumstances that were not addressed in the initial application. Appeal letters must be written and submitted by the international undergraduate applicant to the Senior Director of International Education and Enrollment Management within thirty (30) days of the denial decision. Email is an acceptable format for submission. Please clearly outline the reasons for the appeal and

present new and compelling information. Applicants can appeal only once, and decisions resulting from an appeal are final. Application fees are non-refundable regardless of the result of an appeal. Appeals must be sent directly to the Office of International Affairs (mailing address above) or by email to elizabeth.mcdaniel@ttu.edu.

Guidelines for High School Foreign Language Requirements for International Students

Native Language	Language of Instruction (secondary school)	Exemption Requirements	Documentation Required
Not English	Native Language	(1) English proficiency admission requirement or (2) two years of formal instruction in another language	(1) English proficiency documentation,* or (2) transcript, or (3) Foreign Language Exemption Form
Not English	English	(1) English proficiency admission requirement, or (2) graduation from secondary school, or (3) two years of formal instruction in another language	(1) English proficiency documentation,* or (2) transcript, or (3) Foreign Language Exemption Form
English	English	(1) two years of formal instruction in another language	(1) transcript, or (2) Foreign Language Exemption Form

* Texas Tech University requires students from non-English-speaking countries to demonstrate the ability to speak, write, and understand the English language. Students must provide one of the following to document English proficiency:

- TOEFL score of at least 79 (internet-based) or 550 (paper-based)
 - TOEFL scores must be received directly from ETS
 - Texas Tech University's institutional code is 6827
 - TOEFL scores are valid for two years only.
- SAT Critical Reading and Writing score of at least 500 each
 - SAT scores must be received directly from the College Board
 - Texas Tech University's institutional code is 6827
- ACT English score of at least 21
 - ACT scores must be received directly from ACT
 - Texas Tech University's institutional code is 4220
- IELTS score of at least 6.5 overall band
 - IELTS General Training results are not acceptable
 - There is no IELTS institution code for Texas Tech University
 - IELTS scores are valid for two years only
- Transfer from an accredited U.S. institution of higher education with at least 30 semester credit hours including the equivalent to Texas Tech's English 1301 and 1302 with a grade of "C" or better.
- Level 112 at ELS, documentation provided to TTU directly from ELS

Admission Requirements for Former Texas Tech Students

Application materials and deadlines for former Texas Tech students are available at www.admissions.ttu.edu. 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 "Undergraduate Academic Status Policy" in the Undergraduate Academics section of this catalog and on the website listed above. Students wishing to return to Texas Tech are required to have a 2.0 GPA on work completed during their absence.

Academic Fresh Start

Any applicant who elects to participate in this program should do so at the time of application or within the first semester of enroll-

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

If a student enrolled 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 only consider the grade point average earned after the student enrolled under this program (along with other criteria the institution used to evaluate applicants for admission).

Texas Success Initiative (TSI)

All students are responsible for complying with the Texas Success Initiative (TSI). State regulations require proof that all students involved in higher education must be college ready in reading, writing, and mathematics. A student may demonstrate college readiness by earning passing scores on the TSI Assessment Test. Students may be exempt or designated as college ready if they have specific ACT, SAT, or TAKS test scores or have earned an associate's or bachelor's degree (for other exemptions visit www.reg.ttu.edu).

The TSI Assessment Test is available through Academic Testing Services, 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.

Students with questions about their TSI status should contact the TSI Compliance Office at 806.742.3661. Students who tested but did not earn the minimum score(s) in one or more sections of the TSI Assessment Test are required to meet with an advisor in the TSI Developmental Education Office, 78 Holden Hall, 806.742.3242. Developmental courses offered by the TSI program are listed on page 74.

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 undergraduate students are required to attend RRO in order to register for classes. Sessions are held in January, May, June, July, and August. For more information, call 806.742.5433, visit www.redraiderorientation.ttu.edu, or email redraiderorientation@ttu.edu.

Special Programs

Special High School Enrollment Program

Outstanding local area high school students are invited to take advantage of the Compass Program on the Texas Tech University campus. Students may take college classes and earn credit while still attending high school. Acceptance will be based on SAT/ACT scores, class ranking, and application packet. Email the Honors College (honors@ttu.edu) for more information or visit www.depts.ttu.edu/honors/compass.

Senior Academy Program for Ages 55+

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 and the application, visit the Office of Undergraduate Admissions website (www.admissions.ttu.edu/index.php/admission-financial_aid/senior-academy-for-adult-learners-55).

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. The award of credit by examination will be based upon the score requirements in place during the most current of the following: (1) the first term of entry to Texas Tech University or (2) the term in which the scores are presented to Texas Tech University. 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 161 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.

For those who successfully earn test credit, the grade will not be calculated into their grade point average but will appear on the transcript as follows depending on which test was taken: CLP, AP, SAT, ACT, DE, FLP, and IB. 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 website, 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 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 and Literatures 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 and 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 College 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 Board 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 scores for which designated credit is awarded for English.
- 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. Information concerning each of the testing programs is provided in this section, but students should note that policies and fees are subject to change.

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 each year 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 academic 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 official IB examination transcript to Texas Tech University to receive credit.

Exams for Advanced Placement (AP) Program

TTU Courses for Which Credit Can Be Earned	Standardized Test(s) Used	Minimum Score	Semester Hours
Art			
ART 1302	AP: Studio Art: 2-D Design	4	3
ART 1303	AP: Studio Art: Drawing	4	3
ART 2303	AP: Studio Art: 3-D Design	4	3
ARTH 1301	AP: Art History	4	3
ARTH 2302	AP: Art History	4	3
Biology			
BIOL 1401, 1402	AP: Biology	3	8
BIOL 1403, 1404	AP: Biology	5	8
Chemistry			
CHEM 1305, 1306 & 1105, 1106	AP: Chemistry	3	8
CHEM 1307, 1308 & 1107, 1108	AP: Chemistry	4	8
Chinese			
CHIN 1501, 1502	AP: Chinese Language and Culture	3	10
CHIN 1501, 1502, 2301	AP: Chinese Language and Culture	4	13
CHIN 1501, 1502, 2301, 2302	AP: Chinese Language and Culture	5	16
Computer Science			
CS 1303	AP: Computer Science A	4	3
CS 1303	AP: Computer Science AB	3	3
Economics			
ECO 2301	AP: Microeconomics	4	3
ECO 2302	AP: Macroeconomics	4	3
English			
ENGL 1301	AP: English Language and Composition	3	3
ENGL 1301, 1302	AP: English Language and Composition	4	6
ENGL 1301	AP: English Literature and Composition	3	3
ENGL 1301, 1302	AP: English Literature and Composition	4	6
French			
FREN 1501, 1502	AP: French Language	3	10
FREN 1501, 1502, 2301	AP: French Language	4	13
FREN 1501, 1502, 2301, 2302	AP: French Language	5	16
Geography			
GEOG 2300	AP: Human Geography	3	3

German			
GERM 1501, 1502	AP: German Language	3	10
GERM 1501, 1502, 2301	AP: German Language	4	13
GERM 1501, 1502, 2301, 2302	AP: German Language	5	16
History			
HIST 1301	AP: European History	4	3
HIST 2300, 2301	AP: U.S. History	4	6
HIST 2322 or 2323	AP: World History	4	3
Japanese			
JAPN 1501, 1502	AP: Japanese Language and Culture	3	10
JAPN 1501, 1502, 2301	AP: Japanese Language and Culture	4	13
JAPN 1501, 1502, 2301, 2302	AP: Japanese Language and Culture	5	16
Latin			
LAT 1501, 1502	AP: Latin (Vergil)	3	10
LAT 1501, 1502, 2301	AP: Latin (Vergil)	4	13
LAT 1501, 1502, 2301, 2302	AP: Latin (Vergil)	5	16
Mathematics			
MATH 1451	AP: Calculus AB	4	4
MATH 1451, 1452	AP: Calculus BC	4	8
MATH 1451	AP: Calculus BC*	3*	4
MATH 2300	AP: Statistics	4	3
Natural Resources Management			
NRM 2302	AP: Environmental Science	3	3
Physics			
PHYS 1403	AP: Physics 1	3	4
PHYS 1404	AP: Physics 2	3	4
PHYS 1403, 1404	AP: Physics B	3	8
PHYS 1408	AP: Physics C–Mechanics	3	4
PHYS 2401	AP: Physics C–Electricity and Magnetism	3	4
Political Science			
POLS 1301	AP: Government and Politics–U.S.	3	3
Psychology			
PSY 1300	AP: Psychology	3	3
Spanish			
SPAN 1501, 1502	AP: Spanish Language	3	10
SPAN 1501, 1502, 2301	AP: Spanish Language	4	13
SPAN 1501, 1502, 2301, 2302	AP: Spanish Language	5	16

* A score of 3 combined with an AB subscore of 4. If the AB subscore is less than 4, no credit will be awarded with a Calculus BC score of 3.

Exams for College Level Examination Program (CLEP)

TTU Courses for Which Credit Can Be Earned	Standardized Test(s) Used	Minimum Score	Semester Hours
Biology			
BIOL 1401, 1402	CLEP-S: Biology	52	8
Business Administration			
ACCT 2300	CLEP-S: Financial Accounting	50	3
MGT 3370	CLEP-S: Principles of Management	52	3
MKT 3350	CLEP-S: Principles of Marketing	55	3
BLAW 3391	CLEP-S: Introductory Business Law	51	3
Chemistry			
CHEM 1305, 1306 and 1105, 1106	CLEP-S: Chemistry	52	8
CHEM 1307, 1308 and 1107, 1108	CLEP-S: Chemistry	65	8
Computer Science			
CS 1300	CLEP-S: Information Systems and Computer Applications	55	3
Economics			
ECO 2301	CLEP-S: Principles of Microeconomics	50	3
ECO 2302	CLEP-S: Principles of Macroeconomics	50	3
English			
ENGL 1301*	CLEP-S: College Composition Modular and a departmental essay score of...	55	3
ENGL 1301, 1302*	CLEP-S: College Composition Modular and a departmental essay score of...	55	3
		5, 6	6

ENGL 2307*	CLEP-S: Analyzing and Interpreting Literature and a departmental essay score of...	52 3, 4	3
French			
FREN 1501	CLEP-S: French Language	50	5
FREN 1501, 1502	CLEP-S: French Language	55	10
FREN 1501, 1502, 2301	CLEP-S: French Language	62	13
FREN 1501, 1502, 2301, 2302	CLEP-S: French Language	66	16
German			
GERM 1501	CLEP-S: German Language	50	5
GERM 1501, 1502	CLEP-S: German Language	55	10
GERM 1501, 1502, 2301	CLEP-S: German Language	59	13
GERM 1501, 1502, 2301, 2302	CLEP-S: German Language	63	16
History			
HIST 1300	CLEP-S: Western Civilization I: Ancient Near East to 1648	51	3
HIST 1301	CLEP-S: Western Civilization II: 1648 to Present	51	3
HIST 2300	CLEP-S: History of U.S. I: Early Colonizations to 1877	52	3
HIST 2301	CLEP-S: History of U.S. II: 1865 to Present	52	3
Mathematics			
MATH 1320	CLEP-S: College Algebra	52	3
MATH 1451	CLEP-S: Calculus	50	4
MATH 1550	CLEP-S: Precalculus	50	5
Political Science			
POLS 1301	CLEP-S: American Government	50	3
Psychology			
PSY 1300	CLEP-S: Introductory Psychology	51	3
PSY 2301	CLEP-S: Human Growth and Development	53	3
Spanish			
SPAN 1501	CLEP-S: Spanish Language	50	5
SPAN 1501, 1502	CLEP-S: Spanish Language	55	10
SPAN 1501, 1502, 2301	CLEP-S: Spanish Language	66	13
SPAN 1501, 1502, 2301, 2302	CLEP-S: Spanish Language	68	16

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

† The multiple choice on the Analyzing and Interpreting Literature CLEP earns an examinee the opportunity to sit for a 90-minute Texas Tech on-campus writing exam. The writing exam must have a passing score to earn credit.

Exams for International Baccalaureate (IB)

TTU Courses for Which Credit Can Be Earned	Standardized Test(s) Used	Minimum Score	Semester Hours
Arabic			
ARAB 1501	IB: Arabic ab initio SL	4, 5	5
ARAB 1501, 1502	IB: Arabic ab initio SL	6, 7	10
ARAB 1501	IB: Arabic A1 or A2 SL	4, 5	5
ARAB 1501, 1502	IB: Arabic A1 or A2 SL	6	10
ARAB 1501, 1502, 2301	IB: Arabic A1 or A2 SL	7	13
ARAB 1501, 1502	IB: Arabic A1 or A2 HL	4, 5	10
ARAB 1501, 1502, 2301	IB: Arabic A1 or A2 HL	6	13
ARAB 1501, 1502, 2301, 2302	IB: Arabic A1 or A2 HL	7	16
ARAB 1501	IB: Arabic B (SL or HL)	4, 5	5
ARAB 1501, 1502	IB: Arabic B (SL or HL)	6	10
ARAB 1501, 1502, 2301	IB: Arabic B (SL or HL)	7	13
ASL (American Sign Language)			
ASL 1301	IB: ASL ab initio SL	4, 5	3
ASL 1301, 1302	IB: ASL ab initio SL	6, 7	6
ASL 1301	IB: ASL A1 or A2 SL	4, 5	3
ASL 1301, 1302	IB: ASL A1 or A2 SL	6	6
ASL 1301, 1302, 2301	IB: ASL A1 or A2 SL	7	9
ASL 1301, 1302	IB: ASL A1 or A2 HL	4, 5	6
ASL 1301, 1302, 2301	IB: ASL A1 or A2 HL	6	9
ASL 1301, 1302, 2301, 2302	IB: ASL A1 or A2 HL	7	12
ASL 1301	IB: ASL B (SL or HL)	4, 5	3
ASL 1301, 1302	IB: ASL B (SL or HL)	6	6
ASL 1301, 1302, 2301	IB: ASL B (SL or HL)	7	9
Biology			
BIOL 1401, 1402	IB: Biology SL	4, 5, 6, 7	8
BIOL 1403, 1404	IB: Biology HL	4, 5, 6, 7	8

Chemistry

CHEM 1301	IB: Chemistry SL	4, 5, 6, 7	3
CHEM 1307, 1308 and 1107, 1108	IB: Chemistry HL	4, 5, 6, 7	8

Chinese

CHIN 1501	IB: Chinese ab initio SL	4, 5	5
CHIN 1501, 1502	IB: Chinese ab initio SL	6, 7	10
CHIN 1501	IB: Chinese A1 or A2 SL	4, 5	5
CHIN 1501, 1502	IB: Chinese A1 or A2 SL	6	10
CHIN 1501, 1502, 2301	IB: Chinese A1 or A2 SL	7	13
CHIN 1501, 1502	IB: Chinese A1 or A2 HL	4, 5	10
CHIN 1501, 1502, 2301	IB: Chinese A1 or A2 HL	6	13
CHIN 1501, 1502, 2301, 2302	IB: Chinese A1 or A2 HL	7	16
CHIN 1501	IB: Chinese B (SL or HL)	4, 5	5
CHIN 1501, 1502	IB: Chinese B (SL or HL)	6	10
CHIN 1501, 1502, 2301	IB: Chinese B (SL or HL)	7	13

Economics

ECO 2301	IB: Economics HL	4, 5, 6, 7	3
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English

ENGL 1301	IB: English Language A1 or A2 SL or HL	4	3
ENGL 1301, 1302	IB: English Language A1 or A2 SL or HL	5, 6, 7	6
ENGL 1301	IB: English A Literature A1 or A2 SL or HL	4	3
ENGL 1301, 1302	IB: English A Literature A1 or A2 SL or HL	5, 6, 7	6

Experimental Sciences

BIOL 1305	IB: Environmental Systems and Societies SL	4, 5, 6, 7	3
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French

FREN 1501	IB: French ab initio SL	4, 5	5
FREN 1501, 1502	IB: French ab initio SL	6, 7	10
FREN 1501	IB: French A1 or A2 SL	4, 5	5
FREN 1501, 1502	IB: French A1 or A2 SL	6	10
FREN 1501, 1502, 2301	IB: French A1 or A2 SL	7	13
FREN 1501, 1502	IB: French A1 or A2 HL	4, 5	10
FREN 1501, 1502, 2301	IB: French A1 or A2 HL	6	13
FREN 1501, 1502, 2301, 2302	IB: French A1 or A2 HL	7	16
FREN 1501	IB: French B (SL or HL)	4, 5	5
FREN 1501, 1502	IB: French B (SL or HL)	6	10
FREN 1501, 1502, 2301	IB: French B (SL or HL)	7	13

Geography

GEOG 2351	IB: Geography SL or HL	4, 5, 6, 7	3
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German

GERM 1501	IB: German ab initio SL	4, 5	5
GERM 1501, 1502	IB: German ab initio SL	6, 7	10
GERM 1501	IB: German A1 or A2 SL	4, 5	5
GERM 1501, 1502	IB: German A1 or A2 SL	6	10
GERM 1501, 1502, 2301	IB: German A1 or A2 SL	7	13
GERM 1501, 1502	IB: German A1 or A2 HL	4, 5	10
GERM 1501, 1502, 2301	IB: German A1 or A2 HL	6	13
GERM 1501, 1502, 2301, 2302	IB: German A1 or A2 HL	7	16
GERM 1501	IB: German B (SL or HL)	4, 5	5
GERM 1501, 1502	IB: German B (SL or HL)	6	10
GERM 1501, 1502, 2301	IB: German B (SL or HL)	7	13

Greek (Ancient Greek)

GRK 1501	IB: Greek ab initio SL	4, 5	5
GRK 1501, 1502	IB: Greek ab initio SL	6, 7	10
GRK 1501	IB: Greek A1 or A2 SL	4, 5	5
GRK 1501, 1502	IB: Greek A1 or A2 SL	6	10
GRK 1501, 1502, 2301	IB: Greek A1 or A2 SL	7	13
GRK 1501, 1502	IB: Greek A1 or A2 HL	4, 5	10
GRK 1501, 1502, 2301	IB: Greek A1 or A2 HL	6	13
GRK 1501, 1502, 2301, 2302	IB: Greek A1 or A2 HL	7	16
GRK 1501	IB: Greek B (SL or HL)	4, 5	5
GRK 1501, 1502	IB: Greek B (SL or HL)	6	10
GRK 1501, 1502, 2301	IB: Greek B (SL or HL)	7	13

History

HIST 1301	IB: History SL	4, 5, 6, 7	3
HIST 1301	IB: History HL: Europe	4, 5, 6, 7	3
HIST 2301	IB: History HL: Americas	4, 5, 6, 7	3
HIST 2323	IB: History HL: Africa	4, 5, 6, 7	3

Italian

ITAL 1501	IB: Italian ab initio SL	4, 5	5
ITAL 1501, 1502	IB: Italian ab initio SL	6, 7	10
ITAL 1501	IB: Italian A1 or A2 SL	4, 5	5
ITAL 1501, 1502	IB: Italian A1 or A2 SL	6	10
ITAL 1501, 1502, 2301	IB: Italian A1 or A2 SL	7	13
ITAL 1501, 1502	IB: Italian A1 or A2 HL	4, 5	10
ITAL 1501, 1502, 2301	IB: Italian A1 or A2 HL	6	13
ITAL 1501, 1502, 2301, 2302	IB: Italian A1 or A2 HL	7	16
ITAL 1501	IB: Italian B (SL or HL)	4, 5	5
ITAL 1501, 1502	IB: Italian B (SL or HL)	6	10
ITAL 1501, 1502, 2301	IB: Italian B (SL or HL)	7	13

Japanese

JAPN 1501	IB: Japanese ab initio SL	4, 5	5
JAPN 1501, 1502	IB: Japanese ab initio SL	6, 7	10
JAPN 1501	IB: Japanese A1 or A2 SL	4, 5	5
JAPN 1501, 1502	IB: Japanese A1 or A2 SL	6	10
JAPN 1501, 1502, 2301	IB: Japanese A1 or A2 SL	7	13
JAPN 1501, 1502	IB: Japanese A1 or A2 HL	4, 5	10
JAPN 1501, 1502, 2301	IB: Japanese A1 or A2 HL	6	13
JAPN 1501, 1502, 2301, 2302	IB: Japanese A1 or A2 HL	7	16
JAPN 1501	IB: Japanese B (SL or HL)	4, 5	5
JAPN 1501, 1502	IB: Japanese B (SL or HL)	6	10
JAPN 1501, 1502, 2301	IB: Japanese B (SL or HL)	7	13

Latin

LAT 1501	IB: Latin ab initio SL	4, 5	5
LAT 1501, 1502	IB: Latin ab initio SL	6, 7	10
LAT 1501	IB: Latin A1 or A2 SL	4, 5	5
LAT 1501	IB: Latin	4, 5	5
LAT 1501, 1502	IB: Latin	6	10
LAT 1501, 1502, 2301, 2302	IB: Latin	7	16
LAT 1501, 1502	IB: Latin A1 or A2 SL	6	10
LAT 1501, 1502, 2301	IB: Latin A1 or A2 SL	7	13
LAT 1501, 1502	IB: Latin A1 or A2 HL	4, 5	10
LAT 1501, 1502, 2301	IB: Latin A1 or A2 HL	6	13
LAT 1501, 1502, 2301, 2302	IB: Latin A1 or A2 HL	7	16
LAT 1501	IB: Latin B (SL or HL)	4, 5	5
LAT 1501, 1502	IB: Latin B (SL or HL)	6	10
LAT 1501, 1502, 2301	IB: Latin B (SL or HL)	7	13

Mathematics

MATH 1320	IB: Mathematics Studies SL	4, 5, 6, 7	3
MATH 1550	IB: Mathematics SL	4, 5	5
MATH 1451	IB: Mathematics SL	6, 7	4
MATH 1550	IB: Mathematics HL	4	5
MATH 1451	IB: Mathematics HL	5, 6, 7	4

Music

MUHL 1308	IB: Music SL	4, 5, 6, 7	3
MUHL 1308, MUAP 1001	IB: Music HL	4, 5, 6, 7	4

Philosophy

PHIL 1310	IB: Philosophy SL	4, 5, 6, 7	3
PHIL 2300	IB: Philosophy HL	4, 5, 6, 7	3

Physics

PHYS 1403, 1404	IB: Physics SL	4, 5, 6, 7	8
PHYS 1408, 2401	IB: Physics HL	4, 5, 6, 7	8

Portuguese

PORT 1501	IB: Portuguese ab initio SL	4, 5	5
PORT 1501, 1502	IB: Portuguese ab initio SL	6, 7	10
PORT 1501	IB: Portuguese A1 or A2 SL	4, 5	5
PORT 1501, 1502	IB: Portuguese A1 or A2 SL	6	10
PORT 1501, 1502, 2301	IB: Portuguese A1 or A2 SL	7	13
PORT 1501, 1502	IB: Portuguese A1 or A2 HL	4, 5	10
PORT 1501, 1502, 2301	IB: Portuguese A1 or A2 HL	6	13
PORT 1501, 1502, 2301, 2302	IB: Portuguese A1 or A2 HL	7	16
PORT 1501	IB: Portuguese B (SL or HL)	4, 5	5
PORT 1501, 1502	IB: Portuguese B (SL or HL)	6	10
PORT 1501, 1502, 2301	IB: Portuguese B (SL or HL)	7	13

Psychology

PSY 1300	IB: Psychology SL or HL	4, 5, 6, 7	3
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Russian

RUSN 1501	IB: Russian ab initio SL	4, 5	5
RUSN 1501, 1502	IB: Russian ab initio SL	6, 7	10
RUSN 1501	IB: Russian A1 or A2 SL	4, 5	5
RUSN 1501, 1502	IB: Russian A1 or A2 SL	6	10
RUSN 1501, 1502, 2301	IB: Russian A1 or A2 SL	7	13
RUSN 1501, 1502	IB: Russian A1 or A2 HL	4, 5	10
RUSN 1501, 1502, 2301	IB: Russian A1 or A2 HL	6	13
RUSN 1501, 1502, 2301, 2302	IB: Russian A1 or A2 HL	7	16
RUSN 1501	IB: Russian B (SL or HL)	4, 5	5
RUSN 1501, 1502	IB: Russian B (SL or HL)	6	10
RUSN 1501, 1502, 2301	IB: Russian B (SL or HL)	7	13

Spanish

SPAN 1501	IB: Spanish ab initio SL	4, 5	5
SPAN 1501, 1502	IB: Spanish ab initio SL	6, 7	10
SPAN 1501	IB: Spanish A1 or A2 SL	4, 5	5
SPAN 1501, 1502	IB: Spanish A1 or A2 SL	6	10
SPAN 1501, 1502, 2301	IB: Spanish A1 or A2 SL	7	13
SPAN 1501, 1502	IB: Spanish A1 or A2 HL	4, 5	10
SPAN 1501, 1502, 2301	IB: Spanish A1 or A2 HL	6	13
SPAN 1501, 1502, 2301, 2302	IB: Spanish A1 or A2 HL	7	16
SPAN 1501	IB: Spanish B (SL or HL)	4, 5	5
SPAN 1501, 1502	IB: Spanish B (SL or HL)	6	10
SPAN 1501, 1502, 2301	IB: Spanish B (SL or HL)	7	13

Theatre Arts

THA 2301 or 2303	IB: Theater Arts SL or HL	4, 5	3
THA 2301 or 2303 and THA 3308 or 3309 or 4300	IB: Theater Arts SL or HL	6, 7	6

Turkish

TURK 1501	IB: Turkish ab initio SL	4, 5	5
TURK 1501, 1502	IB: Turkish ab initio SL	6, 7	10
TURK 1501	IB: Turkish A1 or A2 SL	4, 5	5
TURK 1501, 1502	IB: Turkish A1 or A2 SL	6	10
TURK 1501, 1502, 2301	IB: Turkish A1 or A2 SL	7	13
TURK 1501, 1502	IB: Turkish A1 or A2 HL	4, 5	10
TURK 1501, 1502, 2301	IB: Turkish A1 or A2 HL	6	13
TURK 1501, 1502, 2301, 2302	IB: Turkish A1 or A2 HL	7	16
TURK 1501	IB: Turkish B (SL or HL)	4, 5	5
TURK 1501, 1502	IB: Turkish B (SL or HL)	6	10
TURK 1501, 1502, 2301	IB: Turkish B (SL or HL)	7	13

Visual Arts

ART 1309	IB: Visual Arts SL or HL	4, 5, 6, 7	3
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Other Languages

CMLL 1501	IB: Classical Languages ab initio SL	4, 5	5
CMLL 1501, 1502	IB: Classical Languages ab initio SL	6, 7	10
CMLL 1501	IB: Classical Languages A1 or A2 SL	4, 5	5
CMLL 1501, 1502	IB: Classical Languages A1 or A2 SL	6	10
CMLL 1501, 1502, 2301	IB: Classical Languages A1 or A2 SL	7	13
CMLL 1501, 1502	IB: Classical Languages A1 or A2 HL	4, 5	10
CMLL 1501, 1502, 2301	IB: Classical Languages A1 or A2 HL	6	13
CMLL 1501, 1502, 2301, 2302	IB: Classical Languages A1 or A2 HL	7	16
CMLL 1501	IB: Classical Languages B (SL or HL)	4, 5	5
CMLL 1501, 1502	IB: Classical Languages B (SL or HL)	6	10
CMLL 1501, 1502, 2301	IB: Classical Languages B (SL or HL)	7	13

Credit by Exam with SAT, ACT

TTU Courses for Which Credit Can Be Earned	Standardized Test(s) Used	Minimum Score	Semester Hours
English			
ENGL 1301	SAT: Critical Reading and Writing (each)	610	3
ENGL 1301, 1302	SAT: Critical Reading and Writing (each)	700	6
ENGL 1301, 1302	ACT: English	31	6
History			
HIST 2300	SAT II: United States History	600	3
HIST 2300, 2301	SAT II: United States History	700	6

Undergraduate Admission Requirements for Specific Colleges

Undergraduates who are accepted for admission to Texas Tech University will be enrolled in one of the degree-granting units of the university listed below. In addition to the university admission requirements, individual degree programs may have admission requirements that must be met before acceptance into the program.

Office of the Provost

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

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 pre-professional 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 or transfer students who are considering majors within this college may be admitted into a general major known as Arts and Sciences Undeclared (AS-BA-ASUD) until they select an Arts and Sciences degree program in which they intend to graduate. Students transferring from another institution with less than 45 hours (including coursework in progress) may choose ASUD. Students who have completed 45 or more hours must declare a major to be considered for admission to this college.
- Transfer students must have a minimum 2.0 transfer GPA to enter the college.

Jerry S. 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 pre-business major 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.
- Beginning spring 2016, students transferring from any institution must have a minimum of 18 transferable hours and a 3.0 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.

Edward E. Whitacre Jr. College of Engineering

- To gain admission to the Whitacre College of Engineering and a degree program, first-time freshmen or transfer students with fewer than 12 transferable credit hours must be accepted to the university with assured admission status. Applicants who meet these criteria will be placed into their program of choice and initially work to complete a foundational curriculum. Upon completion of the foundational coursework, a student must apply and be successfully admitted

to a Whitacre College upper-division degree program. Students who are not success fully admitted to an upper-division degree program must transfer out of the college.

- Students who do not qualify to be directly admitted to the Whitacre College of Engineering but still intend to pursue an engineering degree will be initially admitted to the Pre-Engineering designation (UN-BS-PREN).
- Transfer students entering fall 2013 or later must have 24 or more hours transferable coursework and have a minimum cumulative GPA of 3.0 that includes the work at all previous institutions. Regardless of the number of hours and the specific courses included in the transfer credits, external transfer students are initially accepted into the lower-division foundational curriculum of their degree program and must complete a minimum of 12 hours of Texas Tech coursework before application to the upper division. Eligibility for admission to the upper division is based exclusively on the cumulative GPA earned at Texas Tech. Transfer students with fewer than 24 hours of transferable credit will begin in pre-engineering.
- The GPA criterion for admission into the petroleum engineering major is 3.2, and enrollment is limited.
- All applicants admitted into Whitacre College of Engineering must be TSI compliant.

Honors College

- 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. The minimum admissions requirements for incoming freshmen are an SAT score of 1200 or higher in critical reading and math or a composite SAT score of 26 or higher or being in the top 10 percent of the high school graduating class. The minimum requirement for a current Texas Tech student or transfer student to apply to the Honors College is a 3.4 GPA. The application is available online at www.honors.ttu.edu.
- Admission requirements for the B.A. in Honor Arts and Letters are contingent on successful admission to the Honors College.
- February 1 is the priority admissions deadline for the Honors College, but the application is open until April 15th.

College of Human Sciences

- Students meeting the admissions requirements of the university will be admitted to any major within the College of Human Sciences with the exception of interior design.
- For admission into interior design, transfer students must have at least a 2.7 GPA. Incoming freshmen must be "assured admit" status.
- Students seeking teacher certification in early childhood or family and consumer sciences must meet university requirements for admission to the Teacher Education Program, including 60 credit hours completed towards the student's major and a 2.75 cumulative GPA.

College of Media and Communication

- 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 into the pre-major (major) codes. To declare a major, a student must have a 2.5 GPA (2.0 for communication studies) in the first 30 hours taken at Texas Tech and have passed MCOM 1300 and 1100 with a C or higher.

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 incoming (ARTI) and must apply and present a portfolio during the spring semester for admission to this field of specialization.
- Students applying to music will be admitted to music audition required (MUAR) until their audition. Music majors must audition and be admitted 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 admitted (THDA). Students pursuing dance majors, minors, and concentrations must audition for acceptance into the program. Entrance to the B.E.A. theatre arts program is by audition and interview, generally at the completion of at least one semester.

Registration

Bobbie Brown, 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, students who complete the admission process are notified of their admission to the university and are furnished additional materials regarding the actual registration process.

Order for Registration. Priority for time of registration is based upon the student's classification. Exceptions to any of the assigned registration times will not be made.

See the Graduate School section of this catalog for information specific to graduate students.

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 Undergraduate Academics section of this catalog.

Name Change. Students who have a change in legal name must notify the Registrar's Office. 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 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 provided by the Graduate School at the time of registration. Once approved, a permit for registration will be issued by the Graduate School. No course taken without this approval may be counted for graduate credit.

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 may be required by specific degree programs to take the test during the first semester of enrollment in graduate courses.

Students who enroll in accelerated graduate degree programs will be coded as a graduate student at the point they have completed 90 undergraduate credit hours and a minimum of 120 combined undergraduate and graduate hours. Students who gain early admission to graduate school will be coded as a graduate student after they have completed all requirements for the undergraduate degree. The maximum course load that may be carried by an undergraduate taking courses for graduate credit is 16 credit hours in a semester or 6 hours in a summer term. An undergraduate may not accumulate more than 12 semester hours for graduate credit before being admitted to the Graduate School. Undergraduates permitted to enroll for

graduate credit are expected to complete all of their undergraduate requirements within the academic year in which they first enroll for graduate credit.

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

Undergraduate students enrolled in graduate credit may not be paid financial aid for graduate credit hours.

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 per semester credit hour 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. This permission must be supplied to Student Business Services for payment. 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.)

Exemptions for Texas Veterans Under the Hazlewood Act. The purpose of the state's Hazlewood Exemption (Hazlewood Act) is to provide an education benefit to honorably discharged or separated Texas veteran and to eligible dependent children and spouses of Texas veterans. For more information see Military and Veterans Programs at www.mvp.ttu.edu.

Veterans' Certification. Each student using federal VA Educational Assistance is responsible for providing accurate information to Military and Veterans Programs. Because the U.S. 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 be admitted into an approved program and provide a degree plan as soon as possible after enrollment in Texas Tech.

All students using these federal or state benefits must be certified immediately following registration each semester through the Department of Military and Veterans Programs, 147 Drane Hall, 806.742.6877, www.mvp.ttu.edu.

Any student using the federal or state Tuition Assistance Program through the Department of Defense should provide documentation to Student Business Services, 301 West Hall, 806.742.3272, sbs.ttu.edu.

Advising and Registration Tools. To support its students in the processes of academic advising and course registration, the university provides a variety of helpful tools, tips, and guides. A consolidated list of these tools has been compiled by Texas Tech University Advising and is located online at www.advising.ttu.edu/students.

Finances

Christine Blakney, 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

Student Business Services (SBS) is responsible for the billing and collection of student accounts. Texas Tech reserves the right, with-out 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 and access to grades.

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 may result in cancellation of the student's 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 may 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.

Payment arrangements must be made by the established due dates. See www.sbs.ttu.edu for payment due dates. Students will receive email notification of billings as statements are posted to the eBill site. All notifications will be sent to the official email of record which is the student's ttu.edu email account.

Payment must reach Student Business Services by close of business on the due date. Cancellation for non-payment may occur after close of business on the due date. Students who are cancelled prior to the first class day for nonpayment must re-register for classes, and the original schedule is not guaranteed. Late fees and other incidental charges must be paid in full or payment arrangements made before registration, grade, and transcript holds will be released. Late fees are subject to collection.

Payment Agreement Options

The Budget Payment Option may be used for tuition, mandatory fees, optional fees, and housing. The Emergency Payment Option is intended to provide coverage for statutory tuition and fees if aid or exemptions have been delayed.

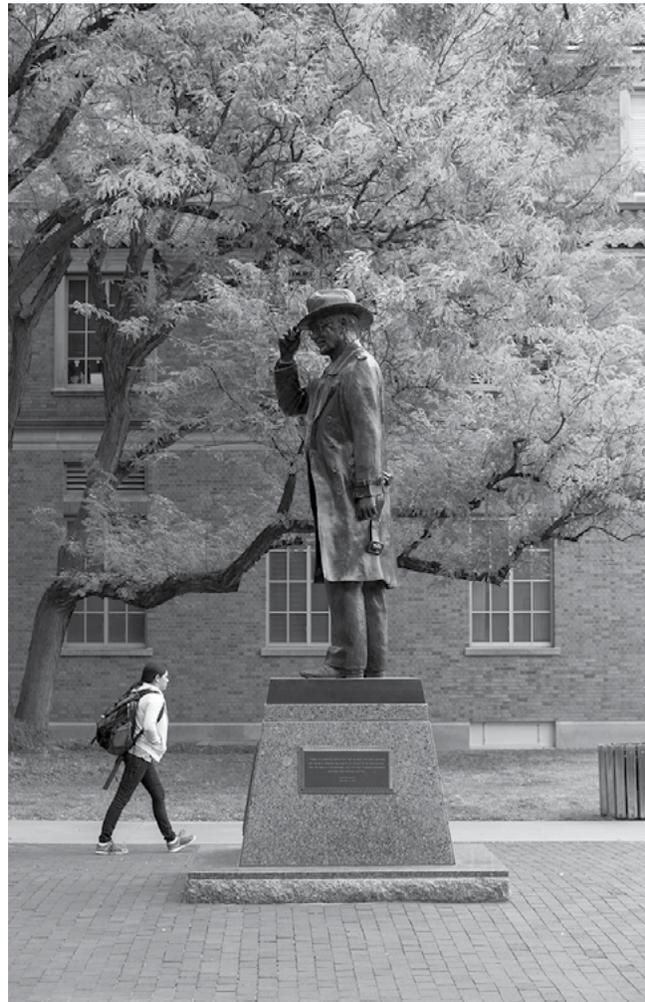
All payment plans will be calculated on the account balance as of the payment plan enrollment date and will be adjusted for additional charges or credits occurring on the account during the term. See the Student Business Services website at www.sbs.ttu.edu for detailed information.

Budget Payment Option

- Available fall and spring terms only. A separate application is required for each term.
- Payments in four installments (25% each) of the total account balance.
- \$25 non-refundable enrollment fee is due at time of set up.
- Initial installments may also be due depending on the time of enrollment.
- Down payments reduce the overall plan balance and do not count toward the first installment.

Emergency Payment Option

- Available fall, spring, and summer terms for students who owe a minimum of \$2,000 of tuition and mandatory fees. Students with accounts that do not meet this threshold must visit the Student Financial Center at 301 West Hall to be administratively enrolled.



- This plan does not include balances due for housing, incidental fees or other institutional charges. Those charges must also be paid prior to the end of the term to avoid holds or late fees regardless of the installment amount provided in the payment plan agreement.
- A separate application is required for each term.
- For fall and spring terms, this plan allows students to defer initial payment for approximately 30 days through financing provided by a short term, no interest loan. The balance will be paid in three installments.
- For summer term, 100% emergency loan applied as payment and a single due date for payment in full.
- Up to \$25 non-refundable enrollment fee due at time of set up.
- Initial installments may also be due depending on the time of enrollment.
- Down payments reduce the overall plan balance and do not count toward the first installment.

Billings

Notification of billings will be sent via email to all registered students approximately one month prior to the due date. Updated statements will be posted to the student account monthly throughout the term. Students with incidental charges and not enrolled in a payment plan must pay their account balance in full within 30 days of the charge being posted to the account to avoid late fees. Students enrolled in payment plans must abide by the terms and deadlines established in the plan agreement. Students are billed based on their residency and location of classes. Students must verify their address each term when registering and may change their address on file any time by entering the change at www.raiderlink.ttu.edu.

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. Checks may be held pending verification of payor. Temporary checks will not be accepted.

- **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 Box 41099, Lubbock, TX 79409 at least five to seven days prior to the due date. Express mail payments should be sent to Student Business Services, Texas Tech University, 301 West Hall, Broadway and Akron, Box 41099, Lubbock, TX 79409-1099.
- **Online 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 from the MyTech tab. The student's eRaider user ID and password will be required to view this information. Students may add authorized users. These users will be given a separate login and can access billing information from a separate site. Students should never divulge their eRaider user ID and password. Doing so constitutes a violation of institutional policy and can result in disciplinary action.

Late Payment Fee. A \$50 late fee may be charged monthly for delinquent accounts. Postmarks will not be considered when assessing this charge.

Dropped/Late Registration Fee. A \$50 fee may be charged to registrations after classes have begun or for registrations dropped due to non-payment.

Returned Check Charge. A \$30 fee may 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. If payment is returned for insufficient funds, SBS may restrict a student from using the same bank account for future payments.



Cancellation Fee. A \$300 fee may be charged for cancellations occurring after the 12th class day (4th class day in summer). For student registrations to be reinstated the student must make appropriate payment arrangements prior to the term report date (20th class day in fall/spring; 15th class day in summer terms). Failure to make payment arrangements by the report date may result in the student being denied reinstatement but still held financially responsible for cancelled courses.

All fees are subject to collection and must be paid in full before registration, grade, and transcript holds will be released. Fee amounts are subject to change by action of the Board of Regents without prior notice.

Refund Policy

Refunds will be issued by Texas Tech University in the form of ACH to the bank account of your choice or by paper check.

Students must visit www.raiderlink.ttu.edu and select the MyTech tab to establish direct deposit information to elect refunds via ACH. Students must also have an active address in the Texas Tech system for refunds to be processed. It is the student's responsibility to maintain a correct, active address with Texas Tech to ensure receipt of refunds.

To expedite refund availability, students should enter their bank routing and account numbers in My Direct Deposit available at www.raiderlink.ttu.edu. Students who do not provide ACH information or whose information is invalid will receive a paper check mailed to the address on file. ACH refunds will be processed multiple times per week. Paper checks will be processed only once a week. For security purposes, all checks will be mailed. No checks will be distributed in person. Due to significant cost, security issues and untimely receipt of payments via paper check, students are highly encouraged to sign up for My Direct Deposit.

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: Refund 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. For a term lasting between five and nine weeks, 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%

Terms of a shorter duration may have different payment requirements as established by law.

For a term lasting five weeks or less, the student will be required to pay tuition and fees according to the following schedule:

Before the 1st class day	None
1st class day.....	20%
2nd class day	50%
3rd class day or later	100%

Terms of a shorter duration may have different payment requirements as established by law.

- **Fall or Spring Semester: Refund 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.

For a term of 10 weeks or longer, 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 made 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. Any amounts in excess of this pro rata calculation that have already been refunded to the student are subject to immediate collection.

Tuition and Fees

A complete list, including authority and explanations for tuition and fees, is available on the SBS website (www.sbs.ttu.edu) in the Global Fee Document. Tuition and fee grids are provided on the SBS website to assist students in estimating the cost of attendance based on enrolled semester credit hours.

Residency Status Determination

For rules governing the determination of residency status as defined by the Texas Higher Education Coordinating Board, see the website www.admissions.ttu.edu/residency-requirements.

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) may be required to 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 54.014, states that a resident student who has attempted 30 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. Under a state program authorized by Texas Education Code 54.0065, qualified students may be eligible for a rebate of a portion of the undergraduate tuition the student has paid. See the Higher Education Coordinating Board website (www.theccb.state.tx.us/GeneralPubs/Agenda/Ag2003_01/IXF/IXFRules13.pdf) for more information and requirements for the rebate program. Contact Student Business Services for information regarding outstanding student loans and the application of the rebate toward them. All application forms must be submitted to Student Business Services prior to graduation to be accepted under the rebate program guidelines.

For 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 and 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.

Exemption and waiver requests 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 exemptions and waivers be accepted after the 20th class day, unless authorized by state law.

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). Texas Tech University reserves the right to audit any exemption or waiver prior or subsequent to application to a student's tuition and fee account and make account adjustments as necessary.

Certain exemptions and waivers are subject to verification of Selective Service registration and Satisfactory Academic Progress. Exemptions and waivers may be denied or revoked during the term if either verification does not meet state guidelines.

A complete list of waivers and exemptions offered by Texas Tech University can be found on the SBS website (www.sbs.ttu.edu).

For 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 comprehensive financial assistance to students seeking a higher education. The financial assistance offered at Texas Tech includes scholarships, grants, employment, and loans. Assistance is awarded to students on the basis of financial need, merit, and other specific program eligibility requirements. Need is defined as the difference between the cost of attending Texas Tech, the family's contribution as determined by the Free Application for Federal Student Aid (FAFSA), 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 admitted and enrolled for at least one-half the normal academic load, be in good academic standing with the university, and demonstrate need as determined by the FAFSA (www.fafsa.ed.gov).

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

- Federal Pell Grant
- Supplemental Educational Opportunity Grant
- TEXAS Grant
- Texas Public Education Grant
- TEACH Grant
- Federal Work-Study Program
- Texas B-On-Time Loan
- Hinson-Hazlewood College Access Loan
- Perkins Student Loan
- Federal Direct Loans
- Federal Direct PLUS Loans for Graduate Students
- Federal Direct Parent Loans for Undergraduate Students

Application Deadlines. Although no strict deadlines have been established for applications for most financial aid programs at Texas Tech, priority is given to applications completed by March 15 for the fall semester, October 1 for the spring semester, and 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 university 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.

Presidential scholarships are awarded to entering freshmen based on SAT and ACT test scores and class rank of top 25 percent. Presidential scholarships range in value from \$3,000 to \$6,000 per year. Contact the Texas Tech Scholarship Office at www.scholarships.ttu.edu for more information on presidential 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 website 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 website www.scholarships.ttu.edu.

Students receiving scholarships from sources outside of Texas Tech University should submit scholarship checks to 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 website at www.depts.ttu.edu/financialaid/.

Assistance for Graduate Students. Financial opportunities are available through both the Graduate School and graduate academic departments. The Graduate School coordinates and disburses scholarships and fellowships each year for new and continuing degree-seeking students (both full- and part-time). The AT&T Chancellor's Fellowship and CH Foundation Doctoral Fellowship are available to departments to aid them in attracting new graduate students to Texas Tech. The majority of deadlines are in the spring (typically February) for awards for the upcoming fall and spring semesters. Many departments also support graduate students through scholarships and assistantship positions, and these must be requested from the specific department concerned. Online applications and detailed information are available at www.depts.ttu.edu/gradschool/scholarships

Housing and Hospitality

Sean Duggan, M.Ed., Managing Director University Student Housing

Wiggins Complex | 3211 18th St. | Box 41141
Lubbock, TX 79409-1141 | T 806.742.2661
F 806.742.2696
housing@ttu.edu | www.housing.ttu.edu

Kirk Rodriguez, Managing Director Hospitality Services

Wiggins Complex | 3211 18th St. | Box 42184
Lubbock, TX 79409-2184 | T 806.742.1360
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The Texas Tech residence hall system includes a variety of living options and provides convenient and affordable housing for over 8,000 students. Learning Communities provide students with the opportunity to live with others of similar interests or major. Carpenter/Wells Complex, which is arranged in three-bedroom townhouses or four-bedroom flats, offers private bedrooms in a suite-style setting. Murray Hall and Talkington Hall offer suite-style accommodations to men and women. Most suites include four private bedrooms, a common living area, and shared bathrooms. Talkington Hall includes a limited number of two bedroom suites. West Village offers apartment style living with full kitchens and washers and dryers. Priority for assignment to Carpenter/Wells Complex and West Village A will be given to students of sophomore or higher classification. Assignment to West Village B will be given to students that are 21 years or older. Gordon Hall, a suite-style residence, is designated as the primary Honors College residence hall.

Ethernet computer connections are provided in each room. All halls will have WiFi throughout the building by Fall 2015. Other services include basic cable television service with Showtime, limitless laundry rooms, vending machines, and in-hall 24-hour professional office.

An experienced and trained staff of Residence Life Coordinators and Community Advisors manage 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

On-campus housing for administration, faculty, and other university employees generally is not provided. Special permission may be granted in exceptional circumstances.

On-campus housing for married couples or individuals with children is not provided.

Registered sex offenders and students convicted of any felony are not permitted to live in university-owned housing. Information submitted is subject to verification.

In support of the Strategic Plan of Texas Tech University, the university requires enrolled first-year students to live in the university residence halls. 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 *Undergraduate and Graduate Catalog* and approved by the Board of Regents. 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 prior to moving in:

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 residency at least six months prior to the request for an exemption. 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 transfer 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, which minimally includes the equivalence of the current academic school year's room, board, tuition, fees, and textbooks (as estimated by the Student Financial Aid Office) during an academic school year. Upon prior approval from the managing department or college, the student may request to be exempt 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.
11. A student has completed a full academic year (fall and spring terms) of living on campus in the Texas Tech residence halls; or provides sufficient evidence of living on campus at another university prior to off-campus residence eligibility.
12. A student is enrolled in on-line classes only.
13. A student is taking six or less hours during each semester.
14. A student enrolled for a Texas Tech University or Texas Tech University Health Sciences Center at a campus other than the Lubbock campus.

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 the Department of Student Judicial Services and in accordance with the Code of Student Conduct of Texas Tech University.

Students sign a Residence Hall Contract for the summer session or the academic year (fall and spring semesters). Any student wishing to move from the residence halls should consult the Residence Hall Contract for the provisions applicable to cancellation of the contract. Signing a lease for off-campus housing does not relieve the student of contractual obligations with the university for housing in the residence halls. The student is responsible for complying with all provisions of Texas Tech's University Student Housing and Hospitality Services Contract.

The student is responsible for updating any incorrect information, including place of residence, with the Office of the Registrar.

No exemptions will be approved once the student has moved in to the residence halls.

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. Applications for admission to the university and applications for residence hall accommodations are separate transactions. To sign up for housing at Texas Tech, students must first be admitted to the university. Students are encouraged to sign up for housing as soon as they are notified of their admission status and receive and activate their eRaider account information. To complete the housing sign-up process, go to housing.ttu.edu and follow the instructions provided.

Students entering in the fall semester will have the opportunity to reserve 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 dates that applications are accepted, go to 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 online a residence hall preference 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 housing application.

Students should notify University Student Housing in writing 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 as of the first day of class. 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.

Room and dining plan fees are due and payable by the semester and will be billed by Student Business Services. A payment plan is available. Payments must be made by the scheduled due dates to avoid delays in registration or termination of the residence hall contract. Additional remedies available to the university for non-payment of room and dining plan fees include withholding the student's transcript of grades, diploma, and other academic records, and cancellation of enrollment.

Students with academic year contracts are charged 60 percent of the academic year room and dining plan rate for the fall semester and 40 percent for spring semester. Students entering the residence halls for the spring semester with an academic year contract are charged 50 percent of the academic year rate.

An Advance Payment must be paid prior to reserving a room/space in the residence halls. These fees are applied to the student's billing account at the end of the contract term provided the contract is not cancelled prior to the end date of the contract term.

An Apartment Reservation Fee must be paid prior to reserving a room/space in designated halls. These fees are applied to the student's billing account at the end of the contract term provided the contract is not cancelled prior to the end date of the contract term.

For assistance, contact Student Business Services at 806.742.3272. For questions about specific charges for a room and dining plan, contact University Student Housing at 806.742.2661.

Dining Plans

Hospitality Services provides a wide variety of fresh, healthy, and convenient dining options and plans. Dining Bucks Plans can be used in any of the all-you-care-to-eat locations, The Market food court at Stangel/Murdough featuring Fazoli's®, the Union Plaza food court, Student Union dining outlets, The Fresh Plate food emporium at Bledsoe/Gordon, The Commons by United Supermarkets at Talkington Hall, Raider Exchange in West Village, Einstein® Bros Bagels at Rawl's College of Business, Quiznos® at the Burkhardt Center, any Sam's Place Mini-market, or Sam's Express Kiosk.

Three levels of Dining Bucks Plans offer students the option of selecting the level that best fits their individual appetite and needs. For example, the Red & Black level is best for those students who consistently eat three meals per day. These plans also have plenty of flexibility for students who need late-night options and will take maximum advantage of the extensive offerings of the mini-markets. The Matador level will appeal to students who eat most meals on campus. The Matador level is the default dining plan when no plan is selected in the Residence Hall Contract. The Double T level is a choice for students who may miss meals for various reasons or work off campus. West Village Dining Plans are exclusively available to students living in these apartments. For more information, visit the Dining Plan & Rates page at hospitality.ttu.edu.

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 locations. 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 dining location on campus. Students may choose from one of the two Commuter Dining Plans and receive a discount when they dine. They also can add their Commuter Dining Plan to their tuition statement. Visit hospitality.ttu.edu for more information on all Dining Plans.

Room and Dining Plan Rates

Rates for room and dining plans are based on a per-person charge and established by the Texas Tech University Board of Regents. Discounted 12-month room rates are available for Carpenter/Wells, Murray, and West Village.

Room and dining rates for 2015-16 can be found at the following:

- housing.ttu.edu
- hospitality.ttu.edu

Undergraduate Academics

Lawrence E. Schovanec, Ph.D., Provost and Senior Vice President

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www.facebook.com/TTUProvost
www.twitter.com/TTUacademics

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 page 71.

Each undergraduate student accepted for admission will enroll in one of the university's degree-granting colleges or areas: College of Agricultural Sciences and Natural Resources, College of Architecture, College of Arts and Sciences, Jerry S. Rawls College of Business, College of Education, Edward E. Whitacre Jr. College of Engineering, Honors College, College of Human Sciences, College of Media and Communication, College of Visual and Performing Arts, and Office of the Provost. A student's major subject is the primary area of specialized study (e.g., English) the student is pursuing within a degree program (e.g., Bachelor of Arts). A student interested in obtaining 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 in Texas Tech University and another institution
- Pass/fail option
- Credit by examination
- Graduation requirements and candidacy for a degree
- Applicability of transfer credits to degree programs

Uniform Undergraduate Degree Requirements

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

- General Requirements
- Core Curriculum Requirement
- Multicultural Requirement

- Foreign Language Requirement
- Science Laboratory 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.

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. All degree requirements must be met according to a single Texas Tech University catalog. Normally this will be the catalog in effect when the student first enrolls in the university. For the student who changes a degree program after having enrolled at Texas Tech University, the applicable degree requirements are those in effect at the time the student is officially admitted to the college in which the degree program is housed. 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 or in a catalog in effect prior to the student's first enrollment in higher education. 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 catalog is published each summer, and its provisions apply during the following academic year, beginning with the fall semester and extending through the next summer semester. 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.

Core Curriculum Option

The university introduced a new core curriculum in fall 2014. Students who entered the university under a catalog prior to fall 2014 will complete the core curriculum specified in their catalog unless they request to change to a 2014-15 or later catalog. In this case, core curriculum requirements completed under the old core will be retained, and remaining core requirements will be completed under the new core requirements. Students should consult with their advisor before they elect to change to a 2014-15 or later university catalog.

Filing a Degree Plan. In 2011 the Texas Legislature passed HB 3025 requiring all students enrolled in a bachelor's degree program at a state university to file a degree plan before the end of the second regular semester after the student has earned a cumulative total of 45 or more semester credit hours. The 45 hours includes all transfer courses, international baccalaureate courses, dual credit courses, and any other course for which Texas Tech University has awarded college course credit. In the event of a change in major, students should submit a new degree plan as soon as the program change is complete.

A baccalaureate student must verify at each registration that a degree plan has been filed and the courses for which the student is registering are consistent with that degree plan. This verification will be done electronically through Raiderlink and Banner. Students who have not filed a degree plan within the allotted time period may not obtain an official transcript from the university registrar until the plan has been filed.

Filing “Intent to Graduate.” Students must file an “Intent to Graduate” or “Application for Degree” form with their college at least one calendar year before they plan to graduate. Students using federal veteran’s benefits must meet a federal requirement to file a degree plan by the time they have accumulated 64 semester hours. Students in compliance with HB 3025 (see “Filing a Degree Plan” above) also will have complied with this requirement.

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 (May and December) and at the end of the second summer term (August).

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 complete the core curriculum at a public Texas institution of higher education must include the Texas Tech University required core curriculum.

Science Laboratory Requirement

Students graduating from Texas Tech University are required to complete two semester credit hours of science laboratory courses. Normally this will be done by taking two 4-credit science courses or combinations of lecture and lab. Examples are BIOL 1401/1402 or CHEM 1305/1105 and CHEM 1306/1106. Students may not take a lab that is not matched to a corresponding lecture course.

Transfer students who present 3-hour science courses may complete the science laboratory requirement in either of the following in ways:

- They may take a laboratory course that matches a 3-hour course accepted in transfer as satisfying a portion of the life and physical sciences requirement (for example, GEOL 1101 if the student transferred a course that was accepted as equivalent to GEOL 1303).
- They may enroll in BIOL 2202. This is a 2-hour self-paced online course designed specifically for transfer students who need to complete the science laboratory requirement. BIOL 2202 carries a biology prefix, but it is designed to be taken by any student who has completed one or two 3-hour science courses in any science discipline. The BIOL 2202 modules stress providing students with a framework for evaluating and critiquing scientific research findings and will help students understand the role of scientific research in improving human health, contributing to economic growth, answering basic questions about the world, and working toward solving a multitude of problems faced by modern society. BIOL 2202 is not available to students who complete their life and physical sciences requirement at Texas Tech University.

Foreign Language Requirement

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

Any entering student who has not completed two years of a single foreign language in high school or has not transferred at least two semesters of a single foreign language from another college must complete at least two semesters (or its equivalent) of a single foreign language at the first-year college level as a graduation requirement. This can be accomplished, for example, by successful completion of course number 1502 or 1507 in FREN, GERM, SPAN, etc.

Almost all programs in the College of Arts and Sciences and some programs in the College of Visual and Performing Arts require sophomore-level proficiency. Admission to sophomore-level foreign language courses requires either a minimum score on a placement exam or successful completion of prerequisites within the respective language.

International students who wish to have the foreign language requirement waived should review the Guidelines for High School Foreign Language Requirements for International Students on page 41 of the catalog.

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 Department of Classical and Modern Languages and Literatures 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 a minimum of six hours of courses that are designated as writing intensive. 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.

Students pursuing a double major or dual-degree must complete six hours of writing intensive coursework in each area of study. Students pursuing an interdisciplinary degree must complete six hours of writing intensive coursework within one or more of the selected areas of study.

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 “upper division” 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 or toward classification.

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 required to take a minimum of 40 credit hours of 3000- and 4000-level courses prior to graduation. They are considered to be making satisfactory progress toward a degree objective when they complete at least 30 credit hours in each calendar/academic year, achieve a GPA of 2.00 or higher in each semester, and maintain an overall GPA of 2.00 or higher.

All references to a grade point average (GPA) reflect policy effective January 1, 2009, stipulating that the university will calculate only current and cumulative GPAs. Both calculations will include replaced

Core Curriculum Requirement Effective Fall 2014

The core curriculum is designed to expose all Texas Tech University graduates to areas of study that are traditionally regarded as basic to the intellectual development of a broadly educated person. These areas of study include: life and physical sciences; social and behavioral sciences; mathematics; language, philosophy, and culture; creative arts; American history; political science/government; and the tools of communication and thought. The Texas Tech University core curriculum complies with Texas statutes and Texas Higher Education Coordinating Board rules. **Students should refer to college and department degree requirements when choosing core curriculum courses.**

All courses listed with an asterisk (*) are pending Texas Higher Education Coordinating Board approval.

A. Communication: 9 hours

Courses in this core component area focus on developing ideas and expressing them clearly, considering the effect of the message, fostering understanding, and building the skills needed to maximize the potential for effecting change through communication. Courses involve the command of oral, aural, written, and visual literacy skills that enable people to exchange messages appropriate to the subject, occasion, and audience.

Students graduating from Texas Tech University should be able to develop ideas and express them clearly, considering the effect of the message, fostering understanding, and building the skills needed to communicate effectively.

1. Written Communication: 6 hours

TTU Course

ENGL 1301	Essentials of College Rhetoric
ENGL 1302	Advanced College Rhetoric

TCCNS

ENGL 1301
ENGL 1302

2. Oral Communication: 3 hours

TTU Course

CFAS 2300	Communication, Civility, and Ethics
CHE 2306*	Exposition of Technical Information
COMS 2300	Public Speaking
COMS 2358	Business and Professional Communication
ENGR 2331	Professional Communication for Engineers
MCOM 2310	Professional Communication

TCCNS

SPCH 1315

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 58).

B. Mathematics: 6 hours

Courses in this core component area focus on quantitative literacy in logic, patterns and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.

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

1. Mathematics: 3 hours

TTU Course

MATH 1300	Contemporary Mathematics
MATH 1320	College Algebra
MATH 1321	Trigonometry
MATH 1330	Intro to Mathematical Analysis I
MATH 1331	Intro to Mathematical Analysis II
MATH 1350	Analytical Geometry
MATH 1420	College Algebra with Review

TCCNS

MATH 1332
MATH 1314
MATH 1316
MATH 1324
MATH 1325
MATH 1425
MATH 1348
MATH 2312
MATH 2412
MATH 1414

MATH 1430	Introductory Mathematical Analysis with Review
MATH 1451	Calculus I

MATH 1452	Calculus II
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MATH 1550	Precalculus
MATH 2300	Statistical Methods

MATH 2345	Introduction to Statistics with Application to Business
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MATH 2370	Elementary Analysis I
MATH 2371	Elementary Analysis II

MATH 2413
MATH 2417
MATH 2513
MATH 2414
MATH 2419

MATH 1342
MATH 1442
MATH 2342
MATH 2442

MATH 1350

2. Mathematics or Logic: 3 hours

Any of the mathematics courses listed above or	
AAEC 2401	Agricultural Statistics
PHIL 2310	Logic
PSY 2400	Statistical Methods

PHIL 2303

NOTE: MATH 1351, 1352, and 2350 are 3-hour calculus courses that have been replaced by 4-hour courses: MATH 1451, 1452 and 2450. Any 3-hour calculus course taken prior to fall 2012 will satisfy all calculus and prerequisite requirements that now require 4-hour courses.

Students cannot receive credit for both MATH 1320 and 1420.

Students cannot receive credit for both MATH 1330 and 1430.

Students may use only one of MATH 2300, MATH 2345, AAEC 2401, or PSY 2400 to satisfy the mathematics and logics requirements.

C. Life and Physical Sciences: 8 hours (Two 3 hour lecture classes, each with a related 1-hour laboratory class)

Texas Tech University also has a 2-hour science laboratory requirement that is not a part of the core curriculum. This requirement may be satisfied by taking two four hour combined lecture and lab science courses (for example, BIOL 1401 and 1402) or two 3-hour science lecture courses along with the accompanying laboratory courses (for example, ATMO 1300 and 1100, GEOL 1303 and 1101). It is also permissible to take one 4-hour science course and one 3-hour science course along with the accompanying laboratory course (such as BIOL 1401 and ATMO 1300 with ATMO 1100). Credit toward the science laboratory requirement is not granted for laboratory courses that do not share the same course prefix as the lecture course taken to satisfy a portion of the life and physical sciences core requirement.

For information about how transfer students who present 3-hour science courses may complete the science laboratory requirement see "Science Laboratory Requirement" on page 58.

TTU Course

ANSC 1401	General Animal Science
ANTH 2100	Physical Anthropology Laboratory
ANTH 2300	Physical Anthropology
ASTR 1400	Solar System Astronomy

TCCNS

ANTH 2101
ANTH 2301*
PHYS 1304
PHYS 1304
(+ 1104 lab)
PHYS 1401
PHYS 1404

PHIL 2350	World Religions and Philosophy
RUSN 2304	Russian Culture
SLAV 2301	The Vampire in East European and Western Culture
VPA 2301	Critical Issues in Arts and Culture
VPA 2302*	Yoga and the Creative Arts: Philosophy and Practice
WS 2300	Introduction to Women's Studies

PHIL 1304

COMS 1301
ECO 2301
ECO 2302
ECO 2305
EDCI 2301

Interpersonal Communication
Principles of Economics I
Principles of Economics II
Principles of Economics
The Education Effect: Why American K-12 Education Really Matters
iGeneration: Living and Learning on the Internet
Intro. to Human Geography
Regional Geography of the World
Life Span Human Development
Partnering: The Development of Intimate Relationships
Honors First-Year Seminar in Social Sciences
Diversity and Cultural Competence in the Workplace
Engineering Economic Analysis
Intro. to Mass Communication
Environmental Science as a Social Pursuit
Cultural Aspects of Food
Life, Love, and Money
General Psychology
Introduction to Sociology
Current Social Problems
The Why and How of Social Services

SPCH 1318
ECON 2302
ECON 2301
GEOG 1302
GEOG 1303
COMM 1307
PSYC 2301
SOCI 1301
SOCI 1306

E. Creative Arts: 3 hours

Courses in this core component area focus on the appreciation and analysis of creative artifacts and works of the human imagination. Courses involve the synthesis and interpretation of artistic expression and enable critical, creative, and innovative communication about works of art.

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

TCCNS

ANSC 2310	The Horse in World Art
ARCH 2315	History of World Architecture II
ART 1309	Art Appreciation
ARTH 1301	Art History Survey I
ARTH 2302	Art History Survey II
DAN 2301	World Dance Forms
DAN 2303*	Dance Appreciation
DAN 2313	Dance History
HONS 1304	Honors First-Year Sem. in Fine Arts
HONS 2314	Honors Seminar in Intl. Cinema
ITAL 2315	Italian Filmmakers
LARC 1302*	Introduction to Landscape Architecture
MCOM 2301	Visual Storytelling
MUHL 1308	Music in Western Civilization
MUHL 2304	History of Jazz
MUHL 2308	Musics of Latin America
MUHL 2310	History of Rock and Roll
MUSI 1300	Creating the Critical Listener
MUSI 2301	Essential Elements of Music
MUTH 1300	Songwriting
THA 2301	Introduction to Acting
THA 2303	Theatre Appreciation
THA 2304	Introduction to Cinema

ARCH 1302
ARTS 1301
ARTS 1313
ARTS 1413
ARTS 1303
ARTS 1304
MUSI 1306
MUSI 1307
MUSI 1308
MUSI 1304
DRAM 1310
DRAM 2366

EPSY 2301
GEOG 2300
GEOG 2351
HDFS 2303
HDFS 2322
HONS 1303
HRDV 2303*
IE 2311
MCOM 1300
NRM 1300
NS 2380
PFP 1305
PSY 1300
SOC 1301
SOC 1320
SW 1300

G. American History: 6 hours

Courses in this core component area focus on the consideration of past events relative to the United States, with the option of including Texas history for a portion of this component area. Courses involve the interaction among individuals, communities, states, the nation, and the world, considering how these interactions have contributed to the development of the United States and its global role.

Students graduating from Texas Tech University should demonstrate an understanding of the historical origins of the United States and be able to identify and describe the importance of key individuals and events in United States and/or Texas history.

TTU Course

TCCNS

HIST 2300	History of the U.S. to 1877	HIST 1301
HIST 2301	History of the U.S. Since 1877	HIST 1302
HIST 2310	History of Texas	HIST 2301

F. Social and Behavioral Sciences: 3 hours

Courses in this core component area focus on the application of scientific methods in the understanding of what makes us human. Courses involve the exploration of behavior and interactions among individuals, groups, institutions, and events, examining their impact on the individual, society, and culture.

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.

TTU Course

TCCNS

AAEC 2305	Fundamentals of Agricultural and Applied Economics
ADRS 2310	Understanding Alcohol, Drugs, and Addictive Behaviors
ANTH 2301	Introduction to Archeology
ANTH 2302	Introduction to World Cultures and Ethnology
ARCH 1311	Design, Environment, and Society
CLAS 2305	Ancient Technology
CLAS 2335	Archaeologies of the Classical World

AGRI 2317
ANTH 2302
ANTH 2351
ANTH 2346
HUMA 2323
ARCH 1311

H. Government/Political Science 6 hours

Courses in this core component area focus on consideration of the Constitution of the United States and the constitutions of the states, with special emphasis on that of Texas. Students who complete their government requirement outside the State of Texas or from a Texas private institution will need to provide a transcript that verifies they have taken a course with the required Texas and United States constitution content. If verification is not provided, students may be required to complete POLS 2107, Federal and Texas Constitutions, to ensure they have attained the required competency. Courses involve the analysis of governmental institutions, political behavior, civic engagement, and their political and philosophical foundations.

Students graduating from Texas Tech University should demonstrate an understanding of the organization and functions of the different levels of government in the United States, be able to explain the importance of the United States Constitution and those of the states, and be able to comment on the role of civic engagement in United States politics and culture.

TTU Course

TCCNS

POLS 1301	American Government, Organization	GOVT 2306
POLS 2302	American Public Policy	GOVT 2305

Multicultural Requirement Effective Fall 2014

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 an approved study abroad course, including assessments by the Texas Tech University Study Abroad Office, also can fulfill this 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, race, gender, class, political systems, religions, sexual orientation, languages, or human geography.

TTU Course		TCCNS	TTU Course	TCCNS
AAEC 4309	Sustaining Global Ecology, Natural Resources and Economy		HIST 3307	African American History from 1877 to Present
AGED 2300	Introduction to Agricultural Education		HIST 3322	Women in Early America
AGED 2304	Agriculture and Society		HIST 3323	Women in Modern America
ANSC 2310	The Horse in World Art		HIST 3381	Colonial Latin America
ANTH 1301	Understanding Multicultural America		HIST 3382	Modern Latin America
ANTH 2302	Introduction to World Cultures and Ethnology	ANTH 2346 ANTH 2351 HUMA 2323	HIST 3395	Africa: Empires and Civilizations
			HIST 3396	Africa: Revolution and Nationalism Since 1800
ARAB 3305	Introduction to Arab-Muslim Civilization		HIST 3398	The Modern Middle East, 1800 to Present
ART 1309	Art Appreciation	ARTS 1301	HIST 4329	Race, Identity, and Citizenship in the United States
CFAS 2360	Diversity in Community, Family, and Addictive Services		HIST 4330	History of Lynching and Racial Violence in America
CLAS 3315	World of Egypt and the Near East		HIST 4335	The History of Hip Hop
CLAS 3320	The World of Greece		HIST 4382	Walking the Line: The History of U.S.-Mexico Border Relations since 1836
CLAS 3330	The World of Rome			
CLAS 3340	Gender and Sexuality in the Classical World		HIST 4385	Global Islam: Past and Present
CLAS 3350	Comparative Mythology		HIST 4386	Slavery in Africa
DAN 2301	World Dance Forms		HRDV 2303	Diversity and Cultural Competence in the Workplace
EDEL 2300	Schools, Society, and Diversity		MUSI 1300	Creating the Critical Listener
EDLL 2300	Literacy Learning in the Preschool Setting		NS 2380	Cultural Aspects of Food
EDSE 2300	Schools, Society, and Diversity		PPF 1302	Cultural and Gender Diversity in Personal Finance
ENGL 2371	Language in a Multicultural America		PHIL 2350	World Religions and Philosophy Through Literature in Translation
ENGL 3337	Modern and Contemporary World Literature			PHIL 1304
ENGL 3338	Global South Literatures		PSY 3398	Ethnic Minority Psychology
ENGL 3351	Creative Writing		RUSN 2304	Russian Culture
ENGL 3387	Multicultural Literatures of America		SLAV 2301	The Vampire in East European and Western Culture
ENGL 3391	Literature and War			
ESS 4353	Social Issues in Sport		SOC 1301	Introduction to Sociology
FREN 2390	French Culture		SOC 3323	Race and Ethnicity
GEOG 2300	Introduction to Human Geography	GEOG 1302	SPAN 3390	Hispanic Culture and Civilization
GEOG 2351	Regional Geography of the World	GEOG 1303	SPAN 4332	Civilización Hispánica: Hispanic Civilization
HDFS 2300	Gender Development: Life Span Perspectives		SW 3331	Social Work with Diverse Populations
HDFS 3350	Development in Cross-Cultural Perspective		THA 3308	History of Theatre I
			THA 3309	History of Theatre II
HIST 3306	African American History to 1877		VPA 2301	Critical Issues in Arts and Culture

View Multicultural Requirements for Students Entering under a Catalog Dated Prior to Fall 2014 at

www.depts.ttu.edu/officialpublications/catalog/_academics_multicultural_old.php

grades. Unless otherwise stated, all GPA references refer to a cumulative GPA that includes replaced grades.

Semester Credit Hour and Contact Hour Equivalents. For most purposes a traditionally offered face-to-face course will have a minimum of 15 contact hours for each semester credit hour. Thus, a 1 credit hour course should meet for at least 15 hours over a long semester and a 3 credit hour course should meet for 45 hours over the semester. Courses taught during a summer session are expected to have the same number of contact hours as if they were taught during a long semester. It is permitted to offer a course in a shortened schedule, online, or in other non-traditional formats that do not meet the contact hour requirement if the course has been reviewed by a college faculty committee and the Office of the Provost and approved as having the same learning outcomes as a comparable traditionally delivered course.

Semester Hours and Course Loads. The semester hour is the unit of measure for credit purposes. **The student is expected to spend a minimum of two hours in preparation for each hour of lecture or recitation.**

In-residence students and any students in their semester of graduation must be enrolled in a minimum of one credit-bearing semester hour. Registration in remedial and other zero-credit hour coursework must be accompanied by one credit-bearing course. Should a student drop to zero credit hours, the student will be withdrawn from the institution.

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 toward 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 rules below. **All course drops, whether during the early semester student-initiated add-drop period, later in the semester as one of the restricted drops, or because of withdrawal from the university, are the responsibility of the student. If students stop attending a class but fail to drop the course, they will receive a grade of F and the grade will become a permanent part of their academic record.**

All students who attend a Texas state institution of higher education are restricted to a maximum of six course drops during their undergraduate academic career. This includes all courses that were dropped at any Texas state institution of higher education the student has attended. For example, if a student attended a public community college and dropped two courses prior to enrolling at Texas Tech University, that student has four course drops remaining prior to graduation.

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 by calling 806.742.3661.

Exclusions from the rule governing course drops are as follows:

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.
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.

- A two-week period of student-initiated drop/add at the beginning of each semester allows students to drop a course without the drop counting against their limit of six drops. The student-initiated drop/add period is noted in the academic calendar that appears in each university catalog and online at: www.depts.ttu.edu/officialpublications/calendar/index.php.
- Students who find it necessary to withdraw completely from the university before withdrawal deadline near the end of the semester will not have the dropped courses counted against their six course limit.

Aside from the exceptions noted above, students will not be permitted to drop more than six courses during their undergraduate academic career unless they can show good cause, including but not limited to demonstrating one or more of the following:

- Severe illness or other debilitating condition that affects the student's ability to satisfactorily complete the course.
- Student 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.
- 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.
- 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 evidence of good cause.
- 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. Students who return to the university following academic suspension may change their college if they follow the procedures specified in the section of this catalog on Subsequent Suspensions and Conditions of Return (page 67).

Change of Address. Students are responsible for maintaining a correct address on file with the university. Changes may be made online at raiderlink.ttu.edu or by calling 806.742.3661 for assistance. 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 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, a designation of DG will be assigned (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.

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 grade of DG is regulated by the university’s drop policy (see section on “Dropping a Course”).

Non-semester-based courses 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.

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.

Mid-Semester and Semester Grade Reports. At the close of each semester and each summer term, final course grades are available on raiderlink.ttu.edu (MyTech). Instructors of Record are to post mid-semester grade reports only for freshmen and student athletes. After mid-term grades are posted between the 34th and 40th class days, students can view the grades on Raiderlink (MyTech).

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 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 Texas Tech University GPA. The cumulative Texas Tech University GPA is adjusted to reflect grade replacements. A pure institutional GPA reflects all hours and courses taken at Texas Tech University and is the GPA used to calculate GPA for Texas Tech University honors designations.

Grade Replacement Policy. The Office of the Registrar will initiate the grade replacement process at the end of each term after a Texas Tech course had been retaken at Texas Tech University and prior to graduation. 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 A, B, or C will replace all previous grades of D or F in that course. Only grades of D and F are eligible for grade replacement. Courses taken pass/fail for grade replacement can only

replace a grade of F. They cannot replace a grade for which grade points were awarded (i.e., a D grade) in a course not taken pass/fail. Students may repeat a course for credit only one time at the normal tuition rate. Additional tuition may be charged for a course taken more than two times.

Students enrolled in a second bachelor's degree program may repeat a course but cannot replace a grade awarded during the first degree program. They may, however, replace a grade in a course taken during the second degree program while that program is in progress.

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 taken as pass/fail may not apply to core curriculum, writing intensive or multicultural requirements. Students wishing to take a course as pass/fail in their major, minor, or area of concentration must obtain approval from the academic dean's office of the college specific to the program in question. For example, students wishing to take as pass/fail a course that is part of their minor must obtain permission from the academic dean's office of the college housing the minor. 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.

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 Undergraduate Admissions 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 Office of the Provost.

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 cumulative Texas Tech University 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. Students in their semester of graduation must be enrolled in a minimum of one credit-bearing semester hour.

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 submit a withdrawal form to the Office of the Registrar in 103 West Hall or online at www.reg.ttu.edu. 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.

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

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 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.

Academic integrity is taking responsibility for one's own class and/or coursework, being individually accountable, and demonstrating intellectual honesty and ethical behavior. Academic integrity is a personal choice to abide by the standards of intellectual honesty and responsibility. Because education is a shared effort to achieve learning through the exchange of ideas, students, faculty, and staff have the collective responsibility to build mutual trust and respect. Ethical behavior and independent thought are essential for the highest level of academic achievement, which then must be measured. Academic achievement includes scholarship, teaching, and learning, all of which are shared endeavors. Grades are used to quantify the successful accumulation of knowledge through learning. Adhering to the standards of academic integrity ensures grades are earned honestly. Academic integrity is the foundation upon which students, faculty, and staff build their educational and professional careers. [Texas Tech University Quality Enhancement Plan, Academic Integrity Task Force, 2010]

Students must understand the principles of academic integrity and abide by them in all classes and/or coursework. Academic integrity violations are outlined in the Code of Student Conduct, Part X, B3 of the *Student Handbook*. If there are questions of interpretation of academic integrity policies or about what might constitute an academic integrity violation, students are responsible for seeking guidance from the faculty member teaching the course in question.

"Academic 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(s) or the attempt to commit such an act).

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

1. Copying from another student's test paper or devices.
2. Using unauthorized materials or devices during a test or other assignment.
3. Failing to comply with instructions given by the person administering the test.
4. Possession during a test of materials that are not authorized by the person administering the test, such as class notes, textbooks, or other unauthorized aids.
5. Possessing, using, buying, stealing, transporting, selling or soliciting in whole or in part items, including but not limited

to, the contents of an unadministered test, test key, homework solution, or computer program/ software. Possession of current or previous test materials at any time without the instructor's permission.

6. Collaborating with, seeking aid, or receiving assistance from another student or individual during a test or in conjunction with other assignments without authority.
 7. Discussing the contents of an examination with another student who has taken or will take the examination without authority.
 8. Substituting for another person or permitting another person to substitute for oneself in order to take a course, take a test, or complete any course-related assignment, including but not limited to, signing in/registering attendance for another student without permission from the instructor.
 9. Paying or offering to pay money or other valuables to obtain or coerce another person to obtain by any means items, including but not limited to, (1) an unadministered test, test key, homework solution or computer program/software or (2) information about an unadministered test, test key, homework solution or computer program.
 10. Falsifying research data, laboratory reports, and/or other academic work offered for credit.
 11. Taking, keeping, misplacing, damaging or altering property of the university or of another individual if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct.
- B. "Plagiarism" includes, but is not limited to, the following:
1. Representation of words, ideas, illustrations, structure, computer code, and other expression or media of another as one's own.
 2. Improper citation or lack of acknowledgement that direct, paraphrased, or summarized materials are not one's own.
 3. Self-plagiarism that involves submission of the same written assignment for two courses without prior permission of the instructor and/or failure to cite correctly previous work written by the same student.
- C. "Collusion" includes, but is not limited to, the following:
1. The unauthorized collaboration with another person in preparing academic assignments offered for credit.
 2. Collaboration with another person to commit a violation of any section of the rules on academic dishonesty.



Photo: Kirby Crumpler, Student Media

D. "Falsifying academic records" includes, but is not limited to, the following:

1. Altering or assisting in the altering of any official record of the university and/or submitting false information.
2. 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, 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.*

E. "Misrepresenting facts" to the university or an agent of the university includes, but is not limited to, the following:

1. Providing false grades, resumes, or other academic information.
2. Providing false or misleading information in an effort to receive a postponement or an extension on a test, quiz, or other assignment to obtain an academic or financial benefit for oneself or another individual.
3. Providing false or misleading information in an effort to injure another student academically or financially.

NOTE: See Academic Integrity information at: www.depts.ttu.edu/studentjudicialprograms/academicinteg.php

Instructor Responsibilities. Any person becoming aware of alleged violations of academic integrity should report the allegation to the instructor of record in the course. The instructor in a course is responsible for initiating action in each case of dishonesty or plagiarism that occurs in that class. The instructor may contact the Office of Student Conduct to discuss the nature of the violation and the student's record of academic integrity violations. The instructor should attempt to discuss the matter with the student and receive a response from the student about the allegations. Then, the instructor may assign academic sanctions, including but not limited to, assigning a paper or research project related to academic integrity, assigning a make-up assignment that is different from the original assignment, issuing no credit for the original assignment, reducing the grade for the assignment and/or course, issuing a failing grade on the assignment, and/or issuing a failing grade for the course. All academic integrity violations should be referred to the Office of Student Conduct as a central clearinghouse of violations and for adjudication as a Code of Student Conduct violation in which disciplinary sanctions, conditions, and/or restrictions will be assigned.

Withdrawal and Assignment of Grades. Once a student has been notified of an academic integrity violation, the student may not drop the course until the academic integrity processes are complete. A student should continue academic class and coursework until a final decision is made. If it is determined that the student was not responsible for academic integrity violations, the student may file a request with the Assistant Vice Provost for Student Affairs for approval to drop the course or withdraw from the university retroactively, without academic and financial penalty.

If a referring faculty member must submit a final course grade before an academic integrity violation allegation is resolved, the faculty member should notify the Registrar of the intention to assign a grade of F and/or leave the final grade blank. The involved student shall be given a temporary grade of X, which does not affect the student's GPA, until the academic integrity adjudication process is complete. When the adjudication process is complete, the final grade will be assigned through the appropriate academic channels and the completion of a grade change form. When a student is found responsible for academic integrity violations, the recommended academic sanction will be enforced. When a student is found not responsible for academic integrity violations, the student will be entitled to the grade he/she would have received in the absence of an academic integrity violation.

All appeals related to academic integrity violations should follow the process outlined in the *Student Handbook*, Part X.E: Code of Student Conduct: Disciplinary Appeals Procedures.

Referrals to the Office of Student Conduct. In addition to the assignment of academic sanctions by the instructor of record, a referral of the academic integrity violation should also be made to the Office of Student Conduct for the assignment of disciplinary sanctions. A student referred to the Office of Student Conduct for alleged violations of academic misconduct is entitled to all substantive and procedural guarantees provided in the Code of Student Conduct. Law students are subject to discipline procedures as described in the Honor Code of the School of Law. Instructors of record of the course in which the violation occurred and the Associate Academic Dean of the college in which the student is enrolled may participate in the adjudication of the violation and assignment of additional sanctions, conditions and/or restrictions with the Office of Student Conduct as outlined in the Code of Student Conduct.

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 List. 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 List 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 pure Texas Tech University 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. The grade point average for graduation honors is calculated using all hours taken at Texas Tech University, and those hours must include the final two semesters prior to graduation. Students are considered for graduation honors only if a minimum of 48 semester credit hours have been completed at Texas Tech University. The grade point average for graduation honors is calculated using all hours taken at Texas Tech University, including Texas Tech University approved study abroad credit, pass/fail credit, and graduate hours applied toward the undergraduate degree. However, no CLEP, foreign language placement tests, or similar types of credit that do not involve course enrollment should be counted in calculating the GPA for graduation honors. 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 honors 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 University, see www.so.ttu.edu/search2.

- **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 chapters at only three 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 3.5 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 3.5 for the first two semesters of work combined.

Service Learning Course Designation

Service learning courses are available to all Texas Tech University students and are identified with an "S" in the course section number, e.g. Section S01. Service learning is a pedagogy that links academic study and civic engagement through thoughtfully organized service that meets the needs of the community. The service is structured by and integrated into the academic curriculum, which provides opportunities for students to learn and develop through critical reflection.

A partnership of the Center for Active Learning and Undergraduate Engagement (CALUE) and the Teaching, Learning and Professional Development Center (TLPDC), the Service Learning Program is committed to providing rigorous and reflective academic experiences for students. Texas Tech faculty from diverse academic disciplines report that service learning enhances their teaching and students' interest in course material, and connects both faculty and students to the community.

Undergraduate Academic Status Policy

Good Standing, Probation, Suspension

Texas Tech University has the following 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. Students whose semester GPA is below 2.0 in their first semester at Texas Tech must complete in the next semester an Academic Recovery Plan, enroll in a Programs for Academic Development and Retention (PADR) course, and pay a nonrefundable course fee. Once required to enroll in a PADR course, students must repeat the course every term that they are enrolled at Texas Tech until the course is successfully completed. 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 or 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.

A suspended student who attains a cumulative GPA of 2.0 or higher as a result of grade replacement and after official grades have been submitted and academic status has been determined may be allowed to attend Texas Tech University upon appeal to the academic dean of the college in which the student is enrolled. 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 reactivated, and a transcript notation made that allows the student to attend 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 Academic Suspension

Students wishing to return to the university after suspension will be treated as former students for reinstatement purposes and must provide official transcripts for all academic work completed at institutions other than Texas Tech. Students who left in good standing, on probation or on first suspension must have a 2.0 GPA on work taken since leaving Texas Tech. Application materials and deadlines for former 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 successfully a Programs for Academic Development and Retention (PADR) course for their major during their first semester of reinstatement and pay a nonrefundable course fee (see www.depts.ttu.edu/passxl). Once required to enroll in a PADR course, students must repeat the course every term that they are enrolled at Texas Tech until the course is successfully completed. Attendance in the PADR class is mandatory from the first day of classes. Five absences in a PADR class in the summer and fall terms or three absences in the summer terms 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 readmission after two semesters. Both summer terms are considered to be a semester for the purpose of serving a suspension. Students seeking to be readmitted must complete the Returning Student Application Form (www.depts.ttu.edu/formertech/), including the required statement of how they plan to complete a degree program successfully.

Returning students must submit all transcripts for work completed at other institutions of higher education attended since leaving Texas Tech. After the application and required fee are received by the Office of Undergraduate Admissions, a message will be sent to the applicant describing the following remaining steps to be readmitted:

1. All returning students are required to meet with the academic dean (or designee) of the college for which they are requesting admission. Returning students will then prepare an academic recovery plan that complies with college and/or program admission requirements.
2. Returning students entering as an undeclared major are required to meet with a University Advising staff member to develop an academic recovery plan.
3. The completed “Second Academic Suspension Academic Dean's Approval Form” concludes the readmission process. This form must be submitted to the Department of Undergraduate Admissions, which will admit the student upon receipt of the form.

Students who fail to adhere to the terms of the agreements required for readmission may be withdrawn from the university and/or barred from enrolling in other Texas Tech University courses until the terms of the contract are successfully completed.

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

The university's Graduate-On-Time Partnership Agreement program (GOT contract) saves students money on their undergraduate education. National and state statistics reveal students take an additional 1 to 1.5 years beyond institutional expected timelines to graduate (i.e., 5.5 years to graduate with a 4-year degree or 6.5 years to graduate with a 5-year degree). When students sign and follow the GOT plan, they can save one to three semesters of college expense, translating into a savings of \$9,931 to \$29,793 or more in out-of-pocket expenses simply by actively planning to graduate on time.

The GOT partnership agreement not only helps students save money but also catapults them into a career or graduate/professional program as soon as possible.

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 college and/or 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 undergraduate degrees at Texas Tech are designated for a 4-year graduation timeline 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 earning credit 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 the university-specified time frame. 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.

Students will work with an advisor to develop an educational plan that will 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 strategically tailored to the individual student's academic needs and goals.
- A timeline for making informed decisions leading to a best-fit choice of major and career.
- A means of making efficient use of academic support services available to the student to enhance academic success.

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 website www.raiderlink.ttu.edu.
- Meet with the academic program advisor for the major at least once each semester to discuss progress toward graduation, identify courses needed the next semester, and make appropriate adjustments to the educational plan.
- Register during the advance 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.
- Avoid cancellation of an advance 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 for the major immediately if graduation appears in danger of being delayed.
- Keep documentation to prove that all these requirements were satisfied.

TEXAS TECH COMMITMENT

Texas Tech University assures GOT partnership agreement participants 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 baccalaureate and master's degrees. 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 DaNay Phelps, 234 West Hall, 806.742.0876, danay.phelps@ttu.edu.

Note: The Graduate-On-Time Partnership Agreement program is not a rebate program. This program is a savings program. For information concerning the State of Texas Tuition Rebate for Certain Undergraduates, visit:

www.depts.ttu.edu/studentbusinessservices/1000rebate.php



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. (Note that teacher certification may include additional requirements and/or hours.) 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 by taking the unavailable course(s) in a later term, Texas Tech will not charge institutional tuition and fees for the course(s) during the term in which it is taken.

MAJOR	YEARS TO COMPLETE DEGREE
• Agricultural Sciences and Natural Resources	
Agribusiness	4
Agricultural and Applied Economics	4
Agricultural and Applied Economics/ General Business (dual)	4
Agricultural Communications	4
Animal Science	4
Conservation Law Enforcement	4
Food Science	4
Interdisciplinary Agriculture (Agric. Education)	4
Landscape Architecture	5
Natural Resources Management	4
• Architecture	
Architecture (Bachelor of Science)	4
Architecture/General Business (dual)	5
Architecture/Civil Engineering (dual)	5.5
• Arts and Sciences	
Anthropology	4
Biochemistry	4
Biology	4
Cell and Molecular Biology	4
Chemistry	4
Communication Studies	4
Economics	4
English	4
Exercise and Sport Sciences	4
General Studies	4
Geography	4
Geosciences	4
Global Studies	4
History	4
International Economics	4
Languages and Literatures	4
Mathematics/Computer Science (dual)	5
Mathematics	4
Microbiology	4
Philosophy	4
Physics	4
Political Science	4
Psychology	4
Social Work	4
Sociology	4
Spanish	4
Technical Communication	4
Zoology	4
• Business	
Accounting	4
Agric. and Applied Eco./Gen. Business (dual)	4.5
Architecture/General Business (dual)	5
Energy Commerce	4
Finance	4
General Business	4
International Business	4
Management	4
Management Information Systems	4
Marketing	4
• Education	
Multidisciplinary Science	4
Multidisciplinary Studies	4
• Engineering	
Chemical Engineering	4
Civil Engineering	4
Civil Engineering/Architecture (dual)	5.5
Computer Engineering	4
Computer Science	4
Computer Science/Mathematics (dual)	5
Construction Engineering	4
Electrical Engineering	4
Environmental Engineering	4
Industrial Engineering	4
Mechanical Engineering	4
Petroleum Engineering	4
• Honors College	
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 Sciences	4
Human Development and Family Studies	4
Interior Design	4
Nutrition	4
Nutritional Sciences and Dietetics	4
Personal Financial Planning	4
Restaurant, Hotel, and Institutional Management	4
Retail Management	4
• Media and Communication	
Advertising	4
Electronic Media and Communications	4
Journalism	4
Media Strategies	4
Public Relations	4
• Office of the Provost	
University Studies	4
Wind Energy	4
• Visual and Performing Arts	
Art (Bachelor of Arts)	4
Art (Bachelor of Fine Arts)	4
Dance	4
General Studies	4
Music (Bachelor of Arts)	4
Music (Bachelor of Music)	4.5
Theatre Arts (Bachelor of Arts)	4
Theatre Arts (Bachelor of Fine Arts)	4

Academic Advising and Support

Academic Advising

Texas Tech academic advisors serve as university guides for students on their path toward academic progress and graduation. Advisors facilitate student growth and development, guide degree plan implementation, and assist students in navigating the world of higher education. Every major and every department provides academic advisors, either faculty or professional, to work with students during their academic careers.

Academic advising is an active process that requires input and investment from the student and the advisor. Students maintain ultimate responsibility for their academic progress; the advisor holds the role of guide, facilitator, mentor.

Academic advising is not simply course selection advising. The goal of academic advising is to provide a means of communication and a consistent point of contact for academic support and progress. To that end, many departments require regular meetings between advisors and students prior to registration for the following term. Students should be aware of the advising requirements from their college and department.

Academic Recovery Process

All students admitted to Texas Tech have the potential to be academically successful. Texas Tech recognizes that many factors can undermine a student's academic performance. The Office of the Provost provides dedicated academic advisors and the Academic Recovery Process to individually engage, equip, empower, and encourage motivated students who, for whatever reason, have found themselves on academic probation or academic suspension.

Through intensive academic advising, students will develop a personalized Academic Recovery Plan that will investigate the causes of past underperformance, anticipate future challenges, identify and implement strategies for addressing these issues, and construct short- and long-term course selections to speed and support recovery.

This generalized Academic Recovery Process is required for declared students in some academic colleges, Undecided/Exploratory (TTUD) students, and Pre-Engineering students. Students who are not in academic good standing should review the policy on academic status (page 66) and check with their academic associate dean to determine the best route back to academic success. Students who are denied when applying to return to any specific academic college from academic suspension may be eligible to return to the university as TTUD students after successfully completing an approved Academic Recovery Plan with University Advising.

Contact: Texas Tech University Advising, 79 Holden Hall, 806.742.2189, advising@ttu.edu, www.advising.ttu.edu/recover

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 of Texas, 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, the following: Accuplacer, ACT, GRE, LSAT, MAT, MCAT, MPRE, PRAXIS,

SAT, TEAS, Texas Educator Certification (TExES), TSI, and TOEFL. To learn more about TSI compliance see www.depts.ttu.edu/tsi/.

ADA Testing Accommodations are available to students registered through Student Disability Services. This program provides an optimal test environment for students needing extended test time, reduced distractions and assigned readers or scribes. Testing protocol is based on the student's approved Letter of Accommodation issued by Student Disability Services.

Additional programs include computer-administered GSP classroom make-up exams, CLEP and other credit-by-exam options, and proctoring for distance-learning exams. All exams are administered by expert staff in an appropriate proctored test environment.

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 website at www.ielts.org. Information regarding scores accepted at Texas Tech for both the TOEFL and the IELTS can be found in the Admissions and Graduate School sections of this catalog.

Contact: Pat McConnell, 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 (CCAAC) is committed to promoting cross-cultural awareness and cultivating a culturally competent university environment. The CCAAC works with faculty, campus units, and students to advance a learning environment that contributes to the academic success of all students. The CCAAC is specifically focused on working with faculty, staff and students in designing and supporting meaningful cross-cultural explorations intended to inculcate well informed global understandings and cross-cultural competencies. The CCAAC facilitates significant interactions with diverse peers, participation in well-informed and research-inspired diversity-related coursework, and substantive co-curricular activities that animate students to challenge their cross-cultural understandings. By providing high engagement activities, cultural programming, curricular engagement, and creative scholarship, the CCAAC aims to enrich and strengthen students' learning and their professional outcomes upon graduation.

Contact: Cross-Cultural Academic Advancement Center, 806.742.8681, www.depts.ttu.edu/diversity/ccaac/

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.

Office of Community College and Transfer Relations

The Office of Community College and Transfer Relations (CCTR) serves a dual purpose targeting increased growth, diversity, and success of the transfer student population. CCTR provides academic advising services to prospective transfer students during the one to two years they attend a partner institution. The services provided by CCTR assist potential transfer students to be better prepared by providing academic guidance allowing students to make informed educational decisions impacting the sequencing of their coursework and assisting them to graduate in a timelier manner.

The academic advising services available to pre-transfer students include review of courses/credits transferred, application of transfer courses to degree checklist(s), course sequence planning, course recommendations, understanding the role of and making plans for participating in undergraduate research and/or study abroad opportunities, graduation timeline strategies, and campus networking. These services are designed to work in conjunction with advising services provided by the students' sending institution to promote strategic degree planning.

Students will explore and set educational goals, engage in degree and major decision-making, and research good fit transfer institutions. Students will become knowledgeable of admission and degree requirements and begin researching potential and optimal career opportunities. CCTR provides guidance in starting various processes for transferring to Texas Tech, including admission and application, financial aid, scholarships, orientation, and connecting with appropriate faculty and staff for the student's chosen degree at the university.

The second purpose CCTR serves is to advocate, coordinate, facilitate, and maintain initiatives to improve and create partnerships with other institutions of higher education to foster outreach and engagement. CCTR works with all of the Texas Tech colleges, schools, offices and departments to facilitate partnership agreements between Texas Tech and other institutions of higher education, primarily community colleges. CCTR promotes collaborations between faculty to enhance transfer students' active learning experiences and engagement in undergraduate research, service learning, and study abroad programs. The agreements CCTR facilitates are designed to enrich students' quality of life and maximize their educational dollars to make the best use of their transfer credits toward a Texas Tech degree.

Contact: Office of Community College and Transfer Relations; Office of the Provost-Undergraduate Education; 235 West Hall; Box 41076, Lubbock, TX 79409-1076; T 806.742.0876; F 806.742.0884; cctr@ttu.edu; www.cctr.ttu.edu

PEGASUS Program for First Generation College Students

PEGASUS is designed to assist first generation college students as they manage the variety of challenges unique to students without a family background in higher education. These challenges include academic progress, social involvement, and personal growth. As a PEGASUS member, the student will have access to professional staff who work specifically with First Generation College (FGC) students and an upper-class mentor. PEGASUS offers many opportunities for students to get involved 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 areas:

- Transitioning to the university environment
- Securing financial aid
- Improving study skills
- Creating appropriate 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 an FGC student, and their friendship and experiences provide meaningful help and real-world advice on how 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: 108 Doak, 806.742.7060, www.fgc.ttu.edu, pegasus@ttu.edu

Support Operations for Academic Retention (SOAR)

Learning Center

The Learning Center's mission is to empower and encourage students in their pursuit of achieving academic success in a welcoming environment.

The Learning Center works to enhance the academic success of all enrolled Texas Tech students by offering a variety of free services:

1. Online tutoring available Monday through Thursday from 7:30 to 10 p.m. (www.lc.soar.ttu.edu)
2. Drop-in peer tutoring for math, physics, chemistry, biology, accounting, engineering, and Spanish.
3. Peer academic coaching designed to provide students with a trained peer coach for ongoing advice on how to prepare academically for Texas Tech courses. Common topics include memory techniques and strategies, time management, note taking, goal setting, test-taking tips, and test anxiety.
4. An onsite licensed professional counselor to assist students struggling with personal issues that may impair their chances of obtaining academic success.
5. A study lounge to accommodate individual and group studying.

The Learning Center is open from 8 a.m. to 8 p.m. Monday through Thursday and 8 a.m. to 5 p.m. on Friday.

Contact: 80 Holden Hall, www.lc.soar.ttu.edu, 806.742.3664.

Programs for Academic Development and Retention (PADR)

Programs for Academic Development and Retention courses are open to all students at Texas Tech. PADR courses are college-specific and are designed to provide opportunities for students to acquire and build skills beneficial for college and career application. Classes meet two to three times a week and average 25 to 30 students each. To learn more about how to take advantage of these opportunities, see page 109 in the All-University Programs section of this catalog.

Programs for Academic Development and Retention offices are open from 8 a.m. to 5 p.m., Monday through Friday.

Contact: 56 Holden Hall, 806.742.3928

Supplemental Instruction (SI)

Supplemental Instruction (SI) targets historically difficult entry-level courses and offers students weekly peer-led review sessions. SI sessions are provided free for all students who want to improve their understanding of course material and improve their grades.

Research shows that students who attend SI sessions regularly achieve an average grade level one-half to one full letter grade higher than students who do not attend.

SI sessions are led by professor-recommended students who have shown excellent competency in the subject area. The SI Leaders are trained to use their experience in the course to help students study more effectively. The SI leaders attend every lecture and create activities and worksheets for each session based on the material presented in the most recent lecture. Please visit www.si.soar.ttu.edu for the current schedule of SI sessions.

Contact: Room 80 Holden Hall, www.si.soar.ttu.edu, 806.742.3664

Texas Success Initiative (TSI)

All students are responsible for complying with the Texas Success Initiative (TSI). State regulations require proof that all students involved in higher education must be college ready in reading, writing, and mathematics. A student may demonstrate college readiness by earning passing scores on the TSI Assessment Test. Students may be exempt or designated as college ready if they have specific ACT, SAT, or TAKS test scores or have earned a baccalaureate degree (for other exemptions visit: www.reg.ttu.edu) from an accredited Texas public institution of higher education or from a regionally accredited out-of-state institution.

The TSI Assessment Test is available through Academic Testing Services, 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.

Students with questions about their status regarding the Texas Success Initiative should contact the TSI Compliance Office at 806.742.3661. Students who have tested but did not meet the minimum scores in one or more sections of the TSI Assessment Test measurements are required to obtain TSI advising through the TSI Developmental Education Office, 78 Holden Hall, 806.742.3242.

Developmental courses offered by the TSI program are listed below.

Texas Success Initiative Courses (TSI)

Reading and Writing

0204. Developmental Literacy I. This is the first of a two course sequence in developmental literacy focused on reading, writing, speaking, and listening in the college reading and writing settings. This course develops reading identification skills (main ideas, details, facts, patterns, strategies and themes) as well as structural writing skills (grammar, sentence structure, paragraph structure, purpose, and organization). Not applicable

toward general degree requirements. Must receive an A, B, or C to fulfill TSI requirements. Course will not count toward full time enrollment.

0304. Developmental Literacy II. This is the second of a two course sequence of developmental literacy focused on reading, writing, speaking and listening in the college reading and writing settings. This course reinforces reading skills (critical reasoning, visualization, strategies and processes) as well as structural writing skills (summarization, writing conventions, style, audience, writing contexts, and research process). Not applicable toward general degree requirements. Must receive an A, B, or C to fulfill TSI requirements. Course will not count toward full time enrollment.

0305. Developmental Literacy for Second Language Learners. This one course in a sequence of developmental literacy classes focused on reading, writing, speaking and listening in the college reading and writing settings. With consideration of the student's individual needs, this course develops reading identification skills (fluency, vocabulary, main ideas) and reinforces reading skills (reasoning, visualization, and processing). Additionally, the course develops writing skills (grammar, structure, purpose, and organization) and reinforces writing skills (conventions, style, context, audience, and research). Not applicable toward general degree requirements. Must receive an A, B, or C to fulfill TSI requirements. Course will not count toward full time enrollment.

0504. Basic Literacy. Prerequisite: By placement. Students move through a series of content modules using a mastery learning approach. Topics include vocabulary building, grammar, punctuation, and how to approach college reading.

Math

0202. Developmental Math II: Introductory Algebra (3). This is the first of a two-course sequence of developmental mathematics courses designed to help students improve their basic math and algebra skills while fulfilling TSI compliance requirements. This course is designed to teach students basic algebra skills to prepare them for TSI 0302. There are four major topics: one-variable linear equations, two-variable linear equations, systems of two-variable linear equations, and operations on polynomials. Students must earn an A, B, or C in the course to progress to TSI 0302. Not applicable to any degree program. Course will not count toward full time enrollment.

0302. Developmental Math III: Intermediate Algebra (3). This is the second of a two-course sequence of developmental mathematics courses designed to help students improve their basic math and algebra skills while fulfilling TSI compliance requirements. This course is designed to teach students the algebra skills necessary to be successful in college-level mathematics. There are four major topics: factoring polynomials, rational expressions and equations, radical expressions and equations, and quadratic equations. Students must earn an A, B, or C to pass the course and fulfill TSI math requirements. Students are assigned to this course on the basis of testing and evaluation and must successfully complete this course before registration in any college-level math. Not applicable toward general degree requirements in any degree program. Course will not count toward full time enrollment.

0502. Basic Mathematics. Prerequisite: By placement. Students move through a series of content modules using a mastery learning approach. Topics include operations with whole numbers, fractions, measurement conversions, and signed numbers.

Course Waivers

0079. TSI Developmental Education Waiver. Course reserved for distance education students. Enrollment approved on a case-by-case basis.

0136. TSI Compliance Review. Course reserved for students in Review when semester begins. Enrollment approved on a case-by-case basis.

0999. TSI Waiver (3). Course enrollment approved on a case-by-case basis.

Refresher TSI Workshop Courses (REF)**Reading and Writing**

- 0304. Literacy Refresher Workshop.** Students move through a series of content modules using a mastery learning approach. Topics include paragraph basics, finding main ideas and supporting details, spelling, grammar, reading comprehension, argumentations, and MLA formatting.

Math

- 0302. Mathematics Refresher Workshop.** Students move through a series of content modules using a mastery learning approach. Topics include solving systems of equations, applications involving systems of equations, solving radication and quadratic equations and functions.

Non-Course-Based Option Courses (NCBO)**Reading and Writing**

- 0304. Non-Course-Based Literacy.** Prerequisite: By placement. Students move through a series of content modules using a mastery learning approach. Topics include reading comprehension, application of prior learning, and how to approach college writing.

Math

- 0302. Non-Course-Based Mathematics.** Prerequisite: By placement. Students move through a series of content modules using a mastery learning approach. Topics include solving systems of equations, applications involving systems of equations, solving radication and quadratic equations and functions

Tech Transfer Acceleration Program (TTAP)

The Tech Transfer Acceleration Program (TTAP) is a partnership between Texas Tech University and South Plains College (SPC). To qualify for the program, students must have applied and been denied admittance to Texas Tech. After subsequently applying and being accepted into TTAP and South Plains College, each student must co-enroll in a minimum of 12 credit hours at SPC and one credit hour at Texas Tech during each semester.

TTAP students live on the Texas Tech campus and attend classes on the campus. The goal is for each student to complete a minimum of 12 credit hours and achieve a cumulative 2.5 GPA by the end of the semester to transfer successfully to Texas Tech.

All TTAP students must attend mandatory orientation prior to the first class day, adhere to the program requirements, and maintain at least a 2.5 GPA.

Contact: TTAP Office, 08 Holden Hall, www.ttap.ttu.edu, 806.742.3645.

TECHniques Center

The TECHniques Center, a program of Student Disability Services, 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: 242 West Hall, www.techniques.ttu.edu, 806.742.1822, techniques.center@ttu.edu

TTU Discovery! Program for Students Exploring Majors

Choosing a major is a big decision, but the decision does not have to be difficult. Students who are exploring majors have access to academic advisors who are trained to work with them through the Discovery! process. These advisors help students find their direction to an amazing university experience, an on-time graduation, and a future career field that will be fulfilling and rewarding.

The Discovery! process incorporates an expansive list of exploration activities that students can complete on their own with the guidance of academic advisors. Providing students the option to choose their own Discovery! elements creates a truly individualized process geared toward meeting students where they are in their research endeavors. Activities (intended to help students identify their values, interests, skills, and abilities) include interviews, career assessments, real-world research, and other tools through campus partners. In one-on-one meetings with advisors, students identify a personalized Discovery! Action Plan that outlines steps to build upon the knowledge they have gained through initial research and guide further exploration. With valuable experiences that inform their thinking, students are better equipped and more appropriately motivated to be successful in their chosen fields of study. The Discovery! process provides flexible options in a stable environment that foster decision making and the identification of a best-fit major.

Contact: Texas Tech University Advising, 79 Holden Hall, 806.742.2189, discovery@ttu.edu, www.discovery.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 an electronic copy. To submit texts electronically, writers may access the University Writing Center through the website (uwc.ttu.edu).

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 30,000 alumni, current students, and friends of Texas Tech.

Located in the McKenzie-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 Orientation 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: 806.742.3641, www.TexasTechAlumni.org

Campus Bus System

The campus bus system, funded by the Student 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 the Citibus Safe-Nite shuttle service from 6:15 p.m. until 1:15 a.m. by calling 806.742.NITE (6483). Students also can ride any Citibus route in Lubbock using their Texas Tech ID.

Contact: Student Government Association, 806.742.3631

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:

- Student Organizations
- Fraternity and Sorority Life
- Texas Tech Spirit Squads
- Raiders Off-Campus Student Services
- Student Emergency and Crisis
- General Student Services

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

Credit Union / ATM

Texas Tech Federal Credit Union offers free cash-back checking accounts, low-cost consumer loans, low-rate credit cards, a full-service home loan center, and mobile banking services for anyone who wants to become a member. There are three branch locations: 1802 Texas Tech Parkway and room 1A-98 at the Health Sciences Center (both on campus), and 4005-98th Street. All locations can be reached at 806.742-3606. ATMs are available at all branch locations, the Administration Building, the Student Recreation Center, and

the United Spirit Arena. For more information about the Texas Tech Federal Credit Union, visit www.TexasTechFCU.org.

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 office and the Center for Campus Life boast nearly 450 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 Tech Activities Board where they can plan events like Texas Tech's Homecoming Week and the Annual Arbor Day Celebration. Students can enroll in leadership programs, participate in Greek letter organizations, and experience multicultural programs through the Center for Campus Life. The value of these experiences is immeasurable as students enjoy the luxury of having a practical forum in which to cultivate leadership skills and develop peer and faculty staff/networks.

Student participation in an off-campus activity is strictly voluntary. Students are responsible for their own safety and welfare. Participation in off-campus activities is at the student's own risk and the university assumes no responsibility. Students are responsible for making their own individual arrangements with instructors for 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: Student Union and Activities Office, 203 Student Union, 806.742.3636 (Student Union), 806.742.4708 (Activities); Center for Campus Life, 201 Student Union, 806.742.5433

Fraternity and Sorority 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 almost 50 chapters recognized at Texas Tech University, more than 4,000 students are involved in Greek life. 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: 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 proce-

dures are described in the *Student Handbook* and questions may be directed to the Student Resolution Center, 232E Student Union Building, 806.742.SAFE(7233), 806.743.SAFE(7233), or: www.studentresolutioncenter.ttu.edu

Intercollegiate Speech, Debate

The Red Raider debate team historically ranks among the top teams in the nation. In 2010, the team won its second national debate championship in three years, one of only four schools nationwide to ever do so. Students who meet general eligibility requirements may participate in intercollegiate debate. Both contest and noncontest events are held on campus and at other colleges. The Forensics Union (administered in the Department of Communication Studies) is also active in sponsoring campus-wide speech activities. Texas Tech teams actively compete in debate competitions across the country.

Contact: Director of Forensics, 806.834.1328

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, Matador Singers, Lubbock Chorale, Court Jesters, Symphonic Band, Concert Band, University Band, Jazz Bands and Combos, Chamber Ensembles, University String Orchestra, Saxophone Quartets, Chamber Orchestra, Woodwind Ensemble, Woodwind Quintet, String Ensemble, String Quartets, Harp Ensemble, Flute Ensemble, Clarinet Choir, Horn Ensemble, Trombone Choir, Trumpet Choir, Tuba/Euphonium Ensemble, Brass Quintet, Percussion Ensemble, Steel Drum Bands, Early Music Ensemble, Celtic Ensemble, Tzumba World Music Ensemble, Mariachi Ensemble, Ballet Folklorico, Balkan Ensemble, Mbira Group, 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.

Parent and Family Relations Texas Tech Parents Association

Parent and Family Relations is dedicated to student success by engaging parents and family members as active partners in supporting student success at Texas Tech University. Parent and Family Relations provides a variety of programs and services to parents, family members, and students. These programs include Family Weekend, Sibling Weekend, Holiday Bus Trips, the *Parent and Family Guide*, Red Raider Orientation for Parents and Family Members, electronic newsletters, and e-Lerts.

Contact: 201Q Student Union Building, 806.742-3630 or 888.888.7409, parent@ttu.edu; www.parent.ttu.edu

The Texas Tech Parents Association (TTPA), an incorporated non-profit organization, was established in 1956 to provide a network of parents and family members as well as programs and services for Texas Tech students and their families. Programs and services include scholarships, faculty and student awards, the Road Raiders Safe Travel Network, and local chapters of TTPA. Membership dues and donations enable the awarding of student scholarships as well as provide program support.

Contact: parents@texastechparents.org; www.texastechparents.org

Office of Student Conduct

The Office of Student Conduct 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 conduct 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 Office of Student Conduct 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.

Contact: 211 Wellness Center, www.depts.ttu.edu/studentconduct, 806.742.1714

RaiderGate

Sponsored by the Tech Activities Board and Student Union and Activities, RaiderGate is the university's premier student tailgating event. For students it is the most exciting on-campus pregame entertainment of the football season.

Contact: Tech Activities Board, 806.742.4708; Student Union and Activities, 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 www.rrsec.ttu.edu, then select Federal Work Study Program or Part-Time Employment. To learn more about other forms of financial assistance, see "Student Financial Assistance" on page 51.

Red to Black Department

Red to Black® offers free and confidential peer-to-peer financial coaching to Texas Tech students. Select students from the Department of Personal Financial Planning provide individual coaching sessions and presentations on topics such as creating spending plans, starting to save early, maximizing financial aid (including student loans), choosing employee benefits, and establishing and using credit. The purpose of Red to Black is to empower students to achieve financial goals. No one understands the needs and concerns of students better than fellow students.

Contact: 024, Student Union Building (east basement), 806.742.9781, redtoblack@ttu.edu, www.r2b.ttu.edu

Safe Way Program

The Safe Way Program safely takes students to various locations and home during hours that normal transportation is not available. This initiative was started and is operated through the Office of the External Vice President of the Student Government Association. The program includes Safe Ride, Safe Bus, and Safe Nite. Students must present a valid Texas Tech ID for free service.

Each segment of the Safe Way Program is available to every student and is an easily accessible means to get home safely during hours when regular transportation is not accessible.

Safe Ride

Safe Ride is a free taxi service for students that operates from 10 p.m. to 3 a.m. on Thursday, Friday, and Saturday. The taxi service will pick up students and take them to their place of residence. The service is a means to keep students off the roads at night and to give

students transportation options when direct means of transportation are not readily available.

Safe Ride is completely confidential. **Contact:** 806.742.7433

Safe Bus

Safe Bus consists of three buses that run from all Overton apartments and drop off at Broadway and the Depot District. Safe Bus runs from 11 p.m. to 3 a.m. on Thursday, Friday, and Saturday. As an addition to the Safe Ride taxi service, Safe Bus reduces the number of students on the road during weekend nights.

Safe Nite

Safe Nite is an on-call, late-night shuttle that circulates on campus from 6:50 p.m. to 1:15 a.m. After picking up students, Safe Nite will take them anywhere on campus. Safe Nite is an on-campus extension of the Safe Ride taxi service. **Contact:** 806.742.6483

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 licensed psychologists/counselors and by their supervisees.

College life is brimming with new challenges and choices. Counseling focuses on the common issues students frequently encounter in this process. This can involve relationship loss, coping with grief, body image concerns, depression, anxiety, stress/time management, alcohol or other substance abuse, gay/lesbian/bisexual/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., mindful eating, sexual assault survivors) as well as general counseling groups called Understanding Self and Others. Relationship counseling for student couples is available during select evening hours as well as the daytime. 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.

SCC 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 services from 12:30 p.m. until 3:30 p.m.

Contact: 201 Student Wellness Center, www.depts.ttu.edu/SCC, 806.742.3674

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, Transfer Council, Student Senate, and executive offices. The SGA also provides many services to students, including Safe-Ride (806.742.7433), Safe-Nite (806.742.6483), Safe-Bus, 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, 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: 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 the primary care clinic for students at Texas Tech University. The Joint Commission accredited clinic is staffed with board certified physicians, nurse practitioners, nursing staff, a dietician, and support staff to provide high-quality care for illnesses and injuries, as well as mental health referrals.

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 Monday through Friday from 8:00 a.m. to 5:30 p.m.

Student Health Services clinical services include general medicine, women's health, sports medicine, triage nurse, nutritionist, after-hours answering service, COLA accredited medical lab, digital x-ray services, retail pharmacy, and the Raider Assistance Program that provides a safe and confidential place for students to address questions and concerns they have regarding alcohol, tobacco, and drugs. Students who pay a medical services fee are entitled to access to the clinic. All major health insurance carriers are accepted and a copy of the insurance card is required at the time of the visit. Access to the clinic is available to students without insurance at a discounted rate. A valid Texas Tech ID is required to access the clinic services. More than 200 appointments are available each day. The nursing staff provides blood pressure checks, immunizations, and advice about self-care. Lab tests and X-rays ordered by Student Health Services providers may be performed at Student Health Services.

A student who is unsure about a medical issue or problem can visit the clinic and speak confidentially to the triage nurse. The triage nurse does not give notes verifying that a student has been seen at Student Health Services. Providers are able to give verification that a student has been seen at Student Health Services, but faculty members use their own judgment about excusing absences for class or exams missed due to illness or injury. Students experiencing a lengthy illness that may affect their academic performance can consult their Student Health Services physician about obtaining a letter of explanation.

Pharmacy services are conveniently located in the Student Wellness Center (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. The pharmacy accepts most prescription insurance cards.

The medical services fee does not cover after-hours care, hospital emergency room visits, hospitalization, or 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. Please contact Student Health Services at 806.743.2848 for more information.

Insurance. 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 to present at any medical facility. Student Health Services accepts private health insurance for visits to the clinic. 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 806.743.2848, or, for enrollment information, visit www.ahpcare.com/ttu

For more information regarding insurance and pricing for Student Health Services, visit www.ttuhs.edu/studenthealth/documents/PIBFAQ.pdf

Bacterial Meningitis Vaccine Requirements for Entering Students. Texas Senate Bill 1107, passed in May 2011, requires all students entering a public, private, or independent institution of higher education in Texas as of January 2012 and thereafter to provide documentation that they have had a meningococcal (bacterial meningitis) vaccine or “booster” dose during the five-year period prior to but no later than 10 days before the first day of the first semester they will enter that institution. This requirement is not part of the admission process, but non-compliance will prevent students from registering for classes. Students must submit their documentation to Student Health Services as soon as they are admitted and have decided to attend Texas Tech. This submission must be at least two weeks before their intended registration date, even if that date is during Red Raider Orientation. Students should send vaccination records to Student Health Services by one of the following: fax to 806.743.1071, email studenthealth@ttuhs.edu, or submit by mail or in person to Student Wellness Center, 1003 Flint Ave., Box 43095, Lubbock, TX 79409-3095. Students should include their Texas Tech “R” number, date of birth, and semester of entry on all documentation. For more information, visit www.ttuhs.edu/studenthealth.

Tuberculosis Screening. The university requires that non-U.S. residents from countries with a high prevalence of tuberculosis receive a T-spot test for tuberculosis screening. This requirement is in accordance with recommendations from the American College Health Association and the Center for Disease Control (CDC). The tuberculosis screening test must be administered by either 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 T-spot test.

MMR Immunization. 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, Box 43095, Lubbock TX 79409-3095 or faxed to 806.743.1071. Students must include their Texas Tech “R” number and date of birth 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 806.743.2848.

Patient Confidentiality. 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.

Contact: www.ttuhs.edu/studenthealth, studenthealthservices@ttuhs.edu, 806.743.2848.

Student Legal Services

Student Legal Services brings legal advice and guidance within the reach of students. Student Legal Services is staffed by three licensed attorneys, an administrative business assistant, law clerks, and student externs from the Texas Tech School of Law. Appointments

are necessary to ensure correct placement with the appropriate attorney. The program’s primary objectives are providing students with confidential legal advice on individual problems and establishing an educational office designed to inform students of their obligation, duties, and rights as defined by a system of law. Outreach presentations are available for student organizations and academic classes. Mediation services are also available.

The attorneys for students are able to represent students 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: 307 Student Union, 806.742.3289

Student Media

The Department of Student Media, located on the first floor of the rotunda in the Media and Communication building, provides out-of-classroom learning opportunities for students to use academic training obtained at Texas Tech in practical settings of publishing the student newspaper, *The Daily Toreador*; digital media at www.dailytoreador.com; and the campus yearbook, *La Ventana*. All publications, productions and telecasts within the department are non-academic and considered out-of-classroom learning opportunities, free from administrative censorship. Student editors of *The Daily Toreador* and *La Ventana* have the authority to make all content decisions and bear the responsibility for their decisions.

Student Media employs 50-75 students each semester as collegiate editors, reporters, photographers, videographers, anchors, graphic designers, print and digital advertising account executives, and members of the delivery staff and street team. Many of the employees are students in the College of Media and Communication, and some study other disciplines. Students interested in the fields of advertising, journalism, marketing, public relations, photography, and broadcast are encouraged to apply for positions on the newspaper, multimedia website, and yearbook staffs by visiting: www.dailytoreador.com

Contact: Media and Communication Rotunda, Room 180; 806.742.3388; www.dailytoreador.com

Student Organization Representative Council (SORC)

The Student Organization Representative Council (SORC) includes all registered student organizations separated into councils based on their area of interest. These councils include a SORC representative from each organization and Student Government Senators to facilitate the agenda. It allows the opportunity for 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.

Contact: Student Government Association, 806.742.3631

Student Resolution Center

The Student Resolution Center (formerly the Ombuds Office) is a safe place to bring concerns and find solutions. The center provides informal, neutral, and confidential dispute resolution services and assists visitors with any student-related concern. The staff works with prospective, current, and former students and their families as well as any staff or faculty member who may have a student-related concern.

The goal of the center is to help individuals resolve their concerns fairly and, if possible, informally. Staff members do not act as advocates for either side in a dispute but rather as advocates for fairness for all parties involved. Options are given as they relate to concerns presented, but the center has no formal decision-making author-

ity. The final decision regarding any option resides with the visitor. Confidentiality is preserved in all cases except for when:

- An individual expresses the intent for self harm or harm to another person.
- The potential exists for injury or harm to a child or protected adult.
- A crime is witnessed by a Student Resolution Center staff member.
- Otherwise required by law or university policy.

Contact: 232E Student Union Building, 806.742.SAFE(7233), 806.743.SAFE(7233), www.safeplace.ttu.edu. Services are available from 8 a.m. to 5 p.m. on weekdays and at other times by appointment. Walk-in visitors are welcome.

Texas Tech Chess Program (TTCP)

The Texas Tech Chess Program (TTCP) has captured more than ten national titles, as well as regional and state championships. In 2014, TTCP made history by receiving a double honor from the U.S. Chess Federation. Texas Tech was named “Chess College of the Year,” and head coach Alex Onischuk was recognized as “Grandmaster of the Year.” In both 2014 and 2015, Texas Tech Chess Teams qualified for the “Final Four of College Chess,” the playoff for the national championship.

TTCP offers chess scholarships on two levels to qualified undergraduate or graduate applicants. Top players may receive significant financial help. Club level players who are willing to teach in the weekly K-12 programs may qualify for smaller scholarships. All of these scholarships qualify students for reduced in-state tuition and include regular training with International Grandmaster Onischuk, a former U.S. Champion and one of the top professionals in the world.

The Texas Tech Chess Program supports the mission of the Division of Institutional Diversity, Equity and Community Engagement by promoting chess as a vehicle for enriching education, recruiting outstanding and diverse students to the university, promoting the university through collegiate competitions and exhibitions, providing outreach to all segments of the community, and seeking partnerships and other opportunities that serve university goals.

In collaboration with the university’s student chess club, the Knight Raiders, TTCP offers a variety of services and opportunities related to chess, including regular meetings, tournaments, after-school programs, workshops for teachers, and chess camps for kids. The TTCP staff prepares the state-wide UIL chess quizzes. TTCP resources include chess sets, chess clocks, a specialized chess library, demonstration boards, chess game analysis programs, and tournament management. Many of these resources are shared with the university’s student chess club.

Contact: 303 Library, al.lawrence@ttu.edu, www.tcp.ttu.edu, 806.742.7742

Transcript Service

Copies of a student’s transcript are available for a fee of \$5 per transcript. Please allow two business days for standard transcript processing. Transcripts can be ordered online at www.depts.ttu.edu/registrar (additional fees may apply) or in person at the Office of the Registrar, 103 West Hall.

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 Center

University Career Center provides a number of services designed to assist all Texas Tech students and alumni with their career development and job search efforts. Representatives from hundreds of organizations visit University Career Center each year to conduct

employment interviews with students in an effort to fill internship, Co-Op, and full-time positions.

To obtain interviews and submit a resume, students may register at www.careercenter.ttu.edu. To assist students who are undecided about their majors or career plans, University Career Center offers career assessment inventories, which include Strong Interest Inventory, MBTI, and Strengths Quest Program.

University Career Center 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: University Career Center, 150 Wiggins Complex, 806.742.2210

Veterans’ Education Services

The Department of Military and Veterans Programs assists veterans and their families in achieving academic and personal success by helping provide a seamless transition from military to civilian life, supporting and encouraging campus and community engagement, and helping provide a positive experience through degree completion.

The department embraces the following values:

- **Motivation** – Provides an encouraging environment focused on the student’s success.
- **Value** – Appreciates service and understands the diversity of thought and experience that veterans bring to the university.
- **Performance** – Connects students to campus and community resources that will enhance their overall college experience and provide a greater opportunity for successful academic achievement and degree completion.

Exemptions for Texas Veterans Under the Hazlewood Act. The purpose of the Hazlewood Exemption (Hazlewood Act) for Texas veterans is to provide an education benefit to honorably discharged or separated Texas veterans and to eligible dependent children and spouses of Texas veterans. Eligible students may receive an exemption from payment of all tuition, dues, fees, and other required charges, including fees for undergraduate, graduate, law, nursing, medical school for up to 150 credit hours maximum. For more information see www.mvp.ttu.edu.

Veterans’ Certification. Each student using federal VA Educational Assistance is responsible for providing accurate information to the Department of Military and Veterans Programs. Because the U.S. 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 be admitted into an approved program and provide a degree plan as soon as possible after enrollment in Texas Tech.
- All veterans using federal benefits must submit military transcripts for evaluation no later than the end of their second semester of enrollment or enrollment certification will be canceled.

All students using federal or state benefits must be certified **immediately** after registration each semester through the Department of Military and Veterans Programs, 147 Drane Hall, 806.742.6877, www.mvp.ttu.edu.

Any student using the federal or state Tuition Assistance Program through the Department of Defense should provide documentation to Student Business Services, 301 West Hall, 806.742.3272, www.sbs.ttu.edu.

Contact: Military and Veterans Programs, 147 Drane Hall, T 806.742.6877, F 806.742.0480, mvp@ttu.edu, www.mvp.ttu.edu

TTU Regional Sites

Melanie Hart, Ph.D., Vice Provost

Box 42019 | Lubbock, TX 79409-2019
 T 806.742.2184 | F 806.742.1331
 melanie.hart@ttu.edu | www.elearning.ttu.edu/regional

The Office of the Provost coordinates all programs offered at regional sites in El Paso, Fredericksburg, Highland Lakes (Marble Falls), Junction, and Waco. Programs at these sites provide distance students with opportunities to earn undergraduate and graduate degrees with a blended delivery of face-to-face, interactive video conferencing, Microsoft Lync, and online classes. Students may complete their degrees without the need to relocate or travel long distances from their homes and work.

Texas Tech University partners with regional community colleges for lower-division coursework and offers upper-division courses to complete a bachelor's degree at the TTU regional sites. Graduate degrees are also offered through participating colleges at Texas Tech.

Students pursuing degree programs at TTU regional sites are held to the same entrance requirements as students at the Lubbock campus. Courses, curriculum, and graduation requirements at each site meet the same standards as those in Lubbock.



The TTU regional sites offer the following concentrations (minors) in the B.G.S, the B.A. in University Studies, and the B.S. in University Studies degree programs: agricultural leadership; business administration; biology; communication studies; English; exercise and sport sciences; history; horticultural and turfgrass sciences; human development and family studies; human resource development; integrative studies; journalism and visual media; mathematics; natural resource management; nutrition; personal financial studies; plant and soil science; restaurant, hotel, and institutional management; sociology; technical communication; and wind energy.

Not all concentrations are available at each regional site. Visit with one of the advisors at the regional sites to determine what minors or areas of concentrations are available at each site. The B.G.S degree does require that at least two of the concentrations be within the College of Arts and Sciences.

Regional Sites

Texas Tech University at El Paso

915.831.7620 | www.elpaso.ttu.edu

- Bachelor of Science in Architecture

Texas Tech University at Fredericksburg

806.742.6440 | www.hillcountry.ttu.edu

This regional site offers an intensive two-week session in May (Maymester) and regular fall, spring, and summer sessions.

- Bachelor of General Studies
- Bachelor of Arts in University Studies
- Bachelor of Science in University Studies
- Bachelor of Science in Multidisciplinary Studies with EC-6 Generalist and either ESL or Special Education Certification (offered in partnership with Austin Community College)
- Master of Education in Educational Leadership and Principal Professional Certification Preparation
- Doctor of Education in Educational Leadership*
- Superintendent Professional Certification Preparation Program

Texas Tech University at Highland Lakes

806.742.6450 | www.hillcountry.ttu.edu

- Bachelor of General Studies
- Bachelor of Arts in University Studies
- Bachelor of Science in University Studies
- Bachelor of Science in Multidisciplinary Studies with EC-6 Generalist and either ESL or Special Education Certification (offered in partnership with Central Texas College)
- Master of Education in Educational Leadership and Principal Professional Certification Preparation
- Superintendent Professional Certification Preparation Program
- Doctor of Education in Educational Leadership*

Texas Tech University Center at Junction

806.742.6434 | www.junction.ttu.edu

TTU Center at Junction offers an intensive two-week session in May (Intersession) as well as two three-week summer sessions in June and July that allow 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 professional organizations for workshops, retreats, and special activities. A wide range of housing accommodations and full-meal service are available year-round for groups of 15 to 200 people. Recreational opportunities include kayaking or tubing the South Llano River, hiking, a sand volleyball court, an interpretive trail system, and a swimming pool.

TTU Center at Junction is also home to the Llano River Field Research Station and the Outdoor School. The Llano River Field Research Station supports research on climate, rivers, watershed management, and environmental education. The nationally recognized, award-winning Outdoor School is a hands-on program for K-12 teachers and students that stimulates imagination and understanding of difficult abstract STEM concepts.

Texas Tech University at Waco

806.834.4667 | www.waco.ttu.edu

- Bachelor of Arts in University Studies
- Bachelor of Science in Biology
- Bachelor of Science in University Studies
- Bachelor of General Studies

* Requires students to travel occasionally to the Lubbock campus.

TTU Worldwide eLearning

Online and Distance Learning at Texas Tech

Justin R. Louder, Ed.D., Assistant Vice Provost

Texas Tech Plaza Building | 1901 University Ave., Ste. 513
Box 45095 | Lubbock, TX 79409-5095
T 806.742.7227 | F 806.742.7277
justin.louder@ttu.edu | www.elearning.ttu.edu

Multiple colleges offer online minors, degree programs, certificate and certificate preparation programs that make pursuing an education through Texas Tech University possible at any location. Online and distance learning programs at Texas Tech are delivered through a variety of modalities, including synchronous or asynchronous instruction and interactive video conferencing.

Students pursuing degree programs via online and distance learning at Texas Tech are held to the same entrance requirements as students in Lubbock. Courses, curriculum, and graduation requirements in each of the online and distance programs meet the same standards as those in Lubbock.

Bachelor's Degrees

- Bachelor of Applied Arts and Sciences in Applied Leadership*
- Bachelor of Arts in University Studies
- Bachelor of General Studies
- Bachelor of Science in Human Sciences*
- Bachelor of Science in Plant and Soil Science with a specialization in horticulture
- Bachelor of Science in University Studies

Doctoral Degrees

- Doctor of Education in Agricultural Education (joint program with Texas A&M)
- Doctor of Education in Educational Leadership
- Doctor of Education in Higher Education (Community College Administrator)
- Doctor of Philosophy in Curriculum and Instruction [with concentration in curriculum studies and teacher education or with specialization in science and mathematics education (hybrid/blended)]
- Doctor of Philosophy in Educational Leadership†
- Doctor of Philosophy in Systems and Engineering Management
- Doctor of Philosophy in Technical Communication and Rhetoric

Graduate Certificate Preparation Programs

- Deaf and Hard of Hearing 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 Academy for Certification of Vision Rehabilitation and Education Professionals [ACVREP])
- Superintendent Professional
- Visual Impairment (Texas State Board for Educator Certification)

Graduate Certificates

- Agricultural Communications Leadership
- Applied Behavior Analysis
- Autism

- Book History and Digital Humanities
- Charitable Financial Planning
- Crop Protection
- Cybersecurity for Critical Infrastructure
- Dual Sensory Impairments
- Essentials of Business
- Fibers and Biopolymers
- Gerontology§
- Horticultural Landscape Management
- Mathematics
- Software Engineering
- Soil Management
- Special Education Transition
- Teacher Advancement Program Connect (educational leadership, literacy, or STEM)*
- Teacher Leadership
- Teaching Technical Communication
- Wind Energy
- Youth Development
- Youth Program Management and Evaluation

Master's Degrees

- Master of Arts in Technical Communication
- Master of Education in Curriculum and Instruction
- Master of Education in Educational Leadership
- Master of Education in Higher Education*
- Master of Education in Instructional Technology
- Master of Education in Special Education (emphasis available in autism and applied behavioral analysis, deaf and hard of hearing education, dual sensory impairments, educational diagnostician, generic special education, orientation and mobility, and visual impairment)
- Master of Engineering (with a specialization in engineering or healthcare engineering)
- Master of Science in Agricultural Education
- Master of Science in Family and Consumer Sciences Education§
- Master of Science in Horticulture Science
- Master of Science in Human Development and Family Studies (with a specialization in gerontology or youth development)§
- Master of Science in Multidisciplinary Science (with an emphasis in middle school or high school math/science)
- Master of Science in Plant and Soil Science (with a specialization in crop protection, crop science, fibers and biopolymers, or soil science)
- Master of Science in Software Engineering
- Master of Science in Systems and Engineering Management
- Professional Science Masters in Environmental Sustainability and Natural Resources Management (with specializations in ecology and environmental sustainability or natural resources management)

Undergraduate Minors

- Human Resource Development
- Integrative Studies
- Nuclear Engineering
- Studies in Personal Finance
- Technical Communication
- Wind Energy

* Pending THECB and SACSCOC notification and approval

† Pending SACSCOC notification and approval

‡ Inter-institutional program offered through the Family and Consumer Science Alliance

§ Includes inter-institutional programs offered through the Great Plains Interactive Distance Education Alliance – GPIEA

School of Law

Darby Dickerson, M.A., J.D., Dean

1802 Hartford Ave. | Lubbock, TX 79409-0004
T 806.742.3791 | F 806.742.4617
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 high level of faculty interaction are only a few of the factors that promote learning and encourage interaction between law students and professors.

Texas Tech School of Law was named one of the Top 20 "Best Value Law Schools" in the nation for five consecutive years by *pre-Law* magazine. Recognizing that Texas Tech has one of the nation's best first-year legal skills programs, *U.S. News & World Report* has twice ranked the law school's Legal Practice Program among the 25 best law school legal writing programs.

The School of Law offers two degree programs:

- Doctor of Jurisprudence (J.D.)
- Master of Laws in United States Legal Studies (LL.M.)

Because Texas Tech is the only campus in the state that is home to a major university, law school, and medical school, law students also can pursue any of the following 12 dual degree or concentration programs:

- J.D./Doctor of Medicine
- J.D./Master of Business Administration
- J.D./Master of Engineering

- 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./Law and Science Concentration Program
- J.D./Business Law Concentration Program
- J.D./Health Law Concentration Program

The Texas Tech School of Law has a strong reputation for being practical in its approach to legal education, and its students consistently perform at a high level of achievement. Its moot court program is one of only four in the nation that has ranked in the top ten of the Blakely Advocacy Institute's list of the best moot court programs each of the past four years. Some of the advocacy program's impressive accomplishments include the following:

- National Champions, National Pretrial Advocacy Competition, 2014, 2012, 2010.
- National Champions, ABA Arbitration Competition, 2014.
- National Champions, ABA National Appellate Advocacy Competition, 2013.
- National Champions, National Moot Court Competition, 2012, 2011.
- National Champions, National Energy & Sustainability Moot Court Competition, 2013.

Administration and Faculty

Dean: Dickerson

Associate Dean for Academic Affairs: Myhra

Associate Dean for Administration and Finance: Ramos

Associate Dean for External Relations: Doss

Associate Dean for International Programs: Ramírez



Associate Dean for Law Library and Information Technology: Torres

Associate Dean for Faculty Research and Development: Sutton

Associate Dean for Student Life: Delony

Assistant Dean for Academic Success Programs: Jarmon

Assistant Dean for Admissions and Financial Aid: Perez

Assistant Dean for Finance and Administration: Uline

Director of Advocacy Programs: R. Sherwin

Director of Academy for Leadership in the Legal Profession: Batra

Director of Bar Preparation Resources: Christopher

Director of Career Services: Smith

Director of Center for Biodefense, Law and Public Policy: Sutton

Director of Center for Military Law and Policy: Rosen

Director of Clinical Programs and Civil Practice Clinic: Spain

Director of Criminal Clinics: Metzke

Director of Energy Law Lecture Series: Keffer

Director of Family Law and Housing Clinic: Ross

Director of Health Law Program: Bard

Director of the Law and Science Certificate Program: Sutton

Director of the Legal Practice Program: Soonpaa

Director of LL.M. in United States Legal Studies: V. James

Director of Pre-Law Academy: Humphrey

Assistant Director of Bar Preparation Resources: Keffer

Horn Professors: Casto, Shannon, Sutton

Alvin R. Allison Professor of Law: Bard

AT&T Professor of Law: Murphy

Charles B. "Tex" Thornton Professor of Law: Shannon

Foundation Professor of Commercial Law: Krahmer

Frank McDonald Professor of Law: Chiappinelli

George H. Mahon Professor of Law: Camp

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

Glenn D. West Endowed Professor Law: Rosen

Governor Preston E. Smith Regents Professor of Law: Beyer

J. Hadley Edgar Professor of Law: Weninger

Jack F Maddox Professor of Law: Cochran

Judge Robert H. Bean Professor of Law: V. James

W. Frank Newton Professor of Law: Dickerson

Walter and Anne Huffman Professor of Law: Ramirez

Professors: Black, Campbell (visiting), Duncan, Gonzalez, Hancock (visiting), Huffman, Metzke, Myhra, Pawlowic, Pirtle (visiting) Ross, Soonpaa, Spain, Torres, Watts

Associate Professors: Benham, Henry, Humphrey, Gossett, Keffer (visiting), Outenreath

Assistant Professors: Batra, Christopher, M. Pearl, T. Pearl (visiting), B. Sherwin, R. Sherwin

Professor of Legal Practice: Jones

Lecturer: Jarmon

Instructor: Yandell

Adjunct Faculty: Baker, Browning, Bubany, Clements, Courville, Eissinger, Hall, Harris, Hatch, Hill, Howell, R. James, Jordan, Kime-Goodwin, Lanier, Lawit, Levine, McNamara, Morgan, Moss, Mustin, L. Pratt, N. Pratt, Richards, Salazar, Stafford, Stayton, Stone, Strange, Terrell, Truit, Valentini, Vaughn, West, Yandell

Law Library Faculty: Baker, Dell, Gatz, Iqbal, Kelleher, Painter-Moreno, Pluta

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 the applicant is qualified for the study of law.

An applicant also must take the Law School Admission Test, which is administered by the Law School Admission Council four times a year throughout the United States and in many foreign countries.

The School of Law cooperates with the Texas Tech University Honors College 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 March 1.

Pre-Law Academy for Undergraduates

The Pre-Law Academy is a program designed for undergraduate students who are interested in attending law school and pursuing a career in the legal field. Students accepted into the Pre-Law Academy will take three undergraduate courses (PLAW 3101 and 4301; COMS 3314) that were developed to prepare them for the competitive law school admissions process and the demands of law school, while also helping them create a vision for themselves as law students and lawyers.

As part of the Academy, students will learn about legal rhetoric, legal analysis, and legal advocacy. In this regard, students will research contemporary legal controversies and write an objective legal memorandum, which will help them improve their critical thinking and writing skills. Students also will participate in round-table discussions with law students, practicing lawyers, and law faculty, and they will be exposed to different practice areas by taking law-related tours. In addition, students will learn about the law school admissions process, including how to write a personal statement, prepare for the LSAT, and understand rankings and the cost of law school. Students also have the option to complete an internship in the legal profession.

Students who complete the Pre-Law Academy will have a better understanding of law school and the practice of law, and they will gain a competitive edge when applying for law school. To apply for the Pre-Law Academy, students must have completed a minimum of 45 credit hours. A limited number of students will be accepted into the Pre-Law Academy so students are encouraged to apply early. Students also are encouraged to consult their advisors.

Applications for the Pre-Law Academy ordinarily start being accepted during the fall semester. Additional information is available online at www.depts.ttu.edu/advising/prelaw/academy. Students also may contact the co-directors for more information, Professor Wendy Adele Humphrey at wendy.humphrey@ttu.edu or Dr. Katie Langford at katie.langford@ttu.edu.

Pre-Law (PLAW)

Undergraduate Courses

- 3002. Legal Profession Internship (V1-3).** Internship in the legal profession. Must be accepted into the Pre-Law Academy to register.
- 3101. Legal Profession Seminar (1).** Prerequisite: Must be admitted to Pre-Law Academy. Introduces students to people in the legal profession, exposes students to different legal practice areas, and covers information about admission to law school.
- 4301. Lawyering Skills: Legal Analysis and Advocacy (3).** Prerequisite: Must be admitted to Pre-Law Academy. Introduces students to the fundamental concepts related to the legal system, legal analysis, and persuasive oral argument.

All-University Programs

Applied Arts and Sciences

Bachelor of Applied Arts and Sciences

Students seeking the 120-hour Bachelor of Applied Arts and Sciences (B.A.A.S.) degree must first obtain an associate degree from an approved institution. This degree requires 60 hours of coursework at Texas Tech University in addition to the initial 60 hours transferred from an approved collaborating institution.

The program is administered by the Office of the Provost, and interested students should contact the student services center in University Studies (806.742.7100). For more information, visit: www.depts.ttu.edu/universitystudies

Degree Requirements

1. Hours Required and General/College Requirement

A minimum of 120 semester hours, 40 of which must be at the junior/senior level, and fulfillment of degree requirements for the Bachelor of Applied Arts and Sciences degree as specified in the "General Requirements" in the Undergraduate Academics section of this catalog.

Upper-Division Curriculum for Bachelor of Applied Arts and Sciences

THIRD YEAR			
	Fall		Spring
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Core Electives*	6	Core Electives*	6
TOTAL	15	TOTAL	15
FOURTH YEAR			
	Fall		Spring
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Multicultural Elective	3	INTS 4350, Capstone in INTS	3
Core Electives*	6	Core Electives*	6
TOTAL	15	TOTAL	15

Years 3 and 4 represent additional 60 credits to be taken at Texas Tech. When combined with 60 hours transferred from an approved institution, the total required number of hours is 120. Students must be advised by the B.A.A.S. advisor before starting the program at Texas Tech.

Prerequisites for courses selected in the concentration areas must be completed and, depending on the concentration, may not count toward the 18-hour minimum in each concentration.

If an entering student has not completed two years of a single foreign language in high school or has not transferred at least two semesters of a single foreign language from another college, the student must complete at least two semesters (or its equivalent) of a single foreign language at the first-year level as a graduation requirement. Visit www.depts.ttu.edu/officialpublications/catalog/_academics.php for more information.

For the Life and Physical Sciences core requirement, 6 hours will fulfill the core curriculum requirements, but Texas Tech also requires for graduation a 2-hour science laboratory that is not part of the core curriculum.

Students must complete 6 hours of writing intensive coursework. INTS 4350 will satisfy 3 hours of writing intensive coursework. Students will need to select another 3-hour writing intensive course within their degree plan.

* Texas Tech University requires 44 hours of core curriculum in order to graduate from the institution.

2. Major Requirements

- **Occupational Specialization, 36 Hours.** Comprised of courses related to a specific occupation, field, or subject. The occupational specialization typically consists of field-specific coursework completed for an Associate of Applied Science (A.A.S.) degree at a community college. Active-duty military or veterans may receive credit for technical or other formal training courses under this component of the degree plan. Other students who have not completed an occupational specialization through courses taken in a community college or in the military may create one by selecting a primary area of study.
- **Professional Development Concentrations, 36 Hours.** Consists of two separate multidisciplinary concentrations that serve to enhance the skills acquired by the student through an associate's degree or are complimentary themes of interest. Requires completion of 36 hours in two separate concentrations of 18 hours each.
 - **Concentration I:** 18 semester hours of course work from one of the concentration areas offered through the B.A.A.S. (areas of concentration include human resource development, agricultural leadership, or studies in personal finance) and approved by a B.A.A.S. advisor. For other approved areas, refer to www.depts.ttu.edu/officialpublications/catalog/_academics_fieldsofstudy.php and a B.A.A.S. advisor.
 - **Concentration II:** 18 semester hours approved by a B.A.A.S. advisor.

3. Core Curriculum Requirements, 44 Hours. Select any approved Texas Tech courses deemed by a B.A.A.S. advisor as appropriate to the degree. Caution must be exercised to ensure the student fulfills the university requirement of 40 hours of junior/senior level coursework.

4. Capstone and Multicultural Requirement, 6 Hours. 3-hour multicultural course (page 61) and the capstone course, INTS 4350.

The following credit may be submitted for consideration:

- Credits may be awarded for military training Community College of Air Force (CCAF) or American Council on Education (ACE)
- Academic credits from regionally accredited institutions of higher education may be transferred into the program. See www.admissions.ttu.edu/index.php/admission-financial_aid/transfer-2/.

Texas Veterans may be eligible for Hazelwood Financial Assistance. Refer to the Military and Veterans Programs at www.mvp.ttu.edu.

Center for Active Learning and Undergraduate Engagement

The Center for Active Learning and Undergraduate Engagement (CALUE) is committed to supporting and increasing undergraduate participation in active learning at Texas Tech. The center serves as a centralized location for those interested in participating in the active learning programs described below.

Service Learning

Service learning is an academic program that links academic study and civic engagement through thoughtfully organized service that enables students to perform meaningful community service related to their courses. CALUE assists faculty in developing service learning courses and identifying community partners. The center also cooperates with academic advisors in helping students identify and enroll in appropriate service learning courses. The Service Learning Program provides information, support, and opportunities to students,

faculty, and community members and fosters an appreciation of the academic and social values of community engagement.

Undergraduate Research

CALUE provides direction, support, and funding for undergraduate students interested in conducting research with a faculty mentor; hosts educational workshops for students targeted at organizing, conducting, and presenting research, as well as preparing for graduate school and graduate admission testing; facilitates collaboration and dialogues among faculty, staff, and organizations engaged in undergraduate research initiatives; and recognizes outstanding undergraduate researchers and faculty mentors.

CALUE hosts the TTU Undergraduate Research Conference annually on the Texas Tech campus to provide an opportunity for undergraduate researchers to present their research to the campus community.

Professional Internships

Through collaboration with academic colleges and other units on campus, CALUE enhances the educational experiences of students by promoting internship opportunities, developing relationships with organizations seeking internship placements, and placing students in work experiences related to their academic major or minor.

Study Abroad

CALUE assists the Study Abroad Office and colleges within the university in promoting study abroad opportunities that allow students to have an international learning experience while making progress toward a degree. Students who study abroad learn independence, self-confidence, flexibility, clarity about their own culture and future goals, views and perspectives held by others, and language and communication skills.

For more information, visit the Center for Active Learning and Undergraduate Engagement, 233 Administration Building, 806.742.1095, calue@ttu.edu, www.calue.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 Center as early as possible. In addition, the student must obtain approval from his or her departmental advisor before enrolling. Ordinarily a student must have completed the sophomore year to be considered for the program.

Cooperative Internship (COIN)

Undergraduate Course

3000. Cooperative Internship (V1-6). Supervised internship in an approved industrial or professional establishment. Approval of enrollment by Co-op program required.

Government and Public Service Internship Program

The Government and Public Service Internship Program at Texas Tech provides students a unique opportunity to experience first-hand how federal or state government functions. Administered by the Office of the President, the internships allow students to work

in offices in Washington, D.C., Austin or Lubbock. Internships are offered each semester and students are selected through an interview process. This opportunity allows interns to earn course credit, experience, networking opportunities, and a scholarship.

The internships are open to students of all majors and academic disciplines. The program prefers for undergraduate applicants to have a minimum 3.0 GPA and to have completed at least 60 semester credit hours. The internship program is also available for graduate and law students. The College of Agricultural Sciences and Natural Resources also offers a government internship program for students in the college (see page 123).

For application information and to contact the program coordinator, see www.congressionalintern.ttu.edu.

General Studies (GST)

Undergraduate Course

4000. Internship in General Studies (V1-12). Supervised internship with government offices and agencies including primarily congressional and legislative offices in Washington, D.C. and Austin, Texas. Open to all undergraduate, graduate, and law students at Texas Tech.

Institute for Studies in Pragmatism

The Institute for Studies in Pragmatism 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: Kenneth L. Ketner, Director, Institute for Studies in Pragmatism, Box 40002, Texas Tech University, Lubbock, TX 79409-0002, 806.742.3128.

Pragmatism (PRAG)

Undergraduate Courses

- 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.
- 6000. Master's Thesis (V1-6).**
- 7000. 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.
- 8000. Doctor's Dissertation (V1-6).**

Interdisciplinary Studies

Interdisciplinary Studies courses support students in the transition to and from university life. "Raider Ready: Freshman Seminar" (IS 1100) is designed for entering freshmen to smooth the transition of students from high school to the university, focusing on academic, social and personal skills needed to make that transition successfully. The one-hour interdisciplinary studies course is taught by faculty from throughout the university in a collaborative approach to address the major concerns of incoming students.

IS 1100 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. Freshman student athletes must take both IS 1100 and 1200, with the latter designed specifically to meet the unique demands and constraints on first-year student athletes.

The purpose of the IS 1101 TTAP seminar is to provide students with the skills and knowledge that will help them become exceptional Texas Tech undergraduates. The TTAP seminar has been specifi-

cally designed to expose students who are part of the TTAP to the insights, skills, dispositions, and resources necessary to excel as a Texas Tech undergraduate.

IS 4100 is a senior seminar to ease the transition of students from college to the workplace. Students who take IS 4100 should experience better results in their job search as a result of course content designed to enhance their ability to identify their own strengths and use those strengths to enter the workplace successfully.

Interdisciplinary Studies (IS)

Undergraduate Courses

- 1100. RaiderReady: Freshman Seminar (1).** Introduces students to philosophy, history, and applications of higher education and critical thinking.
- 1101. TTAP Academic Skills (1).** Introduces Tech Transfer Acceleration Program (TTAP) students to the philosophy of higher education, as well as theoretical and practical approaches to academic, social, and personal success in higher education.
- 1102. AVID for College Success (1).** Introduces the philosophy of the AVID system (Advancement Via Individual Determination) to develop theoretical and practical approaches to individual determination needed for success in higher education.
- 1200. Life Skills for Student Athletes (2).** 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.
- 2301. Introduction to Public Health (3).** Provides broad overview of public health. Covers basic definition, analytical methods, biomedical basis, social and behavioral factors, and environmental and management issues.
- 3100. RaiderReady: Transfer Seminar (1).** Explores the complex challenges of academic life beyond community college. Focuses on skills, techniques, institutional support essential to academic success, and major and career selection.
- 3110. Seminar in Health Careers (1).** Prerequisites: Sophomore standing and a minimum 3.0 GPA. Health professionals present weekly seminars related to preparation, training, and activities associated with various health professions.
- 4100. Strengths-Based Senior Seminar (1).** 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 Blackboard for onsite and distance students. Onsite students will meet for lecture and hands-on sessions.

Contact: Laura Heinz, 806.834.4584

Library Research (LIBR)

Undergraduate Course

- 1100. Introduction to Library Research (1).** Designed to introduce students to life-long information literacy skills and establish the tools for effective and efficient research in a university library.

Military History Minor

The university offers a minor in military history that consists of 18 hours, including the following:

- 3 hours of courses from HIST 1300, 1301, 2300, 2301, 2322, 2323.
- 9 hours of core courses from HIST 3330, 3331, 3332, 3333, 3340, 3348, 3366, 3367, 4302, 4337, 4338, 4343, 4355, 4396.
- 6 hours of elective courses from HIST 3304, 3308, 3309, 3346, 3350, 3359, 3374, 3396, 3398, 4309, 4310, 4311, 4351, 4353, 4356, 4372, 4379, 4383, 4393
- 6 hours must be in U.S. history.
- 6 hours must be in non-U.S. history.
- At least 3 hours must be taken at the 4000 level.
- At least 6 of the 18 hours required for a military history minor must be taken in residence, including the 3 at the 4000 level.

Other courses may be substituted with the consent of the Department of History's undergraduate advisor, 145 Holden Hall, 806.742.3744.

Programs for Academic Development and Retention (PADR)

Programs for Academic Development and Retention (PADR) is designed to provide opportunities for students to acquire and build effective learning strategies and personal management skills for college and beyond. PADR courses are open to all students at Texas Tech University. Classes meet two or three times a week for 16 weeks and average 25 to 30 students each.

Students returning from Academic Suspension who have not already successfully completed a PADR course are required to enroll in PADR and fulfill all class requirements in order to maintain their academic standing with the university.

Courses through PADR encourage students to learn how to manage the complexities of life, identify motivations for being in school, set long-term goals, create stepping stones toward larger goals, and eliminate stress by keeping life in balance. In addition to classroom interaction, students have the opportunity for individualized time with the instructor to work on specific problems that might hinder the student's success. Students who fail to meet minimum GPA requirements set forth by their college (see course descriptions for requirements) and those students returning from academic suspension will be required to enroll in a PADR course designated for their major.

Contact: Room 56 Holden Hall, www.padr.soar.ttu.edu, 806.742.3928

Programs for Academic Development and Retention (PADR)

Undergraduate Courses

- 0010. Strategies for Academic Achievement for the Media and Communication Major.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for less than 2.25 GPA first semester at TTU and students returning from academic suspension.
- 0011. Strategies for Academic Achievement for the Math or Science Major.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for less than 2.25 GPA first semester at TTU and students returning from academic suspension.
- 0021. Strategies for Academic Achievement.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for less than 2.0 GPA first semester at TTU and students returning from academic suspension.
- 0031. Strategies for Academic Achievement for the College of Arts and Sciences Major.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for less than 2.25 GPA first semester at TTU and students returning from academic suspension.

- 0041. Strategies for Academic Achievement for the College of Human Sciences Major.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for 30 hours at TTU with cumulative GPA less than 2.0 and students returning from academic suspension.
- 0051. Strategies for Academic Achievement for the Non-Traditional Student.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Non-traditional students should follow the minimum GPA requirement set forth by the college in which they are enrolled.
- 0061. Strategies for Academic Achievement University Programs.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for university studies students with less than a 2.0 GPA first semester at TTU, PREN/TTUD students with a cumulative GPA of less than 2.0, and students returning from academic suspension.
- 0070. Techniques for College Student Success.** A study of principles and implementation of behaviors and strategies that foster academic and career success through establishing greater productivity, increased influence in key relationships, stronger team unity, and complete life balance. Course will not count toward full-time enrollment.
- 0071. Strategies for Academic Achievement for Majors in Agricultural Sciences and Natural Resources.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for less than 2.0 GPA first semester at TTU and students returning from academic suspension.
- 0080. Theory and Development for Academic Achievement.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for all students who were previously required to enroll in PADR but did not complete.
- 0081. Strategies for Academic Achievement for the College of Business Major.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for less than 2.0 GPA first semester at TTU and students returning from academic suspension.
- 0091. Strategies for Academic Achievement for the Engineering Major.** Theories of learning and motivation. Techniques for personal growth and academic skills development. Required for any engineering student whose cumulative GPA falls below 2.0.

Study Abroad Program

The Study Abroad division of the Office of International Affairs coordinates all study abroad programs for Texas Tech University students. 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.

There are several types of study abroad programs from which Texas Tech students may choose. The Texas Tech center in Seville, Spain, offers students the opportunity to take Texas Tech catalog classes and receive direct Texas Tech credit. Students may participate in a concentrated language program (equivalent to four semesters of Spanish or German) and may select 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.

Many academic departments offer faculty-led programs, usually in the summer, with a wide variety of course offerings and locations. Students earn Texas Tech credit while taking a catalog course in an international location with Texas Tech faculty.

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.

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: studyabroad@ttu.edu; www.studyabroad.ttu.edu; 806.742.3667; International Cultural Center, 601 Indiana Avenue, Lubbock, TX.

General Studies (GST)

Undergraduate Courses

- 2001. General Studies Abroad (V1-12).** Individual studies in interdisciplinary, international, and multicultural experiences.
- 3013. TTU Affiliate Study Abroad (V1-15).** Study abroad.

Graduate Course

- 5013. TTU Affiliate Study Abroad (V1-18).** Open only to students during a term in which they are studying abroad on a Texas Tech-approved affiliate program with department or college approval.

University Studies

Bachelor of Arts or Bachelor of Science in University Studies

University studies is an interdisciplinary major that fosters new areas of learning and discovery by facilitating student learning across department and college boundaries. Administered by the Division of Undergraduate Education and Student Affairs within the Office of the Provost, a Bachelor of Arts or Bachelor of Science in University Studies provides a unique course of study that allows students flexibility in choosing three distinct areas of study. Each area is referred to as a "concentration." Although the three concentrations exist as separate programs within the university, they are normally unavailable as a combination of courses in an existing degree program. For example, a student might focus on a specialization in environmental journalism with concentrations in journalism, plant and soil sciences, and environmental toxicology. Each area exists in different colleges as part of separate degree programs, but only a major in university studies will allow students to study the three concentrations as a unit.

Coursework in the B.A. or B.S. degrees must total 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 9 hours of upper-division credits required in each area of concentration.

Students seeking a B.A. or B.S. in University Studies will be required to make a C or better in 12 hours of Integrative Studies from the following: INTS 2310, 3300, 4350, and either 3301 or 4320. 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 a university studies degree advisor to organize a course of study that meets existing university and degree standards. With the degree advisor's assistance, each student must develop a degree plan that consists of (1) a concentration declaration form and (2) a degree plan incorporating a listing of all courses completed and/or in progress as well as a listing of all intended or enrolled courses related to the degree and major. A student choosing to change an already established area of concentration must be appropriately advised by a university studies advisor and submit a new degree plan.

Credit by Exam. Seniors must receive written permission from the Office of the Provost prior to attempting credit by examination and provide proof of notification upon registering for an exam in Academic Testing Services.

Curriculum for Bachelor of Arts or Bachelor of Science in University Studies

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of 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
Natural Science Elective	4	Natural Science Elective	4
Social and Behavioral Sci. Elective	3	Concentration Area	3
Mathematics	3	Mathematics	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
Humanities Elective	3	Visual & Performing Arts Elective	3
Oral Communication Elective	3	Concentration Area	3
Multicultural Requirement	3	Concentration Area	3
INTS 2310, Found. in Integr. Studies	3	Concentration Area	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
INTS 3300, Persp. on Integr. Studies	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
INTS 3301 or 4320	3	INTS 4350, Capstone in Integr. Studies	3
Concentration Area	3	Elective	3
Elective	3	Elective	3
Elective	3	Elective	4
Elective	3		
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

Prerequisites for courses selected in the concentration areas must be completed and, depending on the concentration, may not count toward the 18-hour minimum in each concentration.

If an entering student has not completed two years of a single foreign language in high school or has not transferred at least two semesters of a single foreign language from another college, the student must complete at least two semesters (or its equivalent) of a single foreign language at the first-year level as a graduation requirement.

Grading Practices. Credits for a course in which a grade of D is earned may not be applied toward fulfillment of any concentration area. No course may be used more than once on a degree plan unless it has been approved by the Office of the Provost or has the statement "may be repeated for credit" in the official published course description.

Final 30 Hours. The final 30 credit hours applied to a degree program must be completed with Texas Tech University enrollments. Credit for courses taken at other institutions must have prior written approval from the Office of the Provost.

Contact: University Studies, 164 Drane Hall, T 806.742.7100, F 806.742.7219, www.depts.ttu.edu/universitystudies

Agricultural Leadership

The area of concentration in agricultural leadership includes breadth in terms of a broad overview of leadership and depth in the areas of personal, team, and organizational leadership taught in an agricultural and natural resources context. Students learn how both non-profit (e.g. cooperative extension, international development agencies) and for-profit (both small-scale and large multinational agribusinesses) organizations are influenced by leadership, as well as specific principles and concepts regarding personal, dyadic, team, managerial, and executive leadership. The coursework is conceptualized around a leadership process model and how leadership traits and skills are utilized through core leadership behaviors (supportive, charismatic, directive, reward and punishment, and participative). The development of human capital undergirds this important field of study.

Human Resource Development

The human resource development (HRDV) curriculum focuses on the skills and knowledge necessary for interacting with people in various work settings. The courses in the program draw on theory from the social and behavioral sciences as well as organizational leadership. HRDV courses are designed to help students understand and address issues confronting both individuals and organizations. Coursework focuses on workplace topics such as human relations and communication, training and development, staffing skills and strategies, and leadership within the workplace.

Human Resource Development as a Concentration. Students interested in pursuing a degree in university studies with an area of concentration in human resource development must complete all of the degree requirements for the chosen degree. An area of concentration in human resource development includes a minimum of 18 hours from HRDV 2301, 3301, 3303, 3305, 3307, 3308, 3309, 3310, 4000, 4301, 4302, 4303, 4304, 4305, or 4306.

Human Resource Development as a Minor. Although students majoring in university studies do not need a minor, students in other degree programs may seek a minor in human resource development by taking 18 hours in HRDV courses approved by a human resource development advisor. The core (required) courses for a human resource development minor are HRDV 2301, 3301, and 3303. The remaining 9 hours can be selected from HRDV 3305, 3307, 3308, 3309, 3310, 4000, 4301, 4302, 4303, 4304, 4305, or 4306. It is recommended that the 18 hours of coursework be taken in the order listed below:

1. HRDV 2301: Introduction to Human Resource Development
2. HRDV 3301: Human Relations in Human Resource Development
3. HRDV 3303: Intro to Research in Human Resource Development
4. Choose at least three courses from HRDV 3305, 3307, 3308, 3309, 3310, 4000, 4301, 4302, 4303, 4304, 4305, or 4306.

Human Resource Development (HRDV)

Undergraduate Courses

2301. **Introduction to Human Resource Development (3).** Online course focusing on the foundations of human resource development, including the history of human resource development, recruitment, training and development, and compensation and benefits.
2303. **Diversity and Cultural Competence in the Workplace (3).** Students will analyze organizational, cultural, and global workplace issues related to diversity leadership and gain cultural competencies necessary to manage a 21st-century multicultural workforce. Fulfills core Social and Behavioral Sciences requirement (pending THECB approval) and fulfills multicultural requirement.
3301. **Human Relations in Human Resource Development (3).** Online course that explores topics related to working with people in the organization, including communication, issues of concept and self-reliance, small group dynamics, and attitudes in the workplace.
3303. **Introduction to Research in Human Resource Development (3).** Online course that explores the common data collection and analysis techniques utilized in the workplace. Includes sampling, survey design, measurement, quantitative and qualitative data analysis, and the use of research findings to inform organizational decision-making and change.
3305. **Staffing Strategies in Human Resource Development (3).** Online course that focuses on the process of staffing organizations. Includes analysis of the external job market, talent acquisition, resume analysis, interviewing techniques, background and reference checks, the hiring process, and integration of new employees into the organization.
3307. **Employment Law in Human Resource Development (3).** Online course that explores contemporary issues in employment law and the major legal facts and concepts used in human resource development. Includes federal laws (OSHA, ADA, FMLA, etc.) that employers deal with regularly.
3308. **Employee and Labor Relations (3).** Online course focusing on the complexities of labor and employee relations. Topics include organizational culture, employment counseling issues, negotiation, dispute resolution, and employee motivation and retention.

- 3309. Role of Human Resource Development in Adult Learning (3).** Online course that focuses on the relationship between human resource development and the adult learning process. Addresses adult learning models and preferences as they relate to human resource development context.
- 3310. Training and Development in Human Resource Development (3).** Online course that addresses key training and development topics, including conducting training needs assessments, developing training to meet employee/employer needs, and adult learning theories and methods.
- 3311. Total Compensation and Benefits (3).** Course topics include the strategic use of total compensation to attract and retain employees, salary and pay structures, variable pay, benefit plans, and compensation administration.
- 3313. Organizational Safety and Wellness (3).** Prepares students to analyze concerns related to workplace safety and wellness, develop and evaluate workplace safety and wellness programs, and follow governmental safety regulations.
- 3315. Job Analysis and Design (3).** Focuses on job analysis and design processes, legal aspects of job analysis/design, and the strategic use of job analysis/design to increase organizational success.
- 4000. Independent Study (VI-12).** Designed to acquaint students with current research, theory, policies, perspectives, and/or practices in human resource development. May be repeated for credit.
- 4301. Principles of Leadership in the Workplace (3).** Focuses on the essential theories, principles, processes, and techniques that can be utilized to lead people in an organization. Examines the linkages between leadership and performance and goal attainment.
- 4302. Global and Virtual Leadership in Human Resource Development (3).** Provides an introduction to leadership in a global and virtual workplace. Topics include strategies for global/virtual talent acquisition and development, leadership issues, and management strategies.
- 4303. Strategic Leadership in Healthcare Organizations (3).** Provides an introduction to and overview of leadership, management, and organizational behavior in the unique sector of health care. Integrates theory with practice through readings, lectures, written assignments, and presentations from different organizational perspectives.
- 4304. Advanced Concepts in Human Resource Development (3).** Provides an overview of advanced human resource topics, including managing human capital, strategic management, global leadership, the alignment of human resources and strategic goals, ethics in human resources, teamwork in the workplace, and conflict management.
- 4305. Internship in Human Resource Development (3).** Prerequisite: HRDV 2301 or consent of instructor. Supervised internship in a professional setting relating to human resource development. Students will apply their knowledge and skills to the workplace. May be repeated for credit. May be substituted for 3-6 hours in an area of concentration.
- 4306. Strategic Leadership in Human Resource Development (3).** Prerequisite: HRDV 4100 or consent of instructor. Advanced course in human resources development. Students will produce an in-depth independent project demonstrating their knowledge of human resource development and their ability to apply learned strategies and skills in a real-world setting.

Integrative Studies

Integrative studies is an approach to answering questions, solving problems and addressing contemporary social issues from multiple perspectives. Integrative studies students develop the intellectual tools needed to build bridges across academic disciplines and apply their skills, innovations, and knowledge in various academic and practical settings. In core classes, students develop portfolio artifacts that showcase their individual skills, interests, and talents. This portfolio and the applied learning experience provide each student with valuable resources for flexible, individualized career planning and development.

Integrative Studies as a Concentration. Students interested in pursuing a degree in university studies with an area of concentration in integrative studies must include in their course of study a minimum of 18 hours from the following courses: INTS 2310, 3300, 3301, 3330, 3350, 4000, 4320, and 4350.

Integrative Studies as a Minor. Although students majoring in university studies do not need a minor, students in other degree programs may seek a minor in integrative studies by taking 18 hours

of integrative studies courses approved by an integrative studies advisor. A grade of C or better must be achieved in each course. The coursework is recommended to be taken in the order listed below:

1. INTS 2310: Foundations in Integrative Studies
2. Choose at least four classes from the following:
 - INTS 3300: Perspectives on Integrative Studies
 - INTS 3301: Career and Professional Development
 - INTS 3330: Global Perspectives in Integrative Studies
 - INTS 3350: Team Leadership in Interdisciplinary Problems
 - INTS 4000: Independent Study
 - INTS 4320: Internship in Integrative Studies
3. INTS 4350: Capstone in Integrative Studies

Integrative Studies (INTS)

Undergraduate Courses

- 2310. Foundations in Integrative Studies (3).** Online course. Introduces students to the foundations of key interdisciplinary concepts and theories and prepares students for success in the integrative studies program.
- 3300. Perspectives on Integrative Studies (3).** Prerequisite: INTS 2310. Online course. Provides students with an introduction to interdisciplinary research methods. Covers methods of disciplinary integration, orientation to interdisciplinary expectations, and standards in academic and professional organizations. May be substituted for 3 hours in area of concentration. (Writing Intensive)
- 3301. Career and Professional Development (3).** Online course. Prepares students for a successful workplace experience. Offers students the opportunity to develop career search and interviewing strategies, resume writing, and professional and personal growth. May be substituted for 3 hours in area of concentration.
- 3330. Global Perspectives in Integrative Studies (3).** Prerequisite: INTS 2310. Online course. Emphasizes interdisciplinary problem solving through critical, analytical, and integrative approaches to the study of general issues and trends facing the contemporary world. May be substituted for 3 hours in area of concentration. (Writing Intensive)
- 3350. Team Leadership in Interdisciplinary Problems (3).** In this online course, students will utilize critical, analytical, and integrative approaches to interdisciplinary problem solving while emphasizing the practices of effective interdisciplinary leadership and teamwork. May be substituted for 3 hours in area of concentration. (Writing Intensive)
- 4000. Independent Study (VI-12).** Prerequisites: 2.5 GPA and consent of instructor. Teaching assistantships, independent coursework, student-initiated research experience, or individual studies of special interest in integrative studies.
- 4320. Internship in Integrative Studies (3).** Prerequisites: INTS 3300 and consent of instructor. Supervised internship in a professional workplace setting. Students apply their research skills and integrative knowledge to a workplace problem. May be repeated for credit. May be substituted for 3-6 hours in an area of concentration.
- 4350. Capstone in Integrative Studies (3).** Prerequisites: INTS 3300 and senior standing. Advanced course in integrative studies. Students will draw together the diverse strands of their studies, reflect on their connections, and produce an in-depth senior project. May be substituted for 3 hours in area of concentration. (Writing Intensive)

Organizational Leadership

The interdisciplinary concentration in organizational leadership formally guides and encourages the exploration of organizations and their influence in the global economy. The curriculum blends challenging course options with relevant interdisciplinary electives to facilitate an interest in and appreciation for the beneficial application of operational concepts through leadership. The concentration comprises 18 credit hours consisting of 6 hours from three curricular learning objectives. Students must have a minimum of a 2.0 TTU GPA to declare the concentration, and a grade of C or better in each class is needed to complete concentration requirements.

Required Coursework. With an emphasis on academic and institutional engagement, utilization of resources, intellectual agility,

and future application, students must select 6 credit hours from each of the three curricular learning objectives of the concentration: communication, leadership, and operational practice. Students cannot select more than 6 credit hours from any curricular learning objective. Courses required explicitly and without alternatives by the student's declared major/minor may not be used to fulfill elective coursework in the organizational leadership concentration.

Communication. Students may select from the following courses: AGSC 2300, AGSC 2301, AAEC 4320, ADV 3310, COMS 3315, COMS 3355, COMS 3358, COMS 3359, **ESS 4356, ESS 4358, INTS 3300, INTS 3301, INTS 4350, MGT 3373, MKT 3350, PFP 3301, PHIL 3323, and RTL 2350.**

Leadership. Students may select from the following courses: AGSC 3301, AAEC 2305, AAEC 3301, AAEC 3304, AAEC 3305, AAEC 4306, AAEC 4313, **COMS 3356, ECO 3320, MGT 3370, BA 3304, BA 3305, HRDV 3305, HRDV 3308, HRDV 3309, HRDV 4301, HRDV 4302, HRDV 4303, HRDV 4306, INTS 3330, INTS 3350, ISQS 3344, RHIM 2310, RHIM 3341, RHIM 3358, and RTL 3340.**

Operational Practice. Students may select from the following courses: AAEC 3302, AAEC 3315, AAEC 4303, AAEC 4315, AAEC 4316, ACCT 2300, ACCT 2301, **BA 3301, BA 3302, BA 3303, BLAW 3391, COMS 3351, ECO 2301, ECO 2302, ECO 2305, ECO 3311, ECO 3323, ECO 3324, FIN 3320, HRDV 2301, HRDV 3301, HRDV 3303, HRDV 3307, HRDV 3310, HRDV 4000, HRDV 4304, HRDV 4305, INTS 4320, ISQS 2340, MATH 2345, MATH 2356, PR 3310, RHIM 3320, RHIM 3321, RHIM 3322, RHIM 3345, RHIM 4316, and RTL 3380.**

Note: Students must satisfy individual course prerequisites that may not count towards the organizational leadership concentration. **Courses listed in bold** are those that have historically been offered online or at a regional site.

Journalism and Visual Media

Students enrolled in the B.S. or B.A. in University Studies may choose the journalism and visual media concentration. This concentration allows students to study issues related to news, writing, photography, and publications. It will appeal to students who have an interest in travel and destination journalism. The concentration is offered only at the Texas Tech University Hill Country campus in Fredericksburg, Texas. Required courses are JOUR 2300, 2310, 3316; PHOT 3310, 4300, 4312.

Undergraduate Certificate in Strategic Leadership in Human Resource Development

University Studies offers a 12-hour Undergraduate Certificate in Strategic Leadership in Human Resource Development to provide students with the knowledge and skills necessary to build productive employee teams and lead organizations in a dynamic workplace environment. The certificate program provides knowledge and skills related to leadership in traditional, global, and virtual workplaces; team building; developing human capital; and aligning human resources with organizational goals.

The required courses for the certificate are HRDV 4301 and 4306. It is recommended that students take HRDV 4301 during their first semester in the certificate program and HRDV 4306 during their last semester in the certificate program. Students additionally select two 3-hour electives from AGED 3314, 3315, 4308; COMS 3355, 3356; HRDV 4302, 4303, 4304, 4305; INTS 3350; and RHIM 3358.

Contact information: Dr. Andrea McCourt, University Studies, 806.834.4387, andrea.mccourt@ttu.edu.

Wind Energy Programs

Rapid growth in the wind energy industry has produced an increase in demand for a well-educated workforce. Texas Tech University, already a pioneer in wind energy education, has developed educational programs to meet these expanding needs and educate future leaders in the wind energy field.

Job growth in wind energy has been strong, while the wind energy industry contributes to energy independence, positive environmental impact, and favorable growth to the United States economy. Texas Tech supports undergraduate and graduate coursework in the field of wind energy.

Bachelor of Science in Wind Energy

The Bachelor of Science in Wind Energy prepares students for a career in all segments of the industry by offering courses on multiple aspects of the industry, from education on the characteristics of wind to instruction on project development and management. The versatile multidisciplinary nature of the degree plan makes Texas Tech's wind energy program unique.

Degree Requirements. Students will maintain a minimum 2.25 GPA for all courses and must follow course prerequisites as stated in their degree plan requirements. Coursework in a wind energy degree must total a minimum of 120 semester hours, including 46 hours of the university's core curriculum, 47 hours of wind energy core courses, 3 hours of a global component, and 24 hours of applied electives.

Global Component. In today's globalized wind energy job market, students who are exposed to a foreign language, participate in a study abroad program, or gain job experience through an internship with an international company are considered more marketable and competitive.

Students will complete the university's foreign language requirement, either by completing two years of high school foreign language or two semesters at the college level, and choose from the following global component options:

- **Study Abroad Option.** Complete an approved study abroad experience through the International Texas Tech Center, a Texas Tech approved reciprocal exchange program, or a faculty-led program. Students must enroll in and successfully complete 3 credit hours of coursework with a grade of C or better to satisfy 3 credit hours of the global component. Departmental consent required.

Bachelor of Science in Wind Energy

FIRST YEAR			
Fall		Spring	
WE 1300, Introduction to Wind Energy	3	GEOG 1401, Physical Geography	4
ATMO 1300, Intro. to Atmo. Science	3	ENGL 1302, Advanced College Rhetoric	3
ATMO 1100, Atmospheric Science Lab.	1	Language, Phil., & Culture Elective*	3
ENGL 1301, Essentials of Coll. Rhetoric	3	MATH 1550, Precalculus	5
MATH 1321, Trigonometry	3		
POLS 1301, American Govt., Org.	3		
TOTAL	16	TOTAL	13
SECOND YEAR			
Fall		Spring	
WE 1310, Analyt. Meth. in Wind Energy	3	WE 1311, Prin. of Wind Power Conv.	3
WE 1110, Analyt. Meth. in Wind En. Lab	1	WE 2310, Meth. for Wind Res. Character	3
ENGL 2311, Intro. to Technical Writing	3	HIST 2301, History of U.S. Since 1877	3
HIST 2300, History of U.S. to 1877	3	Creative Arts Elective*	3
Social and Behavioral Sciences*	3	Multicultural Requirement*	3
WE 2300, Social Impacts of Wind Energy	3		
TOTAL	16	TOTAL	15
THIRD YEAR			
Fall		Spring	
WE 3300, Wind Energy Sci. & Tech. I	3	WE 3301, Wind Energy Sci. & Tech. II	3
WE 3310, Wind Energy Eco. & Finances	3	WE 3100, Wind Energy Lab	1
ENGL 2000-Level Literature*	3	WE 3315, Renewable Energy & Environ.	3
Oral Communication Elective*	3	Global Component	3
Applied Elective (any level)	3	POLS 2302, American Public Policy	3
TOTAL	15	TOTAL	13
FOURTH YEAR			
Fall		Spring	
WE 4300, Wind Energy Grid Integration	3	WE 4311, Wind Energy Law & Reg. Iss.	3
WE 4323, Meteorology for Wind Energy	3	WE 4310, Wind Modeling & Design	3
WE Jr./Sr. Elective	3	WE Jr./Sr. Elective	3
Jr./Sr. Elective (any)	3	Jr./Sr. Elective (any)	6
Applied Elective (any level)	3		
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* Choose from the university's core curriculum and multicultural lists.

- **Internship Option.** Complete an approved internship with an international company, either in the U.S. or abroad, related to the wind energy field. Two hundred hours of job related experience and a written report are required to earn 3 credit hours of internship credit. Internships should be completed during the student's junior or senior year of coursework. Instructor approval required.

Contact: Dr. Andrew Swift, andy.swift@ttu.edu

Additional Wind Energy Programs

Undergraduate Wind Energy Concentration. Students interested in pursuing a Bachelor of Arts in University Studies, a Bachelor of Science in University Studies, or a Bachelor of General Studies with an area of concentration in wind energy must complete all of the degree requirements for the chosen degree. An area of concentration in wind energy includes a minimum of 18 hours of wind energy coursework. A minimum of 9 hours of WE coursework must be taken at the 3000 level or above.

Undergraduate Wind Energy Minor. This minor consists of 18 hours of undergraduate wind energy courses. A minimum of 9 hours of WE coursework must be taken at the 3000 level or above. All courses must be approved by a wind energy advisor, and a grade of C or better achieved in each course. Wind energy is a multidisciplinary field and some concepts will require a background in calculus and physics.

Undergraduate Certificate in Wind Energy. The Undergraduate Certificate in Wind Energy consists of 10 hours of undergraduate wind energy courses. Students pursuing the undergraduate certificate must take WE 1300, 3300, 3301, and 3100. A grade of C or higher in each course is required.

Graduate Certificate in Wind Energy. The Graduate Certificate in Wind Energy includes 15 hours of graduate-level coursework. Students may choose to specialize in the technical or managerial tracks. The technical track of the certificate is calculus and physics-based and focuses on the technical aspects of the growing wind energy field. The managerial track is more interdisciplinary and focuses on the administrative/managerial aspects of the field.

Students pursuing the managerial track must take WE 5310, WE 5311 (prerequisite 5310), IE 5329 and 6 hours of coursework from WE 5320, WE 7000, ECE 5343, IE 5306, IE 5319, or LAW 6205. Students pursuing the technical track must take WE 5300, WE 5301 (WE 5300 prerequisite), ECE 5343 and 6 hours from WE 5320, WE 7000, ATMO 5301, IE 5306, 5319, 5329, or LAW 6205.

See www.depts.ttu.edu/nwi/education/wind_energy_certs_home.php for more information about the graduate certificates.

Ph.D in Wind Science and Engineering. If students decide to pursue studies beyond the certificate level, course credit earned towards the certificate may be considered toward a **Ph.D in Wind Science and Engineering**. See the Graduate School section beginning on page 117 for details about this program.

Wind Energy (WE)

Undergraduate Courses

1110. **Wind Energy Analytical Methods Laboratory (1).** Corequisite: WE 1310. Hands-on exercises in the development of practical MatLab skills associated with mathematical modeling and data manipulation in wind energy.
1300. **Introduction to Wind Energy (3).** 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.
1310. **Analytical Methods in Wind Energy (3).** Covers fundamentals of wind mathematical modeling (one to three dimensions).
1311. **Principles of Wind Power Conversion (3).** Prerequisite: WE 1310. Covers fundamentals of physical wind modeling needed for a complete understanding of wind energy topics.
2300. **Social Impacts of Wind Energy (3).** Provides an in-depth look at environmental, economic, national security, health benefits, and issues of wind energy versus traditional fuels.

2310. **Methods for Wind Resource Characterization (3).** Prerequisite: WE 1310. In-depth study of the methods used in applying wind resource characterizations to contextual wind power problems.
3100. **Wind Energy Lab (1).** Prerequisite: WE 3300. In-depth information on physical principles of wind resources modeling, site assessment, GIS and wind data processing.
3300. **Wind Energy Science and Technology I (3).** Prerequisite: WE 1300. An introduction to wind power meteorology, wind turbine aerodynamics and design, and wind farm grid integration and application.
3301. **Wind Energy Science and Technology II (3).** Prerequisite: WE 3300. Provides an understanding of wind turbine aerodynamics; wind turbine performance and investment; wind energy grid integration; institutional, legal, and environmental issues; and wind energy development and construction.
3310. **Wind Energy Economics and Finances (3).** Prerequisite: WE 2310. In-depth understanding of the economic and financial concepts involved in both large- and small-scale developments of wind energy.
3315. **Renewable Energy and the Environment (3).** Provides an overview of society's needs and future energy demands. Examines conventional energy sources and systems. Provides in-depth analysis of renewable energy sources.
4000. **Internship in Wind Energy (V1-6).** Prerequisite: Junior or senior standing, consent of instructor. May be repeated for up to 8 credit hours. Supervised internship in an approved wind energy industry or professional establishment.
4300. **Wind Energy Grid Integration (3).** Prerequisite: WE 3301. In-depth instruction in wind turbine generator technology, grid integration techniques, and market and grid regulations.
4310. **Wind Modeling and Design (3).** Prerequisites: ENGL 1302; WE 2300, 3300, 3301, 3100, and 3310. Instruction in the process and development of wind energy projects emphasizing technical, environmental, and financial aspects of project development. (Writing Intensive)
4311. **Wind Energy Law and Regulatory Issues (3).** Prerequisite: WE 3315, ENGL 1302, or declared minor in legal studies. Provides an in-depth understanding of the law as it relates to the development of wind projects. (Writing Intensive)
4312. **Wind Energy and the Environment (3).** Prerequisite: WE 3315. Covers issues and possible solutions regarding wind energy development, technology, and the environment.
4313. **Wind Energy Geographic Information Systems and Mapping (3).** Prerequisites: WE 2310 and 3100. Focuses on the tools, methods, technology, data, and related issues of GIS and mapping systems in wind energy.
4320. **Independent Study in Wind Energy (3).** Prerequisites: 9 hours of WE courses and consent of instructor. Individual research in the wind energy area of student's choice under faculty guidance. May be repeated once for credit.
4321. **Wind Dynamics for Wind Energy (3).** Prerequisite: WE 4323. Provides a background on the physical and mathematical bases of wind prediction.
4322. **Wind Turbine Aerodynamics (3).** Prerequisite: WE 3301. Provides an in-depth understanding of wind turbine aerodynamic principles and applications.
4323. **Meteorology for Wind Energy (3).** Prerequisites: WE 1311 and 2310. Covers topics related to wind power meteorology.
4390. **Advanced Wind Farm Project Design and Analysis (3).** Prerequisites: WE 3100 and 4313. Focuses on design of wind farm projects, optimized layouts, and data analysis using real-world data, problems, and considerations.

Graduate Courses

5300. **Advanced Technical Wind Energy I (3).** A multidisciplinary course for students with a physical science/engineering background wishing to pursue a technical approach to wind energy.
5301. **Advanced Technical Wind Energy II (3).** Prerequisite: WE 5300. An in-depth multidisciplinary course for students with a physical science/engineering background wishing to pursue a technical approach to wind energy.
5310. **Advanced Managerial Wind Energy I (3).** Non-technical version studying wind turbine and wind farm architecture, wind energy conservation, aerodynamics, electrical systems, economics, regulatory issues with environmental and utility industries.
5311. **Advanced Managerial Wind Energy II (3).** Prerequisite: WE 5310. An in-depth multidisciplinary course for students with a business/managerial/natural science background wishing to pursue a non-technical approach to wind energy.

5320. **Renewable Energy Policy (3)**. Provides overview of basic economic concepts and examines the progress made in renewable energy policy in the U.S. and the world.
7000. **Research (V1-12)**. Prerequisite: Consent of instructor. May be repeated for credit.

Women's Studies

The Women's Studies Program is an interdisciplinary, all-campus program administered by the Director of Women's Studies.

Undergraduate Minor. 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. A minor consists of 18 hours of courses as approved by the director. The minor typically includes 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. However, many courses without a WS prefix may be used to complete the minor, with the approval of the director.

Graduate Certificate. The Graduate Certificate in Women's Studies offers a specialist interdisciplinary sub-field in women's, gender, and identity studies at the post-graduate level. It also functions as a stand-alone credential useful for professionals in nursing, social work, law, healthcare management, and other fields or as an additional credential for M.A. and doctoral students. The curriculum includes courses in women's studies as well as a wide range of related courses from other departments and programs.

Other Graduate Courses. Both Women's Studies (WS prefix) and a range of other graduate courses from across the university can also be approved by the director for completion of one of the three fields in the interdisciplinary M.A. degree program. For more information, contact the Women's Studies Program, 806.742.4335, or email womens.studies@ttu.edu.

Women's Studies (WS)

Undergraduate Courses

1305. **Human Sexuality (3)**. Examination of the structural and functional traits of sexuality and how they affect well-being; covers relationships, reproduction, and life-style alternatives.
2300. **Introduction to Women's Studies (3)**. Basic survey of concepts and theories related to the study of women and to the analysis of gender roles.
2301. **Gender Roles: Life Span Developmental Perspective (3)**. Introduction to gender role concepts and to the impact of gender and gender role systems on individual and family developmental processes. (HDFS 2300)
2305. **Intersectionalities: Race, Class, and Gender in a Global World (3)**. The study of women's experiences as influenced by such social statuses and identities as race, class, and global status.
2331. **[SOCI 2301] The Sociology of Marriage (3)**. History, present status, and current problems of the marriage institution.
3306. **Women in Culture and Society (3)**. 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.
3307. **Gender Issues in Sport (3)**. 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)**. Examines gender in contemporary society, giving attention to gender roles, masculine and feminine communication styles, social institutions that shape gender, and everyday applications of gender in the lives of people. (COMS 3334)
3321. **Human Sexuality Through the Family Life Cycle (3)**. Human sexuality from a life cycle perspective, with an emphasis on developmental, familial, and societal factors that influence individual sexuality. (HDFS 3321)
3323. **Women in Modern America (3)**. Explores the history of women and gender in the United States from the 16th century to 1877. (HIST 3323)

3325. **Gendered Lives (3)**. Prerequisite: SOC 1301. Course treats women as a group with unique sex role socialization, work, family, and political experience. Emphasis on women in contemporary United States. (SOC 3325)
3326. **Women in Politics (3)**. A study of female political participation in the United States, including voting, campaign activity, interest group activity, and office holding. (POLS 3326)
3331. **Sociology of the Family (3)**. Changing family life styles, mate roles, parent-child relationships, adoption, abortion, population control, technical industrial impact on American family unit. (SOC 3331)
3332. **Feminism and Philosophy (3)**. 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.
3337. **Inequality in America (3)**. Inequality as expressed in occupational, class, ethnic, and sexual hierarchies is examined from varying sociological perspectives. (SOC 3337)
3340. **Gender and Sexuality in the Classical World (3)**. 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)**. What women were supposed to do; what women did, from prehistory to the vote in 1920. (HIST 3341)
3342. **Introduction to Research in Human Geography (3)**. Introduction to research methods in geography. (GEOG 3340)
3382. **Women Writers (3)**. Significant works by women. (ENGL 3382)
4302. **Psychology of Human Sexual Behavior (3)**. 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. May be repeated with consent of the Director of Women's Studies.
4310. **Feminist Thought and Theories (3)**. 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.
4355. **Let's Talk Women, Let's Talk War: Women in Conflict in the 20th Century. (3)**. Prerequisite: Junior standing or consent of instructor. Examines the involvement and reactions of European women to situations of war and revolution in the 20th Century. (HIST 4355)
4399. **Women's Studies Seminar (3)**. Prerequisites: WS 2300 and senior standing. A capstone course for the minor in women's studies. Extends, integrates, synthesizes, and applies women's studies knowledge.

Graduate Courses

5000. **Practicum in Women's Studies (V1-6)**. Prerequisites: 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)**. Prerequisites: 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)**. 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)**. Focused and rigorous examination of selected topics. May be repeated with consent.
5360. **Foundations of Women's Studies (3)**. 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.

Pre-Professional Programs

Pre-Engineering

To gain admission into the Whitacre College of Engineering, students must have the academic preparation necessary to begin an engineering degree program. Whitacre College of Engineering has partnered with Texas Tech University Advising to create the TTU Pre-Engineering Program. The program is a student retention and success initiative that provides intense academic advising and support for students as they build the requisite math skills and college-required GPA to be successful in an engineering degree program. Pre-Engineering students will enroll in normal university core curriculum and foundational math courses. For students who determine that engineering is not an appropriate choice, the advisors in University Advising are uniquely qualified to assist them in finding a course of study that is best suited to their unique talents and interests. The ultimate goal is for every student to graduate successfully from a best-fit major.



Pre-Law Program

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 law school graduates choose to practice in the courtroom, others leverage their newly developed skills to excel in other fields. Through a structured four-year process, the TTU Pre-Law Program

cultivates the undergraduate to become a confident and articulate law school applicant bearing exceptional qualifications. Participants focus on the three essential areas identified by law school professionals nationwide:

- Writing and speaking with comprehension and clarity.
- Understanding social institutions and human nature.
- Thinking creatively and analytically.

To aid students in their law school preparations, the Pre-Law Program functions through a four-part model:

- **Advising.** Through access to the pre-law advisor, program assistants and ambassadors, students are easily able to ask questions and voice concerns about their decision to attend law school and receive help with the application process.
- **Roundtables and Events.** Monthly events aim to familiarize students with the essential aspects of the law school application process, including LSAT, GPA, letters of recommendation, personal statement, and resume. Additionally these events strive to educate students on best practices and tips for doing well in law school (both personally and academically) and to broaden the understanding of legal fields and specialties.
- **Learning Community.** The Pre-Law Learning Community provides a unique experience for future law students to live together in an environment supporting their academic, personal, and professional success.
- **Legal Studies Minor.** The interdisciplinary minor in legal studies formally guides and encourages the exploration of law and its influence in society. The curriculum blends challenging course options in students' home disciplines with relevant interdisciplinary electives to facilitate an interest in and an appreciation for the beneficial application of theory and research through the vehicle of law.

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 Texas Tech University School of Law offers four such early admission programs for qualified students. For more information about early admission see www.prelaw.ttu.edu/earlyadmit.

Contact: Texas Tech University Advising, 79 Holden Hall, 806.742.2189, prelaw@ttu.edu, www.prelaw.ttu.edu

Legal Studies Minor

The 21-credit-hour minor consists of required courses plus three directed electives. The TTU Pre-Law Program is responsible for certifying completion of the requirements for the minor in conjunction with the standard graduation certification processes used in each college. Students must have a minimum 2.75 cumulative Texas Tech GPA to declare, and a grade of C or better is needed to complete minor requirements. In the event an approved course is only offered pass/fail, a grade of pass will fulfill the grade requirement for the minor, per university policy. A minimum of nine credits must be completed in residence at Texas Tech University. Service learning options are valued and recommended where available.

Required Coursework

Students are required to take the following:

- COMS 3313 Persuasion
- ENGL 2311 Introduction to Technical Writing

- PHIL 2310 Logic*

Three hours of seminars must be chosen from the following:

- LIBR 1100 Introduction to Library Research
- IS 1100/3100 Raider Ready Freshman Transition or Transfer Transition†
- IS 4100 Strengths-Based Senior Seminar
- 1-hour Seminar in the Legal Profession
- 1-hour upper-level independent study with prior approval from the Pre-Law Program

* Mathematics core curriculum course option

† To apply, this course will always require a research-grounded, exam-quality paper that reflects upon the course while synthesizing and communicating the value of the course in facilitating the student's transition to a school of law.

‡ Applies only when taken as entering student; Pre-Law focused work is preferred. Freshmen may also apply BA 1101 or HUSC 1100.

Elective Coursework

The remaining 9 credit hours will be divided among the three curricular learning objectives of the minor: social science, communication, and professional practice. Courses required explicitly and without alternative by a student's declared major may not be used to fulfill elective coursework in the legal studies minor. Appropriate alternative courses will be considered. Students must select one course from each of the following areas:

Social Science

- HDFS 4343 Family Law and Public Policy
- HIST 4324 Courts and Capitalism
- PHIL 2320 Introduction to Ethics†
- PHIL 3321 Philosophy of Law
- POLS 3351 The Judicial Process
- POLS 3352 Constitutional Law—Powers
- POLS 3353 Constitutional Law—Limitations
- PSY 4305 Abnormal Psychology
- SOC 3327 Sociology of Law and Policing

Communication

- COMS 3314 Argumentation and Debate
- COMS 3332 Intercultural Communication
- COMS 3356 Leadership and Communication
- ENGL 2391 Introduction to Critical Writing*
- ENGL 3362 Rhetorical Criticism
- ENGL 3365 Professional Report Writing
- MCOM 3320 Mass Communications Law
- THA 2301 Introduction to Acting†

Professional Practice

- AAEC 4320 Agribusiness Law
- AHCM 4314 Quality Assurance and Risk Management
- AHCM 4318 Healthcare Law/Ethics
- ARCH 5392 Professional Practice
- BA 3302 Financial and Managerial Accounting
- BLAW Business Law (3391, 3393, or 4392)
- ECO 3326 Industrial Organization, Antitrust, and Regulation
- EDLD 5340 Educational Law
- ENGR 2392 Engineering Ethics and Its Impact on Society*
- HONS 2311 Seminar in International Affairs*
- PFP 3301 Introduction to Personal Finance
- PSY 4384 Forensic Psychology
- RHIM 4313 Legal Aspects of Hospitality Industry
- WE 4311 Wind Energy Law and Regulatory Issues

* Language, Philosophy, and Culture core curriculum course option

† Creative Arts core curriculum course option

Pre-Professional Health Careers

The Pre-Professional Health Careers office provides three major services to students interested in a health profession career: (1) course registration advice for students who have not yet declared a major; (2) career advice for students who are either undecided

about or reconsidering which health profession career to pursue; and (3) application advice primarily to students applying to the full range of health career professional schools.

While the office maintains an extensive collection of information on a broad range of health careers and can provide support for a wide variety of health career interests, most students align themselves with one of 10 different programs: pre-clinical laboratory sciences; pre-dentistry; pre-medicine; pre-nursing; pre-occupational therapy; pre-optometry; pre-pharmacy; pre-physical therapy; pre-physician assistant; and pre-speech, language, and hearing sciences. Although the academic preparation required for admission to various health career professional schools varies greatly, most require successful completion of specific college-level science, mathematics/statistics, and general education courses.

None of the 10 programs administered by the Pre-Professional Health Careers office are majors and do not lead directly to an undergraduate degree. This distinction between programs and majors is critically important because a baccalaureate degree is required for admission to occupational therapy, physical therapy, and physician assistant programs and is almost always obtained for admission to dentistry, medicine, and optometry programs with a broad range of majors being accepted. Professional programs in clinical lab sciences; nursing; and speech, language, and hearing sciences confer baccalaureate degrees so they are not required for admission. Pharmacy programs occupy an intermediate position where a baccalaureate degree is not required for admission, but about 60 percent of pharmacy students in Texas hold the degree. Regardless of their health profession goals, students pursuing these careers are strongly encouraged to identify a major that is aligned with their talents and inclinations and can provide alternative career options.

To begin receiving department-level course registration advice as early as possible, students pursuing a health profession career are strongly encouraged to declare a major as soon as they are comfortable with their choice. By law, all students at a state university must file a degree plan before the end of the second regular semester after the student has earned a cumulative total, from all sources, of 45 or more semester credit hours. However, delaying the filing of a degree plan until the legal deadline could put completing the degree in four years at risk. Even after a major has been declared students pursuing health careers will still find the Pre-Professional Health Careers office a valuable resource. The office provides the evaluation forms and coordinates assembling evaluation packets for applications to schools of dentistry, medicine, and optometry, sponsors the West Texas Health Career Fair each February, hosts personal statement workshops and health professional admission forums, coordinates shadowing and volunteering opportunities, and sponsors 10 different health career student organizations.

Contact: Pre-Professional Health Careers office, 340A Chemistry Building, 806.742.3078, www.depts.ttu.edu/pphc

Professional School Requirements. Because changes in prerequisite course requirements are occasionally made by various health profession schools and requirements can sometimes differ among institutions, students are strongly encouraged to consult often with the Pre-Professional Health Careers Office and the health profession school of their choice to be sure they have the most up-to-date information. Nevertheless, some general required course guidelines can be outlined for the various health career programs. A four-semester model curriculum for each of the programs is provided for general guidance at www.depts.ttu.edu/pphc. However, many variations on the suggested course of study can equivalently prepare a student for health professional school admission. Students should not feel constrained by these model curriculums, and variations may be required by college credit awarded through transfer, AP examination, and/or dual-credit high school courses. Students should always have alternate curriculum plans evaluated by the Pre-Professional Health Careers advisors.

Pre-Dentistry

The minimum admission requirements for most dental schools in the United States include 14 semester hours of biology, 6 semester hours of English, 8 semester hours of general chemistry, 8 semester hours of organic chemistry, 8 semester hours of physics, and 3 semester hours of statistics. Applicants to dental schools are required to take the Dental Admission Test and submit their application approximately one year prior to the planned matriculation. To learn the admission requirements of a specific dental school, students should consult the website of the dental school. While it is possible to be admitted to dental school after completing only 90 semester hours, this is unusual, and students should plan to complete a baccalaureate degree before entering dental school.

Pre-Medicine

The minimum admission requirements for most medical schools in the United States include 3 hours of biochemistry, 14 hours of biology, 3 hours of calculus or statistics, 6 hours of English, 8 hours of general chemistry, 8 hours of organic chemistry, and 8 hours of physics. Applicants to medical schools are required to take the Medical College Admission Test and submit their application approximately one year prior to the date of the planned matriculation. For the most up-to-date admission requirements, students should consult the most recent edition of Medical School Admission Requirements or the website of a particular medical school of interest. While it is possible to be admitted to medical school after completing only 90 semester hours, this is unusual, and students should plan to complete a baccalaureate degree before entering medical school.

Pre-Nursing

Specific admission requirements vary depending on the nursing school, but the requirements generally include 4 hours of chemistry, 6 hours of English, 8 hours of human anatomy and physiology, 3 hours of humanities, 3 hours of lifespan growth and development, 4 hours of microbiology, 3 hours of nutritional sciences, 6 hours of political science, 3 hours of psychology, 3 hours of statistics, 6 hours of U.S. history, and 3 hours of creative arts. An introduction to nursing course and a pathophysiology course are also often required. Some nursing schools require applicants to take the Test of Essential Academic Skills. Students need to consult the website of particular nursing schools to learn detailed specific application requirements and follow through with the submission of all required information and documents.

Pre-Optometry

Specific admission requirements vary depending on the optometry school, but the requirements generally include 8 hours of biology, 3 hours of biochemistry, 3 hours of calculus, 8 hours of general chemistry, 3 hours of general psychology, 4 hours of human anatomy, 4 hours of microbiology, 4 hours of organic chemistry, 8 hours of physics, 4 hours of physiology, and 3 hours of statistical methods. The website of a particular optometry school should be consulted to learn the detailed specific application requirements. The completion of a baccalaureate degree is not always required. Applicants to optometry school are required to take the Optometry Admission Test and submit all admission related documents in accordance with the timeline available on the website of the optometry school.

Pre-Pharmacy

Specific admission requirements vary depending on the pharmacy school, but the requirements generally include 8 hours of biology, 3 hours of calculus, 3 hours of economics, 6 hours of English, 8 hours of general chemistry, 15 hours of humanities/social science, 3 hours of literature, 4 hours of microbiology, 8 hours of organic chemistry, 4 hours of physics, 3 hours of public speaking, and 3 hours of statistical methods. Applicants to pharmacy school are required to take the Pharmacy College Admission Test, and students are strongly encour-

aged to consult the website of a particular pharmacy school to learn detailed specific application requirements.

Allied Health Sciences

Schools of allied health sciences include programs in clinical laboratory science; speech, language, and hearing sciences; occupational therapy; physical therapy; and physician assistant. Students are awarded degrees upon completion of these programs. Some allied health professional schools require a baccalaureate degree while other professional programs require only 60 to 90 hours of college-level courses. Additionally, some allied health programs require an admission test. This variability makes it essential for a student to consult carefully the website of the particular program at a specific school to learn all the application requirements. Application deadlines also vary, but are usually required six to 12 months prior to the planned start date.



Reserve Officer Training Corps

The Department of Military Science and the Department of Aerospace Studies conduct senior division Reserve Officer Training Corps (ROTC) to provide students the opportunity to learn more about the United States military and its place in American society. Qualified students can 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; be an honorably discharged veteran; or have received constructive credit by having completed either a four-year JROTC program, the Army ROTC Leader's Training Course, or Armed Forces Basic Training and must be approved by the Professor of Military Science.

Air Force ROTC offers a four-year commissioning program. 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 a four-week 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 or 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 will 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 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 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.

Military Studies Minor. A military studies minor is available to enlisted/contracted Army ROTC Cadets who complete the 18-hour MILS curriculum with available substitutions subject to approval by the department chair/Professor of Military Science.

Department of Aerospace Studies

Air Force ROTC Det 820
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Lt. Col.. James Marlow, Chairperson

Professor: Lt. Col. Marlow

Assistant Professors: Maj. Hawthorne, Maj. Simpson

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.

General Military Course. This course is designed for freshman and sophomore students who wish to explore the opportunity to pursue an Air Force officer's commission while studying the historic development and use of air power; the role of air power in today's society; the organizational structure and missions of selected Air Force

organizations; and professionalism and officership. Each General Military Course has a requisite leadership lab course each semester.

Professional Officer Course. The Professional Officer Course (POC), which is normally taken during the cadet's junior and senior years, is designed to commission highly qualified junior officers for the United States Air Force. This course concentrates on two main themes: (1) concepts of leadership and management and (2) national security forces in contemporary society. Enrollment in the Professional Officer Course is open to all students who have met prerequisite screening, testing, and physical examination; have completed the general military course or the pre-enrollment field training or received credit for prior military service; have four semesters of school remaining (may include graduate studies); and have been competitively selected by HQ AFROTC. Please consult the department for details.

Cadets enrolled in the program are paid a minimum tax-free subsistence allowance of up to \$500 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.

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 in Montgomery, Alabama. 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 23.)

Undergraduate Courses

- 1105. Foundations of the United States Air Force I (1).** 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).** 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. The Evolution of USAF Air and Space Power I (1).** 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.
- 2104. The Evolution of USAF Air and Space Power II (1).** 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).** 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).** 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. National Security Affairs and Preparation for Active Duty I (3).** 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)
- 4304. National Security Affairs and Preparation for Active Duty II (3).** 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

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Lt. Col. Michelle Holliday, Chairperson

Professor: Lt. Col. Holliday

Assistant Professors: Maj. Dawson, Capt. Harris, Capt. Monday

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 national security because Army ROTC provides over 70 percent of the commissioned officers serving in the Army Reserve components and the active Army. It is for this reason that Army ROTC seeks quality men and women who are willing to accept the responsibilities inherent with officership. The training program is designed to teach military skills and enhance the individual's abilities in communications, leadership, and physical aptitude.

The four-year Army ROTC program is divided into the basic course (first two years) and the advanced course (last two years). Students who are not scholarship winners or not under SMP or ROTC contract 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. Course content includes wilderness survival skills, land navigation with a compass and topographic map, safety, first aid, rappelling, and physical conditioning, all of which are taught in both the classroom and outdoor settings. Course content 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 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 between the junior and senior years with attendance at the Cadet Leadership Course (CLC). 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 eleven-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 top cadets from other schools. Team members are selected competitively based on physical fitness, endurance, and proficiency in basic soldier skills.

- **Rogers Rangers.** 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.

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 one weekend each semester, including such activities as rappelling, land navigation, marksmanship, and small-unit tactics. These weekend activities are optional for basic course students but 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 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 normally advances 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, land navigation, and first aid training.

Summer Training

Cadet Initial Entry Training (CIET). Cadet Initial Entry Training is a 28-day camp designed to instruct and educate those cadets with little or no prior military experience in basic military skills. It is a requirement for all scholarship contracted freshmen and will be conducted the summer after their freshman year and before their sophomore year. It is held at Fort Knox, Kentucky, and all transportation, lodging and meals are paid by the U.S. Army. Exceptions are available on a case-by-case basis for those cadets who have completed basic military 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 Fort 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 will be paid for the five-week period.

Cadet Leadership Course (CLS). All advanced course students must complete this five-week camp at Fort Knox, Kentucky, between their junior and senior years or immediately following completion of their senior year. Transportation, room and board, and an allowance will be paid for the period. The program of instruction is designed to be the culmination of the military education up to 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.

Cultural Understanding and Language Proficiency (CULP) Program. Cadets may apply to compete for immersion in more than 40 countries. These opportunities expose them to everyday life in different cultures and intensify language study. This helps produce commissioned officers who possess the right blend of language and cultural skills to support global operations in the 21st century.

Participants experience up to three different venues during immersion, including humanitarian service; host nation military-to-military contact; and education related to social, cultural, and historical aspects of the country. In 2012, approximately 1,200 ROTC cadets traveled across the world and participated in the Cadet Command's CULP program. The future goal is for at least half of all cadets to complete a CULP Immersion Internship annually.

Military Science (MILS)

(To interpret course descriptions, see page 23.)

Undergraduate Courses

1101. **MSI Foundations of Officership I (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).** 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).** Prerequisites: 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).** Prerequisites: 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. May be repeated and may substitute for 2201 or 2202 credit. F and S.
3301. **MSIII Leadership and Problem Solving I (3).** Prerequisites: 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).** Prerequisites: 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. May be repeated and may substitute for 3301 or 3302 credit. F and S.
4301. **MSIV Officership I (3).** Prerequisites: 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).** Prerequisites: 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. May be repeated and may substitute for 4301 or 4302 credit. F and S.



Graduate School

Mark A. Sheridan, Ph.D., Vice Provost for Graduate and Postdoctoral Affairs Dean, Graduate School

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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 globally-aware students prepared to use their advanced skills to benefit society.

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 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 numerous 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

Mark A. Sheridan, Ph.D., Vice Provost for Graduate and Postdoctoral Affairs, Dean, Professor of Biology

Darryl L. James, Ph.D., Vice Provost, Professor of Mechanical Engineering

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

Claudia Cogliser, Ph.D., Associate Dean, Associate Professor of Management

Graduate Admissions

Shelby Cearley, Director of Graduate Admissions

Graduate Council

The Graduate Council is composed of 14 members. The graduate faculty elects 11 of the members, the graduate 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. Members appointed by the dean 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 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.

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 Texas Tech University 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.

Graduate Degrees at Texas Tech

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 Communications and Education, Ph.D.
 Agricultural Education, M.S., Ed.D.*
 Animal Science, M.S., Ph.D.
 Food Science, M.S.
 Horticulture Science, M.S.
 Landscape Architecture, M.L.A.
 Plant and Soil Science, M.S., Ph.D.
 Plant Protection, M.S. ‡
 Professional Science Master's in Environmental Sustainability and Natural Resources Management, PS.M.
 Soil Science, M.S. † ‡
 Wildlife, Aquatic, and Wildlands Science and Management, 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.
 Atmospheric Science, M.S.
 Biology, M.S., Ph.D.
 Chemistry, M.S., Ph.D.
 Classics (Classical Languages), M.A. §
 Clinical Psychology, Ph.D.
 Counseling Psychology, M.A., Ph.D.
 Economics, M.A., Ph.D.
 English, M.A., Ph.D.
 Environmental Toxicology, M.S., Ph.D.
 Exercise and Sport Sciences, M.S.
 French, M.A. #
 General Experimental Psychology, M.A., Ph.D.
 Geography, M.S.
 Geosciences, M.S., Ph.D.
 German, M.A. #
 History, M.A., Ph.D.
 Mathematics, M.A., M.S., Ph.D.
 Languages and Cultures, M.A.
 Microbiology, M.S.
 Philosophy, M.A.
 Physics, M.S., Ph.D.
 Physics–Applied Physics, M.S. †
 Political Science, M.A., Ph.D.
 Professional Science Master's in Environmental Sustainability and Natural Resources Management, PS.M.
 Psychology, M.A.
 Public Administration, M.P.A.
 Romance Languages (French or Spanish), M.A.
 Sociology, M.A.
 Spanish, Ph.D.
 Sport Management #, 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.

Management Information Systems, M.S.

• Education

Bilingual Education, M.Ed.
 Counselor Education, M.Ed., Ph.D.
 Curriculum and Instruction, M.Ed., Ph.D.
 Educational Leadership, M.Ed., Ed.D., Ph.D.
 Educational Psychology, M.Ed., Ph.D.
 Elementary Education, M.Ed.
 Higher Education, M.Ed., Ed.D.
 Higher Education–Higher Education Research, 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., † Ph.D.

• Engineering

Bioengineering, M.S.Bio.
 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.Eng.
 Environmental Engineering, M.Env.E.
 Industrial Engineering, M.S.I.E., Ph.D.
 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.SYEM, Ph.D.

• Human Sciences

Environmental Design, M.S.
 Family and Consumer Sciences Education, M.S., Ph.D.
 Hospitality Administration, Ph.D.
 Hospitality and Retail Management, M.S.
 Human Development and Family Studies, M.S., Ph.D.
 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.

• Media and Communication

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

• Visual and Performing Arts

Art, M.F.A.
 Art Education, M.A.E.
 Art History, M.A.
 Fine Arts (Art, Music, Theatre Arts), Ph.D.
 Music, M.M., D.M.A.
 Music Education, M.M.Ed.
 Theatre Arts, M.A., M.F.A.

• Interdisciplinary Programs

Arid Land Studies, M.S.
 Biotechnology, M.S.
 Forensic Science, 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.

• School of Law

Doctor of Jurisprudence, J.D.
 United States Legal Studies, LL.M.

• Dual Degree Programs

General Business/Architecture, M.B.A.–M.Arch.
 General Business/Biomedical Sciences, M.B.A.–Ph.D.

General Business/Biotechnology, M.B.A.–M.S.

General Business/Environmental Toxicology, M.B.A.–M.S.
 General Business/Languages and Cultures, M.B.A.–M.A.
 General Business/Medicine, M.B.A.–M.D..
 General Business/Romance Languages, M.B.A.–M.A.
 General Business/Pharmacology, M.B.A.–Pharm.D.
 Law/Accounting (Taxation), J.D.–M.S.A.
 Law/Agricultural and Applied Economics, J.D.–M.S.
 Law/Biotechnology, J.D.–M.S.
 Law/Engineering, J.D.–M.Eng.
 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.

• Accelerated Bachelor's-to-Master's Degree Programs

B.S. in Agricultural and Applied Economics + Master of Agribusiness
 B.S. + M.S. in Agricultural and Applied Economics
 B.S. in Architecture + Master of Architecture
 B.A. + M.A. in Classics (Classical Languages)
 B.A. in French + M.A. in Romance Languages
 B.A. + M.A. in German
 B.A. + M.A. in Mathematics
 B.A. + M.S. in Mathematics
 B.S. + M.S. in Mathematics
 B.A. + M.A. in Political Science
 B.A. in Psychology + M.A. in General Experimental Psychology
 B.A. in Spanish + M.A. in Romance Languages
 B.B.A. + M.S. in Accounting
 B.B.A. + M.S. in Management Information Systems
 B.S. + M.S. in Chemical Engineering
 B.S. in Computer Engineering + M.S. in Electrical Engineering
 B.S. in Computer Science + M.S. in Software Engineering
 B.S. + M.S. in Computer Science
 B.S. + M.S. in Software Engineering
 B.S. + M.S. in Electrical Engineering
 B.S. + M.S. in Environmental Engineering
 B.S. + M.S. in Industrial Engineering
 B.S. + M.S. in Mechanical Engineering
 B.S. + M.S. in Petroleum Engineering
 B.I.D. (Design) + M.S. in Environmental Design
 B.S. + M.S. Personal Financial Planning
 B.M. + M.M.Ed. (Music Education)

* A distance-delivered degree awarded by both Texas Tech University and Texas A&M University

† Degree being phased out. No new students.

‡ Degree being phased out and consolidated with B.S. in Plant and Soil Science, January 1, 2016. No new students.

§ Degrees being consolidated as specializations within the M.A. in Languages and Cultures, August 31, 2016.

Pending THECB approval.

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 www.admissions.ttu.edu/ residency-requirements.

Financial Assistance. Financial opportunities are available through both the Graduate School and graduate academic departments. The Graduate School coordinates and disburses scholarships and fellowships each year for new and continuing degree-seeking students (both full- and part-time). Deadlines are in mid-January for awards for the upcoming fall and spring semesters. Many departments also support graduate students through scholarships and assistantship positions, and these must be requested from the specific department concerned.

Online applications and detailed information are available at www.depts.ttu.edu/gradschool/funding/scholarships.php.

Graduate Admissions

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. All materials submitted become property of Texas Tech University and will not be returned.
- 2. Test Scores**—The only test scores required for admission consideration by the Graduate School are English proficiency scores for international applicants. International applicants must submit proof of English proficiency as part of their application materials.
- 3. Individual Applicant Materials**—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, family and socioeconomic background, and standardized test scores. Scores on the General Test of the Graduate Record Examination (GRE) or the Graduate Management Admissions Test (GMAT) should be no more than five (5) years old. Verbal, quantitative, and writing scores will be considered separately. 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.

Official scores on the General Test of the Graduate Record Examination (GRE) or, for programs in the Rawls College of Business and some other academic programs, the Graduate Management Admission Test (GMAT) must be no more than five (5) 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 competi-

tive 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 the Office of Graduate and International 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 and International Admissions, not the department. The institution code for Texas Tech varies by program; see below.

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

4. 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—Wildlife, Aquatic, and Wildlands Science and Management** (Arkansas, Louisiana)
- **Doctor of Philosophy—Fine Arts** (Arkansas, Louisiana, Tennessee, Virginia)
- **Doctor of Philosophy—Family and Consumer Sciences 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.

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.

Acts of Dishonesty. All prospective graduate students applying to Texas Tech University are expected to adhere to the university's Statement of Academic Integrity (www.depts.ttu.edu/studentconduct/academicinteg.php). This includes entering all secondary and post-secondary institutions attended on your application for admission as well as submitting official academic credentials from all secondary

and post-secondary institutions attended. Not providing that information on your application or not submitting all academic credentials is considered falsification of academic records and will result in the voiding of your application or to other disciplinary action.

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. Domestic applicants are U.S. citizens and immigrant permanent residents; all others, including undocumented immigrants, are considered international applicants. Submit the following information to the Office of Graduate Admissions to either of the following addresses:

- **Regular Airmail**
Office of Graduate Admissions
Texas Tech University
PO Box 41030
Lubbock, TX 79409-1030, USA
- **Express Mail**
Office of Graduate Admissions
Texas Tech University
Boston Ave. at Akron Ave.
328 Administration Bldg.
Lubbock, TX 79409-1030

The following procedures should be followed in order for domestic applicants to be considered for admission to a graduate program at Texas Tech University. Applications will not be evaluated until all admission requirements have been met. All materials become the property of Texas Tech University and are not returnable or refundable. A completed domestic Graduate School application consists of the following:

1. **Application**—Applications should be submitted at least three months prior to date of intended enrollment. Preferred deadlines for priority processing are June 1 for fall, September 1 for spring, and March 1 for summer. Initial applications should be submitted via ApplyTexas (www.ApplyTexas.org). All institutions (including name and location) attended must be included on the application. Falsification of application information will void admission to Texas Tech University. Subsequent applications should be made by submitting the Graduate Application Change Form available on the Graduate School website (www.depts.ttu.edu/gradschool).
2. **Nonrefundable Application Fee**—An application fee as approved by the Board of Regents is required for the initial application and also for any subsequent application; the current application fees are available on the website www.depts.ttu.edu/gradschool. Acceptable methods of payment are credit card, money order, cashier's check and traveler's check; do not send cash. The application fee may be paid either through the ApplyTexas application (www.applytexas.org) or on the Graduate School website if using the paper application. Texas Tech University System employees who are employed at least half-time, 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. McNair Scholars and GEM (National Consortium for Graduate Degrees for Minorities in Engineering) Scholars will receive an application fee waiver by submitting documentation from either the McNair Scholar coordinator at their current/former institution or by supplying proof of their GEM Fellowship.
3. **Official Transcripts**
 - The applicant must have earned a bachelor's degree from a regionally accredited post-secondary institution in the United States or its equivalent from a foreign institution with substantially similar degree requirements as Texas Tech University; foreign institutions must be recognized by their government/government ministry or department to award undergraduate and/or post-graduate degrees.

- The applicant must submit an official transcript from each college or university attended, including any transcript for which no degree was awarded. This includes transcripts for schools at which the applicant received credit/grades for dual credit, extension, correspondence, and distance learning credit. Failure to list all institutions will be considered an intentional omission and may lead to forced withdrawal. Unofficial copies of transcripts are acceptable for evaluation purposes. Copies of all transcripts must be received before the application will be evaluated. All degrees earned must appear on an official transcript.
- Unofficial copies of transcripts are acceptable for evaluation purposes. However, copies of all transcripts must be received before the application will be evaluated.
- 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. **Resident Alien Card**—Immigrant Permanent Residents must provide a copy of the front and back of their Resident Alien Card. Applicants with pending applications for permanent residency may submit alternative documentation; for a list of alternative documentation please email graduate.admissions@ttu.edu.

5. **Proof of Citizenship for Foreign-Born U.S. Citizens Alien**—Foreign-born U.S. citizens, including U.S. citizens born abroad and naturalized U.S. citizens, must submit proof of citizenship. The following documents can be submitted to meet this requirement:

- a. Consular Report of Birth Abroad (CRBA, or Form FS-240)
- b. Certificate of Citizenship – naturalized citizens must submit a notarized copy of the Certificate of Citizenship form, available on the website www.depts.ttu.edu/gradschool or in the Graduate School. Copies of the applicant's Certificate of Citizenship issued by the United States Customs and Immigration Service at the time of naturalization cannot be sent in lieu of this notarized form; it is illegal for the USCIS-issued form to be photocopied.
- c. Birth certificate from the following American territories, commonwealths, and protectorates – U.S. Virgin Islands, American Samoa, Guam, Swains Island, the Panama Canal Zone before 1 October 1979, the Philippines before 4 July 1946, and the Northern Mariana Islands after 3 November 1986.

Citizens who cannot provide the documentation above should contact the Office of Graduate Admissions to find out what other documentation may suffice.

6. **Residency Questionnaire**—A Residency Questionnaire is required of all Texas Tech University graduate applicants. The core residency questions are incorporated into the ApplyTexas application and the PDF version of the Graduate School application. However, the Residency Questionnaire is available through the Graduate School website for those applicants and current students who wish to be considered for residency reclassification. Applicants and current students wishing to be considered for residency reclassification MUST submit a residency questionnaire before the twelfth (12) class day of the semester for which they are seeking reclassification.

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 (e.g., GRE or GMAT), applications, or letters of recommendation. **Applicants must send individual profile documents to their prospective department, not to the Office of Graduate Admissions.** A list of graduate advisor/department contact information is available on the Graduate Admissions website (www.depts.ttu.edu/gradschool/graduate_advisors/).

Evaluating Applications. Application files will not be evaluated until all of the above requirements have been met. Applicants will be

notified of admission decisions via Raiderlink. If admitted, students can print an official acceptance letter from Raiderlink. Some departments that operate with a limited number of spaces for students will make final decisions for the fall semester in early spring.

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 Graduate Admissions

Texas Tech University 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, the Office of Graduate Admissions is committed to helping international students in this important transition.

All applicants who are not U.S. citizens or immigrant permanent residents are considered international applicants. International students must have a visa type which allows for academic study. Undocumented immigrants are eligible to apply for graduate admission consideration and must apply as international applicants.

Submit the following information to the Office of Graduate Admissions to either of the following addresses:

- **Regular Airmail**
Office of Graduate Admissions
Texas Tech University
PO Box 41030
Lubbock, TX 79409-1030, USA
- **Express Mail**
Office of Graduate Admissions
Texas Tech University
Boston Ave. at Akron Ave.
328 Administration Bldg.
Lubbock, TX 79409-1030

The following procedures should be followed carefully in order for international students to be eligible for graduate admission consideration 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. January 15 is the application deadline for fall and summer semesters, and June 15 is the deadline for spring semester. International applicants may apply after the deadline. However, the Office of Graduate Admissions cannot guarantee that there will be sufficient time for late applications to be entered and reviewed by the Graduate School, for departments to review late applications, and for late applicants to make any necessary visa/travel arrangements if admitted. Late applications may be submitted on Apply-Texas until approximately one month before the start of the term.

1. **Application**—Initial applications should be submitted via Apply-Texas (www.ApplyTexas.org). All institutions (including name and location) attended must be included on the application. Falsification of application information will void admission to Texas Tech University. Subsequent applications should be made by submitting the Graduate Application Change Form, which is available on the Graduate School website (www.depts.ttu.edu/gradschool).
2. **Nonrefundable Application Fee**—An application fee as approved by the Board of Regents is required for the initial application and also for any subsequent application; the current application fees are available on the website www.depts.ttu.edu/gradschool. Acceptable methods of payment are credit card, money order, cashier's check and traveler's check; do not send cash. The application fee may be paid either through the Apply-Texas application (www.applytexas.org) or on the Graduate School website if using the paper application. Texas Tech University System employees who are employed at least half-time, 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. Vietnam Education Foundation (VEF) Fellowship recipients will receive an application fee waiver upon confirmation of their fellowship in the VEF database. No other waiver or deferral of the application fee is available.

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 have been in good standing in all schools attended at final matriculation. Texas Tech University requires a degree that is equivalent to a U.S. undergraduate degree. Texas Tech University does not equate three-year bachelor's degrees from any country to be equivalent to a comparable Texas Tech University-earned bachelor's degree; holders of such bachelor's degree are not eligible for graduate admission. A list of acceptable credentials for graduate admission is available on the website www.depts.ttu.edu/gradschool/forms/Acceptable%20Credentials.pdf.

An applicant must submit an official transcript from each college or university attended, including transcripts/marksheets for each semester. An 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 (6) semesters of coursework to be eligible for admission consideration.

International applicants must also provide an official English translation of all transcripts/marksheets if the documents are not provided in English. The Office of Graduate Admissions will not accept a public notary certification. If official English translations are not supplied by the applicant's institution(s), the applicant must provide a translation done by an American Translators Association-certified translator. A list of ATA-certified translators is available online at www.atanet.org/onlinedirectories.

4. **Official Diploma/Degree Certificates**—The applicant is required to submit an original or certified photocopy of the degree certificate, diploma, or official statement that the degree has been granted. Provisional certificates are not considered to be diplomas.

International applicants must also provide an official English translation of all diplomas/degree certificates if the documents are not provided in English. The Office of Graduate Admissions will not accept a public notary certification or translation. If official English translations are not supplied by the applicant's institution(s), the applicant must provide a translation done by an American Translators Association-certified translator. A list of ATA-certified translators is available online at www.atanet.org/onlinedirectories.

5. **Official Proof of English Proficiency**—All international applicants must provide proof of English proficiency before their applications can be considered for admission. This test is waived only for graduates of regionally accredited U.S. universities or universities in English proficiency-exempt countries. Applicants who have completed at least two consecutive years at a college or university in the U.S. or in an English proficiency-exempt country are also exempted from the English proficiency requirements. Texas Tech University considers the following countries to have English as their native language: Australia, Canada (except the Province of Québec), 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, and Wales), and the United States. Applicants may submit one of the following measures of English proficiency:
 - **TOEFL** (Test of English as a Foreign Language; www.toefl.org). The minimum TOEFL score required is 550 (paper-based version) or 79 (internet-based version). The TOEFL score must be received directly from the Educational Testing

Service (ETS). Texas Tech University's institutional code is 6827. TOEFL scores are valid for two (2) years. Applicants may provide a copy of their Examinee Score Report for application evaluation purposes; screenshots of the TOEFL results from the ETS website are not acceptable.

- **IELTS** (International English Language Testing Service; www.ielts.org). The minimum IELTS required score is an overall band score of 6.5 on the Academic version; IELTS General Training results are not acceptable. There is no IELTS institutional code for Texas Tech University. IELTS scores are valid for two (2) years.
- **PTE Academic** (Pearson Test of English Academic; www.pearsonpte.com/pteacademic). The minimum required PTE Academic score is 60. PTE General and PTE Young Learners results are not acceptable. There is no PTE Academic institutional code for Texas Tech University. PTE Academic scores are valid for two years.
- **Cambridge Certificate of Proficiency in English** (www.cambridgeenglish.org/exams-and-qualifications/proficiency/). The minimum required Cambridge CPE grade is C. There is no institutional code for the Cambridge CPE. The Cambridge CPE is valid for life.
- **Cambridge Certificate of Advanced English** (www.cambridgeenglish.org/exams-and-qualifications/advanced/). The minimum required Cambridge CAE grade is B. There is no institutional code for the Cambridge CAE. The Cambridge CAE is valid for life.
- **ELS Intensive English Program** (www.els.edu). Texas Tech will accept completion of Level 112 of ELS' English for Academic Purposes program. An official transcript and certificate of completion must be submitted.

6. Copy of Biographical Page of Passport (OPTIONAL)—This page will be used only if an international applicant is admitted and an I-20 needs to be issued. This document is not necessary for application evaluation purposes.

7. Proof of Financial Support (OPTIONAL)—If a student is admitted to a graduate program, 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 (or by the Office of International Student and Scholar Services in some situations) and mailed to the student. If financial information is needed, it should be in the form of proof of liquid assets 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; an Affidavit of Financial Support is available on the Graduate School website (www.depts.ttu.edu/gradschool). Students should check with the Office of Graduate Admissions about the current amounts needed on their financial support documents. These amounts include tuition, books, living expenses, mandatory international student insurance, etc. Amounts will vary depending upon the program to which the student is admitted and any financial assistance awarded by the department.

8. Conditional Admission for English Proficiency — Prospective international students who meet the minimum academic requirements for admission consideration except for proof of English proficiency may apply for conditional admission through ELS University Admissions (www.els.edu/UniversityAdmissions). If an international graduate student is admitted conditionally, the student must complete Level 112 of ELS' English for Academic Purposes program plus any additional departmental requirements before beginning an academic program at Texas Tech University. Please note that some programs will still require applicants to submit GRE or GMAT results, even if the applicant is applying for conditional admission for English proficiency.

Submitting Applications. Students should be certain to give their full names on the envelope return address. An application Document Cover Sheet is available on the Office of Graduate Admissions website. Correspondence should include the full name and date of birth.

Evaluating Applications. Applications will not be evaluated until all of the above requirements have been met. Applicants will be noti-

fied by the Office of Graduate Admissions via the Raiderlink portal when an admissions decision has been made.

Deadlines. Deadlines for international applicants are as follows:

- January 15 for fall and summer semester
- June 15 for spring semester

International applicants may apply after the deadline. However, the Office of Graduate Admissions cannot guarantee that there will be sufficient time for late applications to be entered and reviewed by the Graduate School, for departments to review late applications, and for late applicants to make any necessary visa/travel arrangements if admitted. Late applications may be submitted on Apply-Texas until approximately one month before the start of the term.

Contact Department. Prospective students must also contact the department in which they are planning to study to obtain information regarding any special admission requirements (e.g., additional tests, applications, or letters of recommendation). 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

Applicants seeking non-degree admission in any category must provide the same application requirements as those seeking admission to a degree program. Please see either Domestic/Permanent Resident Admission or International Admission requirements above. NOTE: International students may not be eligible to apply for non-degree status depending on their visa type. International applicants considering applying for non-degree status are strongly encouraged to email the Office of Graduate and International Admissions at graduate.admissions@ttu.edu before submitting an application for a non-degree status. 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)**—The PGRD category is for students who have earned an undergraduate degree and desire to take only undergraduate courses, typically for leveling purposes. In this status, a student may register indefinitely as a non-degree graduate student but cannot be appointed to teaching assistantships or research assistantships, nor are they eligible to receive an undergraduate degree from Texas Tech University while registered as a PGRD student. Students in this category may not register for graduate courses. PGRD students are not eligible for financial aid. Admission decisions for PGRD applications are made by the Office of Graduate Admissions.
- **GTMP (Graduate Temporary)**—A student in this category is considered a temporary non-degree student and may enroll for no more than twelve (12) hours. All GTMP students should be aware that completion of courses as a GTMP does not ensure that the student will be accepted into a degree program, nor does it ensure that any courses taken while enrolled as a GTMP will be accepted for credit if the student is subsequently accepted into a degree program. GTMP students are not eligible for financial aid. Admission decisions for GTMP applications are made by the Office of Graduate Admissions.
- **Teacher Certification, (CERT or FCSC)**—A student who desires to earn teacher certification through the College of Education (CERT) or Family and Consumer Sciences teacher certification through the College of Human Sciences (FCSC) 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 the Office of Graduate Admissions. CERT and FCSC students may be eligible for financial aid if they are concurrently enrolled in a graduate degree-seeking program.

- **CPED (Continuing Professional Education Development)**—The CPED status 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. CPED students are not eligible for financial aid. Admission decisions for CPED applications are made by the Office of Graduate Admissions.
- **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 (1) academic program and may be more practice-oriented than the courses in a graduate academic program. Students applying for a graduate certificate program may not be required to submit GRE or GMAT scores (although some of the programs do require these scores). GCRT students may be eligible for financial aid if they are concurrently enrolled in a graduate degree-seeking program.

Graduate School Readmission/Deferment

Students who fail to register or who leave school during a spring or fall semester must submit the “Graduate Application Change Form” plus a non-refundable application change fee; the form and the current application change fee are both available on the website www.depts.ttu.edu/gradschool. Automatic readmission is not guaranteed; departments will consider students on a case-by-case basis. The Office of Graduate Admissions will notify the applicant of the department’s decision via the Raiderlink portal.

International and domestic students who wish to defer admission to a semester for which they did not originally apply must submit the “Graduate Application Change Form” plus a non-refundable application change fee; the form and the current application change fee are both available at www.depts.ttu.edu/gradschool. Deferral of admission 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 via the Raiderlink portal.

Application Appeals. Texas Tech University graduate applicants have the right to appeal admissions decisions. The appeal must first be filed with the academic department responsible for the admissions decision; please contact the Graduate Program Coordinator for that department to find out in what format the appeal must be filed. The department will reconsider your application and inform you of their decision on your request for reconsideration. An unfavorable ruling at the department level may be appealed to the Graduate School in writing within thirty (30) days of the date on the correspondence that you received from the academic department’s decision on the initial appeal; email the Director of Graduate Admissions (shelby.l.cearley@ttu.edu) for more information on how to file such an appeal. Applicants can only appeal once, and decisions resulting from an appeal are final. Application fees are non-refundable regardless of the result of an appeal.

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 on Raiderlink (www.raiderlink.ttu.edu).

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 hours. Students on fellowships, assistantships, or other appointments designed for the support of graduate study should enroll for 9 hours in each regular semester, 3 hours in each summer term, or 3 hours of trimester as designated by the department and the Graduate School.

If a student is devoting full time to research, using university facilities and faculty time, the schedule should reflect at least 9 hours enrollment (3 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.

The maximum allowable hours per semester is 13 for doctoral students, 16 for other graduate students, and 6 in a six-week summer term. 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 syllabus for the individual study course should be on file with the department for any class taken.

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. Request for leaves of absence must be sent to and approved by the associate dean and by the student’s faculty advisor prior to their leaving the university.

Continuous Enrollment. 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 at least 9 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.

Students who have begun thesis or dissertation research must register for 6000 or 8000 courses, respectively, 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.

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.

Registration in Session of Graduation. There are three official graduation dates: December, May, and August. Every candidate for a graduate degree must be registered for classes in the session of graduation. Doctoral students must register for at least 3 hours at the 8000 level and master's students in a thesis option must be registered for at least 3 hours at the 6000 level. Master's students in a non-thesis option must register for at least 1 hour. Failure to graduate at the expected time requires such additional registrations as may be necessary until graduation. A new Application to Graduate is required for each semester.

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 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 approved by the Dean of the Graduate School. An immediate supervisor of the faculty/staff member may not direct the student's research nor permit the enrollment of the supervisee in his/her courses or other organized instructional activity.

Enrollment by Undergraduates. An undergraduate student who has earned 90 hours of course credit and who has at least a 3.0 GPA in their major subject courses 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 from the Graduate School website prior to registration. Students may not receive both graduate and undergraduate credit for the same course, except for up to 9 hours when a student is admitted into an approved combined/accelerated baccalaureate – master's degree program.

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 unless they are admitted into an approved combined/accelerated baccalaureate – master's degree program.

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 overall graduate GPA falls below 3.0 are placed on academic probation. During the following term, if their overall GPA remains less than 3.0 and their term GPA is greater than 3.0, they are placed on continued probation. They are placed on academic suspension in the second consecutive term in which their overall GPA is less than 3.0. Students placed on academic suspension are required to remain out of the Graduate School for one term. Summer terms and/or trimester count as one term. 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 placed on academic suspension 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.

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 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.

Work completed at another graduate school with a grade less than B will not be accepted unless approved by the dean, 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 (7000 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, when failure to complete the work has been due to causes beyond the student's control, and when the progress at the point at which the Incomplete is requested has been satisfactory. It is not used as a substitute for F. When the grade of Incomplete is given, the instructor must file a form with the Graduate School specifying the reasons for the grade and the work remaining to be finished as well as the agreed upon requirements with the student to obtain a satisfactory grade and a timeline for completion. The Graduate School

strongly recommends that work be completed within one year of the Incomplete grade and that the grade be changed to an F if not completed within the one-year timeframe.

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.

Apply to Graduate. A student planning to graduate must file an "Apply to Graduate" online form (through Raiderlink) at the beginning of the semester of intended graduation. A list of deadlines, including the date for filing the "Apply to Graduate," can be found on the Graduate School website (www.depts.ttu.edu/gradschool). No candidate's name will be considered for graduation unless this form has been received by the Graduate School by the specified deadline.

A candidate who does not meet the requirements to graduate at the expected time is required to file a new "Apply to Graduate" online form for any subsequent graduation and enroll in that semester.

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 stated in the "Enrollment" section of the Graduate School catalog text.

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.

Minor. Programs for a master's degree may include 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:

- 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.

- A minimum of 30 hours of graduate coursework. Some degrees have a greater minimum hour requirement.

The option to offer thesis or non-thesis programs is a departmental decision. In addition, no more than 6 hours of individual study courses (aside from the thesis) will be permitted in the master's program.

Filing the Official Degree Program. Immediately following the first semester of enrollment (or the completion of 9 hours), the student should submit to 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. Forms for the "Program for the Master's Degree and Application for Admission to Candidacy" are available online at www.depts.ttu.edu/gradschool.

When an approved program of study is filed with the Graduate School, students are 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 and Application for Admission to Candidacy" 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.

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 an 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.

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 within their program for the Master's degree, 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 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:

- All conditions relating to admission to the program have been met.
- At least 9 semester hours of the graduate work required for the master's degree have been completed (exclusive of transfer and extension courses).
- All required leveling work has been completed with C or better grades.
- An average grade of 3.0 or better has been maintained in all courses comprising the official program exclusive of leveling work.
- Proficiency in a foreign language or tool subject required for the particular degree has been acceptably demonstrated.
- The general field of the thesis has been stated and approved (for thesis student only).

- Work to date is acceptable to the departments concerned, as attested by their approval of the application for admission to candidacy.
- 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.

Combined/Accelerated Baccalaureate–Master's Programs. The Graduate School supports the development of combined/accelerated bachelors to master's programs. Such programs provide an opportunity for highly-qualified students to earn both degrees in a cost-effective and timely manner. The programs are designed to ensure that students in these programs earn a high-quality master's degree in pursuit of their educational and/or professional goals. The following guidelines set the minimum expectations for the combined/accelerated bachelor's to master's programs. Programs may set more stringent standards.

- There must be an application process to each program to identify highly-qualified candidates.
- The earliest a student may apply to a combined/accelerated program is the semester in which they will attain their 90th hour. Additionally, students from institutions with which TTU has articulation agreements must have, or be in the semester that they will attain, 30 hours at TTU.
- Once accepted by the respective program into the combined/accelerated bachelor's to master's program, the student must apply to the Graduate School for which all admission will be conditional.
- To obtain full standing in the Graduate School, students must meet the required hours for their respective baccalaureate degree and the program director must notify the Graduate School that the student has satisfied the program's academic requirements.
- No undergraduate level course may be counted toward the master's degree.
- Courses completed at the graduate-level prior to being accepted to the combined/accelerated bachelor's to master's programs may be counted toward the master's degree.
- A maximum of 9 hours of graduate-level courses can be used to meet the requirement of the bachelor's degree.
- Course content in graduate coursework applied to the baccalaureate degree should be in conformity with the expectations of Comprehensive Standard 3.6.1 (Post-baccalaureate program rigor) of the Principles of Accreditation (graduate-level academic content is more advanced in relation to content and outcomes than the undergraduate classes substituted).
- Students must be offered the option to have their baccalaureate degree conferred at the time when they meet the respective baccalaureate program requirements; otherwise, their baccalaureate and master's degrees will be conferred simultaneously upon completion of all baccalaureate- and master's-degree requirements.
- The student must meet all requirements that are expected of a student in the respective master's program.

All combined baccalaureate-master's programs must be approved by Graduate Council and Academic Council.

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 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 June, 2013) is available at the university website www.depts.ttu.edu/gradschool. All manuscripts must conform to the Graduate Schools formatting guidelines. 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 website. 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 Thesis/Dissertation Fee is posted to students' accounts by the Graduate School after Apply 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.

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.

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 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 four 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. Appeals for comprehensive evaluation decisions are covered under Operating Policy 64.07.

Doctoral Program

General Requirements

The degree requirements set forth here are in addition to those stated in the "Enrollment" section of the Graduate School catalog text.

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. In addition, no more than 6 hours of individual study courses (aside from the research or dissertation) ordinarily will be permitted in the doctoral program. Prior approval by the dean is required for any exceptions.

Grade Requirement. For the doctoral 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 in their program taken for graduate credit outside the major. Individual departments and colleges may have higher standards than this minimum, university-wide requirement.

Major and Minor. The doctorate requires at least 60 semester hours of graduate work beyond the bachelor's degree, 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.

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 Examina-

tion"). 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 two consecutive terms. Students holding half-time 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 and approved by the Graduate School in the first year of doctoral study. (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 will 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. Doctoral 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 graduate faculty and be a member of the department or program faculty from which the student will receive the doctorate.

Annual Review. The Graduate School requires faculty in each doctoral program to conduct a formal review of their students' progress at least once each year. 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 student's 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.

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 of 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 and must be held when school is in session. The oral examination must be scheduled by the student and the advisory committee after the committee has read the completed dissertation and prior to the defense deadline during the semester of graduation. Students should present their dissertation to all committee members at least three weeks before the defense date. In addition, 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 at www.depts.ttu.edu/gradschool.

The advisory committee and the graduate dean or a member of the graduate faculty 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 policies published at: www.depts.ttu.edu/gradschool. 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 website. 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 website. 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 www.depts.ttu.edu/gradschool.

Interdisciplinary Graduate Degree Opportunities

The Graduate School of Texas Tech encourages interdisciplinary study and research, believing that the 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 to 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.**



Arid Land Studies

The Master of Science in Arid Land Studies (MSALS) is a unique interdisciplinary program designed to prepare students for international, aridlands-oriented careers in natural resources, environmental science, and associated economic and social factors. Programs are individually tailored to fit student goals.

Program Overview. The interdisciplinary nature of this two-year program is ideal for students who wish to expand their knowledge in related areas of study rather than specialize. The program must be related to the sustainable use and management of drylands. MSALS students may choose the thesis option (24 hours of graduate coursework plus 6 hours of thesis and 6 hours of research credit) or the 36-hour non-thesis plan.

Students in the MSALS program choose three subject areas from the sciences and/or humanities that best suit their career goals. Common subject areas include (1) agricultural sciences and natural resources; (2) geosciences; and (3) water resources and environmental toxicology. However, any graduate course may be taken upon recommendation of the graduate advisor. No more than 12 credit hours may be taken within any single college except the College of Arts and Sciences.

Admissions Criteria. Applicants to the program must satisfy the requirements set by the university and the Graduate School. Applications and supporting documentation must be submitted to the Graduate School (www.depts.ttu.edu/gradschool/admissions/apply.php) with copies to Dr. Gad Perry, gad.perry@ttu.edu. Competitive scholarships may be available. For additional information, email Dr. Perry.

Biotechnology

Director: Dr. David B. Knaff, Horn Professor of Chemistry and Biochemistry

Texas Tech University offers 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. The Texas Tech Center for Biotechnology and Genomics administers the Master of Science in Biotechnology, with an emphasis in bioinformatics as a new option.

The degree 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 to research (and possibly additional advanced coursework). 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 (or final) semester. Options should be carefully discussed with the director and/or graduate advisor of the center.

First-year students take a core curriculum consisting of an introductory lecture course, an introductory lab course (BTEC 5338), a course on the ethics of research (GSBS 5101), a bioinformatics course, and a course in scientific communication (BTEC 5100). The remaining coursework requirements are satisfied by selections from a broad list of approved electives offered by the Center for Biotechnology and Genomics or other departments.

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 should be submitted through the Office of Graduate Admissions.

Scholarships. A limited number of scholarships will be available at the start of the fall semester for outstanding first-year students. 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 23.)

Graduate Courses

- 5001. **Topics in Biotechnology (VI-6).** Prerequisite: Consent of instructor. Special areas of current interest in biotechnology. Content and credit vary by section number. May be repeated for credit.
- 5100. **Scientific Communication (1).** Different aspects of scientific communication, including presentation of scientific material, written communication skills targeted toward information organization and summary, and reading and thoughtful analysis of primary scientific literature.
- 5311. **Protein Engineering (3).** Prerequisite: BTEC 5338 or consent of instructor. A protein-based course to determine the structure-function relationship of protein through protein engineering and x-ray crystallography.
- 5312. **Gene Expression Analysis (3).** Prerequisite: Consent of instructor. Introduction to nucleic acids, gene structure and function; techniques of RNA extraction, quantification and quality determination; applications of next generation sequencing for gene expression analysis.
- 5313. **Experimental Mass Spectrometry in Biotechnology (3).** Prerequisite: Consent of instructor. Mass spectrometry instrumentation and generation and interpretation of mass spectra in analysis of biomolecules. Other preparative analytical techniques, including 2D-gel and chromatographic techniques.
- 5338. **Methods in Biotechnology (3).** 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).** Prerequisite: BTEC/GBTC 5338. Topics include DNA sequencing and amplification, mass spectrometry, liquid-handling robotics, automated chromatography, and protein-ligand interactions and kinetics.
- 5414. **Advanced Plant Biotechnology (4).** 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 (VI-6).** (GBTC 6000)
- 6001. **Biotechnology Internship (VI-9).** Research and training in a university, private-sector, or government laboratory. Consent of program director required. For nonthesis students.
- 6101. **Biotechnology Seminar (1).** Presentation of current research topics in areas directly relevant to biotechnology. (GBTC 6101)
- 6301. **Introduction to Biotechnology (3).** Prerequisites: CHEM 3311, 3312, 3313. Scientific basis 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)

Interdisciplinary Studies

Coordinator: Dr. Clifford Fedler, Professor of Civil Engineering, Senior Associate Dean of the Graduate School

The Master of Arts or Master of Science in Interdisciplinary Studies is a degree program intended for students who wish to continue education at the graduate level but do not seek specialized training concentrated in a traditional major area. This program is not a substitute for a 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 with typically 12 hours from any one area, within at least two different colleges. Some programs (departments/colleges) have specific prerequisites for students taking their courses so students are encouraged to discuss their options with those program advisors. Most students pursue the 36-hour non-thesis plan, but the thesis option (24 hours of graduate coursework plus 6 hours of thesis [6000]) may be appropriate. For the 36-hour non-thesis option, students may choose the master's examination, an internship, a project report, or the portfolio as their final comprehensive component of their program.

The standard admission policy for applicants to other degree programs will apply to those seeking admission to the interdisciplinary master's program. Applicants may submit GRE or GMAT scores and undergraduate records. Students should 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 interests, 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.

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. Greta Gorsuch, 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.

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 Geosciences.

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, or any other department that matches their interests. Interested students should contact Dr. Frank Thames, Department of Political Science, 806.742.4049.

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 of the 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 the director of the Women's Studies Program, 806.742.4335, womens.studies@ttu.edu.

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 the Health Sciences Center. Those interested in a customized program should contact Senior Associate Dean Clifford Fedler in the Graduate School or visit the website www.depts.ttu.edu/gradschool/about/INDS/index.php

Interdisciplinary Studies (IS)

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.
- 5031. Internship in Interdisciplinary Studies (V1-6).** Supervised internship experience in an aspect of interdisciplinary studies designed to provide students with practical experience in their specified field.
- 5330. Master's Report in Interdisciplinary Studies (3).** Supervised research project to provide students an opportunity to develop specific experience in the field.
- 5332. Advanced Topics in Interdisciplinary Studies (3).** Nature of the course depends on the students' interests and needs for advanced study in their specific field in interdisciplinary studies.
- 6000. Master's Thesis (V1-6).**
- 7000. Research (V1-12).**

Museum Science

Chairperson: Dr. Eileen Johnson, Horn Professor of Museum Science and Director, Lubbock Lake Landmark

The Master of Arts in Museum Science offers a specialization in either museum science or heritage management. The specialization in museum science emphasizes thorough preparation in the broad spectrum of museum theory and practice. Graduates from the museum science specialization of the program have a comprehensive background in museum studies and are prepared as generalists in a number of subdisciplines, including collections management and care; exhibitions and interpretation; museology; museum manage-

ment; and curatorship in anthropology, art, ethnology, history, paleontology, or the natural sciences.

The heritage management specialization emphasizes extensive investigation in the field of heritage management. Graduates from the heritage management specialization of 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 programing designed to derive maximum advantage from innovative technology without the loss of cultural identity and biodiversity. The heritage management specialization is configured to allow students to emphasize areas of special interest such as heritage administration, conservation, interpretation, heritage education, and use (heritage tourism and ecotourism). The specialization offers both theoretical and practical coursework designed to prepare graduates to be leaders in the heritage management field.

The chairperson of the program administers the museum science program. Interested persons should contact the Museum of Texas Tech University for comprehensive information about the program and application materials. Applicants will be considered for admission to the museum science program after the following materials are received: (1) two letters of reference from persons knowledgeable of the student's academic and professional abilities and (2) a completed career summary statement. Prior to admission consideration, students must complete the online application through the Graduate School 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.
- **Test Scores.** Scores on the GRE should be no more than five years old. The GRE is required, but no test score will be considered the sole criterion.
- **Individual Profile.** Profiles may include recommendation letters, research background, motivation, multilingual proficiency, undergraduate institution, presentations, and the completed career summary statement. 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.

A student majoring in the program and in the museum science specialization must take at least 27 hours from the museum science core curriculum, a minimum of 12 hours of elective graduate-level courses, and 6 hours of thesis or internship. Required core courses for the program are MUSM 5321, 5326, 5327, 5330, 5331, 5332, 5333, 5334, and 5340.

A student majoring in the heritage management specialization must take at least 27 hours from the heritage management core curriculum, a minimum of 12 hours of graduate-level elective courses, and 6 hours of thesis or internship. Required core courses for the heritage management specialization are MUSM 5327, 5330, and HMG 5323, 5327. Course numbers for the additional five required core courses are pending.

For electives, 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 in both specializations must develop competency in the core courses taught by members of the museum graduate faculty and staff. Competency is construed to mean an understanding of professional museum and heritage practices.

A total of 45 credit hours of graduate-level work is required for graduation. In addition, students must pass a faculty panel exam prior to beginning either the internship or thesis and must pass comprehensive written and oral exams at the conclusion of their studies. Students pursuing the thesis option must write and defend

the thesis. Internships are to be at a location approved by the student's advisory committee.

Following the first 9 credit hours of graduate study, each student's curriculum is formalized through consultation with a graduate faculty advisory committee that reflects the student's area of emphasis and consists of at least three members. This degree plan is approved by the faculty advisor and the chairperson and sent to the Graduate School. When approved, it serves 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, at least 9 of which must be from the core curriculum. A minor at the master's level in the heritage management specialization 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.

Heritage Management (HMG)

Graduate Courses

5323. **Principles of Heritage Management (3).** 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 resources.
5327. **Heritage Planning (3).** Prerequisite: Consent of instructor. Explores practical approaches and methods to heritage planning with emphasis on the integration of related disciplines to attain environmentally sound and socially responsible preservation, management, and development initiatives.
6000. **Master's Thesis (V1-6).**
6001. **Heritage Management Internship (V1-6).** Internship at an approved museum to include a special project approved by the student's advisory committee. Project provides practical experience for professional development.
7000. **Research (V1-12).**

Museum Science (MUSM)

Graduate Courses

- 5321.* **Museology (3).** 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).** 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).** 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).** 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).** 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).** 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.

* Indicates required course for M.A. in Museum Science.

- 5330.* Museum Law, Ethics, and Standards (3).** 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).** Prerequisite: Consent of instructor. Investigates the theories and methods of museum exhibitions and interpretation. Includes planning, developing, and evaluating strategies of exhibitions, publications, and interpretive programs.
- 5332.* Museum Preventive Conservation (3).** Prerequisite: Consent of instructor. 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).** 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).** Prerequisite: Consent of instructor. Develops 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).** 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. Documentation of project provides practical experience for professional development.
- 7000. Research (V1-12).**

* Indicates required course for M.A. in Museum Science.

Wind Science and Engineering

Director: Dr. Daan Liang, Associate Professor of Civil Engineering and Interim Director of the National Wind Institute

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 the 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 six core courses, field of emphasis courses, and an external internship.

- ATMO 5301 Individual Studies in Atmospheric Science—Wind Science (3)
- CE 5348 Wind Engineering (3)
- BA 5310 Domestic and Global Business Conditions (3)
- CE 5331 Advanced Work in Specific Fields—Leadership in Engineering (3)
- STAT 5384 Statistics for Engineers and Scientists I (3)
- STAT 5385 Statistics for Engineers and Scientists II (3)

A master's degree is strongly 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 with

the advice and consent of the graduate advisor, depending on the student's area of research emphasis. Some of the courses available to fulfill the requirements are as follows:

- ATMO 5353 Meteorologic Field Experiments (3)
- ATMO 5317 Wind Storm Hazards (3)
- CE 5341 Wind Engineering Laboratory (3)
- IE 5320 Systems Theory (3)
- ECO 5320 Managerial Economics (3)
- FIN 5320 Financial Management Concepts (3)
- GEOL 5428 GIS in Natural Science and Engineering (4)
- MATH 5334 Numerical Analysis I (3)
- MATH 5335 Numerical Analysis II (3)
- PUAD 5352 Public Policy Analysis (3)
- STAT 5378 Stochastic Processes (3)
- WE 5300 Advanced Technical Wind Energy I (3)
- WE 5301 Advanced Technical Wind Energy II (3)
- 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 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 also available to complete this internship requirement abroad.

Students pursue multidisciplinary research under the guidance of the chair or co-chairs of their advisory committee. 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 website (www.wind.ttu.edu) for more details of the degree program and ongoing research topics.**

Wind Energy (WE)

Graduate Courses

- 5300. Advanced Technical Wind Energy I (3).** A multidisciplinary course for students with a physical science/engineering background wishing to pursue a technical approach to wind energy.
- 5301. Advanced Technical Wind Energy II (3).** Prerequisite: WE 5300. An in-depth multidisciplinary course for students with a physical science/engineering background wishing to pursue a technical approach to wind energy.
- 5310. Advanced Managerial Wind Energy I (3).** Non-technical version studying wind turbine and wind farm architecture, wind energy conservation, aerodynamics, electrical systems, economics, regulatory issues with environmental and utility industries.
- 5311. Advanced Managerial Wind Energy II (3).** Prerequisite: WE 5310. An in-depth multidisciplinary course for students with a business/managerial/natural science background wishing to pursue a non-technical approach to wind energy.
- 5320. Renewable Energy Policy (3).** Provides overview of basic economic concepts and examines the progress made in renewable energy policy in the U.S. and the world.
- 7000. Research (V1-12).** Prerequisite: Consent of instructor. May be repeated for credit.

Graduate Programs by College

College of 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 the Departments of Agricultural and Applied Economics, Agricultural Education and Communications, Animal and Food Sciences, Plant and Soil Sciences, and Natural Resources Management.

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 the Departments of Agricultural and Applied Economics, Agricultural Education and Communications, Animal and Food Sciences, Plant and Soil Sciences, and Natural Resources Management.

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. 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 agricultural education and horticulture. The Master of Science degrees in horticulture and plant and soil 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

Master's Program

The Master of Science in Agricultural and Applied Economics requires either a minimum of 30 hours of graduate credit for the thesis option or a minimum of 36 hours for the non-thesis option. The Master of Agribusiness requires 36 hours. A student seeking a M.S. in Agricultural and Applied Economics may choose courses to emphasize agribusiness and trade or resource policy and development.

Doctoral Program

The doctoral program in agricultural and applied economics requires a minimum of 70 credit hours of coursework beyond the baccalaureate degree and at least 20 credit hours for dissertation. The program is designed to develop a broad-based competence in advanced economic theory, techniques of quantitative analysis, and public administration of agricultural and economic issues. Two options are offered for the Doctor of Philosophy degree in the agricultural and applied economics program. The first option allows graduate students to select a minor of their choice in business administration, finance, mathematics, public administration, statistics, sociology, or other possible areas of study. The program has been designed to take advantage of the strengths of the department and areas of interest to students. The second option allows graduate students to select a minor in personal financial planning, a joint Ph.D. program between the department and the College of Human Sciences. Completion of the doctoral program in agricultural and applied economics with a minor in personal financial planning qualifies graduates to take a test administered by the Certified Financial Planning Board of Standards to become Certified Financial Planners.

Each Ph.D. candidate is expected to demonstrate competency by satisfactorily completing (1) a comprehensive written examination in each specialty field chosen, (2) a dissertation research project that demonstrates original independent scholarly research, and (3) a final oral exam.

Before being recommended for admission to a degree program with a major in agricultural and applied economics, the student may be required to take (without graduate credit) undergraduate leveling courses as specified by the department.

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 36-hour 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.

Department of Agricultural Education and Communications

Master's Program

The department offers two Master of Science degree programs, one in agricultural education and one in agricultural communications. These programs may be completed with 36 hours of approved graduate courses or 30 hours of graduate courses plus 6 hours of thesis research.

Doctoral Program

The department offers two doctoral programs to meet unique career goals and personal needs. The Doctor of Philosophy in Agricultural Communications and Education is a resident degree designed to prepare students for a career as a faculty member. The program provides an opportunity for advanced study in the human dimensions of agriculture (agricultural communications, agricultural education, and agricultural leadership) to meet the growing demand for college and university faculty who can provide instruction in more than one dimension. This degree program requires a minimum of 48 semester hours of graduate coursework along with the development of a dissertation (12 hours) beyond a master's degree (total of 60 hours post-master's degree).

The Doctor of Education in Agricultural Education is a unique distance-delivered degree that is awarded by both Texas Tech and Texas A&M University. Students in this program must apply for admission at both universities. Most coursework associated with this joint degree is delivered via the ITV and 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.

Graduate Certificates

Agricultural Communications Leadership. A 12-hour Graduate Certificate in Agricultural Communications Leadership enables individuals working in agricultural communications profession to increase their understanding of the more complex and dynamic communication strategies such as crisis communications, knowledge management, and effective online media utilization. It increases students' understanding of leadership and the people with whom they interact on a daily basis, enabling them to perform their professional duties more effectively and efficiently. Required courses are ACOM 5302, 5304, 5308. Electives are AGLS 5304, 5306, 5307.

Agricultural Leadership. A 12-hour Graduate Certificate in Agricultural Leadership will enable individuals working in any sector of the agricultural industry to develop an understanding of theoretical leadership principles as well as the basics of applying leadership techniques to groups in a variety of situations. Required courses include AGLS 5304, 5305, 5306, and 5307.

Department of Animal and Food Sciences

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 Program

The non-thesis, 36-hour 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 these degrees.

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. This degree requires a thesis in addition to at least 24 semester hours of coursework and 6 thesis hours.

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

The doctoral program in animal science requires 60 hours of graduate coursework and 12 dissertation hours, totaling 72 hours. Students may transfer in 30 hours of coursework from a M.S. degree excluding thesis and seminar hours. 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, exercise 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.

The department has a collaborative agreement with the Department of Kinesiology and Sport Management in the College of Arts and Sciences that will lead to a Ph.D. in Animal Science with an emphasis in exercise physiology. The program is designed for students with specific interests in human physiology and exercise. The curriculum includes coursework in physiology, biochemistry, neurosciences, cell function and regulation, and statistics. A preliminary examination administered by joint faculty from exercise physiology and animal science is required before the dissertation proposal.

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.

Department of Landscape Architecture

The Master of Landscape Architecture degree is a professional degree program designed to accommodate students with a Bachelor of Landscape Architecture (B.L.A.) as well as those with degrees in a discipline other than landscape architecture. This is a flexible program designed to meet a variety of professional interests, as well as individual needs and career objectives. The program focuses on the unique environmental and cultural challenges found in the arid and semi-arid regions of the United States and incorporates program offerings such as vernacular design, land use and regional planning, geographic information systems, and cultural landscape design.

First Professional Degree. The first professional degree track accepts students from a broad range of disciplines, including anthropology, art, business, and environmental sciences. The first professional degree requires 36 hours and up to 35 hours of leveling courses.

Advanced Professional Degree. The advanced professional degree is designed for students with the Bachelor of Landscape Architecture degree or its equivalent. The advanced professional degree requires a minimum of 36 credit hours.

Thesis and Project Thesis Options. The option of a thesis or a project thesis is at the discretion of the student. The thesis option is optimal for advanced degree students seeking greater research and theoretical opportunities particularly suited to a career in academia or public practice. The project thesis option is primarily for first professional degree students and is intended to highlight the student's ability to manage the design process for a complex design project.

Accreditation. The Master of Landscape Architecture (M.L.A.) is fully accredited by the Landscape Architecture Registration Board. This national accreditation allows graduates to sit for the Landscape Architectural Registration Exam (LARE) to become a licensed landscape architect.

Admissions. Admission requirements are established by the Texas Tech University Graduate School. At this time, neither the Graduate School nor the Department of Landscape Architecture requires the GRE for admission. Application for both U.S and international students may be made through the Graduate School website.

In addition to the Graduate School requirements, the Department of Landscape Architecture requests a letter of intent, two letters of reference, transcripts of all previous coursework, and a portfolio of graphic and/or creative works. The letter of intent should address how the program fits the applicant's career goals. Letters of reference should be from individuals who are familiar with the applicant's academic abilities. Transcripts should be official and requested directly from the institution. A portfolio of creative works can include any drawing, sketching, photography, landscape projects, creative writing, or any form of artistic and creative work that is of interest to the candidate. The format is entirely at the discretion of the candidate.

Department of Natural Resources Management

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 of Science Program

The department offers thesis and non-thesis Master of Science programs. The thesis option requires a minimum of 24 hours of graduate coursework plus 6 hours of thesis followed by successful defense of the thesis and final examination. The non-thesis degree requires a minimum of 36 hours of graduate coursework and a final examination. Transfer from a thesis to a non-thesis degree is not allowed after the first semester of enrollment. However, transfer from a non-thesis to a thesis degree is allowed for students showing a significant aptitude, provided that a major advisor has the desire and resources to support the transfer. Before recommendation for candidacy to a master's degree program, students may be requested to take a preliminary examination to determine proficiency and background for graduate work. Students may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the graduate advisory committee.

Professional Science Master's Degree

The Professional Science Master's (P.S.M.) degree is a two-year graduate degree designed to allow students who are already employed in a related profession to pursue advanced training while simultane-

ously developing valued business skills. The PSM degree qualifies students for employment in the public or private sector and offers two tracks: (1) Natural Resource Management offered in the Department of Natural Resources Management and (2) Ecology and Environmental Sustainability taught through the Department of Biological Sciences within the College of Arts and Sciences.

The degree consists of 15 to 19 hours of required courses (including either a 6-hour internship or a 3-hour capstone course) plus 15 hours of elective courses. In addition, students will be required to complete a series of online workplace skills modules (e.g., economics, ethics, interviewing skills, human resource management, conflict management, team building). Students accepted into the program but found to be deficient in preparation for taking graduate courses will be required to take leveling courses. This primarily online P.S.M. degree differs from a conventional M.S. degree in requiring an internship or capstone experience in lieu of a research-based thesis. The degree is intended for those already employed in the environmental fields.

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, upland game ecology, fisheries, 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. In accordance with the requirements of the Graduate School, a 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).

Department of Plant and Soil Science

The department offers a Master of Science in Horticulture Science (available online); a Master of Science in Plant and Soil Science with specializations in crop protection, crop science, fibers and polymers, and soil science; and a Doctor of Philosophy in Plant and Soil Science.

Master of Science Program

Before being recommended for admission to a master's degree program with a major in this department, students may be requested to provide evidence of proficiency in background for graduate work or may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the department.

Master of Science degree students may pursue either the thesis or non-thesis 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 non-thesis option (36 hours of graduate coursework) is considered a terminal degree. An oral exam is required during the graduating semester for the non-thesis option.

Both Master of Science degrees are available at a distance; 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 semester of graduation.

Doctoral Program

The department offers a Doctor of Philosophy in Plant and Soil Science that requires at least 60 or more semester hours of coursework beyond the baccalaureate degree. Doctoral students can specialize 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, 806.834.3685, peter.dotray@ttu.edu

Fibers and Biopolymers. The 12-hour Graduate Certificate in Fibers and Biopolymers 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. Noureddine Abidi, 806.834.1221, n.abidi@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, 806.834.0722, 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. Jennifer Moore-Kucera, 806.834.5485, jennifer.moore-kucera@ttu.edu

College of 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 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 page 187.

Comprehensive Exam. The Comprehensive Exam is a review of the student's work at the end of the second topical studio. Students will present work from the comprehensive studio and two topical studios to a faculty committee. Depending on the results of the review, students may be required to satisfactorily complete an additional studio or specific course assignments.

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 website 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.

Architecture Research and Design Center (ARDC). The ARDC is the clearinghouse for scholarly work, research, and creative activity in the college. The ARDC 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. In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted a 6-year, 3-year, or 2-year term of accreditation, depending on the extent of its conformance with established educational standards.

Doctor of Architecture and Master of Architecture degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree that, when earned sequentially, constitute 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 (Post-professional Degree)

The Master of Science in Architecture (M.S.) is a research-based academic degree for students interested in advanced architectural studies. This degree does not prepare students to receive an architecture licensure. It is for students with an accredited professional B.Arch. or M.Arch. degree, or an approved bachelor's degree in architecture or in another discipline (e.g., art, interior design, engineering, archaeology). Students who have non-architecture degrees and wish to enter the program and those who do not have a basic understanding of computing and computer-assisted design skills 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 30 credit hours of graduate study and write and defend a thesis (6 hours). Students requesting admission into the Master of Science in Architecture program 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 requesting admission into the Master of Science in Architecture program 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.

There are two options for Master of Science in Architecture (M.S.) students:

- Master of Science in Architecture with specialization in Digital Design and Fabrication
- Master of Science in Architecture with specialization in Urban and Community Design

Academic requirements vary depending on the option chosen. Candidates for the Master of Science in Architecture must specify the option in which they are interested. 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 committee

members. All students seeking a degree must complete the program in residency, including the thesis.

Financial assistance may be available for students applying by January 15 for admission into the program the next fall semester. There are scholarships, teaching assistantships, research assistantships, and graduate part-time instructor positions available for graduate students. For more information about the Master of Science in Architecture see www.arch.ttu.edu/MS.

Graduate Certificates

The college offers four graduate certificates. A graduate certificate program is a set of courses that provides in-depth knowledge in a subject matter. Any graduate student at Texas Tech or professionals outside the university may apply for admission. Additional information about graduate certificates offered by the College of Architecture can be found on the website www.arch.ttu.edu/certificates.

Graduate Certificate in Digital Design and Fabrication. Dedicated to advancing design knowledge and pursuing innovation in the process of making architecture, the Graduate Certificate in Digital Design and Fabrication is positioned at the intersection of architecture, engineering, and computation with a profound sustainable and interdisciplinary direction. Students develop a set of skills geared towards a "digital-craft" based design professional orientation with emphasis on design techniques, advanced material processes, and fabrication methodologies.

Graduate Certificate in Health Care Facilities Design. The Graduate Certificate in Health Care Facilities Design is an interdisciplinary certificate that offers specialty courses to graduate students and design professionals in healthcare, emphasizing evidence-based design as a way to enhance efficiency and safety. Successful completion of the certificate will position graduates to be employed in the healthcare facilities design sector and play a leading role in evidence-based design.

Graduate Certificate in Historic Preservation. The Graduate Certificate in Historic Preservation prepares graduate students to play leadership roles in the historic preservation of architecture. This certificate 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.

Graduate Certificate in Urban and Community Design. The Graduate Certificate in Urban and Community Design provides an area of specialization in urban and community design studies for architecture graduate students, as well as other related fields of study. Students develop a more sensitive understanding of the relationship between architecture and the urban environment as a framework for architecture.

Doctor of Philosophy in Land-Use Planning, Management, and Design

The interdisciplinary Ph.D. program in Land-Use Planning, Management, and Design (LPMD) focuses on various aspects of land and land use. It trains students to be leaders in their community and their organizations with enhanced understanding of multi-disciplinary endeavors, improved communication skills between compartmentalized systems of knowledge, and the ability to bring knowledge from one discipline to focus on problems and ongoing projects in another. LPMD training prepares students to be leaders

in administrative, legislative, research, or design organizations that deal with land use.

This program is administered by the College of Architecture with an interdisciplinary steering committee. Faculty and courses are drawn from participating units across the university. 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 are included in the program.

The four tracks in this program 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 admitted to the LPMD program are expected to bring a set of knowledge and skills from their background departments. They will be exposed to various courses in contributing disciplines and, with the assistance of their advisor and/or committee, will be expected to demark an intersection that will be the focus of the dissertation. All students are required to complete a minimum of 66 hours beyond the bachelor's degree plus a minimum of 12 (8000-level) hours of dissertation. This includes specified 24 hours of multidisciplinary core courses, 21 hours of track courses, 15 hours of supporting courses and 6 hours of tool courses. Students will need to specify one track in which 21 hours of courses are selected, of which only 4 courses in one discipline can be taken. Track courses, research projects, and the student's dissertation will focus on the

track selected and will be chosen by the student and approved by the advisor.

Because students come from a variety of backgrounds with different interests and career goals, one standard course of study is not required. The program coordinator conducts initial advisement and program development. A degree plan is formulated by an advisory committee drawn from three or more departments and two or more colleges. This committee arranges a student's course of study in the track specialization. The student follows a "custom-designed" program of study. The advisory committee is responsible for administering comprehensive exams and for directing both the dissertation and the student's program.

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.

Core Courses

Choose 24 hours from the following with no more than one course from a department: ARCH 5324, 5605; LARC 5302; PAUD 5333; LAW 6025; HMG 5323; GEOG 5306; one research methods course (3 credit hours).

Other Courses

LPMD 7000, LPMD 8000

For more information about the LPMD program, see the website at www.arch.ttu.edu/LPMD.

College of Arts and Sciences

Interdisciplinary Graduate Programs

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 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.

Contact: Dr. Kanika Batra, kanika.batra@ttu.edu

Graduate Courses in Comparative Literature (CLT)

- 5301. Theories of Literature (3).** Intensive exploration of selected theories or methodologies of literary study. May be repeated.
- 5310. Literature and Cultural Studies (3).** 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).** Examines the representation of gender in various national literatures. May be repeated for credit.
- 5355. Studies in Comparative Literature (3).** Practice of the study of comparative literature with emphasis on themes and motifs. (ENGL 5355)
- 7000. Research (V1-12).**

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)
ANTH 5323*	Topics in Cultural Anthropology (3)
ANTH 7000*	Research (V1-12)
ART 5315	Arts of the Indian Americas (3)
COMS 5302	Intercultural Communication (3)
ECO 7000*	Research (V1-12)
EDBL 5332*	Foundations of Bilingual Education (3)
EDBL 5333*	Teaching the Multicultural-Multilingual Student (3)
EDCI 7000*	Research (V1-12)
EDEL 7000*	Research (V1-12)
HIST 5319	Studies in Native-American History (3)
HIST 5333	Studies in African-American History (3)
HIST 6304*	Seminar in American History (3)
HIST 7000*	Research (V1-12)
POLS 5327*	Selected Topics in American Government and Politics (3)
POLS 7000*	Research (V1-12)
SOC 5312	Seminar in Urban Problems (3)
SOC 5313	Seminar in Minority Relations (3)
SOC 7000*	Research (V1-12)
SPAN 5381	Hispanic Literature of the Southwest (3)
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.

Contact: Dr. Julian Perez, Department of Classical and Modern Languages and Literatures; 806.834.6332; julian.perez@ttu.edu

Forensic Science

The Master of Science in Forensic Science degree program emphasizes extensive learning in the scientific and laboratory skills necessary for application in a modern forensic laboratory. The program offers concentration focuses in areas of forensic investigation and includes exposure to the breadth of forensic disciplines, including the principles, practices, and contexts of science as they relate to specialized forensic topics.

Graduates from this program are prepared to enhance and strengthen the forensic science disciplines through sound methodologies and practices while simultaneously advocating the highest ethical standards through public service to federal, state, and local law enforcement jurisdictions and agencies.

Students from various undergraduate backgrounds may pursue either of two tracks within the program: the forensic scientist

track or the forensic investigative track. The investigative track is designed for students who have a social science background and intend to work in a non-laboratory setting. The scientist track is designed for students who have a chemistry/biology science background and wish to work in a traditional laboratory setting. The program offers both theoretical and practical coursework and is designed to allow students to emphasize areas of special interest such as toxicology, DNA, crime scene investigation.

Students in the both tracks must take at least 21 hours from the core curriculum, including statistics, research methods, and ethics. The remaining coursework requirements for each track are satisfied by selections from a broad list of approved electives. Students are required to complete either a research oriented thesis or a comprehensive written exam. This comprehensive assessment is highly

individualized and will focus on the student's primary area of interest. Students following the internship option are also required to take and pass a comprehensive examination. The non-thesis option is a total of 39 credit hours of graduate-level work while the thesis option is a minimum of 24 hours of graduate coursework plus 6 hours of thesis (6000).

Following the first 9 credit hours of graduate study, each student's curriculum will be formalized through consultation with a graduate faculty member and will reflect the student's area of emphasis. This degree plan will be approved by the program director before being submitted to the Graduate School. When approved, it will serve as a tool for advising and reviewing to assure completion of degree requirements.

Applicants will be considered for admission to the forensic science program after the following materials are received: completed application to the Texas Tech Graduate School, GRE test scores, three letters of recommendation (two of which must be from academic faculty), letter of intent, and curriculum vita/resume. The program accepts students in the fall and spring semesters. Once that process is completed, program admission and competitive scholarship awards are based on the following 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, undergraduate institution, presentation, and interviews. Other information that admission committees may consider is work commitment, demonstrated commitment to a particular field of work or study, and community involvement.

Contact: Dr. Robert Paine; Department of Sociology Anthropology, and Social Work; robert.paine@ttu.edu

NOTE: Certain criminal, traffic, and civil convictions can disqualify a graduate from obtaining some positions in the law enforcement or criminal justice professions.

Scientist Track

Core Courses (Choose two in addition to required courses)*

FSCI 5350	Crime Scene Investigation (3)
FSCI 5352	Ethics in Forensic Science (3) – required
FSCI 7000	Research (3) – required
ENTX 6351	Analytical Toxicology Lecture (3)
BTEC 5338	Methods in Biotechnology (3)

Statics Course (Choose one)

BIOL 6309	Advanced Topics in Quantitative Biology (3)
PSY 5480	Experimental Design (3)
SOC 5331	Field Research (3)
STAT 5302	Applied Statistics (3)

Research Design

FSCI 5353	Research Methods in Forensic Sciences (3) – required
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Research Methods Course (Choose one)

BTEC 5338	Methods in Biotechnology (3)
SOC 5394	Seminar in Sociological Research Methods (3)

Law Course

FSCI 5331	Advances Topics in Forensic Sciences (3) – required
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Investigative Track

Core Courses*

FSCI 5350	Crime Scene Investigation (3) – required
FSCI 5351	Serial Crimes (3) – required

* Minimum grade of 3.0 required for core courses unless otherwise approved by the senior director.

- FSCI 5352 Ethics in Forensic Sciences (3) – required
 FSCI 7000 Special Topics in Forensic Science (3) – required

Statistics Course (Choose one)

- BIOL 6309 Advanced Topics in Quantitative Biology (3)
 PSY 5480 Experimental Design (3)
 SOC 5331 Field Research (3)
 STAT 5302 Applied Statistics (3)

Research Design

- FSCI 5353 Research Methods in Forensic Sciences (3) – required

Research Methods Course (Choose one)

- BTEC 5338 Methods in Biotechnology (3)
 SOC 5394 Seminar in Sociological Research Methods (3)

Law Course

- FSCI 5331 Advances Topics in Forensic Sciences (3) – required

- Elective** 3 hours

Courses in Forensic Sciences (FSCI)

5331. **Advanced Topics in Forensic Science (3).** Students will experience real-world topics specific to legal issues. The Innocence Project of Texas is dedicated to investigating claims of innocence related to serious crimes.
5350. **Crime Scene Investigation (3).** Relevant issues and the principles of forensic science will be examined. Concepts of identifying, preserving, and collecting of evidence as it relates to solving crimes will be emphasized.
5351. **Serial Crimes (3).** 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.
5352. **Ethics in Forensic Science (3).** A survey of ethics and professional standards in forensic sciences. Critical thinking and communication are emphasized.
5353. **Research Methods in Forensic Science (3).** A survey of research methods in forensic science. Emphasis is on critical aspects of designing, conducting, and critiquing experiments; and interpreting and communicating results.
6000. **Master's Thesis (V1-6).**
6031. **Internship in Forensic Science (V1-6).** Supervised internship in an aspect of forensic science designed to provide the student with practical experience in the field.
6330. **Master's Report in Forensic Science (3).** Supervised research project to provide the student an opportunity to develop specific experience in the field.
7000. **Research (V1-12).**

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 non-thesis or a 30-hour plus thesis option with a concentration in linguistics. The department also offers a doctorate with a concentration in linguistics requiring students to take 18 hours of linguistics and write a dissertation on linguistics under the guidance of English faculty.

English also offers a Certificate in Linguistics that can be earned by completing a minimum of 12 hours of linguistics courses in the Department of English. Students may earn a certificate without being admitted to a graduate degree program in the Department of English.

The Department of English offers graduate study focusing on the core areas of linguistics (e.g., syntax, phonology, morphology, semantics) as well as the structure of English, including its historical development and contemporary American dialects. The department includes specialists in East Asian languages and in Old, Middle, and Modern 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 non-thesis 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 CMLL'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 prior to entering the program.

There is no foreign language requirement as part of the program. 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)

5312. **Linguistics for Second Language Educators (3).** Concepts in linguistics and linguistics analysis as they relate to bilingual and second language education.
5320. **Second Language Writing (3).** 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).** Study of theory and research underlying current language teaching with an emphasis on communicative approaches.
5325. **Technology in Teaching Second Languages (3).** 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).** Analysis of second and foreign language teaching curriculum design models and application to current language teaching.
5328. **Teaching English in International Contexts (3).** Designed to prepare students methodologically and professionally for teaching English in international contexts.
5330. **Second Language Acquisition (3).** An introduction to second language acquisition as a research field, including basic and major research findings with emphasis on adult learners.
5332. **Instructed Second Language Acquisition (3).** Prerequisite: consent of instructor. Focuses on the theory and research related to the effect of instruction on linguistic development.
5340. **Second Language Testing (3).** 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).** 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).** 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).**

Medieval and Renaissance Studies

The 18-hour Graduate Certificate in Medieval and Renaissance Studies enables students whose study and research relate to Medieval and Renaissance materials to obtain an interdisciplinary certificate that will give them an advantage for positions in the field. The certificate will be of particular interest to students working toward a master's or doctoral degree in art history, classics, English, romance languages, German, history, music or architecture.

Coursework. MRST 5301 is the only required course. Students may choose the remaining 15 hours from CLAS 5311, 5350; FREN 5312; GERM 5314; ITAL 5301; SPAN 5345, 5361, 5362; ENGL 5301, 5303, 5304, 5305, 5334, 5364; HIST 5341, 5342, 5351, 5366; ARTH 5305, 5320, 5340; MUHL 5320, 5322, 5331; and THA 5325, 5333.

Contact: Dr. John Howe, 806.742.3744, john.howe@ttu.edu; or Dr. Connie Scarborough, 806.742.3145, connie.scarborough@ttu.edu, www.depts.ttu.edu/classic_modern/medieval

Courses in Medieval and Renaissance Studies (MRST)

5301. Medieval and Renaissance Methods (3). Introduction to the scholarship of medieval and Renaissance studies. Focuses on interdisciplinary perspectives and Texas Tech resources for medieval and Renaissance studies.

7000. Research (V1-12). Faculty-directed research addressing medieval and Renaissance topics from an interdisciplinary perspective, often involving library archive and museum sources, including venues in Europe.

Department of Biological Sciences

The Department of Biological Sciences offers four master's degrees and two doctorates. The Ph.D. in Zoology will be consolidated in 2018 with the Ph.D. in Biology.

The department 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.

Master and Doctoral Programs

The 36-hour non-thesis option may be elected by students working toward the M.S. degrees in biology, microbiology, 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.

The Master of Science 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.

All graduate students in the Master of Science or Ph.D. programs 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.

Professional Science Master's Degree

The Professional Science Master's (P.S.M.) degree is a two-year graduate degree designed to allow students to pursue advanced training and excel in science while simultaneously developing valued business skills. The PSM degree qualifies students for employment in the public or private sector and offers two tracks: (1) Ecology and Environmental Sustainability taught through the Department of Biological Sciences and (2) Natural Resource Management offered in the Department of Natural Resources Management within the College of Agricultural Sciences and Natural Resources Management.

The degree consists of 15 to 19 hours of required courses (including either a 6-hour internship or a 3-hour capstone course) plus 15 hours of elective courses. In addition, students will be required to complete a series of online workplace skills modules (e.g., economics, ethics, interviewing skills, human resource management, conflict management, team building). Students accepted to the program but found to be deficient in preparation for taking graduate courses will be required to take leveling courses. The P.S.M. degree differs from a conventional M.S. degree in requiring an internship or capstone experience in lieu of a research-based thesis. Capstone courses will be taken by those already employed.

Department of 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).

Doctoral Program

A doctoral degree program includes a minimum of 24 credit hours of graduate-level coursework, 36 credit hours of research (CHEM 7000), and 12 credit hours of dissertation (CHEM 8000).

A cumulative examination system is used as the written part of the qualifying examination for the doctoral degree, with cumulative examinations offered six times each year. A successful oral defense of the Ph.D. research and future work plan must be completed before the end of the second year. This constitutes the oral part of the qualifying exam.

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.

Department of 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. The program requires study in greater depth and development of critical thinking skills. 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. For outstanding students who want to pursue undergraduate and graduate work in Spanish, Classics, German, or French, the department offers an accelerated option that allows them to complete both degrees in a timely manner (see previous page).

M.A. in Romance Languages with a specialization in either French or Spanish. Applicants for the Master of Arts in Romance Languages degree with a specialization in French or Spanish may complete 30 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 Languages and Cultures with a specialization in Applied Linguistics. Applicants for the Master of Arts in Languages and Cultures with a specialization in Applied Linguistics complete 36 hours of coursework. Areas of emphasis include teaching English as a second language, teaching second/foreign languages, or general applied linguistics. Candidates for this degree must demonstrate knowledge of a language other than English prior to entering the program. There is no foreign language requirement as part of the program.

M.A. in Languages and Cultures with a specialization in Classics. Applicants for the Master of Arts in Languages and Cultures with a specialization in Classics degree may complete 30 hours of graduate courses and a thesis or 36 hours of coursework. Candidates for this degree are directed to the *Guide to the M.A. Degree Program in Languages and Cultures—Classics*, which is obtainable from the graduate advisor or the departmental office. Areas of emphasis include art history, gender, language, and literature.

M.A. in Languages and Cultures with a specialization in German. Applicants for the Master of Arts in Language and Cultures with a specialization in German degree may complete 30 hours of graduate courses plus 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.

Minors. Graduate minors for the M.A. degree include 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 Minor in Latin American and Iberian Studies

Latin American and Iberian Studies (LAIS) administers a minor at both the master's level and the doctoral level. The LAIS minor at the master's level consists of the following 9 credit hours:

- Up to 6 graduate credit hours of LAIS content courses taken in a discipline of concentration selected from history, Spanish, Portuguese, anthropology, geography, political science, or another discipline that meets the required LAIS standards upon consultation with the director of LAIS.
- At least 3 additional graduate credit hours of LAIS content courses in disciplines different from the subject of concentration chosen by the student.

The LAIS minor at the doctoral level consists of the following 18 graduate credit hours:

- Up to 12 graduate credit hours of LAIS content courses and a minimum of 9 hours taken in a discipline of concentration to be selected from history, Spanish, Portuguese, anthropology, geography, political science, or another discipline that meets the required LAIS standards upon consultation with the director of LAIS.
- At least 6 additional graduate credit hours of LAIS content courses in disciplines different from the subject of concentration chosen by the student.

Contact information: Liz Hildebrand, Department of Classical and Modern Languages and Literatures, Box 42071, 254 Foreign Languages, 806.742.3146; CMLL Advising Center, 806.834.2463

Graduate Course in LAIS

5300. Directed Studies (3). 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 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.

Department of Economics

Students seeking a degree in economics should consult with the graduate advisor or the chairperson of the department.

Master's Program

Non-Thesis Option. The non-thesis plan requires successful completion of 12 courses (36 credit hours) and passing of a comprehensive written examination for the Master of Arts in Economics degree. The coursework includes ECO 5311 and 5312; 21 hours of economic electives; and 9 hours of approved general electives.

Thesis Option. The thesis plan requires successful completion of 12 courses (36 credit hours), writing an M.A. thesis, and a successful final defense of the M.A. thesis. The coursework includes ECO 5311, 5312, and 6000 (6 hours); 15 hours of economics electives; and 9 hours of approved general electives.

Doctoral Program

The candidate for the doctoral degree must choose three specializations from within the areas of international economics, monetary economics, public finance, labor economics, environmental and natural resource economics, industrial organization, and special fields of economics.

In addition, the doctoral student must demonstrate a mathematical proficiency in calculus and analytical geometry.

Department of English

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

The director of each certificate, in consultation with the director of graduate studies, will develop and specify a program of study appropriate for each student. If students decide to pursue studies beyond the certificate level, course credit earned toward the certificate can be considered toward a graduate degree.

Graduate Certificate in Book History and Digital Humanities. This program requires a minimum of 15 hours of courses in English, technical communication, and related fields. These courses typically include study in topics such as history of the book, teaching history of the book, digital humanities, scholarly editing, document design, and historic letterpress printing. They can also include work in art history, museum studies, and technical communication and rhetoric, among other related fields.

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.

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.

Graduate Certificate in Teaching Technical Communication.

This program requires a minimum of 15 hours of either online or onsite courses and is designed for international institutions needing to provide faculty and students with instruction in how to teach technical communication and for individuals seeking to retool their English degrees to develop teaching expertise in technical communication.

Master's Program

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 non-thesis 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 non-thesis option requires students to complete 36 hours of graduate courses in technical communication, electives, and a minor. Students who elect the non-thesis 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 non-thesis 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.depts.ttu.edu/english/tcr for details of degree requirements and the course schedule.

Doctoral Program

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.depts.ttu.edu/english/tcr for details of degree requirements and the course schedule.

Department of Environmental Toxicology

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.

The Institute of Environmental and Human Health (TIEHH) integrates the efforts of Texas Tech University, the School of Law, and the Texas Tech University 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.

Department of Geosciences

Master's degree candidates may specialize in areas within geology, atmospheric science, geography, and geophysics. At the doctoral level, research concentrations for the major in geosciences are available in the following:

- Sedimentology, sedimentary petrology, petroleum geology
- Low temperature geochemistry, igneous petrology, high temperature geochemistry, and stable-isotope geochemistry

- Paleobiology and biostratigraphy
- Geophysics, structural geology, tectonics
- 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.

Master's Program

Master of Science in Geosciences. Requirements for the master's degree in geosciences include completion of a minimum of 24 hours of graduate coursework in geology, geophysics, or related fields and 6 hours of thesis credit. The degree requires a total of 36 hours of graduate course credits.

Master of Science in Atmospheric Science. The master's degree in atmospheric science provides the student with a comprehensive treatment of the dynamics describing the current and future atmospheric state using theory, observations, and numerical modeling. The curriculum is comprised of a minimum of 30 hours of graduate-level coursework, 4 hours of seminar credit, and 6 hours of thesis credit. Students are expected to complete a thesis project as part of the degree requirements.

Master of Science in Geography. The 30-hour master's degree in geography is a thesis-based program designed to provide students with critical thinking skills, specific geographic expertise, spatial analysis techniques, and research experience. Coursework will include GEOG 5312 and 5340, 12 hours in the major, 6 hours in the minor, and 6 hours of thesis.

Doctoral Program

Requirements for the Doctor of Philosophy 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 doctoral-level research. In the second year, the student will formalize the dissertation topic and committee. Under normal circumstances the committee will consist of three to five 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.

Graduate Certificate

The 12-hour Graduate Certificate in Geographic Information Science and Technology is designed to provide a flexible solution to professionals and recent graduates who would like to further their education in geospatial technology. The core requirements of the program are GIST 5302, 5304, and two electives. For those new to the field, the program requires GIST 5300 as a leveling course, GIST 5302 and 5304 as core requirements, plus two electives. For recent graduates, credit will not be applied toward the graduate certificate for

equivalent courses taken at the undergraduate level. For students who have already completed one or more of the core requirements and/or electives at the undergraduate level, the graduate certificate requires 12 additional hours. For more information, contact Dr. Kevin Mulligan at kevin.mulligan@ttu.edu, 806.834.0391.

Department of History

Information about 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 website.

Master's Program

Students can pursue a Master of Arts in History by choosing either the Academic Preparatory Track or the Terminal Master of Arts Track.

Academic Preparatory Track

A student in this plan must successfully complete at least 36 hours of graduate work to receive the Master of Arts degree. A minimum of 24 hours must be taken in the Department of History. This includes 12 hours taken at the 5000 level in a geographic area of concentration (U.S., Europe, or World) and 12 hours of electives. Of the electives, 6 hours must be chosen from geographic areas outside of the student's geographic area of concentration. Students also must take a minimum of 6 hours of electives at the 5000 level and may take no more than 6 hours at the 7000 level. Students also must complete HIST 5304 and 6301 during the first semester the courses are offered after the student's admission to the program. HIST 5304 and 6301 also must be taken before completing 6 hours of HIST 6000. **Within this framework, students are strongly advised to plan their programs with the advice and consent of the graduate advisor and their thesis director.**

The 36 hours are distributed as follows:

	<i>Semester Hours</i>
Geographic Area of Concentration.....	12
Electives.....	12
HIST 5304 (The Nature of History).....	3
<small>(Take during first semester course is offered after admission)</small>	
HIST 6301 (Research Methods Seminar)	3
<small>(Take during first semester course is offered after completion of HIST 5304)</small>	
HIST 6000 (Master's Thesis)	6
One Language	

Foreign Language Requirement. Proficiency in one language other than English is required of all candidates for the Master of Arts degree. "Proficiency" in a language is defined according to the following parameters:

- Native speaker status.
- 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 coursework 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.

Thesis. Thesis work is directed by a committee consisting of at least two members of the history graduate faculty. Frequently a third member, who may be a scholar with relevant expertise from the history department, another department, or even from another university, is added if the thesis director, student, and graduate advisor conclude that the nature of the thesis topic warrants it. Students may select any member of the history graduate faculty as the direc-

tor of their theses. Usually a student, with the approval of the thesis director, chooses the other committee members. A degree plan that includes a listing of committee members must be filed with the graduate advisor by the end of the student's second semester of graduate coursework. The completed thesis should demonstrate the student's competence to research an historical problem, to organize a rather sizable mass of information, and to present the findings on the topic selected in a clear and accurate form.

Thesis Defense. After the thesis has been approved by a committee, students are required to pass an oral defense of the thesis. The committee chairperson must file a written report of the outcome of the defense with the graduate dean and the graduate advisor.

Terminal Master of Arts Track (Non-Thesis Professional Enrichment)

This plan is designed to assist students for whom a two-year graduate degree would provide career advancement in a chosen or desired field other than that for which a history Ph.D. is required. The focus of the terminal M.A. is on providing a platform for developing critical analytical skills (reading, written, and oral) within an historical framework. The program provides intense study of up to three inter-related geographic, temporal, and /or thematic fields. The terminal M.A. concludes with the presentation of a portfolio. It does not end in the completion of a thesis-length work. For this reason, the terminal M.A. track is not intended for a student whose interests are oriented toward undertaking Ph.D. work in history.

Some of the careers for which obtaining a terminal M.A. in History may be an asset include the following: education (K-12 or community college), library studies, non-governmental agencies, social work, journalism, campaign management, genealogist, archivist/archival administration, public historian, corporate management, community organizer, counseling, public affairs, political activism, and entertainment industry historical consultant.

Course Requirements. A student in this plan must successfully complete at least 36 hours of graduate work to receive the terminal Master of Arts degree. A minimum of 24 hours must be taken in the Department of History and at least 3 hours must be taken at the 6000 level. No more than 6 hours may be taken at the 7000 level. Students must complete HIST 5304 and select at least two and no more than three focused areas (either geographic and/or from the thematic fields list produced by the department). For each focus area, students are required to complete a minimum of 9 hours. The remaining 6 hours toward the degree can be used either to intensify work in an already selected focus area or pursue an appropriate minor in another department. Within this framework, students are strongly advised to plan their programs with the advice and consent of the graduate advisor and their committee chair. The student is to select a committee chair by the second semester of coursework and, in conjunction with the chair, select one department faculty member for each focus area chosen.

The 36 hours are distributed as follows:

	<i>Semester Hours</i>
Focus Area One.....	9
Focus Area Two.....	9
Focus Area Three.....	9
Minor Field or Discretionary Hours	6
HIST 5304.....	3
(At least 3 hours must be at the 6000 level)	

No language is required for the Terminal Master of Arts option.

If students choose three areas of concentration, they will take 9 hours in each. If they choose two, they will divide those hours into a configuration of 12 and 15.

Professional Enrichment Portfolio. At the end of 36 hours, students will be expected to produce a portfolio detailing their scholarly achievements and corresponding professional implications. The portfolio will contain sample representative work from all courses, including a copy of the major writing assignment completed in each course; an updated copy of the CV; and copies of any articles, publications, or other projects completed in conjunction

with, or developing out of, the undertaken studies. Finally, students will write an 8- to 10-page intellectual biography explaining the connections between chosen coursework, skills developed, and other aspects taken from the studies that have helped them in a professional capacity. This portfolio will be distributed to the student's portfolio review committee at least one month before the intended graduation date as outlined in the course catalog.

Portfolio Defense. After the Professional Enrichment Portfolio has been approved by the committee, students are required to pass an oral examination emphasizing the general area of their coursework and portfolio. The committee chairperson must file a written report of the outcome of the examination with the graduate dean and the graduate advisor.

Doctoral Program

The Doctor of Philosophy in History requires 60 hours beyond the bachelor's degree and 12 hours of dissertation credit, 30 of which must be taken at Texas Tech University. A minimum of three years of graduate study beyond the bachelor's degree is required for the doctorate. Work completed for the master's degree may be considered as a part of this period if it forms a logical sequence in the entire program. Doctoral students must choose three fields of study for their programs organized according to the requirements mentioned below.

Geographic Major Field (30 hours). Upon entering the program, all doctoral students must first declare their geographic major field from among the following three fields:

- **North America**—Students choosing U.S. history as their major geographic field must take HIST 6311, 6312, and 6313.
- **Europe**—Students selecting Europe as their major 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 6307, which is already a general degree requirement. Within their primary geographic field, students also must 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 select one non-major geographic field (one of the two geographies not selected for the major field).

One Thematic Field (9 hours). Students must 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.* Possible thematic fields include the following:

- State and Nation Building
- Borderlands
- Globalization
- Urbanization
- Economics and Business
- Sports and Recreation
- Religion
- Science, Medicine, and Technology
- Environmental
- Memory and Memorialization
- Comparative Imperialism
- Diaspora and Immigration
- Genocide Studies

- Propaganda, Rhetoric, and Ideologies
- Gender and Sexuality
- Labor and Working Class Studies
- Race and Ethnicity
- War and Diplomacy
- Indigenous Peoples
- Politics
- Atlantic World

Other Course Requirements (12 hours)

- All doctoral students regardless of which primary or secondary fields they choose are required to take HIST 5305.
- 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 history doctoral 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.

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 Doctor of Philosophy degree (see "Foreign Language Requirement" under M.A. degree requirements). Proficiency in other languages and/or greater linguistic fluency in a language will be required (or not required) for the Doctor of Philosophy degree as specified by the candidate's exam committee in the candidates formal degree plan. The language proficiencies specified therein will reflect the judgment of the graduate director, the faculty advisor, and the examination committee about the linguistic competencies the candidate will need to successfully complete dissertation research in the proposed area(s) of specialization. "Linguistic fluency" is defined in two alternative ways: (1) either 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 shall 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 (that is, two advanced courses beyond the 2302 or 5342 sequences or their equivalents).

Dissertation (12 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). Once students enroll in dissertation hours, they must continue to enroll in at least 1 hour every semester and summer until graduation.

Department of Kinesiology and Sport Management*

Master's Program

Exercise and Sport Sciences. The Master of Science in Exercise and Sport Sciences provides advanced study in basic exercise physiology, clinical exercise physiology, human performance, and motor behavior/exercise and sport psychology. This degree requires a minimum of 36 hours of graduate courses and provides thesis and non-thesis options. The thesis option requires successful completion of a research project culminating in a thesis and its defense, which comprises 6 of the 36 hours. The non-thesis option requires 36 hours of coursework that may include up to 6 hours in clinical internships, along with passing of a comprehensive evaluation. Each student will have a faculty advisor with whom the planned course of study must be developed.

Sport Management.* The Master of Science in Sport Management* provides advanced study in management theories, principles, and research about the sport industry. This degree requires a minimum of 36 hours of graduate courses and provides thesis and non-thesis options. The thesis option requires successful completion of a research project culminating in a thesis and its defense, which comprises 6 of the 36 hours. The non-thesis option requires 36 hours of coursework that may include up to 6 hours in internships, along with passing of a comprehensive evaluation. Each student will have a faculty advisor with whom the planned course of study must be developed.

* New title and degree pending Texas Higher Education Coordinating Board approval.

Doctoral Program

Students interested in exercise physiology may obtain a Ph.D. with a concentration or specialization in exercise physiology in the Department of Animal and Food Sciences within the College of Agricultural Sciences and Natural Resources. Students interested in a program in rehabilitation sciences may obtain a Ph.D. with a concentration or specialization in rehabilitation sciences at the Texas Tech University Health Sciences Center School of Allied Health Sciences. Students interested in exercise and sport psychology may obtain a Ph.D. with a concentration or specialization in exercise and sport psychology in the Department of Educational Psychology and Leadership within the College of Education.

Department of Mathematics and Statistics

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. Program details may be found in the department handbook (www.math.ttu.edu/FacultyStaff/Resources/DeptHandbook_current.pdf).

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 Program

M.A. Degree in Mathematics. This degree is offered primarily for those students who wish to teach mathematics at the secondary level or at a junior/community college. This is an online program consisting of 30 hours of graduate work, including 6 hours of credit for the master's thesis or 36 hours of graduate work that includes 3 hours of credit for a departmental report. The student must complete two sequences for the thesis option or three sequences for the report option chosen from algebra, analysis, geometry, probability and statistics, applied mathematics, computer literacy and programming, and topology. The courses may be chosen from STAT 5302 and 5303 and MATH 5364 through 5378.

M.S. Degree in Mathematics. This program consists of 30 hours of graduate work, including 6 hours of credit for the master's thesis or 36 hours of graduate work that includes 3 hours of credit for a departmental report. The student must complete at least one of the core sequences listed on the Ph.D. program for the 30-hour plan and at least two of the core sequences for the 36-hour plan. A minor of 6 hours is permitted for the 30-hour plan, and a minor of 9 hours is permitted for the 36-hour plan. In each case the minor must be approved by the graduate advisor.

M.S. Degree in Statistics. This program consists of 36 hours of graduate work that includes 3 hours of credit for a departmental report or 6 hours of credit for the master's thesis.

Doctoral Program

The doctoral program offers concentrations in four areas: pure mathematics, applied mathematics, statistics, and mathematics education. The program consists of 60 hours of graduate course work and 12 hours of doctoral dissertation. Each doctoral student will complete the preliminary exam requirements as early as possible during graduate training. The examinations are administered annually in May and August. In addition, each doctoral student must pass a qualifying examination in a specialty area and complete the doctoral dissertation. Details concerning the preliminary examinations and the doctoral program may be found in the department handbook.

Graduate Certificate

The Graduate Certificate in Mathematics is an online 18-hour certificate designed for anyone with a bachelor's degree (that included coursework in linear algebra) who wants to increase mastery of mathematics, particularly in-service teachers who desire to teach dual credit in high school or teach at a junior college. Students may choose six courses from among MATH 5364 through 5378.

Department of Philosophy

The master's degree program is aimed at providing a broad background in philosophy while encouraging complementary work in an approved minor field of study.

The student may choose to complete 24 hours of graduate coursework plus 6 hours of thesis research. Alternatively, the student may complete 33 hours of graduate coursework and then take an oral exit examination over a significant research paper. Up to one third (but no more than 9 hours) of the student's coursework may consist of graduate courses in disciplines other than philosophy, subject to the approval of the departmental graduate advisor.

For specific information on admission to the program, prospective students should contact the Department of Philosophy and the Graduate School. Students from fields other than philosophy are encouraged to apply, although they may be required to complete a certain amount of philosophy leveling work during their first year of enrollment.

The department also offers a Graduate Certificate in Ethics. This requires four courses in ethics on the graduate level.

Department of 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. preliminary 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 Department of Physics. 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 Program

M.S. 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. in Physics, Non-Thesis Option. 36 hours of course credit with a minimum of 24 hours in the department, plus passing a master's examination.

***M.S. in Physics–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. in Physics–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.

* Degree being phased out. No new students.

Doctoral Program

The core courses for the Ph.D. in Physics 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. Examination topics are drawn from general undergraduate physics and graduate core courses. The program requires a Ph.D. dissertation based on original research.

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.

Department of 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, international relations, comparative politics, and public administration. In addition, the department offers graduate courses in methodology, public policy, and strategic studies

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, a curriculum vitae, and a statement of purpose. 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. International students also must submit evidence of English language proficiency. 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, POLS 5382, and POLS 5383. The M.P.A. program requires 36 hours of coursework, an additional 3-hour capstone course, 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 Master of Public Administration program is designed to provide students with the highest quality education in preparation for careers or advancement of careers and in public, nonprofit, and healthcare organizations. The program stresses the acquisition of academic theory and practical skill to foster an ethical and enduring commitment to public service values of serving the public interest with accountability and transparency; serving professionally with competence, efficiency and objectivity; acting ethically to uphold the public trust; and demonstrating respect, equity and fairness in dealings with the public and fellow workers.

The program provides students with a public service perspective to do the following:

- Lead and manage organizations
- Understand and contribute to public policy
- Critically analyze policies, programs, problems, and issues and make pertinent recommendations
- Communicate effectively in oral and written discourse with a diverse and changing workforce and public.

Applicants to the M.P.A. program should complete the Graduate School application process and submit two letters of reference.

The M.P.A. degree is a non-thesis program that requires 36 hours of in-class coursework, a 3-hour internship, and a 3-hour capstone practicum. Of these hours, 24 are specified as core curriculum and must be completed by all students. The remaining hours are electives that are grouped as a combination of courses in a major field of concentration and an area of emphasis. The 3-hour internship can be waived for in-service students with substantial public service work experience. 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 just before the last semester of the candidate's coursework.

Specialty tracks include public management, health administration, nonprofit administration, and environmental policy administration.

Doctoral Program

The doctoral degree requires a minimum of 61 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 with a minimum grade of B. 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 two major fields and one minor field. For the qualifying examination, the student will select two major fields and will be tested in those fields only. There will be no exam for the minor field.

Additional information and application materials for these programs can be found at www.depts.ttu.edu/politicalscience. Interested students may also address questions and information requests to polsgrad@ttu.edu for the M.A. and Ph.D. programs and to mpa@ttu.edu for the M.P.A. program. A brochure providing additional information may also be obtained by writing to the department.

Dual Degree Program

Dual Master of Public Administration—Doctor of Jurisprudence. The School of Law and the Graduate School of Texas Tech

offer a dual degree program that allows students to complete the requirements for the M.P.A. and the J.D. degrees in less than the five years normally required if the degrees were pursued separately. The dual program reduces the total required hours through a reciprocal arrangement by which 12 hours of approved public administration courses are counted as elective credit toward the J.D. degree, and 12 hours of law are counted as credits towards the M.P.A. degree. To enter the program, candidates must apply separately to the School of Law and the Graduate School and be accepted by both (see top left column for admission information). The degree is designed so that students complete the first year of law school before taking a mix of PUAD and law school courses.

Graduate Certificate Program

The Department of Political Science offers a Graduate Certificate in Strategic Studies. The 15-hour program prepares students to fill the need for strategic positions 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 the strategic responsibilities. For further information contact Professor Dave Lewis, 806.834.4972, dave.lewis@ttu.edu.

Department of Psychological Sciences

The Department of Psychological Sciences 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 General 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, 202-336-5979, 202-336-6123 (TDD/TYY) 202.336.5978 (fax). 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 non-thesis 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 program 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 **December 1** for the clinical psychology doctoral program, **January 1** for the counseling psychology doctoral program, and **January 15** 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.

Graduate Certificate. The Graduate Certificate in Psychological Methods and Analysis (pending THECB acknowledgement) provides students with supplemental, specialized training in various methodologies and analyses that will be useful to professionals in psychological sciences and related fields of study. The core requirements of the program include PSY 5480 and 5447 (or equivalents) and three elective courses, including at least one of the courses marked with an asterisk: PSY 5448,* 5460,* 5467,* 5465, 5485, 5490, 5495, 5496. For information, contact Dr. Amelia Talley, amelia.talley@ttu.edu, 806.834.3937.

Department of Sociology, Anthropology, and Social Work

The department offers graduate degrees in all three programs: Master of Arts in Sociology, Master of Arts in Anthropology and Master of Social Work (M.S.W.). In sociology and anthropology, the master of arts (M.A.) 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 master's-level training is appropriate and useful. Both programs emphasize training in basic theory and methods. The M.S.W. is a professional degree program that prepares students for advanced social work practice.

Admission. General admission requirements are those established by the Graduate School. The best preparation is an undergraduate major in the same field 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 the sociology, anthropology, or social work graduate advisor or the department website.

Sociology Program

Decisions on the program of study, specific courses, and thesis topics are made through consultation with the graduate advisor and other faculty members as appropriate on the basis of the student's background, interests, and objectives.

Coursework. The sociology program provides coursework specialization in such areas as family, criminology and deviance, social psychology, minority relations, demography, urban problems, medical sociology, and gerontology. Six of the 36 required hours may be taken as a minor outside the department. Selection of a minor requires approval of the graduate committee. 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.

Thesis, Non-Thesis Options. Students in the sociology program may select the thesis option or non-thesis 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 non-thesis 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.

Assessment. In the sociology program, a final examination is required. The final examination in the thesis plan involves at least one of the various areas in sociology listed above. Students may present at two conferences in lieu of taking the final exam. In the non-thesis plan the examination includes coursework taken, work experience outside the department, and the topic of the formal paper.

Anthropology Program

Decisions on the program of study, specific courses, and thesis topics are made through consultation with the graduate advisor and other faculty members as appropriate on the basis of the student's background, interests, and objectives.

Coursework. The anthropology curriculum requires 9 hours of core courses in the following three subfields: archaeology, physical anthropology, and ethnology. Students are required to take ANTH 5305 (ethnology core), ANTH 5341 (archaeology core), and either ANTH 5311 or 5312 (physical core). Thirty-six total hours of graduate credit are required, including 21 hours of elective courses. The elective courses may include a 6-hour minor or courses outside of anthropology. Students, in consultation with the graduate advisor, will also elect the thesis or non-thesis option for 6 hours of graduate credit. A grade of B or better is required to receive graduate credit for a course. Coursework is planned in consultation with the graduate advisor or thesis director soon after admission to the graduate program.

Thesis Option. Students in the anthropology program are strongly encouraged to write a thesis, particularly if they plan to continue their studies in a doctoral program. Students choosing this option are required to take 30 hours of coursework (including 12 core hours and 18 elective hours) plus 6 hours of thesis credit. The thesis is based on original research done in consultation with the thesis advisor. Students must submit a thesis prospectus prior to initiating their research and must defend the completed thesis to the department before the thesis may be submitted to the Graduate School.

Non-Thesis Option. Students choosing the non-thesis option are required to take 36 hours of coursework (including 12 core hours, 18 elective hours, and 6 additional hours of electives). In addition to the coursework requirement, students must choose a three-person committee (two of these faculty must be in the anthropology program) to administer a three-day exit examination in their final semester.

Master of Social Work Program

To complete a graduate degree in social work, students will follow one of four possible tracks. Those with standard admission will complete 59 hours of graduate credit, including 900 field placement hours, and can begin only in the fall semester. Full-time students on the standard track can complete the program in two years, while part-time students should be finished in four years.

Students who have completed an undergraduate degree in social work from a program that was accredited (or approved by) the Council on Social Work Education may be eligible for advanced admission status. In this track, students will complete 32 hours of graduate credit, including 500 field placement hours, and can only begin the program in the summer. Full-time students on the advanced track can complete the program in one full calendar year, while part-time students should be finished in two years.

For further information, contact Helen Morrow, Ph.D., LCSW, MSW Program Director, at helen.morrow@ttu.edu or refer to the program website (www.depts.ttu.edu/socialwork).

Rawls College of Business

Graduate Program in Business Administration

Academic Requirements

Admission to graduate degree programs offered through the Rawls College of Business is based on 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 15 hours of BA courses.

The college requires that master's program students maintain at least a 3.0 GPA. Doctoral students must maintain at least a 3.2 average. A student's GPA is computed from all graduate courses. Students falling below these averages will be subject to probationary action. To graduate, master's students must have at least a 3.0 GPA.

Technology Requirements

The Rawls College of Business building is designed with forward-thinking technology that includes printing kiosks, breakout rooms with technology consoles and high definition monitors, classrooms with internet access, internet and power tables, and free Wi-Fi throughout the building. Access to a computer is required for many assignments; students are required to provide their own device for accessing the internet and printing kiosks when necessary.

Master's Programs

Master of Business Administration. The MBA program provides a broad background in business with particular emphasis on developing managerial perspective, analytical tools, and skills. The 42-hour program is AACSB accredited. STEM MBA students are lock-step and may complete the program in 12 months. Working Professional MBA students may complete the program 16-24 months.

A joint venture with the Texas Tech University Health Sciences Center offers a concentration in Health Organization Management. The MBA 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.

Working Professional Master of Business Administration. This MBA program is offered in two formats for students who wish to remain employed full-time while simultaneously attaining their degree. Classes are offered either one weekend per month, or through weeklong residencies during August and January. Students may expect to complete this 42-hour program in 2 years.

STEM Master of Business Administration. This MBA program is specifically designed for students with undergraduate degrees in science, technology, engineering, and mathematics (STEM). The 42-hour, lock-step program may be completed in 12 months of on-campus courses and a distance component.

Master of Science in Accounting. The 36-hour MSA program is designed to prepare graduates for professional careers in the practice of accounting. Concentrations are available in auditing/finan-

cial reporting and taxation. Graduates are prepared for professional service in a variety of fields.

Master of Science in Business Administration (Finance Emphasis). The M.S. in Business Administration with a finance emphasis requires 30 hours of graduate courses in finance. Students without an undergraduate degree in business are required to take ACCT 5301 in addition to the required 30 hours.

Master of Science in Business Administration (Statistics Emphasis). The M.S. in Business Administration with a statistics emphasis requires 30 hours of graduate courses in finance.

Master of Science in Business Administration (Health Care Administration Emphasis). The M.S. in Business Administration with a health care administration emphasis requires 36 hours of graduate courses in business and health operations management. Leveling courses will be required for those who do not have an undergraduate degree in business.

Master of Science in Data Science.* This Science, Technology, Engineering, and Math (STEM)-designated master's degree in Data Science is a 36-hour intensive program that allows students to graduate in one year. The program is focused on data science, giving students equal measures of statistics, technology, and business education. The program accepts either the GRE or GMAT score for admission.

*Degree name change pending THECB approval.

Accelerated Bachelor's-to-Master's Programs. Undergraduate B.B.A. students may apply during their junior year for admission to the Master of Science in Accounting or Master of Science in Management Information Systems accelerated bachelor's-to-master's programs. The accelerated programs are designed for academically outstanding undergraduate students who wish to complete a master's degree while at Texas Tech. Those students accepted into the program will begin taking graduate courses during their senior year. A maximum of 9 semester hours of graduate work may apply to both the B.B.A. and master's degrees. The total number of credit hours required for both degrees will vary depending on the program. Upon successful completion of the required undergraduate courses plus 6 to 9 hours of designated graduate work, the B.B.A./M.S. program will grant the B.B.A. degree, but the B.B.A./M.S.A. program will grant both degrees simultaneously after completion of graduate work.

Doctoral Program

Doctor of Philosophy in Business Administration. This degree is offered with first-field and second-field specializations in accounting and taxation, finance, management, marketing, management information systems, and business statistics. The program of study requires a minimum of 60 semester credit hours beyond the bachelor's degree, plus approximately 30 hours of dissertation research. There are 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. Students are expected to be competent in linear algebra and calculus as determined by the area of specialization. By completing coursework with a minimum grade of B, students must satisfy requirements in advanced statistics and economics early in the program. There is no foreign language requirement. A student who is successful should complete degree requirements in four years of full-time study beyond the master's degree. For more information visit: www.depts.ttu.edu/rawlsbusiness/graduate/phd/index.php

Dual Degree Programs

Doctor of Jurisprudence—Master of Business Administration. Rawls 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. Law students may begin the dual program either the summer prior to the first year of law or the summer after the first year 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. Rawls 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. A student with an undergraduate accounting degree may complete both degrees with 105 hours of law and business courses. 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. Rawls 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. This 45-hour M.B.A. program may be completed in four years concurrently with the M.D.

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 this 36-hour 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 courses concentrating in health organization management.

Master of Business Administration and Other Master's Degrees. Rawls College, in association with other colleges and schools, offers programs that enable students to obtain selected master's degrees and the 42-hour M.B.A. Applications should be made through and approved by the respective colleges involved in these programs: the College of Architecture (Master of Architecture), and the College of Arts and Sciences (M.S. in Environmental Toxicology or M.A. in languages and cultures or romance languages.) These dual programs require 12 to 24 fewer hours than if both degrees were pursued separately.

Master of Science in Biotechnology—Master of Business Administration and Doctor of Philosophy in Biomedical Sciences—Master of Business Administration. Rawls College, in association with the TTUHSC Graduate School of Biomedical Sciences, offers two programs allowing students the opportunity to earn both an M.S. in Biotechnology and an M.B.A., or an M.B.A. and a Ph.D. in Biomedical Sciences. Students must be admitted to both the Graduate School of Biomedical Sciences and the M.B.A. program. Rawls College accepts 12 hours from the Graduate School of Biomedical Sciences as electives in the M.B.A. program. Likewise, the Graduate School of Biomedical Sciences will accept 12 hours from the M.B.A. program as electives for the M.S. in Biotechnology or Ph.D. in Biomedical Sciences.

Master of Science in Business Administration and Other Master's Degrees. Rawls College, in association with other colleges and schools, offers programs that enable students to obtain a 36-hour Master of Science with a major in Business Administration degree and selected other master's degrees. Applications should

be made through and approved by the respective colleges involved. These dual programs require 12 to 24 fewer hours than if both degrees were pursued separately.

Graduate Certificate Programs

Authentic Leadership and Entrepreneurship for the Family Business. The 12-hour Graduate Certificate in Authentic Leadership and Entrepreneurship for the Family Business addresses the unique needs of the family business in two critical areas: interpersonal leadership skills and entrepreneurship skills. **Contact:** Dr. Michael Ryan, 806.834.3175, michael.r.ryan@ttu.edu; Nikki Bohannon, 806.834.3763, nikki.bohannon@ttu.edu.

Business Analytics. The 15-hour Graduate Certificate in Business Analytics is designed to train professional analysts to help organizations with the collection, filtering, storage, and analysis of large amounts of data to support decision-making. Business Analytics is one of the fastest growing and most important areas in today's business world and is in high demand in organizations and consulting companies. **Contact:** Dr. Eric Walden, eric.walden@ttu.edu or 806.834.1925.

Essentials of Business. The 12-hour Graduate Certificate in Essentials of Business provides tools for a wide variety of business areas, including accounting, finance, information systems and quantitative sciences, management, and marketing. Courses in this certificate may be applied toward the M.B.A. degree upon acceptance or as electives in other degree programs. **Contact:** Kelsey Zickefoose, 806.834.1455, kelsey.zickefoose@ttu.edu.

Finance. The 15-hour Graduate Certificate in Finance provides specialized knowledge in the area of finance and/or real estate. The certificate courses may be utilized as electives for other degree programs. The certificate requires one core finance course, FIN 5320, and four additional masters-level finance classes. **Contact:** Dr. Jeffrey Mercer, 806.834.3365, jeffrey.mercer@ttu.edu.

Health Care Facilities Design. Rawls College participates with the College of Architecture, and the School of Nursing in a 12-hour Graduate Certificate in Health Care Facilities Design. **Contact:** Dr. Saif Haq, saif.haq@ttu.edu, 806.834.6317.

Leadership. The 12-hour Graduate Certificate in Leadership provides the experienced manager the opportunity to build and reinforce the interpersonal skills, which are essential to the management role at every level. **Contact:** Dr. Michael Ryan, 806.834.3175, michael.r.ryan@ttu.edu; Nikki Bohannon, 806.834.3763, nikki.bohannon@ttu.edu.



College of Education

Residency Requirements for Graduate Programs

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

This department supervises the following degree programs and certificates:

- 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
- Graduate Certificate in Multidisciplinary Science
- Master Mentor Graduate Certificate

Master's Programs

M.Ed. in Bilingual Education. A master's degree in bilingual education 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.

M.Ed. in Curriculum and Instruction. The program area of curriculum and instruction offers a 36-hour master's degree that is designed to meet the diverse needs of professional educators in elementary, secondary, and post-secondary education. Thesis and non-thesis options are available. This degree is offered online with specializations in language and literacy and bilingual education. Further information and application forms are available on the website www.educ.ttu.edu/edci.

M.Ed. in Elementary Education. The 36-hour master's program in elementary education is designed for students interested in concentrating on the fundamentals of reflective practice with an emphasis in social studies, mathematics, and science education. Thesis and non-thesis options are available. Students enrolled in a post-baccalaureate certification program should meet with a faculty advisor to develop a master's degree plan that will include certification coursework. Information about the program and application forms can be found at www.educ.ttu.edu/eled

M.Ed. in 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 non-thesis options are available.

M.Ed. in Secondary Education. This 36-semester-hour degree 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. 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.

M.S. 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 has two tracks, one for secondary science teachers or K-8 teachers with a strong science background and another for middle-level science and math teachers. The program requires completion of a core of nine courses:

- | | |
|-------------|--|
| • BIOL 5311 | Ecology for Teachers |
| • BIOL 5312 | Cellular, Molecular Biology for Teachers |
| • CHEM 5360 | Conceptual Chemistry for Teachers I |
| • CHEM 5361 | Conceptual Chemistry for Teachers II |
| • EDSE 5377 | Science Curriculum and Instruction |
| • IS 5301 | The Nature of Science for Teachers |
| • MATH 5360 | Advanced Mathematics for Teachers I |
| • MATH 5361 | Advanced Mathematics for Teachers I |
| • PHYS 5371 | Conceptual Physics for Teachers |

Middle-level students are required to take ECE 5332, PHYS 5300, and EDCI 6306 in addition to the nine core courses.

Secondary-level students are required to take ATMO 5302, GEOL 5340, and PHYS 5372 in addition to the nine core courses.

Doctoral Program

Ph.D. in Curriculum and Instruction. The Doctor of Philosophy in curriculum and instruction may be completed with 93 credit hours beyond the baccalaureate. Students may choose a concentration in

one of four areas: curriculum studies/teacher education; language, diversity, and literacy studies; physical education and sports science; or science, technology, engineering, and mathematics (STEM) education. Courses are taken in curriculum and instruction, the student's concentration, research methods, diversity, and technology. Contact the department (peggie.price@ttu.edu) for further information.

Online/Blended Ph.D. in Curriculum and Instruction. This degree is designed to emphasize studies in areas that are crucial to development of existing P-12 teachers, administrators, and curriculum specialists as well as college and university professors and administrators. The program prepares students to apply, synthesize, and evaluate curriculum and instruction theory. Coursework is completed primarily online, but students are required to attend an on-campus orientation and three consecutive annual, two-week intensive summer sessions. The concentration areas available are (1) curriculum studies and teacher education and (2) STEM education, and (3) language, diversity, and literacy studies. Contact the department (peggie.price@ttu.edu) for further information.

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, 806.834.1186, mellinee.lesley@ttu.edu

Master Mentor. The 12-hour Master Mentor Graduate Certificate is designed to prepare experienced teachers to mentor beginning professionals 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. Connie Anderson, connie.anderson@ttu.edu

Multidisciplinary Science. The 15-hour Graduate Certificate in Multidisciplinary Science supports on-going and professional development activities that are designed to improve classroom practice for English learners in science and mathematics instruction. **Contact:** Zenaida Aguirre-Muñoz, 806.834.4949, z.aguirre@ttu.edu

Department of Educational Psychology and Leadership

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 Leadership
- Doctor of Philosophy in Educational Psychology
- Doctor of Philosophy in Higher Education-Higher Education Research
- Doctor of Philosophy in Special Education
- Graduate Certificate in Applied Behavior Analysis
- Graduate Certificate in Autism
- Graduate Certificate in College Student Counseling
- Graduate Certificate in Dual Sensory Impairment
- Graduate Certificate in Higher Education Administration

- Graduate Certificate in Mental Health Counseling
- Graduate Certificate in Sensor Impairment and Autism Spectrum Disorders
- Graduate Certificate in Special Education Transition
- Graduate Certificate in Teacher Leadership

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 of Education and a Doctor of Philosophy in Counselor Education. The master's program with a track in school counseling requires 48 credit hours. The master's program with a track in clinical mental health counseling requires 60 credit hours. The doctoral program requires 93 hours beyond the bachelor's degree and 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 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 Certification. 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.), a Doctor of Education (Ed.D.), and a Doctor of Philosophy (Ph.D.) degree in educational leadership. The M.Ed. requires 36 hours of graduate coursework, and the doctorate degrees require 60 hours of coursework beyond the master's degree. Graduate preparation programs are also offered for principal and superintendent professional certification. Degree programs and certification programs have different requirements, but many courses will apply to both and are explained at www.cms.educ.ttu.edu/academic-programs.

Educational Psychology. Students enrolled in the educational psychology program earn a M.Ed. or a Ph.D. in Educational Psychology. Students have the option of selecting a specialization in school psychology; quantitative methods; or cognition, motivation, and development. Students are required to complete a minimum of 36 semester credit hours for the Master of Education degree; additional hours are required for licensure and/or certification as a licensed specialist in school psychology (LSSP). Students pursuing a master's degree can do so with or without a thesis. Students specializing in quantitative methods or cognition, motivation, and development require a minimum of 91 semester credit hours beyond the bachelor's degree for the Doctor of Philosophy degree; additional hours are required for licensure and/or certification as an LSSP. The Quantitative Methods specialization provides a unique doctoral training experience wherein students are trained as quantitative specialists who can interface quantitative methods with substantive issues across the educational, behavioral, and social sciences. Current methodological interests in quantitative methods include longitudinal structural equation modeling, multilevel modeling, mixture modeling, psychometrics, item response theory, nonparametric

statistics, and many other topics on quantitative methods as applied across the educational, behavioral and social sciences.

Applicants to either the M.Ed. or Ph.D. 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. See www.educ.ttu.edu/academic-programs/psychology-and-leadership/educational-psychology for more information.

Higher Education. The Higher Education program is a competency-based program for those who wish to lead, change, and reform higher education settings. It is designed to develop scholarly and theoretical practitioners and researchers who understand the importance of equity and social justice. Graduates of the program are equipped to apply theories and practical research as tools to name, frame, and solve problems of practice, using empirical evidence to evaluate impact and develop innovative solutions for colleges and universities.

The Higher Education program is committed to excellence in preparing and supporting administrative and instructional leaders for higher education, generating and supporting research in the field of higher education, and delivering public service to the practice of higher education. The program delivers teaching, research, and professional services to students, institutions of higher education, and other academic disciplines.

Students working on a master's degree may pursue either non-thesis or thesis options. The master's program requires completion of 36 semester credit hours for non-thesis students. Students completing a thesis will complete 39 semester credit hours. During their second semester, students must declare a thesis or non-thesis option. Later, if desired, they may switch from the thesis to the non-thesis option (or vice versa) with the permission of their advisor. However, thesis credit hours they have earned will not count toward the non-thesis degree. Each option has a set of required core courses that are selected in consultation with the student's advisor.

The Doctor of Education (Ed.D.) is designed for advanced scholarly practitioners who wish to achieve a superior level of competency in their professional field with emphasis on practice and leadership. Under the direction of their advisor, students may select a focus in community college administration or general higher education administration. The Doctor of Philosophy (Ph.D.) is designed for advanced theoretical practitioners and researchers who want to acquire the ability to contribute to the knowledge base of research, 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; higher education administrators with an orientation towards research, sponsored programs, or grant proposal writing; program assessment-evaluation specialists; research associates; and faculty members.

The Ed.D. in Higher Education requires completion of 90 credit hours beyond the baccalaureate. The Ph.D. in Higher Education—Higher Education Research requires 96 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 website at www.cms.educ.ttu.edu/academic-programs/psychology-and-leadership/higher-education/default.

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 technol-

ogy applications. Several online courses are offered and an online master's degree is available.

The doctoral program requires 93 credit hours (including a dissertation) beyond a bachelor's degree. Doctoral program graduates often enter the field of higher education as professors, instructional designers, and technology specialists.

Two areas of emphasis are available: educational computing and distance education. The master's program with an emphasis in educational computing requires 39 credit hours, and the emphasis in distance education requires 36 hours. Graduates often accept positions as technology specialists in public education, consultants or developers of instructional materials in the private sector, or community college instructors or technology specialists. For more information, visit 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. Additional national certifications are available in orientation and mobility and applied behavior analysis. 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.

Specific areas of interest within the special education program include autism, applied behavior analysis, generic special education, orientation and mobility, visual impairment, deafblindness, deaf education, and special education transition.

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. A majority of the courses in the master's program in special education are available online.

The Doctor of Philosophy (Ph.D.) in Special Education requires 93 credit hours beyond the baccalaureate. Courses in the doctoral core are generally available throughout the year, including the summer sessions. These hours are typically traditional on-campus classes with options for distance participation. The remainder of the program can be completed on campus or through distance education with a residency requirement.

Special education program applicants for the post-baccalaureate, certification, master's, or doctoral program must complete an application found at www.educ.ttu.edu/future/admission/apply-now. Acceptance to the master's program does not guarantee later acceptance to the doctoral program. For additional information, visit www.educ.ttu.edu. For information about the undergraduate Bachelor of Science in Multidisciplinary Studies leading to a special education certificate, refer to the Department of Teacher Education section.

Graduate Certificate Programs

Applied Behavior Analysis. The 15-hour Graduate Certificate in Applied Behavior Analysis serves as a course of study for students who want to take the Board Certified Behavior Analyst coursework but may not want to complete the entire national certification process. **Contact:** Dr. Robin Lock, 806.742.1997, Ext. 288, robin.lock@ttu.edu; Dr. Stacy Carter, 806.742.1997, Ext. 303, stacy.carter@ttu.edu

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:** Dr. Devender Banda, 806.834.4827, devender.banda@ttu.edu

College Student Counseling. The 15-hour Graduate Certificate in College Student Counseling does not represent licensure or certification in mental health, but it will enhance professionals who work in student counseling, mentoring, advising, personnel, and student affairs perform their duties more effectively. **Contact:** Dr. L.J. Gould, 806.834.4224, lj.gould@ttu.edu.

Dual Sensory Impairment. The 15-hour Graduate Certificate in Dual-Sensory Impairment closely mirrors CEC standards 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:** Dr. Rona Pogrund, 512.206.9213, rona.polgrund@ttu.edu.

Higher Education Administration. The 15-hour Graduate Certificate in Higher Education Administration provides the opportunity for higher education professionals to hone their skills in current trends, methodologies, administration, strategic management, and leadership. **Contact:** Dr. David Jones, 806.834.0989, djones.jones@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, 806.834.4224, lj.gould@ttu.edu

Sensory Impairment and Autism Spectrum Disorders. The 15-hour Graduate Certificate in Sensory Impairment and Autism Spectrum Disorder provides graduate students with specialized knowledge and strategies to use with the growing population of students with autism who also have a sensory impairment (visual impairment, hearing impairment, or deafblindness). This certificate can be undertaken during a master's or post-baccalaureate certification program or as a stand-alone certificate. **Contact:** Dr. Nora Griffin-Shirley, 806.742.1997 Ext. 247, n.griffin-shirley@ttu.edu

Special Education Transition. The 15-hour Graduate Certificate in Special Education Transition provides specialized training for anyone working with individuals with disabilities in the transition from school to employment, postsecondary education, or independent living. It can be undertaken during a master's, doctorate, or post-baccalaureate certification program or as a stand-alone certificate. **Contact:** Dr. Donna Brown, 806.834.2490, donna.brown@ttu.edu

Teacher Leadership. The 15-hour Graduate Certificate in Teacher Leadership enhances leadership skills in data-driven decision making, instructional leadership, communication, and mentoring for teachers who aspire to perform teacher leadership duties more effectively. The certificate can be undertaken prior to joining the master's program or as part of the master's program. **Contact:** Dr. Fernando Valle (f.valle@ttu.edu) or David Jones (djones.jones@ttu.edu).

Whitacre College of Engineering

The Edward E. Whitacre Jr. 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 Science in Bioengineering Degree. The master of science in bioengineering program is a thesis option program with four interdisciplinary tracks:

- Biomechanics (Department of Mechanical Engineering)
- Biomedical Signals and Systems (Department of Electrical and Computer Engineering)
- Biochemical Processes (Department of Chemical Engineering)
- Occupational Ergonomics (Department of Industrial Engineering)

Faculty in the bioengineering area are heavily involved with research activities that require collaboration from scientists and clinicians in the Texas Tech University Health Sciences Center.

Students are required to take 24 credit hours of coursework and six credit hours of thesis. Of the 24 hours of coursework, nine hours are pre-determined core credits for all participating students in all tracks, six hours are prescribed electives to be taken in the home department, and nine hours are free electives. The free electives may be taken in any of the four departments participating in the degree.

For further information, contact Dr. Stephern Ekwaro-Osire, Associate Dean for Research and Graduate Programs, 806.742.3451, stephen.ekwaro-osire@ttu.edu.

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.

Dual J.D./Master of Engineering Degree. The college participates in a dual program with the Texas Tech School of Law that enables a student to earn both the Doctor of Jurisprudence (J.D.) and Master of Engineering (M.Engr.) degrees in three years of academic work. The program is designed for students interested in the areas of intellectual property (particularly patents) and law and science. A student may complete both degrees with 126 hours of law and engineering courses. This is possible by allowing 12 hours of approved law courses to transfer as elective credit towards the M.Engr. degree and vice versa. The M.Engr. courses counting toward the J.D. degree transfer as credits only. The grades in these courses will not affect a student's law school GPA.

Department of Chemical Engineering

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. .

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, 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, Non-Thesis Option. The master's program may also be completed without a thesis. Entry into the non-thesis option must be approved by the departmental graduate committee. Graduate students in this non-thesis option are required to take 36 credit hours of graduate coursework, and must pass a comprehensive examination. 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. Ph.D. students are required to have 60 hours, exclusive of dissertation hours.

Department of Civil, Environmental and Construction 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 Program

The department offers two 30 credit hour master's degrees: Master of Science in Civil Engineering (M.S.C.E.) and Master of Environmental Engineering (M.Env.E.). Both degrees have thesis and non-thesis options. Requirements for the non-thesis option are as follows:

- Students enrolling in a non-thesis master's program may fulfill the degree requirements by either (a) completing 27 credit hours of graduate-level coursework and 3 credit hours of CE 6330, Master's Report; or (b) completing 30 credit hours of graduate-level coursework.

- Students will not be allowed to use credit/non-credit courses (e.g., CE 7000) to fulfill the required 30 credit hours.
- Students will be required to complete successfully a department-administered comprehensive exam during their graduating semester.

Master of Science in Civil Engineering. Students working toward a M.S.C.E. specialize in one of the principal subdisciplines of civil engineering (e.g., environmental engineering, structural engineering) in this degree program. Two degree options are available: (1) the thesis option allows students to complete 24 hours of coursework, perform 6 credit hours of independent research, and write a thesis based on the findings of the research, and (2) the report option requires students to complete 30 hours of coursework and write a report on a selected topic.

Master of Environmental Engineering. The M.Env.E. is an ABET-accredited 154-hour 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 major focus areas of water supply resources, 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. Students choosing the M.Env.E. degree are formally admitted to the upper-division courses after faculty review 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. Students who do not achieve admission to the Graduate School may receive the non-accredited Bachelor of Science in Environmental Engineering, which comprises all the undergraduate courses shown in the M.Env.E. curriculum. Further information about the curriculum and assessment procedures can be found at www.ce.ttu.edu.

Doctoral Program

Doctor of Philosophy in Civil Engineering. Doctoral studies consist of selected courses and independent research culminating in a dissertation (minimum 60 coursework hours plus 12 dissertation hours). Each student's degree plan is individually formulated through consultation with a faculty advisory committee. Recent dissertation research studies have included topics in the civil engineering specialty areas of structural engineering, engineering mechanics, geotechnical engineering, geoenvironmental engineering, water resources engineering, wind engineering, environmental engineering, and computational mechanics.

Typically, students with master's degrees in engineering programs enter the civil engineering doctoral program. Students with graduate degrees in non-engineering sciences initially may be accepted subject to completing specified leveling courses in civil engineering. Students with master's degrees in civil or environmental engineering who have not completed courses equivalent to the core courses required for the master's degree in civil engineering will be required to complete the missing core courses satisfactorily at the earliest opportunity. Doctoral degree plans are individually prepared in consultation with a faculty advisor and usually comprise courses listed with CE or ENVE prefixes, but the degree plan often includes courses outside the Department of Civil, Environmental and Construction Engineering and the College of Engineering.

Graduate Certificate

The department offers a 12-hour graduate certificate in Construction Engineering and Management. The certificate is designed for professionals who have a bachelor's degree in civil engineering, architec-

ture, landscape architecture, interior design, or business and are seeking a senior management position in the construction industry. It is ideal for students interested in pursuing graduate study without committing to a full master's program. The coursework for the certificate consists of two required courses (CONE 5320 and 5322) and two electives from CONE 5302, 5304, 5314, and 5332. Course selection will be reviewed and approved by the graduate advisor.

Contact: Dr. Tewodros Ghebrab, tewodros.ghebrab@ttu.edu, 806.834.3218.

Department of Computer Science

The Department of Computer Science 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, computer security, 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 website for additional details and requirements of the Graduate Program and admissions (www.cs.ttu.edu).

Graduate Certificate

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 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, 5358, 5363, 5369, 5380, and IE 5320.

Contact: Dr. Susan Mengel, 806.742.3527, cs.grad_advisor@ttu.edu, www.depts.ttu.edu/cs/grad/certificate

Master's Program

The department offers two Master of Science degrees, a Master of Science in Computer Science (M.S.C.S.) and a Master of Science in Software Engineering (M.S.S.E). The M.S.C.S. is a multidisciplinary degree program designed to strengthen skills in advanced computing concepts concerning software development, modeling, and experimental techniques. The M.S.S.E. is a professional degree program with an emphasis on the integration of systems and software engineering concepts. Both degree programs require filing a degree plan within the student's first semester of study and passing the Final Comprehensive Examination as required by the university.

Master of Science in Computer Science. The degree plan for students pursuing a Master of Science in Computer Science must include two theory courses chosen from CS 5381, 5383, and 5384 as well as two systems courses chosen from CS 5352, 5375, and 5368. The thesis plan requires an additional four CS graduate elective courses (one of which may be CS 7000) and 6 hours of CS 6000.

The non-thesis project/report option requires an additional seven CS graduate elective courses (one of which may be CS 7000) and 3 hours of CS 6001/6002. The non-thesis exam option requires an additional eight CS graduate elective courses.

Master of Science in Software Engineering. The degree plan for students pursuing a Master of Science in Software Engineering (M.S.S.E.) has two options: a thesis option or a project option. The plan for both options must include CS 5373 and 5374. Students choose a number of courses from the following list of software engineering electives (four for thesis option, five for project option): CS 5332, 5341, 5358, 5363, 5368, 5379, 5380, 5381; ENGR 5392; STAT 5384, 5385; IE 5316, 5319, 5320. In addition, the thesis option requires two additional CS graduate elective courses and six hours of CS 6000. The project option requires an additional four CS graduate elective courses and three hours of CS 6001. Both options allow at most one CS 7000 as a CS graduate elective.

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.

Department of Electrical and Computer Engineering

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 non-thesis option is available for master's students.

Master's Program

The master's degree program prepares students for successful professional careers in electrical engineering based on a broad foundation and specialized technical expertise.

Students working toward the M.S.E.E. degree have the option of writing a thesis or taking additional courses. During their first semester, students must declare a thesis or non-thesis option. Later, if desired, they may switch from the thesis to the non-thesis option with the permission of their thesis advisor. However, thesis credit hours they may have earned will not count toward the non-thesis degree. Alternately, students may switch from the non-thesis to the thesis option with permission of the graduate advisor. For more information visit:

www.depts.ttu.edu/ece/grad/ms/

Thesis Option. Students must take 30 credit hours (plus 1 credit hour per semester of graduate seminar), including 24 credit hours of coursework and 6 credit hours of thesis. At most 6 of the 24 credit hours may be non-ECE courses and 3 of the 24 credit hours may be ECE individual study courses. Students must complete a thesis, deliver an oral presentation of the results, and pass the Fundamentals of Engineering Examination or a comprehensive oral examination.

Non-Thesis Option. Students must take 36 credit hours (plus 1 credit hour per semester of graduate seminar) of coursework. At most 9 of the 36 credit hours may be non-ECE courses and 6 of the 36 credit hours may be ECE individual study courses. Students must

pass the Fundamentals of Engineering Examination or a comprehensive oral examination.

Doctoral Program

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.

The doctorate demands substantial depth and breadth of study in the major subject, electrical engineering. Students must take at least 60 credit hours of graduate course work exclusive of the dissertation, with no more than 18 hours of individual study courses. Such courses involve a special arrangement between a student and a faculty member in which the student carries out assignments in a subject not available in a regular course. Students are not required to take a formal minor subject, but if a minor is declared, it must include at least 15 credit hours outside the department. The minor must be represented by a faculty member from the minor department on the student's advisory committee. For more information see www.depts.ttu.edu/ece/grad/phd/.

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, Germany, 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.

Department of Industrial Engineering

The Master of Science in Industrial Engineering (M.S.I.E.), Master of Science in Systems and Engineering Management (M.S.SYEM), 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 30-hour non-thesis option. The course selection may include a minor in an area outside industrial engineering. The doctoral program requires a minimum of 60 hours of coursework beyond the bachelor's degree, which may include up to 15 hours constituting a minor area. At least 12 hours of doctoral dissertation enrollment are also required for the doctoral degree. Transfer credits from a master's degree program are determined by a graduate advisor.

Master's and Ph.D. programs incorporate courses taken in each of the five specialty areas below.

- **Engineering Management:** Systems theory, decision theory, industrial cost analysis, advanced engineering economics, performance improvement in organizations, project management, and productivity management.

- **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.
- **Operations Research:** Simulation modeling, scheduling and sequencing, just-in-time production systems, inventory and production control, linear and nonlinear programming, network analysis, artificial intelligence and expert system.
- **Statistics and Quality Assurance:** Design of experiments, statistical data analysis, reliability and maintainability, on-line and off-line quality assurance, and total quality assurance.

The Master of Science in Systems and Engineering Management (M.S.SYEM) and the Ph.D. in Systems and Engineering Management programs are offered both on campus and by distance education and are designed to prepare graduates for positions in technical management. Details regarding admission and degree requirements are available from the department.

Graduate Certificate Program

The 15-hour Graduate Certificate in Cybersecurity for Critical Infrastructure brings together the relevant computing, engineering, and legal aspects of critical infrastructure with a focus on security for cyberphysical systems. The program is structured to reach a wide range of graduate students, including working professionals and on-campus students. Working professionals who are not seeking a graduate-level degree can earn this certificate by completing cybersecurity courses through distance learning. On-campus graduate students also have the option to take courses that define a cybersecurity concentration. The program options involve defining the courses that define the interdisciplinary core and disciplinary tracks.

Department of Mechanical Engineering

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 and fluid mechanics, dynamics and controls, design, solid mechanics and materials, or transdisciplinary 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 non-thesis report option consisting of 30 hours of graduate coursework and 3 hours of credit for the master's report; and (3) the non-thesis 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 published or accepted for publication in an archival journal relevant to their field of expertise, prior to the defense of their thesis. Individual faculty advisors may choose to require more than one journal publication. The Ph.D. degree requires a minimum of 60 hours of graduate coursework, 12 hours of ME 8000 (Doctor's Dissertation), the candidacy exam, and public Ph.D. defense. The graduate coursework includes at least 12 lecture courses (36 credit hours) and research courses. A maximum of 6 graduate-level courses (18 credit hours) can be transferred from a prior master's degree earned outside the Mechanical Engineering department at Texas Tech University.

Department of 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. The department is located in a geographical area that produces 22 percent of the nation's petroleum resources. Sixty eight 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 graduate-level petroleum engineering courses must 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, 5323, 5325

Formation Evaluation: PETR 5000, 5304, 5305, 5308, 5324, 5328, 5329

Simulation/Computational: PETR 5309, 5310, 5312, 5313, 5322.

All graduate students are required to register for PETR 5121 each long semester. Students should notify their graduate advisor immediately when receiving a grade of C, D, or F and before dropping a course, or when withdrawing from the university, in order to gain a full understanding of the implications and develop a plan for the future.

Admission Process

The ideal graduate applicant should have a B.S. in Petroleum Engineering with at least a 3.0 GPA. In addition the applicant must provide the following:

- Financial statement (proof of financial support)
- Official transcript
- Proof of proficiency in English (TOEFL, IELTS, PTE Academic, Cambridge CPE, Cambridge CAE, or completion of ELS Level 112)
- Official GRE scores (quantitative, verbal and written)
- Three letters of recommendation
- Goals/purpose statement

For more information about the graduate school application process visit www.depts.ttu.edu/gradschool/ or www.depts.ttu.edu/pe/grad/admissions.php.

Master's Program

Master's With Thesis. The department graduate advisor will meet, advise, and approve courses for the degree each semester. In addition to the written thesis, the candidate's thesis committee will administer a final oral exam/defense of the completed thesis. This thesis option requires a minimum of 30 credit hours comprised of 24 hours of coursework and 6 hours of PETR 6000 (thesis) and PETR 5121 (seminar). (All students are required to enroll in PETR 5121 each long semester.)

Master's Without Thesis. The graduate program for a non-thesis master's candidate is specifically tailored for that candidate's educational background, industry experience, and individual interest. For the non-thesis program, a final comprehensive examination is required by the department and the Graduate School. 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. The non-thesis option requires a minimum of 33 credit hours comprised of 27 hours of coursework and 6 hours of PETR 6001(report) and PETR 5121 (seminar). (All students are required to enroll in PETR 5121 each long semester.)

Combined B.S.—M.S. Non-Thesis Degrees. Students in the B.S. petroleum engineering program at TTU 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) and non-thesis degree requirements.

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 a doctoral degree must successfully pass the qualifying examinations.

These qualifying examinations consist of two parts. The first part is based on the undergraduate curriculum and concerns the following five areas of petroleum engineering: production, drilling, reservoir engineering, formation evaluation, and computational/numerical simulation. Students must pass this first part by the end of the second long semester. The second part of the qualifying examination is an oral defense of the dissertation proposal.

In addition to regulations established by the Graduate School, applicants for candidacy for the doctor's degree are required to complete a minimum of 72 credit hours beyond the bachelor of science degree in petroleum engineering comprised of 60 hours of coursework (which may include up to 12 hours of 7000-level research) and 12 hours of PETR 8000 (dissertation). During their coursework, students are required to demonstrate high proficiency in one of the five areas mentioned above. The coursework of each student must also meet any additional recommendation of the student's dissertation committee.

The graduate advisor determines course content and transferrable hours from any previous Master of Science in Petroleum Engineering programs. No more than 30 hours can be transferred.

College of Human Sciences

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 areas that affect human development: nutrition; family studies; environmental design; restaurant, hotel, and institutional management; personal financial planning; marriage and family therapy; and family and consumer sciences education.

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.

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 hospitality and retail management.

Doctoral Degree. The Doctor of Philosophy degree has majors in interior and 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 and doctoral programs 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. Twelve 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 12 universities. The student is admitted to one university and receives a graduate degree or certificate from that same university.

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

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 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 a minimum of 18 hours as determined by the program and must complete with a B or better. (Due to petroleum engineering enrollment surges, this graduate certificate program is temporarily unable to accept new students.)

each institution's admissions, enrollment, payment, and transcript transfer processes.

Four programs are offered through collaboration of the GPIDEA and the College of Human Sciences. Students can specialize in gerontology or youth development within the M.S. in Human Development and Family Studies or obtain an M.S. in Family Consumer Sciences Education. An undergraduate degree in early childhood is also available through the B.S. in Human Development and Family Studies.

For additional information, see graduate program listings for the department of Human Development and Family Studies or the College of Human Sciences.

For more information about the GPIDEA, its programs, and the participating institutions, visit www.hs.ttu.edu/gpidea.

Graduate students may obtain a teaching certificate in family and consumer sciences by completing coursework that meets the Texas standards for teacher certification.

Post-Baccalaureate 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.).

Graduate Degree Programs Administered by Dean's Office

Most graduate degree programs within the College of Human Sciences are administered by departments and summarized in the catalog sections of those departments. The Office of the Dean, however, administers the graduate programs in the area of Family and Consumer Sciences Education.

FCSE Master's Program

The Master of Science in Family and Consumer Sciences Education (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 non-thesis option. Required coursework includes curriculum development, evaluation, educational leadership, and research methods. The thesis option requires statistics.

An online master's degree program with two options is offered in collaboration with the Great Plains Interactive Distance Education Alliance (GPIDEA).

The first option is a non-thesis program 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 online program consists of 41 semester hours and includes the pedagogy courses required for certification. Teacher certification standards vary by state, and students must meet any additional certification requirements mandated by the state in which they wish to be certified.

The second online option is designed for FCSE professionals who are certified teachers or who are working in educational settings. This program consists of 36 semester hours and provides a thesis option. Students admitted to the GPIDEA program register for all courses at Texas Tech, but the courses may be taught by faculty at any of the participating institutions. Additional information is available at www.hs.ttu.edu/gpidea or by contacting an FCSE advisor.

FCSE Doctoral Program

The Doctor of Philosophy in Family and Consumer Sciences Education prepares individuals for faculty positions in higher education and other professional leadership roles. A Ph.D. requires a minimum of 60 semester hours beyond the bachelor's degree, exclusive of dissertation. Admission to the FCSE doctoral program requires a master's degree.

The doctoral 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.

Department of Community, Family, and Addiction Services

The Department of Community, Family, and Addiction Services supervises graduate degree programs in marriage and family therapy. Applicants seeking information about admission requirements, programs of study, and financial assistance should contact the graduate advisor in the individual program. Admission to a graduate degree program requires both the recommendation of the department and the Graduate School.

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.

Master's Program

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. Students accepted for the Master of Science in Marriage and Family Therapy program have the option to complete the thesis track.

Doctoral Program

The program prepares scientist practitioners with a focus on developing advanced clinical and research skills. 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.

Graduate Certificate

The Graduate Certificate in Addictions and the Family provides 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.

Department of Design

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 statement of intent including current research interests
- A design portfolio or examples of scholarly writing
- A resume
- TOEFEL scores for international students
- GRE scores

The master's and doctoral degrees are research- and studio-based programs; students entering without undergraduate degrees in interior design or architecture are advised that the graduate programs in the Department of Design do not prepare students for professional practice. Students who wish to practice as interior designers should enroll in the CIDA-accredited Bachelors of Interior Design degree program offered by the Department of Design.

To obtain departmental procedures and guidelines, students should contact the director of graduate programs or refer to: www.course.ttu.edu/hs-DesignGrad

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. The master's degree in environmental design (thesis and non-thesis options) requires a minimum of 37 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 interior and environmental design research.

Doctoral Program

The Doctor of Philosophy in Interior and Environmental Design requires a minimum of 67 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. Following completion of all coursework, a qualifying examination for admission to candidacy for the Ph.D. degree will be conducted in accordance with the requirements of the Graduate School.

Department of Hospitality and Retail Management

The department supervises degree programs leading to the Master of Science and Doctor of Philosophy degrees described below. 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.

Hospitality and Retail Management

Master's Degree. The Master of Science in Hospitality and Retail Management degree requires a minimum of 37 semester hours, thesis or non-thesis. All master's degree students in hospitality and retail management must complete 16 to 19 hours of core coursework and at least 18 hours of electives. A GRE or GMAT score is required. Students without appropriate background in the chosen specialization will be required to take undergraduate leveling courses designed by the department. For more information, see www.depts.ttu.edu/hs/hrm/rhim/academics_masters.php.

Those interested in the area of hospitality management may choose from RHIM 5316, 5370, 6308 and 6350. Students who wish to increase their knowledge of food and beverage management may choose from RHIM 5310, 5370, 5375 and 6370. A retail management track is also available for students who wish to pursue opportunities in the retail industry. These students may choose from RHIM 5320, 5335, 5340, 5343 and 5360. Students who have an interest in planning special events can follow the event management track and may choose from RHIM 5316, 5345, 5360, 6308, and 6335.

Hospitality Administration

Doctoral Degree. The Doctor of Philosophy in Hospitality Administration degree requires a minimum of 39 hours in hospitality, 21 of which must be completed as a hospitality administration doctoral student at Texas Tech. Additional requirements include 9 credit hours of education courses, 21 credit hours of research and statistics courses, 3 credit hours of seminar, and 12 dissertation credit hours. A GRE or GMAT score is required. Leveling coursework may also be required. See www.depts.ttu.edu/hs/hrm/rhim/academics_doctoral.php for further information.

Department of Human Development and Family Studies

The department offers master's and doctoral degrees (including a post-baccalaureate Ph.D. option) in human development and family studies (HDFS), as well as a minor in cross-cultural studies (see below). These research-oriented programs require a thesis and dissertation, respectively, and prepare 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 master's degrees and graduate certificates in gerontology and youth development 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), measuring brain function using fMRI, 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 specific to rural populations.

Master's Program

Master of Science in HDFS. Students in the HDFS 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 of Science in HDFS with a Specialization in Gerontology. The 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. The master's concentration requires a total of 36 hours comprised of eight core courses and four elective courses. The universities that are part of the gerontology program include Iowa State University, Kansas State University, North Dakota State University, Oklahoma State University, University of Missouri–Columbia, University of Arkansas, and Texas Tech University. This program is designed to prepare professionals who are either working directly with older people or involved in education and research related to aging adults.

Great Plains IDEA Master of Science in HDFS with a Specialization in Youth Development. Through the Great Plains IDEA, the department offers an online master's degree in HDFS with a specialization in youth development. The 36-hour master's degree includes 28 credit hours of coursework and 8 hours of either a practicum, project or thesis. All courses are taught by distance and in collaboration with the following participating Great Plains IDEA institutions: Kansas State University, Michigan State University, University of Nebraska–Lincoln, and Texas Tech University. Once admitted to a home institution, students can take courses from any of the institutions with credit applied toward the appropriate degree. The Great Plains IDEA youth development program is designed to prepare professionals who are working directly with adolescents and young adults or are involved in education and research related to youth.

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 (1) take the lead on a research project (the 7000 project) prior to becoming a doctoral candidate and (2) 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. This allows students to define their own area of specialization. At least nine courses must be related to their specialization, and up to five courses

may be taken outside of the HDFS department. Up to 30 transfer hours may be applied toward doctoral program requirements upon 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 Educator (CFLE), and several graduate students have pursued this certification.
- Cross-Cultural Studies – This is a minor offered through the department.
- Women's Studies – Many graduate students pursue a certificate or minor in Women's Studies.

Minor in Cross-Cultural Studies (CCS)

The 15-credit-hour graduate minor in cross-cultural studies (CCS) is designed to provide fundamental competencies on multicultural and international/transnational issues affecting diverse populations as well as core principles of human development and socio-political change from a global perspective. The CCS graduate minor is supported by a multidisciplinary curriculum geared toward enhancing cross-cultural knowledge, skills, leadership, and lifetime professional success in a broad variety of traditional and non-traditional career paths. The CCS minor is offered to all master's and doctoral students in the university system as well as non-traditional students seeking to enhance their professional expertise by incorporating a cross-cultural dimension to their programs of study.

The core courses (9 credit hours) included in the CCS minor are designed to provide students with a comprehensive, in-depth exploration of culture and how arguments about cultural diversity, ethnicity, and race are constructed, substantiated, and used across disciplines. The courses encourage critical thinking and analytical reasoning to develop an in-depth understanding of practical applications of cross-cultural theoretical frameworks and methodologies (qualitative-quantitative) from a multidisciplinary perspective. The courses also evaluate the significance of cross-cultural knowledge and the main challenges and issues experienced by professionals across fields in today's multicultural society.

Requirements for the minor are as follows:

- Completion of 15 hours of courses as approved by director of the minor program.
- Nine hours of required coursework (see core courses below).
- Six hours of electives **approved by** the cross-cultural studies program director. Students can choose and combine courses from electives across disciplines in the university system.
- No courses may be taken for pass/fail credit.
- With approval of the program director, some special topic courses may be taken for credit more than once.
- Many courses may be used toward completion of the minor at the discretion of the cross-cultural studies program director.

Core Courses

HDFS 5353	Foundations of Cross-Cultural Studies (3)
HDFS 5311	Socialization Processes and Addiction (3)
HDFS 5353	Cross-Cultural Research Methods (3)

Contact: Dr. Elizabeth Trejos-Castillo, Associate Professor of Human Development and Family Studies; elizabeth.trejos@ttu.edu

Graduate Certificates

Gerontology. The Graduate Certificate in Gerontology is a 15-hour inter-institutional program offered through the Great Plains Interactive Distance Education Alliance, a consortium of seven universities. The program is designed to prepare professionals who are either working directly with older people or are involved in education or research related to aging adults. The web-based

courses are comprised of two core courses and three electives offered by universities participating in Great Plains IDEA.

Youth Development Specialist. The Graduate Certificate in Youth Development Specialist is designed to assist youth professionals to train individuals in the second decade of life with the skills necessary for a successful transition into adulthood. The target audience is professionals who are either working directly with adolescents and young adults or are involved in education and research related to youth. Great Plains IDEA is the only alliance of public universities to offer a youth specialist certificate completely online. The program addresses the need for advanced education in youth issues and does so through a strengths-based curriculum.

Youth Program Management and Evaluation. The Graduate Certificate in Youth Program Management and Evaluation is designed to prepare professionals who are either working directly with adolescents and young adults or are involved in education and research related to youth. Few graduate programs exist that focus solely on the second decade of life, and Great Plains IDEA is the only alliance of public universities to offer this type of certificate completely online. The certificate is designed to assist youth professionals to develop and apply resources for successful implementation and management of youth-serving organizations. The program addresses the need for advanced education based on research and policy for optimal youth outcomes through a strengths-based curriculum.

Department of Nutritional Sciences

The department supervises degree programs leading to the Master of Science and Doctor of Philosophy degrees described below. 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.

Nutritional Sciences

Master's Degree. The Master of Science in Nutritional Sciences (NS) degree requires a minimum of 30 semester hours (thesis option) or 36 hours (non-thesis option) for students in the basic M.S. program. For students who are in the combination M.S./Dietetic Internship program, 33 hours (thesis) and 39 hours (non-thesis) are required. Courses must be chosen in consultation with the major professor (thesis option) or NS graduate advisor (non-thesis option). For further information, see www.depts.ttu.edu/hs/ns/master.php.

Internship Program. The department offers a fifteen-month dietetic internship program. Participants are selected yearly via a national computerized selection process. Selected credits earned during the program may apply to an optional master's or doctoral degree. Fifteen 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 www.depts.ttu.edu/hs/intern for more information.

Doctoral Degree. The Doctor of Philosophy in Nutritional Sciences degree requires a minimum of 72 hours (includes a minimum of 12 dissertation hours and includes at least 12 hours in the specialization track area). A maximum of 30 hours of transfer credit from the student's master's program will be allowed. See www.depts.ttu.edu/hs/ns/phd.php.

Department of Personal Financial Planning

The Department 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. Students must average a 3.0 GPA in order to maintain good standing with the Graduate School and to graduate. 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 Program

Non-Thesis Master's. The non-thesis 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 the following dual degrees:

- Master of Science in Personal Financial Planning/Master of Science in Accounting
- Master of Science in Personal Financial Planning/Master of Business Administration
- Master of Science in Personal Financial Planning/Doctor of Jurisprudence

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 theory and research collateral 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.

Graduate Certificates

Charitable Financial Planning. The Graduate Certificate in Charitable Financial Planning is intended for those who wish to develop a specialty in the area of planned giving, including complex techniques involving private foundations, charitable remainder trusts, charitable lead trusts, donor advised funds, life insurance, and remainder interests. Students also will review and discuss the latest academic research on charitable giving motivations and fundraising strategies. The certificate requires completion of four courses: PFP 5325, 5326, 5327, and 5398.

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, client communications, and estate planning for the certificate from Texas Tech University.

For students with no previous coursework in these areas, 28 hours may be required to meet the educational requirements of CFP Board to sit for the CFP® Certification Examination.

Admission

Applicants should visit www.depts.ttu.edu/pfp/graduate/ms_program.php or contact the department 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 department and the Graduate School.



College of Media and Communication

The College of Media and Communication offers both the Master of Arts and the Doctor of Philosophy degrees. 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.

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 traditional research-based thesis program or a professional non-thesis program. All programs are 30 credit hours. The thesis program requires 24 hours of coursework and a minimum of 6 hours of thesis credit. The thesis is comprehensive original research and typically takes a full summer or regular semester to complete. Coursework must include three required courses: MCOM 5366, 5364, and 5374.

The professional non-thesis program includes coursework that concludes with a capstone final project course. This course will be taken in the student's final semester and will require a practicum/internship, portfolio, directed readings, or an applied research

project. The sports media option is a track within the professional program. A typical curriculum in this track includes not only coursework but also an internship in sport and media.

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 in media research, theory, and effects. 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.

The Ph.D. in Mass Communications at Texas Tech focuses on the integration of different approaches to the study of mass communications and of all media of mass communications. While coursework may concentrate in the areas of advertising, electronic media, journalism or public relations, each student is required to acquire at least some background in all areas of mass communications and some familiarity with all media of mass communications.

Department of Communication Studies

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. A non-thesis option requires a minimum of 36 hours of coursework, a written comprehensive exam, and an oral defense. Required courses are COMS 5300, 5301, 5305, 5306, and 5307.



College of Visual and Performing Arts

School of Art

For specific admission requirements and procedures for each program, visit the School of Art website: www.art.ttu.edu

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 must 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 Arts Education degree program **do not** need to submit scores for the Graduate Record Examination.

Master of Arts in Art History

Art history investigates the intellectual and cultural products of human activity by focusing on artifacts, artworks, and monuments from around the globe. The Master of Arts in Art History prepares students for doctoral studies in art history and related fields. Those who earn the M.A. will be prepared for a variety of positions in museums and cultural organizations and for teaching in institutions that do not require the terminal degree.

The M.A. in Art History requires a minimum of 30 hours of post-baccalaureate study, including two required art historical theory and methodology courses (ARTH 5308 and 5309), 12 hours of graduate art history topics, 6 hours of an extra-departmental minor, and 6 hours of thesis. Additionally, the degree requires reading knowledge of at least one foreign language.

Students, in consultation with a faculty advisor, will craft a broad curriculum from the following areas: contemporary art and critical theory; European art from ancient and medieval through modern with emphases on the Mediterranean, Italy, France, and northern Europe; colonial and modern Latin American, Chicano/a art, Pre-Columbian Mesoamerican and Native American. The program also offers two trans-geographic areas of concentration: art of borderlands and contact zones and history of the book as art.

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 field of specialization in the School of Art is titled "Critical Studies and Artistic Practice." Students in this program examine diverse discourses in the visual arts, exploring their trans-disciplinary 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. This is usually accomplished with one consecutive fall-spring schedule, or summer sessions I and II consecutive with either a fall or a spring semester.

For acceptance into the doctoral program, we strongly recommend but do not require that the applicant have a master's degree, or its equivalent, with emphasis in a visual arts area. 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. Applicants must include GRE scores.

For admission into this program, the graduate visual studies and art history-criticism faculty review the applicant's dossier. A personal interview is recommended. Faculty submit recommendations to a three-member preview committee. If approved, the applicant is recommended by the committee to the college's Graduate Committee for acceptance into the program. Acceptance is also contingent upon meeting the admission requirements of the Graduate School. After admission, a specific degree plan is determined.

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 and to the Graduate Certificate Coordinator, School of Art, 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.

Credit and Time Requirements

For most purposes a traditionally offered face-to-face course will have a minimum of 15 contact hours for each semester credit hour. Thus, a 1-credit-hour course should meet for at least 15 hours over a long semester and a 3-credit-hour course should meet for 45 hours over the semester. Courses taught during a summer session are expected to have the same number of contact hours as if they were taught during a long semester. It is permitted to offer a course in a shortened schedule, online, or in other non-traditional formats that do not meet the contact hour requirement if the course has been reviewed by a college faculty committee and the Office of the Provost and approved as having the same learning outcomes as a comparable course delivered traditionally.

In-residence students and any students in their semester of graduation must be enrolled in a minimum of one credit-bearing semester hour. Registration in remedial and other zero-credit hour coursework must be accompanied by one credit-bearing course. Should a student drop to zero credit hours, the student will be withdrawn from the institution.

Pursuant to the Texas Tech University *Undergraduate/Graduate Catalog*, the Texas Administrative Code, and norms stated in the *NASAD Handbook*, the credit and time expectations for School of Art courses are as follows:

- For studio- or project-based courses, a standard of 30 in-class contact hours per credit hour per term is employed. Further, non-contact hour time expectations for out-of-class student activity typically range from 15 to 30 hours per credit hour per term.
- For traditionally delivered 3-credit-hour lecture- or seminar-based courses during a regular semester, students should expect to be in class for 3 hours per week and work outside of class a minimum of 6 hours per week. For 3-credit-hour studio- or project-based courses, students should expect to be in class for 6 hours per week and work outside of class between 3 and 6 hours per week.

School of Music

The School of Music offers two master's degrees with seven fields of specialization, a Doctor of Philosophy degree, a Doctor of Musical Arts with four fields of specialization, and two graduate certificates.

Master's Program

Master of Music in Music. The M.M. in Music degree offers fields of specialization in composition, conducting, jazz performance, music theory, musicology, pedagogy, and performance. The degree consists of a minimum of 30 hours of graduate work, including recitals for the performance student, thesis for the musicology or music theory student, and an original composition for the composition student. The Master of Music degree in string pedagogy or keyboard pedagogy may be attained with a 36-hour program without a thesis. For the performance student, 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.

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.

Doctoral Program

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. Fields of specialization 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. A research document is a component of this final doctoral project. Of singular importance is the inclusion of an interdisciplinary arts class selected from the core course in the fine arts doctoral program. Additional information may be obtained from the School of Music.

Doctor of Philosophy in Fine Arts. The music field of specialization in the Ph.D. 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. Concentrations are in musicology, theory, music education, and administration. 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.

Language Requirements. The musicology concentration in the doctoral program requires **competency in** one foreign language. Other concentrations may or may not have this requirement, depending on the dissertation area. Except for the musicology concentration (one foreign language), no foreign language require-



ment exists for the Doctor of Musical Arts degree, the Master of Music degree, or the Master of Music Education degree. Vocal performance students and choral conducting students must demonstrate singing proficiency in French, German, and Italian.

Graduate Certificates

Graduate Certificate in Early Music Performance Practice. The 15-credit Graduate Certificate in Early Music Performance Practice provides graduate music majors with the option of tailoring their coursework and medium ensemble participation to focus on the research and performance of medieval, Renaissance and Baroque music. This resume-enhancing certificate is especially recommended for musicology, theory, choral, or vocal/instrumental students who wish to obtain the in-demand skills required of specialists in the dynamic area of early music scholarship and performance.

Graduate Certificate in Piano Pedagogy. This graduate certificate 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 a performance concentration or the Doctor of Musical Arts degree programs do not need to submit these scores. Students beginning a graduate 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 also required to take the placement 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 School section of this catalog for admissions requirements.

Credit and Time Requirements

Pursuant to the Texas Tech University *Undergraduate/Graduate Catalog*, the Texas Administrative Code, and norms stated in the *NASM Handbook*, the credit and time expectations for School of Music graduate courses are as follows:

- For studio- or project-based courses, in-class contact hours typically include a combination of individual meetings and group activities that may vary by studio discipline and instructor. Total time expectations for in- and out-of-class student activity typically range from 45 to 60 hours per credit hour per semester.
- For traditionally delivered 3-credit-hour lecture- and seminar-based courses during a regular semester, students should expect to be in class for 3 hours per week and work outside of class a minimum of 6 hours per week. For 3-credit-hour studio- and project-based courses, students should expect to devote 9 to 12 hours to the course per week.

Department of Theatre and Dance

Master of Arts

The Master of Arts in Theatre Arts requires a minimum of 36 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 in Theatre Arts 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 written thesis or a thesis project. In the case of performance and pedagogy and design students, the thesis project is based on a performance or production project accomplished during their program. For playwriting students, each 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 Doctor of Philosophy 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 field of specialization is theatre can choose two of the following concentrations: acting and directing; design; history, theory, and criticism; arts administration; and playwriting. Work toward 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 that allows a choice of several avenues of research created through traditional research, professional problems, or an internship.

Admission

For admission to any graduate program in theatre, the applicant must fulfill all requirements of the Graduate School as well as departmental requirements. Applicants for the Ph.D. program must also be recommended by the faculty and be approved by the college Graduate Committee. All incoming students must take at the start of the fall term a departmental diagnostic examination that will provide a basis for faculty decisions about leveling courses that may be required and credits that may be transferred.

All graduate students are expected to participate actively in the department's production program.

Credit and Time Requirements

Pursuant to the Texas Tech University *Undergraduate/Graduate Catalog*, the Texas Administrative Code, and norms stated in the *NAST Handbook*, the credit and time expectations for the Department of Theatre and Dance graduate courses are as follows:

- For studio-based courses, in-class contact hours typically include a combination of individual meetings and class-based activities that may vary by studio and instructor. Total time expectations for in- and out-of-class student activity typically range from 45 to 60 hours per credit hour per term.
- For traditionally delivered 3-credit-hour lecture- and seminar-based courses during a regular semester, students should expect to be in class for 3 hours per week and work outside of class a minimum of 6 hours per week. For 3-credit-hour studio- and project-based courses, students should expect to devote 9 to 12 hours to the course per week.

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 and a coherent knowledge base.

A student applying for a graduate certificate program will be admitted with a "GCRT" designation. Some certificate programs require the GRE or GMAT, and some do not. 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 3.0 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 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 3.0 or better. No grade lower than a C will be accepted.

For information about required courses and contacts, visit: www.depts.ttu.edu/officialpublications/catalog/grad_certificate.php

Certificate	College/Department	Hours	Courses	Contact
ADDICTIONS AND THE FAMILY				
Created to provide specialized training to mental health providers who work with families and individuals struggling with substance abuse and addictive behaviors.	Human Sciences/ Community, Family, and Addiction Services	18	Required: MFT 5322, 5370; ADRS 6301, 6315 Electives: Must complete two of the following MFT 5304, 6303, 6305; ADRS 6329	Dr. Jaclyn D. Cravens; 806.834.2705 jaclyn.cravens@ttu.edu
AGRICULTURAL COMMUNICATIONS LEADERSHIP				
Enables individuals working in agricultural communications profession to increase their understanding of the more complex and dynamic communication strategies such as crisis communications, knowledge management, and effective online media utilization. Increases students' understanding of leadership and the people with whom they interact on a daily basis, enabling them to perform their professional duties more effectively and efficiently.	Agricultural Sciences and Natural Resources/ Agricultural Education and Communications	12	Required: ACOM 5302, 5304, 5308 Elective (choose one); AGLS 5305, 5306, 5307	Dr. David Doerfert, 806.834.4477 david.doerfert@ttu.edu or Dr. Courtney Meyers, 806.834.4364 courtney.meyers@ttu.edu or Dr. Erica Irlbeck, 806.834.6708 erica.irlbeck@ttu.edu
AGRICULTURAL LEADERSHIP				
Enables individuals working in any sector of the agricultural industry to develop an understanding of theoretical leadership principles as well as the basics of applying leadership techniques to groups in a variety of situations. Provides coursework that will help leaders understand the people with whom they interact on a daily basis and enable them to perform their duties more effectively and efficiently.	Agricultural Sciences and Natural Resources/ Agricultural Education and Communications	12	AGLS 5304, 5305, 5306, 5307	Dr. David Doerfert, 806.834.4477 david.doerfert@ttu.edu; Dr. Todd Brashears, 806.834.2135 todd.brashears@ttu.edu
APPLIED BEHAVIOR ANALYSIS				
Serves as a comprehensive course of study for students who want training in applied behavior analysis.	Education/ Educational Psychology and Leadership	15	EDSP 5303, 5345, 5346, 5347, 5348, 5349	April Chavez, 806.834.5629 april.chavez@ttu.edu http://cms.educ.ttu.edu/future
ART HISTORY, CRITICISM, AND THEORY				
Provides a knowledge base in art history and a critical and theoretical foundation that is increasingly valuable for professional advancement in art and art-related fields.	Visual and Performing Arts/ Art	15	Must complete 5 of the following, including 2 of the courses marked with an asterisk: ART 5340,* ARTH 5305, 5308,* 5309,* 5313, 5320, 5335, 5340, 5363, 5382	Dr. Carolyn Tate, carolyn.tate@ttu.edu www.depts.ttu.edu/ART/SOA/nav/ grad/cert.php
AUTHENTIC LEADERSHIP AND ENTREPRENEURSHIP FOR THE FAMILY BUSINESS				
An integrated course of study that addresses the unique needs of the family business in two critical areas: (1) interpersonal leadership skills and (2) entrepreneurship skills. Serves as a lead-in to the Week-Block M.B.A. for Working Professionals.	Rawls College of Business/ Management	12	MGT 5372, 5373, 5378, 5381	Dr. Michael Ryan, 806.834.3175 michael.r.ryan@ttu.edu Nikki Bohannon, 806.834.3763 nikki.bohannon@ttu.edu
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.	Education/ Educational Psychology and Leadership	15	EDSP 5303, 5306 5320, 5344, 5345 (all are web-based)	Dr. Devender Banda, 806.834.4827 devender.banda@ttu.edu http://cms.educ.ttu.edu/future

Certificate	College/Department	Hours	Courses	Contact
BOOK HISTORY AND DIGITAL HUMANITIES				
Students prepare for a career in publishing, civil service, industry, digital humanities, library science, or the academy; develop new workplace skills or supplement existing skills; learn best practices for converting cultural artifacts into digital form; understand the relationship between print culture, book history, and textual criticism; and develop or improve pedagogical or technological skills.	Arts and Sciences/ English	15	Required: 2 courses from ENGL 5341, 5344, 5346 Electives: ENGL 5345, 5347, 5348, 5349, 5369, 5375, 5376, 5388, 5386; ARTH 5305; MUSM 5327, 5329, 5331	Dr. Marta Kvande, marta.kvande@ttu.edu Applicants must fill out the certificate application available at: www.depts.ttu.edu/english/grad_degrees/Book_History/BHDHcert.php .
BUSINESS ANALYTICS				
Designed to train professional analysts to help organizations with the collection, filtering, storage, and analysis of very large amounts of data to support decision making. Business Analytics is one of the fastest growing and most important areas in today's business world and is in very high demand in organizations and consulting companies.	Rawls College of Business/ Information Systems and Quantitative Sciences	15	Required: ISQS 6339, 6347, 7339 Electives: Two of ISQS 5347, 5348, 5349, 6348, 6349	Dr. Eric Walden, 806.834.1925 eric.walden@ttu.edu
CHARITABLE FINANCIAL PLANNING				
Serves the needs of current and future financial planners interested in expanding their ability to serve clients with charitable interests. Serves the needs of current and future fundraising professionals interested in expanding their ability to offer sophisticated planned-giving advice to supporting donors.	Human Sciences/Personal Financial Planning	12	PFP 5325, 5326, 5327, 5398	Dr. Russell James, 806.834.5130 russell.james@ttu.edu
COLLEGE STUDENT COUNSELING				
Provides specialized training for professionals interested in college student counseling, mentoring, advising, personnel, and student affairs. This certificate does not represent licensure or certification in counseling.	Education/Educational Psychology and Leadership	15	Required: EPCE 5354, 5355, 5357, 5364 Electives: One from EPCE 5094, 5360, 5369, 5371, 5372, 6366/5369; any course in the student's degree area related to college student counseling	Dr. L.J. Gould; 806.834.4224 lj.gould@ttu.edu www.educ.ttu.edu/future/graduate-certificates
CONSTRUCTION ENGINEERING AND MANAGEMENT				
Designed for professionals who have a bachelor's degree in civil engineering, architecture, landscape architecture, interior design, or business and who are seeking a senior management position in the construction industry. It is ideal for students interested in pursuing graduate study without committing to a full master's program.	Engineering/Civil, Environmental and Construction Engineering	12	Required: CONE 5320, 5322 Electives: Two of CONE 5302, 5304, 5314, 5332	Dr. Tewodros Ghebrab, 806.834.3218 tewodros.ghebrab@ttu.edu,
CROP PROTECTION				
With the emergence of transgenic crops, this certificate provides supplementary training and updated credentialing in the development of crop protection chemicals.	Agricultural Sciences and Natural Resources/ Plant and Soil Science	13	Required: PSS 5307, 5429 Electives: PSS 5318, 5323, 5415, 6323, 6331	Dr. Peter Dotray, 806.834.3685 peter.dotray@ttu.edu www.pssc.ttu.edu/ProgramPages/GCP-CP.php
CYBERSECURITY FOR CRITICAL INFRASTRUCTURE				
Brings together the relevant computing, engineering, and legal aspects of critical infrastructure with a focus on security for cyberphysical systems. Structured to reach a wide range of graduate students, including working professionals and on-campus students.	Engineering/ Industrial Engineering	15	Required: IE 5381, 5382, 5383 Electives: 6 hours of cybersecurity topics from CS 5331, 5332; ECE 5325, 5332, 5375; IE 5384, 5385, 5308, 5319, 5320; ME 5312, 5314; LAW 6021	Dr. Joseph Urban, 806.834.5831, joseph.urban@ttu.edu
DEVELOPMENTAL LITERACY				
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.	Education/ Curriculum and Instruction	15	EDLL 5341, 5342, 5356, 5366, and either 5355 or 6350	Dr. Mellinee Lesley, 806.834.1186 mellinee.lesley@ttu.edu http://cms.educ.ttu.edu/future
DIGITAL DESIGN AND FABRICATION				
Teaches advanced design knowledge and innovation in architecture, architecture interiors, and product design. The program is positioned at the intersection of architecture, engineering, and computation with a sustainable design and interdisciplinary direction. Students develop skills geared towards a "digital-craft" based design professional orientation with emphasis on computer-aided design and material processes by leveraging state-of-the-art fabrication technologies (software, CAD-CAM, rapid prototyping, laser cutting, CNC routing, casting etc.)	Architecture	15	Choose from: ARCH 5301, 5302, 5303, 5304, 5352, 5501, 5502, 5503, 7000	Professor Christian Pongratz 806.834.7927 christian.pongratz@ttu.edu http://arch.ttu.edu/wiki/Programs#Certificate:_Digital_Design_Fabrication
DUAL SENSORY IMPAIRMENT				
Aligned with CEC standards for students who are deaf and blind. Course emphasis is on communication and assessment. The certificate can be undertaken during a master's or post-baccalaureate certification program or as a stand-alone certificate.	Education/ Educational Psychology and Leadership	15	EDSP 5383 (requires one weekend in Lubbock, TX), 5388, 5389, 5390 (take twice as topics vary) All courses are web-based.	Dr. Rona Poggrund; 512.206.9213 rona.poggrund@ttu.edu

Certificate	College/Department	Hours	Courses	Contact
EARLY MUSIC PERFORMANCE PRACTICE				
A resume-enhancing certificate that provides students with the research and performance skills increasingly expected of scholars and performers specializing in the performance practice of medieval, Renaissance, and Baroque music.	Visual and Performing Arts/ Music	15	Required: MUHL 5322, 3 semesters of MUEN 5110 Electives: two from MUHL 5331, 5332, 5333, 5334; one from MUTH 5310, 5311, 5320; one from MUHL 5313, MUHL 5320, MUHL 5321, or MUTH 5320	Angela Mariani Smith; 806.834.3912 Ext. 235; angelamariani.smith@ttu.edu http://ttuearlymusic.org/grad_certificate.html
ESSENTIALS OF BUSINESS				
Provides tools for a wide variety of business areas, including accounting, finance, management, and marketing. Courses in this certificate may be utilized toward the M.B.A. degree at acceptance and may be used as electives in other degree programs.	Rawls College of Business	12	Choose four from ACCT 5301, FIN 5320, ISQS 5331, MGT 5371, MKT 5360	Kelsey Zickefoose kelsey.zickefoose@ttu.edu 806.834.1455
ETHICS				
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.	Arts and Sciences/ Philosophy	12	Must complete 4 of the following, including at least 2 of the courses marked with an asterisk: PHIL 5320,* 5321,* 5322,* 5301, 5302, 5308, 5323, 5341, 7000	Dr. Daniel Nathan, 806.742.0373 daniel.nathan@ttu.edu www.depts.ttu.edu/philosophy/degrees/ethicscert.php
FIBERS AND TEXTILES				
Provides professionals an opportunity to understand the meaning and complexity of cotton production and processing and its impact on industrial cotton products.	Agricultural Sciences and Natural Resources/ Plant and Soil Science	12	Required: PSS 5371, 5373, 5376 Electives: PSS 5370, 5378	Dr. Nouredine Abidi; 806.834.1221 n.abidi@ttu.edu www.pssc.ttu.edu/ProgramPages/GCP-FT.php
FINANCE				
Provides specialized knowledge in the area of finance and/or real estate. The certificate courses may be utilized as electives for other degree programs	Rawls College of Business/ Finance	15	Required: FIN 5320 Electives: FIN 5321, 5324, 5325, 5326, 5327, 5328, 5329, 5331, 5332, 5333, 5334, 5338, 5345	Dr. Jeffrey Mercer jeffrey.mercer@ttu.edu 806.834.3365
GEOGRAPHIC INFORMATION SCIENCE AND TECHNOLOGY				
Provides a flexible solution for professionals and recent graduates who would like to further their education in geospatial technology.	Arts and Sciences/ Geosciences	15	Prerequisite: GIST 5300 (or equivalent) Required: 5302, 5304 Electives: Choose two from GIST 5308, 5310, 5312; GEOG 5301; GEOL 5341, 5342; NRM 5404, 6305	Dr. Kevin Mulligan, 806.834.0391 kevin.mulligan@ttu.edu
GERONTOLOGY				
An inter-institutional program offered through the Great Plains Interactive Distance Education Alliance (GPIDEA). Designed to prepare professionals who are either working directly with older people or are involved in education and research related to older adults. Tuition is set by the GPIDEA.	Human Sciences/ Human Development and Family Studies	15	Required: 6 hours of Perspectives in Gerontology, Adult Development Electives: 9 hours gerontology (All are web-based. Course prefix and numbers will vary according to institution. See www.gpidea.org)	Dr. Jean Scott; 806.834.6589 jean.scott@ttu.edu , www.depts.ttu.edu/hs/gpidea/gerontology.php
HEALTH CARE FACILITIES DESIGN				
An interdisciplinary certificate that offers specialty courses to graduate students and design professionals in health care, emphasizing evidence-based design as a way to enhance efficiency and safety. Successful completion of the certificate will position graduates to be employed in the health care facilities design sector and play a leading role in evidence-based design.	Architecture/ Rawls College of Business/ TTUHSC School of Nursing	12	Must complete 6 hours from: ARCH 5366, 5503; and 6 hours from: HOM 5306, 5308; NURS 5322, 5325, 5349, 5376 NOTE: M.Arch students must enroll in ARCH 5503 and 5366 and choose two from the second group	Dr. Saif Haq; 806.834.6317 saif.haq@ttu.edu www.arch.ttu.edu/HCaF
HIGHER EDUCATION ADMINISTRATION				
Provides the opportunity for higher education professionals and those who seek administrative positions to develop and reinforce their knowledge base in current trends, leadership, methodologies, administration, and strategic management.	Education/ Educational Psychology and Leadership	15	Required: EDHE 5300, 5324, and either 5313 or 5321 Electives: 6 hours of higher education courses. Consult with an advisor.	David Jones; 806.834.0989 djones.jones@ttu.edu http://cms.educ.ttu.edu/academic-programs/psychology-and-leadership/higher-education/default
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 policy and law, and building analysis technology.	Architecture	15	ARCH 5319, 5320, 5321, 5324, 5325	Dr. Elizabeth Loudon; 806.834.5358, Ext. 241; elizabeth.louden@ttu.edu www.arch.ttu.edu/wiki/Historic_Preservation_Certificate

Certificate	College/Department	Hours	Courses	Contact
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	12	Required: PSS 5316, 5429 Electives: PSS 5307, 5317, 5318, 5324, 5331, 5415, 6301, 6331; LARC 6302	Dr. Cynthia McKenney, 806.834.0722 cynthia.mckenney@ttu.edu www.depts.ttu.edu/elearning/ certificate/horticultural-landscape/
LEADERSHIP				
Provides the experienced manager the opportunity to build and reinforce the interpersonal skills that are essential to the management role at every level. May be taken as a stand-alone certificate. The credits may be used in partial fulfillment of a M.B.A. degree. Not available to students in the M.B.A. program.	Rawls College of Business/ Management	12	Required: MGT 5372, 5381 Electives: Must take 2 courses from MGT 5371, 5373, 5374, 5377, 5384, 5391	Dr. Michael Ryan, 806.834.3175, michael.r.ryan@ttu.edu; Nikki Bohannon, 806.834.3763 nikki.bohannon@ttu.edu http://ilr.ba.ttu.edu/certificate.asp
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	12	12 hours of linguistics coursework as approved by the Director of Linguistics. See the website www.english.ttu.edu/linguistics/gradcertificate.asp for details.	Dr. Min-Joo Kim, 806.742.2501 min-joo.kim@ttu.edu www.depts.ttu.edu/english/linguistics/ gradcertificate.php
MASTER MENTOR				
Designed to prepare those interested in mentoring beginning professionals. Theories, policies, and best practices in mentoring are examined.	Education/ Curriculum and Instruction	12	Required: EDCI 5308, 5309, 5311, 5312 Electives: EDCI 6392, 6395	Dr. Susan Myers, 806.470.0511 susan.myers@ttu.edu; or Dr. Connie Anderson, 806.742.1997, Ext. 272, connie.anderson@ttu.edu http://cms.educ.ttu.edu/future
MATHEMATICS				
Online certificate designed for anyone with bachelor's degree who wants to increase mastery of the subject, particularly in-service teachers who desire to teach dual credit in high school or teach at a junior college.	Arts and Sciences/ Mathematics and Statistics	18	Choose six courses from MATH 5364, 5365, 5366, 5367, 5368, 5369, 5370, 5371, 5372, 5375, 5376, 5377, 5378	Dr. Chris Monico, c.monico@ttu.edu; Dr. Victoria Howle, victoria.howle@ttu.edu Gene Gray, gene.gray@ttu.edu
MEDIEVAL AND RENAISSANCE STUDIES				
Enables students whose study and research relate to medieval and Renaissance materials to obtain an interdisciplinary certificate that will give them an advantage for positions in the field. The certificate will be of particular interest to students working toward a master's or doctoral degree in art history, classics, English, romance languages, German, history, music or architecture.	Arts and Sciences	18	Required: MRST 5301 Electives: Choose 15 hours from CLAS 5311, 5350; FREN 5312; GERM 5314; ITAL 5301; SPAN 5345, 5361, 5362; ENGL 5301, 5303, 5304, 5305, 5334, 5364; HIST 5341, 5342, 5351, 5366; ARTH 5305, 5320, 5340; MUHL 5320, 5322, 5331; THA 5325, 5333	Dr. John Howe, 806.742.3744, john.howe@ttu.edu Dr. Connie Scarborough, 806.742.3145 connie.scarborough@ttu.edu www.depts.ttu.edu/classic_modern/ medieval
MENTAL HEALTH COUNSELING				
Post-master's certificate designed for professionals in the mental health field who wish to expand their training to a specialization in the mental health area. This certificate does not represent licensure or certification in counseling.	Education/ Educational Psychology and Leadership	15	Required: EPCE 5364, 5366, 5372, 5373 Electives: EPCE 5094, 5354, 5355, 5357, 5360, 5370, 5371	Dr. L.J. Gould; 806.834.4224 lj.gould@ttu.edu
MULTIDISCIPLINARY SCIENCE				
Supports on-going and professional development activities that are designed to improve classroom practice for English learners in science and mathematics instruction.	Education/ Curriculum and Instruction	15	Required: EDCE 5372, 5373; EDBL 5306; PHYS 5371; MATH 5360 Substitutes: MATH 5377 or 5378 for MATH 5360, EDCI 5306 for PHYS 5371 or MATH 5360	Dr. Zenaida Aguirre-Muñoz, 806.834.4949, z.aguirre@ttu.edu
PERSONAL FINANCIAL PLANNING				
Designed to advance students' knowledge that leads to the educational requirement for the Certified Financial Planner™ Certification designation.	Human Sciences/ Personal Financial Planning	18	PFP 5362, 5371, 5372, 5373, 5377, 5394, 5398, 5497; ACCT 5311	Dr. John Gilliam; 806.742.5050, Ext. 240; john.gilliam@ttu.edu www.depts.ttu.edu/pfp/graduate/ graduate_studies.php
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. Field experience is a plus for admission to this program.	Engineering/ Petroleum Engineering	18	PETR 5380, 5381, 5382, 5383, 5384, 5385; GEOL 3324,* 4324,* 4334,* <i>This program is not accepting new students.</i>	Dr. Habib Menouar; 806.834.3452, habib.menouar@ttu.edu www.depts.ttu.edu/pe/students/grad/ curriculum.php *Dependent on prior educational background
PIANO PEDAGOGY				
Designed for the professional piano teacher. Offers participants continuing education in graduate-level piano pedagogy and performance courses.	Visual and Performing Arts/ Music	13-17	Required: MUAP 5001, 5313 Electives: MUAP 5101, 5302, 5333, 5315	Dr. Carla Davis Cash; 806.834.3924 carla.d.cash@ttu.edu www.depts.ttu.edu/ music/AreasofStudy/ keyboardGradCertPianoPedagogy.asp

Certificate	College/Department	Hours	Courses	Contact
PSYCHOLOGICAL METHODS AND ANALYSIS*				
Provides students with supplemental, specialized training in various methodologies and analyses that will be useful to professionals in psychological sciences and related fields of study.	Arts and Sciences/ Psychological Sciences	15	Required: PSY 5447, 5480 Electives: (choose three, including at least one of the courses marked with an asterisk) PSY 5448,* 5460,* 5467,* 5465, 5485, 5490, 5495, 5496	Dr. Amelia Talley, 806.834.3937 amelia.talley@ttu.edu
* Pending THECB acknowledgement				
PUBLISHING AND EDITING				
Prepares students for a career in editing and publishing; develops new workplace skills or supplements existing skills; learns publication production; understands the relationship among publishing history, book history, and literary studies; and develops or improves editing skills.	Arts and Sciences/ English	15	Required: 2 courses from ENGL 5300, 5343, 5380 Electives: ENGL 5374, 5375, 5376, 7000; MUSM 5331; PR 5340; ADV 6315	Dr. Marjean Purinton marjean.purinton@ttu.edu Applicants must fill out the certificate application available at www.depts.ttu.edu/english/grad_degrees/PubCert.php
SENSORY IMPAIRMENT AND AUTISM SPECTRUM DISORDERS				
Provides graduate students with specialized knowledge and strategies to use with the growing population of students with autism who also have a sensory impairment (visual impairment, hearing impairment, or deafblindness).	Education/ Educational Psychology and Leadership	15	Required: EDSP 5303, 5345, 5393 Electives: 6 hours from EDSP 5383, 5389, 5390 in Deafblindness; 5391, 5392; AHSL 5344, 5345	Dr. Nora Griffin-Shirley, 806.834.0225 n.griffin-shirley@ttu.edu
SOFTWARE ENGINEERING				
For 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 who are interested in systematic software development.	Engineering/ Computer Science	12	CS 5373 and 5374 plus two courses from CS 5332, 5358, 5363, 5369, 5380; IE 5320	Dr. Susan Mengel, 806.834.6866 cs.grad_advisor@ttu.edu www.depts.ttu.edu/cs/grad/certificate
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	15	PSS 5327, 5331, 5335, 5336, 6432	Dr. Jennifer Moore-Kucera, 806.834.5485 jennifer.moore-kucera@ttu.edu www.depts.ttu.edu/elearning/certificate/soil-management/
SPECIAL EDUCATION TRANSITION				
Provides specialized training for anyone working with individuals with disabilities in the transition from school to employment, postsecondary education, or independent living. Can be undertaken during a master's, doctorate, or post-baccalaureate certification program or as a stand-alone certificate.	Education/ Educational Psychology and Leadership	15	EDSP 5304, 5306, 5308, 5320, 5330	Dr. Devender Banda, 806.834.4827 devender.banda@ttu.edu www.educ.ttu.edu/edsp/
STRATEGIC STUDIES				
Prepares students to fill the need for officials who can deal with strategic responsibilities in all branches of federal government, in the armed forces of the United States as well as state and local governments.	Arts and Sciences/ Political Science	15	Required: MCDR 5300, 5306, 5307 Electives: POLS 5360, 5361, 5363, 5365, 5367, 5369, 5384; HIST 5307, 5308, 5313, 5322, 5323, 5326, 5328, 5329, 5330, 5331, 5332, 5344, 5345, 5350, 5356, 5361; LAW 6342	Dave Lewis, 806.834.4972 dave.lewis@ttu.edu
TEACHER ADVANCEMENT PROGRAM (TAP) CONNECT EDUCATIONAL LEADERSHIP				
Educators and administrators with specific performance-based knowledge of TAP: The System for Teacher and Student Advancement will improve teaching in high-need schools across the state. This graduate certificate will prepare completers to radically reform educational practices in classrooms that have previously been low performing. The certificate will focus on issues that administrators face in helping classroom teachers and other educational personnel to improve their instructional performance.	Education/ Educational Psychology and Leadership	15	EDLD 5320, EDLL 5370, EDLL 5001, EDLL 5385, EDLL 5361	Dr. Fernando Valle, f.valle@ttu.edu
TEACHER ADVANCEMENT PROGRAM (TAP) CONNECT LITERACY				
Educators and administrators with specific performance-based knowledge of TAP: The System for Teacher and Student Advancement will improve teaching in high-need schools across the state. This graduate certificate will prepare completers to radically reform literacy educational practices in classrooms that have previously been low performing.	Education/ Educational Psychology and Leadership	15	EDLD 5320, EDLL 5355, EDLL 5344, EDLL 5346, EDLL 5342	Dr. Mellinee Lesley, mellinee.lesley@ttu.edu, 806.834.1186
TEACHER ADVANCEMENT PROGRAM (TAP) CONNECT STEM				
Educators and administrators with specific performance-based knowledge of TAP: The System for Teacher and Student Advancement will improve teaching in high-need schools across the state. This graduate certificate will prepare completers to radically reform STEM educational practices in classrooms that have previously been low performing.	Education/ Educational Psychology and Leadership	15	EDLE 5320, EDCI 5333, EDCI 5373, EDLL 5344, EDCI 5377	Dr. Shirley Matteson, shirley.matteson@ttu.edu, 806.834.3841

Certificate	College/Department	Hours	Courses	Contact
TEACHER LEADERSHIP				
Enhances leadership skills in data-driven decision making, instructional leadership, communication, and mentoring for teachers who aspire to perform teacher leadership duties more effectively. The certificate can be undertaken prior to joining the master's program or as part of the master's program.	Education/ Educational Psychology and Leadership	15	EDCI 5308, 5309; EDLD 5310, 5320, 5351	Dr. Fernando Valle, f.valle@ttu.edu or Heather Kruk, heather.kruk@ttu.edu
TEACHING ENGLISH IN AN INTERNATIONAL CONTEXT				
For any student at Texas Tech enrolled in any graduate program and considering teaching English outside the United States.	Arts and Sciences/ Classical and Modern Languages and Literatures	15	LING 5312 or CMLL 5307, LING 5322, LING 5328; and two from LING 5320, LING 5325, LING 5327, LING 5340 or CMLL 5305, LING 5382 or CMLL 5301	Dr. Greta Gorsuch, 806.742.3145 greta.gorsuch@ttu.edu www.depts.ttu.edu/classic_modern/ linguistics/TEIC.php
TEACHING TECHNICAL COMMUNICATION				
Online and onsite certificate designed for international institutions needing to provide faculty and students with instruction in how to teach technical communication and for individuals seeking to retool their English degrees to develop teaching expertise in technical communication.	Arts and Sciences/ English	15	Required: ENGL 5371, 5366, and either 5361 or 5364 Choose one: ENGL 5365, 5368, 5369, 5377, 5382, 5384, 5385, 5386, 5381 Choose one: ENGL 5372, 5373, 5374, 5375, 5376, 5378, 5383, 5387, 5381	Dr. Kelli Cargile Cook kelli.cargile-cook@ttu.edu Dr. Sean Zdenek, sean.zdenek@ttu.edu Dr. Amy Koerber, amy.koerber@ttu.edu
URBAN AND COMMUNITY DESIGN STUDIES				
Provides an area of specialization in urban and community design studies for graduate students and professionals in related fields of architecture. Students develop a more focused understanding of the relationship between architecture and the urban environment as it relates to research-based academic endeavors and professional practice. The certificate is further supported by opportunities to participate in the Houston Program specializing in urbanism and/or the Urban Tech Downtown Studio in Lubbock.	Architecture	14	Required: ARCH 5384; and one of ARCH 5501, 5502, or 5503 Approved ARCH Elective: one of 5301, * 5382, 5383 Approved General Elective: one of FIN 5332, 5345; GIST 5300; PUAD 5324 * Under certain circumstances, students may take ARCH 5301 as an approved general elective. See website and director for details.	Assoc. Professor MaryAlice Torres-MacDonald, 713.806.2584 ma.torres-macdonald@ttu.edu http://arch.ttu.edu/wiki/Certificate_in_Urban_and_Community_Design_Studies
WIND ENERGY—MANAGERIAL				
Offers professionals post-baccalaureate level training options in six topic areas relevant to the industry. Specifically designed for non-technical professionals who wish to assume managerial responsibilities in wind energy.	Office of the Provost	15	Required: WE 5310, 5311; IE 5329 Electives: ECE 5343; IE 5306, 5319; WE 5320, 7000; LAW 6205	Dr. Andrew Swift, andy.swift@ttu.edu www.depts.ttu.edu/nwi/education/ wind_energy_certs_home.php
WIND ENERGY—TECHNICAL				
Offers professionals post-baccalaureate level training options in six topic areas relevant to the industry. Specifically designed for non-technical professionals who wish to assume technical responsibilities in wind energy.	Office of the Provost	15	Required: WE 5300, 5301; ECE 5343 Electives: ATMO 5301; IE 5306, 5319, 5329; WE 5320, 7000; LAW 6205	Dr. Andrew Swift, andy.swift@ttu.edu www.depts.ttu.edu/nwi/education/ wind_energy_certs_home.php
WOMEN'S STUDIES				
Offers a specialist interdisciplinary 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	15	Required: WS 5310, 5360 Electives: WS 5000, 5300, 5340; other electives from an approved list	Dr. Charlotte Dunham, 806.834.5104 charlotte.dunham@ttu.edu www.depts.ttu.edu/wstudies/ws_grad.php
YOUTH DEVELOPMENT SPECIALIST				
Designed to prepare professionals who are either working directly with adolescents and young adults or are involved in education and research related to youth. It is designed to assist youth professionals to train individuals in the second decade of life with the skills necessary for a successful transition into adulthood.	Human Sciences/ Human Development and Family Studies	13	One required foundations course and four electives	Dr. Jean Pearson Scott, 806.834.6589 jean.scott@ttu.edu Pam Gardner, 806.742.3031, Ext. 224 pam.gardner@ttu.edu
YOUTH PROGRAM MANAGEMENT AND EVALUATION				
Designed to prepare professionals who are either working directly with adolescents and young adults or are involved in education and research related to youth. Great Plains IDEA is the only alliance of public universities to offer a youth specialist certificate completely online. It is designed to assist in developing and applying resources for successful implementation and management of youth-serving organizations.	Human Sciences/ Human Development and Family Studies	13	One required foundations course and four electives	Dr. Jean Pearson Scott, 806.834.6589 jean.scott@ttu.edu Pam Gardner, 806.742.3031, Ext. 224 pam.gardner@ttu.edu

College of Agricultural Sciences and Natural Resources

Michael Galyean, Ph.D., Dean

108 Goddard | Box 42123 | Lubbock, TX 79409-2123
T 806.742.2808 | F 806.742.2836 | www.casnr.ttu.edu

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 inter-collegiate 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.

Government Internship Program

The Government Internship Program within the College of Agricultural Sciences and Natural Resources provides students an opportunity to intern in congressional and legislative offices in Washington, D.C., and Austin. Requirements for the program include but are not limited to the following:

- Interns must have completed 30 hours of coursework by the start of the internship and have a minimum cumulative GPA of 2.75.
- Internships coincide with the first and last day of a full semester term.
- Interns must register for a minimum of 6 hours in absentia in a CASNR departmental problems course or internship course and will be considered a full-time student for insurance/scholarship purposes.
- Interns will receive a stipend to help defray expenses. State and congressional offices may elect to provide additional compensation (not mandatory).
- Housing costs will come out of the stipend and students interning in Washington, D.C., must live in the Texas Tech House.

See www.casnr.ttu.edu/gov_interns/page1.php for more information.

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

Graduate Program

For information on graduate programs offered by the College of Agricultural Sciences and Natural Resources, visit the Graduate School section of the catalog on page 117.

the university. Minors are offered in the following areas: agribusiness management, agricultural leadership, agricultural communication studies, animal science, food science, landscape architecture, plant and soil science. A minimum of 18 hours is required for a minor. The maximum number of transfer hours in any minor is 9. Courses in a major but outside a student's department may be used in the minor. A student must earn a grade of C or better in each course counted toward a minor. Students are encouraged to seek early advisement from the chair of the minor department to plan for courses that will best meet their educational and career objectives.

General Standards and Requirements. Minimum standards and requirements of the College of Agricultural Sciences and Natural Resources are the same as those for the university, with certain additions. In addition to the requirements stated in the Undergraduate Academics section of this catalog, other requirements include the following:

1. Students must file an application for a senior audit with the dean's office before or during the semester in which they are enrolled for their 90th semester hour. Substitution and elective sheets also must be filed prior to or during the semester the students are enrolled for their 90th semester hour.
2. Transfer students who plan to request the use of provisional elective transfer courses as a substitution for required courses must make such a request by the end of their first semester in the College of Agricultural Sciences and Natural Resources.
3. Any deviation from the approved curriculum for a particular degree must have prior approval from the chairperson of the department and the dean of the College of Agricultural Sciences and Natural Resources.

New Students. All new students should carefully read the catalog sections entitled Undergraduate Admissions. Entering freshmen should give special attention to course credit that can be obtained by the College Level Examination Program (CLEP) examinations usually given prior to the beginning of the fall semester. Transfer students should read the paragraphs dealing with admission of transfer students and transfer of credits from other colleges and universities in the Undergraduate Admissions section of this catalog.

Distance Degree Program. One distance education program is available at the undergraduate level. The Bachelor of Science in Plant and Soil Science with a specialization in horticulture 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).** 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).** Prerequisite: AGSC 2300 or satisfactory performance on placement exam. Introduction to database management applications, extended application of spreadsheet software, and networked systems. F, S.

Graduate Courses

- 5303. Ecology of Grazing Lands Systems (3).** A field oriented course on ecology, management, and research in forage-livestock systems.

Department of Agricultural and Applied Economics

Phillip N. Johnson, Ph.D., Chairperson

Professors: Hudson, Johnson, Knight, Lyford, Malaga, Misra, Segarra

Associate Professors: Carpio, Chidmi, Elam, Farmer, Murova, Rahman, Wang

Assistant Professors: Martin, Williams

Research Assistant Professor: Boonsaeng

Instructors: Middleton

Adjunct Faculty: Ethridge, Phillips, Smith

CONTACT INFORMATION: 317 Agricultural Science Building, Box 42132, Lubbock, TX 79409-2132, T 806.742.2821, F 806.742.1099, www.aaec.ttu.edu

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

Dual Degree Programs

- Bachelor of Science in Agricultural and Applied Economics/ Bachelor of Business Administration (General Business)
- Master of Science in Agricultural and Applied Economics/ Doctor of Jurisprudence

The department cooperates with the Rawls College of Business in a Master of Business Administration degree with a concentration in agricultural business management. This M.B.A. program is administered by the Rawls College of Business.

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 Bachelor of Science 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 Bachelor of Science in Agribusiness. 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 Rawls College of Business. This program leads to a B.S. in agricultural and applied economics and a B.B.A. in general business. Students may

Graduate Program

For information on graduate programs offered by the Department of Agricultural and Applied Economics, visit the Graduate School section of the catalog on page 117.

also prepare to study toward advanced degrees in economics, law, business administration, and other related areas.

The department's programs also emphasize international economics, particularly with respect to trade in commodities. Students completing these plans of study will be better educated for the world economy of the future and will have opportunities for a wide range of careers. Local, regional, and national processing and marketing firms offer many applied economists their first positions. Others become self-employed business operators or managers. State Cooperative Extension Services, financial institutions, the United States Department of Agriculture, utility companies, and many state and government agencies also hire graduates.

The opportunity to participate in the Honors College is available to agricultural and applied economics students who demonstrate high academic achievement and are accepted into the Honors College. AAEC students wishing to earn an Honors College designation may take AAEC 4301 for honors credit. Admission criteria and other information about the Honors College can be found in the "Honors College" section of this catalog.

Minor. 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, non-thesis option

Admission to these programs allows students to count 6 dual hours of undergraduate coursework toward these degrees. Application should be made during the first semester of the junior year following procedures available from the graduate program coordinator in the department.

Course Descriptions

(To interpret course descriptions, see page 23.)

Agricultural and Applied Economics (AAEC)

Undergraduate Courses

2305. [AGRI 2317] **Fundamentals of Agricultural and Applied Economics (3).** 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 requirement. F, S, SS.
2401. **Agricultural Statistics (4).** 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. Partially fulfills core Mathematics requirement (in conjunction with a mathematics course). F, S, SS.
3300. **Seminar (3).** Prerequisites: AAEC 3315, 2401; junior standing. Review of microeconomics and statistics, assigned readings,

informal discussion, guest speakers, and written and oral reports on subjects relating to agricultural and applied economics. F, S.

3301. **Agribusiness Marketing (3).** Prerequisites: 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).** Prerequisites: AAEC 2305 or ECO 2301 and MATH 1320 or 1330 with a grade of C or better. Basic principles of finance emphasizing the mathematics of finance, credit, and financial analysis. F, S.
3303. **Cooperatives (3).** Prerequisite: AAEC 3301. Organization and operation of agricultural and other cooperatives. S. (Writing Intensive)
3304. **Farm and Ranch Business Management (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).** 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).** Prerequisites: AAEC 2305 or ECO 2301 and MATH 1331. Basic economic principles with applications to agricultural pricing problems and resource allocations. F, S, SS.
4000. **Internship in Agricultural and Applied Economics (VI-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 and 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. (Writing Intensive) F, S, SS.
4302. **Statistical Methods in Agricultural Research (3).** Prerequisites: AAEC 2401 and MATH 1331 or MATH 2300 or MATH 2345. 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).** Prerequisites: AAEC 2305 and sophomore English or ENGL 2311. Factors governing property prices and valuation. Appraisal of property for use, sale, and other purposes. F. (Writing Intensive)
4305. **Agricultural and Public Policy (3).** 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).** Prerequisite: AAEC 3315. Economic principles of interregional and international trade, location, and inter-area competition in products and services. S. (Writing Intensive)
4309. **Sustaining Global Ecology, Natural Resources and Economy (3).** Challenges to global markets and environment across diverse systems and histories. Fulfills multicultural requirement. (Writing Intensive) F.
4312. **Applied Optimization Methods (3).** 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).** Prerequisite: AAEC 3315. Economics of natural resource use and allocation including land economics, economics of water development, and environmental economics. S.
4315. **Agribusiness Management (3).** Prerequisite: AAEC 3315 and 2401. Case studies emphasizing managerial techniques applied to decision-making problems of business firms. F. (Writing Intensive)
4316. **Agricultural Financial Analysis (3).** Prerequisite: AAEC 3302 or FIN 3320. Principles and procedures in managing financial and credit resources; nature, purposes, and use of financial statements, budgets, and credit instruments; and criteria for decision making in borrowing and lending. S.
4317. **Commodity Futures Trading and Analysis (3).** Prerequisites: AAEC 2305 or ECO 2301. History and characteristics of commodity futures markets, hedging and speculation, and use of futures as a management tool. F, S.

Bachelor of Science in Agribusiness

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
		AGSC 2301, Computers in Ag. II	3
TOTAL	13	TOTAL	16

SECOND YEAR

Fall		Spring	
ECO 2302, Principles of Economics II	3	AAEC Elective†	3
HIST 2300, History of U.S. to 1877	3	AAEC 2401, 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	Creative Arts/Multicultural§	3
TOTAL	15	TOTAL	16

THIRD YEAR

Fall		Spring	
AAEC 3315, Agr. Price Theory	3	AAEC 3300, Seminar	3
or ECO 3312, Intermediate Eco. Theory		ECO 3311, Intermediate Macroecon.	3
FIN 3320, Financial Management	3	AGBS Group 2#	3
MGT 3373, Managerial Communications	3	MGT 3370, Organization and Mgt.	3
MKT 3350, Intro. to Marketing	3	ISQS 3344, Intro. to Prod. Ops. Mgt.	3
BLAW 3391, Business Law I	3		
or AAEC 4320, Agribusiness Law			
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
AAEC 4317, Commodity Futures Trading	3	COMS 2358, Business & Prof. Comm.	3
AGBS Group 1#	3	BA Group**	9
BA Group**	3	AAEC 4302, Statistical Methods	3
MGT 4380, Strategic Management	3	or AAEC 4312, Appl. Optimiz. Methods	
or AAEC 4315, Agribusiness Mgmt.			
Free Elective	3		
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* At least 4 of the 8 hours of lab science must be selected from ANSC 1401, PSS 2401 and 1411; the remaining hours must be selected from university Life and Physical Sciences core curriculum.

† Select AAEC elective from AAEC 3301, 3302, 3304, or 3305.

‡ Choose one course from ENGL 2305, 2306, 2307, 2308, or 2351.

§ Choose a course that fulfills both the university core curriculum Creative Arts requirement and the multicultural requirement.

AGBS Curriculum Groups: Select 1 course from Group 1—AAEC 4305, 4306, or 4313; select 1 course from Group 2—AAEC 4303, 4309, or 4316.

** BA Curriculum Group: Choose 12 hours from at least two of the areas ACCT, BECO, ECO, FIN, ISQS, MGT, MKT (if not used to fulfill another requirement). At least 6 hours must be senior-level courses. Be aware that some senior-level courses will most likely have prerequisites. Refer to the course descriptions.

Department CORE Policy: Includes AAEC 3300, 3315, and 2401. All students expecting to graduate on schedule are strongly advised to complete the CORE before beginning their senior year. Students failing to do so may delay their graduation date.

All MATH, ECO, ENGL, and BA courses, AAEC 2305, and AGSC 2301 must be completed with a grade of C or better.

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.

Graduate Courses

4320. Agribusiness Law (3). Focuses on various areas of law that directly affect the operation of agricultural businesses and producers. Examines nature and source of law, contracts, real estate matters, commercial transactions, business entities and environmental issues. F.

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). Prerequisite: AAEC 4305. Analysis of public policies affecting the food and fiber sector; commodity programs, environmental laws, and trade policy. F.

5303. Advanced Production Economics (3). Prerequisite: AAEC 3315. Criteria for resource use optimality under price and yield certainty and uncertainty. F.

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 Agriculture 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
or ACOM 2302, Scientific Comm.		COMS 2300, Public Speaking	3
HIST 2300, History of U.S. to 1877	3	Language, Philosophy, and Culture;	
Language, Philosophy, and Culture;	3	Multicultural; or Creative Arts Elective†	3
Multicultural; or Creative Arts Elective†			
TOTAL	15	TOTAL	15

THIRD YEAR

Fall		Spring	
AAEC 3315, Agricultural Price Theory	3	ACCT 2301, Managerial Accounting	3
AAEC 2401, Agricultural Statistics	4	ECO 3311, Intermed. Macroeconomics	3
ACCT 2300, Financial Accounting	3	AAEC 3304, Farm & Ranch Bus. Mgmt.	3
Electives	6	AAEC 3300, Seminar	3
		Elective	3
TOTAL	16	TOTAL	15

FOURTH YEAR

Fall		Spring	
AAEC Group 1‡	6	AAEC Group 2‡	6
AAEC 4312, Appl. Optimization Methods	3	Electives	6
or AAEC 4302, Statistical Methods			
Electives	6		
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

* 8 hours must be from PSS 1411, 2401; ANSC 1401; ATMO 1300-1100; BIOL 1401, 1402; CHEM; PHYS; or any other 4-hour Life and Physical Sciences course from the university core curriculum.

† Language, Philosophy, and Culture; Multicultural; and Creative 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, 4309, 4315, 4316, and 4317.

Department CORE Policy: Includes AAEC 3300, 3315, and 2401. All students expecting to graduate on schedule are strongly advised to complete the CORE before beginning their senior year. Students failing to do so may delay their graduation date.

Agriculture electives must be selected from PSS 1321; NRM 1300, 1401, 2301, 2302; or ANSC 1401.

All courses in MATH and AAEC 2305 must be completed with a grade of C or better.

Electives: The degree program consists of 21 elective hours including 9 hours of required electives chosen from upper-level BA, ECO, PFP, or AAEC courses not required elsewhere (this may include AGSC 4300 and AAEC 4301 for students wanting undergraduate research experience), and 12 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.

5307. Applied Econometrics I (3). Prerequisite: AAEC 4302. Advanced statistical methods, including multiple regression analysis, for applied economic problems; constructing econometric models; multicollinearity, autocorrelation, heteroscedasticity, and related problems. F.

5308. Natural Resource Economics (3). 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). Prerequisite: AAEC 3315. World food and devel-

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 Agriculture II	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
ECO 2302, Principles of Economics II	3	AAEC 3301, Agribusiness Marketing	3
COMS 2358, Business & Prof. Comm	3	AAEC 2401, Agricultural Statistics	4
ACCT 2300, Elementary Accounting I	3	HIST 2301, History of U.S. Since 1877	3
AAEC 2305, Fund. Ag. Appl. Economics	3	ACCT 2301, Managerial Accounting	3
HIST 2300, History of U.S. to 1877	3	Language, Philosophy, and Culture; Multicultural; or Creative Arts Elective [†]	3
TOTAL	15	TOTAL	16
SUMMER			
FIN 3320, Financial Management	3	MKT 3350, Intro. to Marketing	3
BCOM 3373, Managerial Comm.	3	MGT 3370, Organization & Mgmt.	3
TOTAL	6	TOTAL	6
THIRD YEAR			
Fall		Spring	
ISQS 3344, Intro to Prod. & Ops. Mgmt.	3	AAEC 3300, Seminar	3
AAEC 3315, Agricultural Price Theory	3	AAEC 3304, Farm & Ranch Mgmt.	3
BLAW 3391, Business Law I	3	ECO 3311, Intermed. Macroeconomics	3
AGGB Group [‡]	6	BA Group [#]	3
BA Group [#]	3	AGGB Group [‡]	3
		AAEC 4316, Agricultural Financial Anal.	3
TOTAL	18	TOTAL	18
FOURTH YEAR			
Fall		Spring	
BA Group [#]	12	Free Elective	3
AGGB Group [‡]	3	AAEC 4302, Statistical Methods	3
MGT 4380, Strategic Management	3	AGGB Group [‡]	3
		Language, Philosophy, and Culture; Multicultural; or Creative Arts Elective [†]	3
		BA Group [#]	3
TOTAL	18	TOTAL	15
TOTAL HOURS: 144			

* Select at least 4 hours of lab science courses from PSS or ANSC and the other 4 hours from core curriculum Life and Physical Sciences requirements.

† Language, Philosophy, and Culture; Multicultural; and Creative Arts: There are three university 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.

‡ AGGB Curriculum Group: Select 5 courses from AAEC 4303, 4305, 4306, 4309, 4312, 4313, 4315, and 4317.

§ Ag. Elective must be selected from PSS 1321, NRM 1300, 1401; or ANSC 1401.

BA Curriculum Group: Choose 21 hours from at least 3 of the areas ACCT, BECO, ECO, FIN, ISQS, MGT, MKT (if not used to fulfill another requirement). At least 9 hours must be from senior-level courses. Be aware that some senior-level courses will most likely have prerequisites. Please refer to course descriptions.

Department CORE Policy: Includes AAEC 3300, 3315; and 2401. All students expecting to graduate on schedule are strongly advised to complete the CORE before beginning their senior year. Students failing to do so may delay their graduation date.

Both degrees may be granted on completion of all 144 hours.

All MATH, ECO, ENGL, and BA courses, AAEC 2305, and AGSC 2301 must be completed with a grade of C or better.

See the Rawls College of Business 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 Rawls College of Business 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.

- opment issues; economic development of the food and fiber sector in industrialized and developing economies. F.
5310. **Advanced Market Analysis (3)**. Theoretical and empirical approaches to market structures and market price behavior. S.
5312. **Agribusiness Analysis (3)**. 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)**. 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. F, S.
5314. **Environmental Economics and Policy Analysis (3)**. Familiarize students with economic techniques and their use in analyzing natural resources and environmental policy issues. For non-majors only.
5315. **Property Appraisal (3)**. 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. F.
5316. **International Agricultural Trade (3)**. 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)**. Prerequisite: 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. F, S.
5318. **Finance and the Agribusiness Sector (3)**. Prerequisite: 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. S.
5320. **Agribusiness Law (3)**. Course focuses on various areas of law that directly affect the operation of agricultural businesses and producers. Course examines nature and source of law, contracts, real estate matters, commercial transactions, business entities and environmental issues. F.
5321. **Research Methodology in Economics (3)**. Review of philosophical and conceptual basis of economic research and study of the procedural aspects of designing, planning, and conducting research in economics. S.
5325. **Applied Regression and Least Squares Analysis for Agricultural Sciences (3)**. Application of regression analysis to analyze problems in the agricultural sciences; simple linear and multiple regression models, residual analysis, introduction to time series models.
5393. **Economics of Cotton as an Industrial Raw Material (3)**. Evaluates entire marketing chain pertinent to cotton and cottonseed, along with the industrial transformation required. Develops methodology for analyzing agricultural commodities as industrial raw materials. (PSS 5378).
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)**. Prerequisite: AAEC 4305. Analysis of policies, programs affecting food, agricultural commodities, trade, and natural resources. Includes policies in the U.S. and other countries. F.
6305. **Economic Optimization (3)**. 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)**. 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)**. Prerequisite: ECO 5312. Applied price and demand analysis including complete demand systems and hedonic-characteristic price analysis. S.
6311. **Applied Econometrics II (3)**. 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)**. 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)**.

Department of Agricultural Education and Communications

Steven Fraze, Ph.D., Chairperson

Professors: Akers, Baker, Brashears, Briers, Doerfert, Dooley, Elliot, Fraze, Lawver, Lindner, Murphy

Associate Professors: Boleman, Boyd, Burris, Cummings, Elbert, Harlin, Irlbeck, Meyers, Ritz, Rutherford, Ulmer, Vestal, Wingenbach

Assistant Professors: Boren, Murphrey, Rayfield

Adjunct Faculty: Alexander, Dromgoole

CONTACT INFORMATION: 103 Agricultural Education and Communications Building, Box 42131, Lubbock, TX 79409-2131, T 806.742.2816, F 806.742.2880, steven.fraze@ttu.edu, www.depts.ttu.edu/aged

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
- Doctor of Philosophy in Agricultural Communications and Education
- Graduate Certificate in Agricultural Communications Leadership
- Graduate Certificate in Agricultural Leadership

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).

Agricultural communications allows students to specialize in both mass communications and agriculture. The communications component consists of prescribed courses in journalism, speech, public relations, photography, and advertising. Students select technical agriculture courses that allow them to specialize in areas of interest and to reinforce their general knowledge in agriculture.

Examples of careers in agricultural communications are communications specialist, photographer, lobbyist, editor, reporter, public relations specialist, event planner, and graphic designer. Agricultural communications majors gain hands-on experience while interning

Graduate Program

For information on graduate programs offered by the Department of Agricultural Education and Communications, visit the Graduate School section of the catalog on page 118.

with a variety of professional communication entities, including national publications, television stations, and major agricultural events.

These degrees are also recommended for students interested in continued studies in professional schools such as law or business.

Minors. The department offers two minors for students outside the department: agricultural leadership and agricultural communication studies.

Required courses for the agricultural leadership minor are as follows:

- AGLS 1300
- AGED 3315, 3314 or 4308
- nine hours from ACOM 1300, 2302, 3300; AGED 2300, 3330, 4000 (3 hours only), 4303; AGED 4309.

Required courses for the agricultural communication studies minor are the following:

- ACOM 1300, 2302, 2305, 3300
- JOUR 2310
- one of ACOM 3301, 3305, or 3311.

Undergraduate students in the department are required to have a laptop computer. Specifications are posted at both: www.depts.ttu.edu/aged/ugrad/gen_info.php and www.depts.ttu.edu/ithelpcentral/recommend.php

Course Descriptions

(To interpret course descriptions, see page 23.)

Agricultural Communications (ACOM)

Undergraduate Courses

1300. **Introduction to Agricultural Communications (3).** An overview of information systems and media associated with the agricultural industry.
2200. **Professional Development in Agricultural Communications (2).** Focuses on job applications, business etiquette, soft skills, event planning, and professionalism.
2302. **Scientific Communications in Agriculture and Natural Resources (3).** Improve written, visual, and oral communications. Development of press releases, scientific papers, popular press articles, poster presentations, technical presentations, and grant applications. (Writing Intensive)
2303. **Digital Imaging in Agriculture (3).** Basics of composition, techniques, and lighting involved in photographing agricultural images. Students will learn about photographing agricultural subjects, people, and landscapes.
2305. **Digital Communications in Agriculture (3).** 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).** 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).** Prerequisite: Must be ACOM or INAG major. Basics in producing an agricultural video. Students learn scripting, shooting, and digital video editing.
3305. **Layout and Design in Agricultural Sciences (3).** Prerequisite: ACOM 2305. Examination of design principles and desktop publishing in the agricultural industry.
3311. **Web Design in Agricultural Sciences and Natural Resources (3).** Prerequisite: ACOM 2305. Promote basic understanding of Web design principles and experiential learning through a project requiring students to develop a website for a client in the agriculture industry.
4000. **Internship in Agricultural Communications (V1-12).**

Bachelor of Science in Agricultural Communications

FIRST YEAR

Fall		Spring	
Life & Physical Sciences*	4	Life & Physical Sciences*	4
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 1300, Intro. Ag. Communications	3	ACOM 2200, Prof. Develop. in Ag. Comm.	2
ACOM 2305, Digital Comm. in Ag.	3	ACOM 2302, Scientific Communications	3
TOTAL	16	TOTAL	15

SECOND YEAR

Fall		Spring	
AAEC 2305, Fund. of Ag. & Applied Eco.	3	ACOM 2303, Digital Imaging in Ag.	3
Basic Agricultural Elective	3	HIST 2301, History of U.S. Since 1877	3
MATH 2300, Statistical Methods	3	Language, Philosophy and Culture*	3
ACOM 3301, Video Prod. in Ag.	3	Basic Agricultural Elective	3
JOUR 2310, News Writing†	3	ACOM 3305, Layout and Design	3
TOTAL	15	TOTAL	15

THIRD YEAR

Fall		Spring	
POLS 1301, American Government, Org.	3	ACOM 3300, Communicating Ag. to Public	3
COMS 2300, Public Speaking	3	Advanced Agricultural Elective#	3
Communications Elective§	3	Basic Agricultural Elective	3
AGED 2300, Intro. to Ag. Education	3	POLS 2302, American Public Policy	3
ACOM 3311, Web Design for Ag.	3	Communications Elective§	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
Communications Elective§	3	Advanced Agricultural Elective#	9
ACOM 4305, Campaigns in Agriculture	3	ACOM 4310, Develop. of Ag. Publications	3
Creative Arts Elective‡	3	Communications Elective§	3
Advanced Agricultural Elective#	3		
ACOM 4000, Internship in Ag. Commun.	2		
TOTAL	14	TOTAL	15

TOTAL HOURS: 120

* Choose from ANSC 1401, BIOL 1401 or 1402, CHEM 1305 and 1105, NRM 1401, PSS 1411 and 2401.

† Must pass GSP, maintain a 2.5 GPA, and pass ENGL 1301 and 1302 with a C or better before enrolling in JOUR 2310.

‡ Choose from core curriculum requirements.

§ Suggested communications electives: ADV 3310; PR 3310; MCOM 3300, 3320, 3380; BA 3301 or AAEC 3301; EMC 3301; or others with advisor approval.

Advanced agricultural elective is a 3000- or 4000-level course.

4001. **Agricultural Communications Problems (V1-3).** Individual study of advanced application of principles of agricultural communications.
4100. **Seminar in Agricultural Communications (1).** Overview and analysis of the history, development, issues, and trends of traditional agricultural and related information outlets. May be repeated once for credit. F.
4305. **Agricultural Communication Campaigns (3).** Prerequisites: ACOM 3305, junior or senior standing, and ACOM majors only. Principles, practices, and applications of social marketing as they pertain to developing communication campaigns for the food and fiber industry.
4310. **Development of Agricultural Publications (3).** Prerequisite: JOUR 2410. Students integrate various skills including writing, editing, and layout in producing agricultural publications. Emphasis upon computer software applications in agricultural publishing. (Writing Intensive)
4311. **Convergence in Agricultural Media (3).** Prerequisites: Consent of instructor and ACOM majors only. Intensive application of communication skills to produce a multimedia website focused on agricultural topics.

Graduate Courses

5302. **Knowledge Management in Agricultural and Natural Resources (3).** 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 Imaging and Design in Agricultural Communications (3).** Study of video, images, and design as well as visual theories in relation to agriculture. Course includes study and practice of photo manipulation, video production, and agricultural design for agricultural communications.
5304. **Risk and Crisis Communications in Agriculture and Natural Resources (3).** 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).** Explore historical foundations and selected philosophical concepts and philosophers and evaluate their influence upon agricultural communications.
5307. **Methods of Technological Change (3).** 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.
5308. **Utilizing Online Media in Agricultural Communications (3).** Identify agricultural audiences, conduct analyses, and use results to evaluate and produce online media that utilizes design fundamentals, visual communication theories, and new media technology.

Agricultural Education (AGED)

Undergraduate Courses

2300. **Introduction to Agricultural Education (3).** History and principles of vocational education, community assessment of agricultural programs planning, and development of agricultural youth organization. Fulfills multicultural requirement.
2304. **Agriculture and Society (3).** An examination of relationships between agriculture and society, the environment, and population. Emphasizes agriculture's use of science, technology, engineering, and mathematics. Fulfills multicultural requirement
3100. **Introduction to Teaching Agricultural Education (1).** Provides new teacher candidates information, access and skills to successfully complete a teacher education program in agricultural education.
3302. **Transfer of Agricultural Technology (3).** Examination of processes by which professional agriculturalists influence the introduction, adoption, and diffusion of technological change. F.
3314. **Team Leadership Development in Agriculture and Natural Resources (3).** 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).** 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).** Utilization of agricultural service systems to disseminate information to traditional and nontraditional agricultural clientele. Emphasis on USDA organizations.
3333. **Developing Secondary Agricultural Education Programs (3).** Provides theory and application in instruction, leadership, and experience for agricultural science teachers as they learn components of the agricultural education model.
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.
4303. **Designing and Integrating the Agricultural Curriculum (3).** Instructional methodology on curricular goals for agricultural programs and designing curriculum with integration of STEM areas for cross-content credit in secondary agricultural education. (Writing Intensive)
4304. **Methods of Teaching Agriscience in the Secondary School (3).** F, S. (Writing Intensive)

B.S. in Interdisciplinary Agriculture Agricultural Leadership Track

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ACOM 1300, Intro to Ag Comm.	3	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	HIST 2300, History of U.S. to 1877	3
MATH 1320, College Algebra	3	ANSC 1401, General Animal Science	4
Life & Physical Sciences†	4	MATH 2300, Statistical Methods	3
		AGED 2300, Intro. to Ag. Education	3
TOTAL	13	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
AGLS 1300, Ag. Leadership Principles	3	ANSC Elective	4
PSS 1321, Agronomic Plant Science	3	AAEC 2305, Fund. Ag. & Appl. Econ.	3
POLS 1301, American Govt., Org.	3	COMS 2300, Public Speaking	3
HIST 2301, History of U.S. Since 1877	3	POLS 2302, American Public Policy	3
Life & Physical Sciences†	4	PSS Elective	3
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
Scientific Ag. Elective	3	AGED 3314, Team Leadership	3
ACOM 2302, Scientific Communications	3	AGED 3330, Inter. of Ag. Agency Info.	3
AGED 3315, Personal Leadership	3	AGED 3333, Develop. Secondary Ag. Ed.	3
Creative Arts*	3	AGED 4303, Des. & Integ. Ag. Curric.	3
Language, Philosophy, and Culture*	3	NRM 2301, Introductory Wildlife	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Scientific Ag. Elective	4	AGED 4000, Internship	10
AAEC Elective	3	AGED 4309, Cont. Issues in Ag. Lead.	3
AGED 3302, Transfer of Ag. Technology	3		
AGED 4308, Organizational Leadership	3		
Advanced Scientific Ag. Elective	3		
TOTAL	16	TOTAL	13

TOTAL HOURS: 120

* Choose from ANSC 1401, BIOL 1401 or 1402, CHEM 1305 and 1105, NRM 1401, PSS 1411 and 2401.

† Choose from core curriculum requirements.

B.S. in Interdisciplinary Agriculture (Agricultural Education)—Teacher Certification

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
AGED 2300, Intro. to Ag. Education	3	AGSM 2303, Welding & Metalwork	3
CHEM 1305, Chemical Basics	3	ENGL 1302, Advanced College Rhetoric	3
CHEM 1105, Experim. Chem. Basics	1	HIST 2300, History of U.S. to 1877	3
PSS 1321, Agronomic Plant Science	3	ANSC 1401, Gen. Animal Science	4
ENGL 1301, Essentials of Coll. Rhetoric	3	AAEC 2305, Fund. Ag. Appl. Economics	3
TOTAL	13	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ACOM 2302, Sci. Comm. in Ag & Nat. Res.	3	AGED 3333, Dev. Second. Ag. Edu. Prog.	3
POLS 1301, American Govt., Org.	3	COMS 2300, Public Speaking	3
HIST 2301, History of U.S. Since 1877	3	MATH 1320, College Algebra	3
BIOL 1401 or 1402	4	POLS 2302, American Public Policy	3
Ag. Elective	3	Advanced Ag. Elective	3
TOTAL	16	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
Creative Arts*	3	ANSC 3305, Appl. Animal Nutrition	3
PSS 2432, Principles & Practices of Soil	4	ENGL 2307, Introduction to Fiction	3
PSS 1411, Principles of Horticulture	4	AGED 4303, Design. & Integrate Ag. Curr.	3
ANSC 3402, Animal Genetics or	4	AGSM 3304, Systems in Ag. Mechanics	3
PSS 3421, Principles of Genetics	3	MATH 2300, Statistical Methods	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
AGED 4304, Methods of Teaching Ag. Sci.	3	EDLL 4382, Adolescents, Content Learn.	3
AGED 4410, Integrate Science into Ag. Ed.	4	AGED 4306, Student Teaching	9
EDSE 4312, Secondary Class Mgmt.	3	AGED 4311, Ag. Edu. Senior Seminar	3
AGED 3100, Intro. to Teach Ag. Ed.	1		
AGSM 4303, Lab. Methods in Ag. Sys. Mgt.	3		
AGED 4001, Ag Education Problems	1		
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* Choose from core curriculum requirements.

- 4306. **Student Teaching (3).** Prerequisite: Senior standing in agricultural education.
- 4308. **Organizational Leadership Development in Agriculture and Natural Resources (3).** 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).** 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)
- 4311. **Agricultural Education Senior Seminar (3).** Students pursuing teacher certification must value professional demands. Course involves theory and application toward teaching, conducting daily tasks, and assuming professional roles.
- 4410. **Integrating Science into Agricultural Education (4).** Methods of integrating activities related to science content during the instruction of secondary agricultural education. Special focus on laboratory instruction in animal science.

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).** 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).** 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.
- 5305. **Program Development in Agricultural and Extension Education (3).** 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).** Historical and philosophical foundations of education, communications, and extension education in agriculture.
- 5308. **Foundations of Adult Education (3).** Study and investigation of adult learning theories, methods, and procedures to implement changes in adult behavior.
- 5309. **Evaluation of Programs in Vocational, Technical, and Extension Education (3).** 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).** 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).** Study current issues and trends in the human dimension of international agricultural development.
- 5312. **Assessing Program Effectiveness in Agriculture and Extension Education (3).** Assessment of programs in agriculture and extension education based on programming theories, concepts, and research. Emphasizes assessing client need, monitoring programs based on objectives, and determining program effectiveness and efficiency.
- 5314. **Agricultural Education in International Settings (3).** A study-abroad exploration of agricultural and sustainable practices in international settings. Conducted across a country and includes tours of crops, livestock facilities, and educational environments. May be repeated for credit.

5340. **Educational Law (3)**. 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)**. 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)**.
6301. **The Professorate (3)**. Overview of agriculture-focused faculty roles and career paths in non-profit colleges and universities in the United States.
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 Leadership (AGLS)

Undergraduate Course

1300. **Agricultural Leadership Principles (3)**. Principles of leadership and personal skill development. Emphasizes leadership styles, types of management, group dynamics, and managing change as applied to agriculture. (Writing Intensive)

Graduate Courses

5304. **Theoretical Foundations of Leadership (3)**. Theory of motivation, behavior, leadership styles, power, influence, charisma, and the historical context of leadership in the agriculture industry. S
5305. **Developing Leadership in Rural Communities (3)**. Introduction to the theories, concepts, and practical application of

identifying, developing, and utilizing leadership to help sustain and revitalize rural communities.

5306. **Contemporary Issues in Agricultural Leadership (3)**. Exposes students to national, regional, and local agricultural issues that can be positively impacted with the proper application of leadership principles
5307. **Evaluating Leadership in Agricultural Organizations (3)**. The application of leadership and evaluation principles to determine improvement areas to maximize efficiency of the human dimension of the agricultural industry.

Agricultural Systems Management (AGSM)

Undergraduate Courses

2303. **Welding and Metalwork (3)**. Metal fabrication and repair using hand tools, power tools, and welding equipment. Includes metallurgy pertaining to welding processes and heat treating.
3304. **Systems in Agricultural Mechanics (3)**. Prerequisite: AGSM 2303. Mathematics and physical science applications to systems in agricultural mechanics. Topics in electricity, internal combustion engine theory, land measurement, and environmental control.
4301. **Agricultural Mechanization Problems (3)**. Individual study of an advanced phase of agricultural mechanization. Research report required. F, S, SS.
4303. **Laboratory Methods in Agricultural Systems Management (3)**. Prerequisite: AGSM 2303; AGSM 3304 recommended. Principles in managing secondary agricultural science laboratories. Features safe operation of power tools and equipment.

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, SS.



Department of Animal and Food Sciences

Michael Orth, Ph.D., Chairperson

Horn Professor and Thornton Chair: Galyean

San Antonio Livestock Exposition Chair: M. Miller

Gordon W. Davis Regent's Chair: Johnson

John W. and Doris Jones Associate Professor: Rathmann

Professors: Brady, Brashears, C. Brooks, Loneragan, McGlone, Orth, Prien, Thompson

Associate Professors: Ballou, Jackson, R. Miller, Nightingale, Sanchez Plata

Assistant Professors: Bernhard, den Bakker, Echeverry, Garcia (visiting), Neary, Rakhshandeh, Sarturi, Trojan

Associate Professor of Practice: Riccitelli

Research Assistant Professors: Bugarel, Garmyn

Instructors: T. Brooks, Jennings

Adjunct Faculty: Allen, Alvarado, Arbault, Beckett, Binkley, Blodgett, Brown, Butters-Johnson, Carroll, Cole, Davis, Ganjyal, Hentges, Lyte, MacDonald, McAdams, Nichols, O'Quinn, Penrose, Shome, Sutherland, Waggoner, Wheeler, Wilson, Wu

CONTACT INFORMATION: 103 Animal and Food Sciences Building, Box 42141, Lubbock, TX 79409-2141, T 806.742.2805, F 806.742.0898, www.depts.ttu.edu/afs/

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 a collaborative agreement with the Department of Health, Exercise, and Sport Sciences in the College of Arts and Sciences that leads to a Ph.D. in Animal Sciences with an emphasis in exercise physiology.

The department offers minors in animal science or food science for students majoring outside the department. For more information on requirements for completing a minor, refer to "Selecting a Minor" in the introductory information about this college or contact a department advisor.

Undergraduate Program

Animal Science Program

Students majoring in animal science for the B.S. degree may choose to focus on one of eight emphases: animal business, production, science, meat science, meat science business, equine production, equine science, and equine assisted therapy. In addition, the department also directs the preprofessional course preparation for veterinary medicine and the Equine Science Certificate Program.

For students majoring in animal science, the **business option** prepares them 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** and **meat science business options** prepare students in meat processing, science, and safety.

The equine emphasis options are designed to prepare students for careers in the equine industry. The **equine science option** provides training in advanced basic sciences to prepare students for study towards an advanced degree with equine emphasis. The **equine production option** is designed to prepare students to enter the equine industry with training in all aspects of equine management. The **equine assisted therapy option** is a specialized option to prepare students for a career in the field of equine therapy and handicapped rehabilitation.

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 microbio-

Graduate Program

For information on graduate programs offered by the Department of Animal and Food Sciences, visit the Graduate School section of the catalog on page 118.

logical laboratories allow students practical experience in development, manufacture, and analysis of food products.

Students majoring in food science for the B.S. degree may choose between two options: industry or science. All students are required to take a 3-hour internship or 3-hour research experience to fulfill graduation requirements.

Pre-Veterinary Medicine Option

Although Texas Tech does not offer a degree in pre-veterinary medicine, students may still prepare for veterinary school by completing the minimum admission requirement of 58 credit hours. The following courses are included in the minimum admission requirement: ANSC 3301; BIOL 1402; CHEM 1307, 1107, 1308, 1108, 3305, 3105, 3306, 3106, 3311, 3314; COMS 2300; ENGL 1301, 2311 or ACOM 2302.; PSY 1300; MATH 2300; MBIO 3401; PHYS 1403, 1404; PSS 3421 or BIOL 3416. A pre-veterinary medicine advisor is available to assist students in selecting courses and degree programs.

B.S. in Food Science Sample Curriculum

FIRST YEAR			
Fall		Spring	
BIOL 1401, 1402, or 1403 [§]	4	AAEC 2305, Fund. Ag. & Appl. Eco.	3
ENGL 1301, Essentials of Coll. Rhetoric	3	CHEM 1308, Principles of Chem. II	3
MATH 1330, Intro. to Math. Analysis I†	3	CHEM 1108, Exper. Princ. of Chem. II	1
CHEM 1307, Principles of Chem. I	3	ENGL 1302, Advanced College Rhetoric	3
CHEM 1107, Exper. Prin. of Chem. I	1	ANSC 1401, General Animal Science	4
TOTAL	14	TOTAL	14
SECOND YEAR			
Fall		Spring	
CHEM 3305/3105, Org. Chem.#	4	Approved Electives**	3
MATH 1331, Intro. to Math. Analysis II‡	3	FDSC 2302, Elem. Analysis of Foods	3
FDSC 2300, Principles of Food Tech.	3	HIST 2301, History of U.S. Since 1877	3
COMS 2300, Public Speaking	3	Lang., Phil., & Culture/Multicultural*	3
HIST 2300, History of U.S. to 1877	3	ENGL 2311, Technical Writing	3
TOTAL	16	TOTAL	15
THIRD YEAR			
Fall		Spring	
POLS 1301, American Govt., Org.	3	Approved Elective**	6
NS 3340 or ANSC 3301	3	POLS 2302, American Public Policy	3
FDSC 3100, Food Science Seminar	1	FDSC 3301, Food Microbiology or	3
FDSC 3302, Advanced Food Analysis	3	FDSC 3303, Food Sanitation or	3
MBIO 3400, Microbiology	4	FDSC 3309, Food Safety	3
Approved Elective**	3		
TOTAL	17	TOTAL	15
FOURTH YEAR			
Fall		Spring	
FDSC 4303 or FDSC 3302	3	FDSC 4306, Dairy Products Mfg.	3
FDSC 4304, Field Studies	3	FDSC 3305, Prin. Food Engineering	3
MATH 2300, Statistical Methods	3	Approved Elective**	4
Creative Arts*	3	Free Elective	4
Approved Elective**	3		
TOTAL	15	TOTAL	14

TOTAL HOURS: 120

MATH 1451 may be substituted for MATH 1330, MATH 1452 may be substituted for MATH 1331, and AAEC 3401 may be substituted for MATH 2300.

* Choose from core curriculum requirements.

† Math 1320 or 1330 is required for the industry emphasis.

‡ MATH 1321 or 1331 is required for the industry emphasis.

§ BIOL 1401 or 1402 is required for the industry emphasis

CHEM 2303/2103 may be used for industry emphasis.

** 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.

Students must complete an internship or research experience to fulfill graduation requirements.

Undergraduate Equine Science Certificate

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 3307, 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 4000, 4001, 4306**Industry Option (Select 6 credits):** ANSC 3204, 3304, 3310, 3312, 3313, 4000**Equine-Assisted Therapy Option (Select 6 credits):** ANSC 3309, 4000, 4001, 4301, 4305**General Option:** Customize curriculum from at least 6 credit hours available in the other options. ANSC 2310**B.S. in Animal Science: Business Option**

FIRST YEAR			
Fall		Spring	
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3
CHEM 1305, Chemical Basics	3	CHEM 1306, Chemistry That Matters	3
CHEM 1105, Experimental Chem. Basics	1	CHEM 1106, Chem. Experi. That Matter	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
		MATH 2300, Statistical Methods	3
TOTAL	14	TOTAL	16
SECOND YEAR			
Fall		Spring	
AAEC 3301, Agribusiness Mkt.	3	POLS 1301, American Govt., Org.	3
ANSC 2202, Anatomy of Dom. Animals	2	HIST 2300, History of U.S. to 1877	3
ENGL 2311, Technical Writing	3	ANSC 2306, Physiology of Dom. Animals	3
or ACOM 2302		ANSC 3302, Agribusiness Finance	3
CHEM 2303, Introductory Organic Chem.	3	BA 3302, Fin. & Managerial Accounting	3
CHEM 2103, Exper. Intro. Organic Chem.	1		
FDSC 2300, Principles of Food Tech.	3		
TOTAL	15	TOTAL	15
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 3403, Sel./Care/Proc./Cook. Meats	4
AAEC 3304, Farm & Ranch Mgmt.	3	ANSC 3307, Feeds & Feeding	3
COMS 2300, Public Speaking	3	POLS 2302, American Public Policy	3
ANSC 3402, Animal Genetics	4		
TOTAL	17	TOTAL	13
FOURTH YEAR			
Fall		Spring	
Production Elective	4	Production Electives	8
ANSC 3100, Animal Science Seminar	1	Creative Arts/ Multicultural*	3
AAEC 3303, 3305, 4303, 4317, or 4320	3	Electives	5
BLAW 3391, Business Law I			
or AAEC 4320, Agribusiness Law	3		
Lang., Phil., & Culture/Multicultural*	3		
TOTAL	14	TOTAL	16

TOTAL HOURS: 120

* Choose from core curriculum requirements.

Course Descriptions

(To interpret course descriptions, see page 23.)

Animal Science (ANSC)**Undergraduate Courses**

- 1401. [AGRI 1419] General Animal Science (4).** The application of basic scientific principles to the efficient production of domestic animals. Students must enroll in lecture and lab concurrently. Partially fulfills core Life and Physical Sciences requirement. F, S, SS.
- 2202. Principles of Anatomy of Domestic Animals (2).** Introduction to anatomy of domesticated animals with emphasis on bones, muscles, organs, vascular and nervous systems. F, S.
- 2301. [AGRI 2322] Livestock and Meat Evaluation I (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).** Advanced training in evaluating, selecting, pricing, and grading of breeding and market livestock, carcasses, and wholesale cuts. Field trips to ranches and meat packing plants. Livestock and meat judging teams originate from this course. May be repeated for credit. F.
- 2303. Care and Management of Companion Animals (3).** Principles and practices of proper selection, feeding, and care of companion animals, with emphasis on the dog and cat. Nutrition, health care, behavior, training, and reproduction are discussed. F, S.
- 2304. Selection and Evaluation of Horses (3).** 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).** Introduction to basic nutrition and feeding of horses. Emphasis on practical applications and feeding management guidelines. F.

**B.S. in Animal Science:
Equine Assisted Therapy Option**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ANSC 1401, General Animal Science	4	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	MATH 1321, Trigonometry	3
MATH 1320, College Algebra	3	or MATH 2300, Statistics	
CHEM 1305, Chemical Basics	3	ANSC 2304, Selection. & Eval. of Horses	3
CHEM 1105, Experimental Chem. Basics	1	ANSC 3309, Principles of Hippotherapy	3
		CHEM 1306, Chemistry That Matters	3
		CHEM 1106, Chem. Exper. That Matter	1
TOTAL	14	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ANSC 2202, Anat. of Domestic Animals	2	PSY 1300, General Psychology	3
ANSC 3303, Introductory Horse Mgmt.	3	HIST 2301, History of U.S. Since 1877	3
ANSC 4305, Therapeutic Riding	3	ANSC 2306, Physiology. of Dom. Animals	3
CHEM 2303, Introductory Organic Chem.	3	ANSC 4000, Internship	1
CHEM 2103, Exper. Intro. Organic Chem.	1	POLS 1301, American Govt., Org.	3
HIST 2300, History of U.S. to 1877	3		
TOTAL	15	TOTAL	13

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ANSC 3301, Principles of Nutrition	3	ANSC 3307, Feeds & Feeding	3
ANSC 3401, Reproductive Physiology	4	or ANSC 2305, Intro. Horse Nutrition	
ANSC 4302, Animal Genetics	4	ANSC 4301, Equine-Assisted Mental Hlth	3
ANSC 3100, Animal Science Seminar	1	ANSC 4402, Horse Production	4
ANSC 4000, Internship	1	ANSC 4000, Internship	1
Free Elective	3	ENGL 2311, Technical Writing or ACOM 2302	3
		COMS 2300, Public Speaking	3
TOTAL	16	TOTAL	17

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
FDSC 3303, Food Sanitation	3	ANSC 3403, Sel./Care/Proc./Cook. Meats	4
Production Elective†	4	Lang., Phil., & Culture/Multicultural*	3
Free Elective	2	ANSC 3306, Animal Diseases	3
ANSC 2310, The Horse in World Art	3	Production Elective†	4
POLS 2302, American Public Policy	3		
TOTAL	15	TOTAL	14

TOTAL HOURS: 120

* Choose from core curriculum requirements.

† Select 2 courses from ANSC 4401, 4403, 4406, or 4407

**B.S. in Animal Science: Equine
Production Option**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1320, College Algebra	3	ANSC 2304, Selection. & Eval. of Horses	3
CHEM 1305, Chemical Basics	3	CHEM 1306, Chemistry That Matters	3
CHEM 1105, Experimental Chem. Basics	1	CHEM 1106, Chem. Exper. That Matter	1
		MATH 1321, Trigonometry	3
TOTAL	14	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
ANSC 2202, Anatomy of Dom. Animals	2	HIST 2301, History of U.S. Since 1877	3
ANSC 3303, Introductory Horse Mgmt.	3	ANSC 2306, Physiol. of Domestic Animals	3
CHEM 2303, Introductory Organic Chem.	3	ANSC 3306, Animal Diseases	3
CHEM 2103, Exper. Intro. Organic Chem.	1	COMS 2300, Public Speaking	3
HIST 2300, History of U.S. to 1877	3		
TOTAL	15	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ANSC 3301, Principles of Nutrition	3	ANSC 3307, Feeds & Feeding	3
ANSC 3401, Reproductive Physiology	4	or ANSC 2305, Intro. Horse Nutrition	
ANSC 3402, Animal Genetics	4	ANSC 3316, Animal Growth & Develop.	3
ANSC 3100, Animal Science Seminar	1	ANSC 4402, Horse Production	4
Free Elective	3	ENGL 2311, Technical Writing or ACOM 2302	3
		Free Elective	3
TOTAL	15	TOTAL	16

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
FDSC 3303, Food Sanitation	3	ANSC 3403, Sel./Care/Proc./Cook. Meats	4
Production Elective†	4	Lang., Phil., & Culture/Multicultural*	3
Approved Electives‡	4	Approved Electives‡	4
ANSC 2310, The Horse in World Art	3	Production Elective†	4
TOTAL	14	TOTAL	15

TOTAL HOURS: 120

* Choose from core curriculum requirements.

† Select 2 courses from ANSC 4401, 4403, 4406, or 4407

‡ Select 8 hours from the following: ANSC 3304, 3309, 3310, 3312, 3313, 4000, 4001, 4305, 4301, 4306

- 2306. **Principles of Physiology of Domestic Animals (3)**. Prerequisite: ANSC 2202. Introduction to physiological principles of domesticated animals, including major systems. S.
- 2310. **The Horse in World Art (3)**. A comprehensive study of the depiction of the horse in fine arts, reflecting cultures, values, traditions, and heritage of civilization throughout history. Fulfills core Creative Arts and multicultural requirement. F, S, IIL.
- 3100. **Animal Science Seminar (1)**. Information to prepare students to function in a competitive work environment or professional/graduate school. F, S.
- 3203. **Livestock and Meat Judging (2)**. 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)**. 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)**. Prerequisites: ANSC 1401; CHEM 1305 or 1307. Nutritional roles of carbohydrates, proteins, lipids, minerals, vitamins, and water. Digestion, absorption, and use of nutrients and their metabolites. F, S.
- 3303. **Introductory Horse Management (3)**. 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)**. Prerequisite: Consent of instructor. Practical application of the science of equine behavior to training young ranch horses. Emphasis on training, communication, and progressive learning of ranch skills.
- 3305. **Applied Animal Nutrition (3)**. Prerequisites: 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 involve-

- ment. Not open to animal science majors. Will not qualify as prerequisite to ANSC 3307. S, SSI.
- 3306. **Animal Diseases (3)**. Diseases of farm animals, both infectious and noninfectious, parasites, parasitic diseases, and the establishment of immunity through the use of biological products. S.
- 3307. **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. F, S.
- 3308. **Clinical Veterinary Science (3)**. Prerequisites: ANSC 2202 and 2306. Clinical course working with various animal species. Course provides practical applications in various disciplines of veterinary medicine. SSI.
- 3309. **Principles of Hippotherapy (3)**. An interdisciplinary overview of hippotherapy with primary emphasis on the use of the horse in therapy for children with physical, cognitive, and other disabilities. F, S, SS.
- 3310. **Principles of Equine Sales Preparation and Marketing (3)**. Prerequisite: ANSC 3303. Principles of equine management as related to fitting, presentation, and marketing of horses. S.
- 3312. **Horsemanship I: General Horsemanship (3)**. Fundamentals of horse care and riding with an emphasis on practical experience. F.
- 3313. **Horsemanship II: Advanced Horsemanship (3)**. Riding-intensive class for advanced riders. Emphasis on communication with horse in both hunt/stock seat disciplines. S.
- 3316. **Animal Growth and Development (3)**. Prerequisites: ANSC 2202 and 2306. A comprehensive course in the basic principles and concepts of livestock growth and development.
- 3317. **Ranch Horse Techniques (3)**. Prerequisite: Consent of instructor. Riding-intensive class for advanced riders. Instruction in working cattle, reining, and trail. Student will provide a horse. May be repeated for credit. F, S.
- 3318. **Domestic Animal Behavior (3)**. Prerequisite: ANSC 1401 or BIOL 1402 or BIOL 1403. Examines farm and companion

B.S. in Animal Science: Equine Science Option

FIRST YEAR					
Fall			Spring		
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3		
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3		
MATH 1321, Trigonometry	3	ANSC 2304, Selection. & Eval. of Horses	3		
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3		
CHEM 1107, Exper. Prin. of Chem. I	1	CHEM 1108, Exper. Princ. of Chem. II	1		
		MATH 2300, Statistical Methods	3		
TOTAL	14	TOTAL	16		
SECOND YEAR					
Fall			Spring		
POLS 1301, American Govt., Org.	3	ANSC 2306, Physiol. of Domestic Animals	3		
ANSC 2202, Anat. of Domestic Animals	2	ANSC 3306, Animal Diseases	3		
ANSC 3303, Introductory Horse Mgmt.	3	CHEM 3306, Organic Chemistry	3		
CHEM 3305, Organic Chemistry I	3	CHEM 3106, Organic Chemistry Lab II	1		
CHEM 3105, Experimental Org. Chem. I	1	COMS 2300, Public Speaking	3		
BIOL 1402, Biology of Animals	4				
TOTAL	16	TOTAL	13		
THIRD YEAR					
Fall			Spring		
ANSC 3301, Principles of Nutrition	3	ANSC 3307, Feeds & Feeding	3		
ANSC 3401, Reproductive Physiology	4	or ANSC 2305, Intro. Horse Nutrition			
ANSC 3402, Animal Genetics	4	HIST 2301, History of U.S. Since 1877	3		
ANSC 3100, Animal Science Seminar	1	ANSC 4402, Horse Production	4		
HIST 2300, History of U.S. to 1877	3	ENGL 2311, Technical Writing or ACOM 2302	3		
		POLS 2302, American Public Policy	3		
TOTAL	15	TOTAL	16		
FOURTH YEAR					
Fall			Spring		
FDSC 3303, Food Sanitation	3	ANSC 3403, Sel./Care/Proc./Cook. Meats	4		
Production Elective†	4	Lang., Phil., & Culture/Multicultural*	3		
Approved Electives‡	5	Approved Electives‡	4		
ANSC 2310, The Horse in World Art	3	Production Elective†	4		
TOTAL	15	TOTAL	15		
TOTAL HOURS: 120					
* Choose from core curriculum requirements.					
† Select 2 courses from ANSC 4401, 4403, 4406, or 4407					
‡ Select 9 hours from the following: ANSC 3304, 3309, 3310, 3312, 3313, 4000, 4001, 4301, 4305, 4306					

animal behavior, including physiology of behavior, communication, social behaviors, and others. S, SSI.

- 3401. Reproductive Physiology (4).** Prerequisites: 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).** Prerequisites: ANSC 1401, MATH 1320 or higher. Fundamental principles of cellular, population, and quantitative genetics applied in selection and mating systems to make genetic improvements in farm animals. F
- 3403. Selection, Care, Processing, and Cooking of Meats (4).** A general course in selecting, preserving, inspecting, grading, and cooking meats. S.
- 3404. Consumer Selection and Utilization of Meat Products (4).** A course for nonmajors who desire general knowledge of meat purchasing, selection, and cookery. Aspects of hazard analysis, food safety, and sanitation will be studied. F, S, SS.
- 3405. Advanced Physiology of Animals (4).** Prerequisites: 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, even years.
- 4000. Internship (VI-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 (VI-6).** Prerequisite: Approval of instructor. Individual investigation. May be repeated for credit. F, S, SS.
- 4202. Artificial Insemination of Livestock (2).** Prerequisites: ANSC 3401 and consent of instructor. Anatomy and physiology of reproductive organs, palpation, insemination techniques, handling frozen semen, estrous detection, synchronization of estrus and ovulation, and pregnancy determination. Intersession.

B.S. in Animal Science: Meat Science Option

FIRST YEAR					
Fall			Spring		
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3		
CHEM 1305, Chemical Basics	3	CHEM 1306, Chemistry That Matters	3		
CHEM 1105, Experimental Chem. Basics	1	CHEM 1106, Chem. Experi. That Matter	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		
		MATH 2300, Statistical Methods	3		
TOTAL	14	TOTAL	16		
SECOND YEAR					
Fall			Spring		
POLS 1301, American Govt., Org.	3	FDSC 2302, Elem. Analysis of Foods	3		
ANSC 2202, Anatomy of Dom. Animals	2	HIST 2300, History of U.S. to 1877	3		
ENGL 2311, Technical Writing	3	FDSC 2300, Principles of Food Tech.	3		
or ACOM 2302, Scientific Comm. in Ag.		COMS 2300, Public Speaking	3		
CHEM 2303, Introductory Organic Chem.	3	ANSC 2306, Physiology of Dom. Animals	3		
CHEM 2103, Exper. Intro. Organic Chem.	1				
HIST 2301, History of U.S. Since 1877	3				
TOTAL	15	TOTAL	15		
THIRD YEAR					
Fall			Spring		
ANSC 3401, Repro. Physiol.	4	ANSC 3316, Animal Growth & Devel.	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		
		ANSC 3403, Sel./Care/Proc./Cook. Meats	4		
TOTAL	14	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	4	FDSC 3303 or 3309	3		
Creative Arts/Multicultural*	3	Lang., Phil., & Culture/Multicultural*	3		
		Approved Electives†	4		
TOTAL	15	TOTAL	16		
TOTAL HOURS: 120					
* Choose from core curriculum requirements.					
† Select 4 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.					

- 4301. Equine-Assisted Mental Health (3).** An introduction to therapeutic intervention using horses to address behavioral, relational, and emotional issues for clients. S.
- 4305. Therapeutic Riding (3).** Skills and theories of therapeutic riding, including lesson plan development, knowledge of disabilities, and groundwork for instructor certification. F
- 4306. Equine Feeding and Exercise Management (3).** 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).** 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).** Prerequisite: ANSC 3301 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).** An advanced study of equine anatomy, reproductive physiology, nutrition, disease, and management. S. (Writing Intensive)
- 4403. Beef Production (4).** Prerequisite: ANSC 3301. 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).** Introduction to manufactured meat products and muscle ingredients, processing technologies, storage conditions, and stability of cured muscle foods. F.
- 4405. Beef Cattle Stocker and Feedlot Management(3).** Prerequisite: ANSC 3301. Stocker and feedlot cattle production with focus on management, procurement and marketing, animal health and nutrition. Field trips to feedlots. F
- 4406. Sheep and Goat Production (4).** Prerequisite: ANSC 3301. Sheep, goat, wool, and mohair production management and marketing practices. Field trips to ranches and feedlots. S. (Writing Intensive)

B.S. in Animal Science: Meat Science Business Option

FIRST YEAR

Fall		Spring	
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3
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
CHEM 1305, Chemical Basics	3	CHEM 1306, Chemistry That Matters	3
CHEM 1105, Experimental Chem. Basics	1	CHEM 1106, Chem. Experi. That Matter	1
		MATH 2300, Statistical Methods	3
TOTAL	14	TOTAL	16

SECOND YEAR

Fall		Spring	
POLS 1301, American Govt., Org.	3	ANSC 2306, Physiology of Dom. Animals	3
ANSC 2202, Anat. of Domestic Animals	2	HIST 2300, History of U.S. to 1877	3
ENGL 2311, Technical Writing	3	ANSC 3316, Animal Growth & Devel.	3
or ACOM 2302, Scientific Comm.		COMS 2300, Public Speaking	3
CHEM 2303, Introductory Organic Chem.	3	BA 3302, Fin. & Managerial Acctg.†	3
CHEM 2103, Exper. Intro. Organic Chem.	1		
FDSC 2300, Principles of Food Tech.	3		
TOTAL	15	TOTAL	15

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 3100, Animal Science Seminar	1
ANSC 3402, Animal Genetics	4	FDSC 3309, Food Safety	3
POLS 2302, American Public Policy	3	or FDSC 3303, Food Sanitation	3
		BLAW 3391, Business Law†	3
		ANSC 3403, Sel./Care/Proc./Cook. Meats	4
TOTAL	14	TOTAL	14

FOURTH YEAR

Fall		Spring	
Production Elective†	4	BA 3304, Operations Management‡	3
ANSC 4400, Meat Sci. & Muscle Biol.	4	or AAEC 3304, Farm & Ranch Mgmt.	
ANSC 4404, Processed & Cured Meats	4	BA 3305, Organization Management‡	3
IB 3105, Cross-Cultural Mgmt. Skills‡	1	Approved Electives§	3
Creative Arts/Multicultural*	3	Production Elective†	4
		Lang., Phil., & Culture/Multicultural*	3
TOTAL	16	TOTAL	16

TOTAL HOURS: 120

* Choose from core curriculum requirements.

† Select from ANSC 4401, 4403, 4406, or 4407.

‡ BA courses require 2.75 GPA.

§ Select 3 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, 3303, 3304, 3309, 4304, 4305, 4306; PSS 2432, 3321, 3322, 4421; NRM 3303; PFP 2310, 2370, 3301; FIN 3321.

4407. **Poultry Production (4)**. Prerequisite: ANSC 3301. 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 (non-thesis) 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)**. 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)**. Combination of lecture presentations and student analysis of behavior in science to explore aspects of scientific integrity and conduct. S, even years.
5219. **Advanced Studies in Equine Behavior and Dynamics (2)**. Advanced study of equine behavior, psychology, and herd dynamics. SS.
5301. **Advanced Equine-Assisted Mental Health (3)**. Advanced study of equine-assisted mental health as a therapeutic intervention utilizing horses to address behavioral, relational, and emotional issues for clients. S.
5302. **Advanced Beef Production (3)**. Advanced study of beef production and management. Emphasis on the application of current research to improve the efficiency of beef production. SS, even years.

B.S. in Animal Science: Production Option

FIRST YEAR

Fall		Spring	
ANSC 1401, General Animal Science	4	AAEC 2305, Fund. Ag. Appl. Economics	3
CHEM 1305, Chemical Basics	3	CHEM 1306, Chemistry That Matters	3
CHEM 1105, Experimental Chem. Basics	1	CHEM 1106, Chem. Experi. That Matter	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
		MATH 1321 or 2300	3
TOTAL	14	TOTAL	16

SECOND YEAR

Fall		Spring	
FDSC 2300, Principles of Food Tech.	3	ANSC 2306, Physiology of Dom. Animals	3
POLS 1301, American Govt., Org.	3	HIST 2300, History of U.S. to 1877	3
ENGL 2311, Technical Writing	3	ANSC 3306, Animal Diseases	3
or ACOM 2302, Scientific Comm. in Ag.		POLS 2302, American Public Policy	3
CHEM 2303 Introductory Organic Chem.	3	Creative Arts/Multicultural*	3
CHEM 2103, Exper. Intro. Organic Chem.	1		
ANSC 2202, Anatomy of Dom. Animals	2		
TOTAL	15	TOTAL	15

THIRD YEAR

Fall		Spring	
ANSC 3401, Reproductive Physiology	4	HIST 2301, History of U.S. Since 1877	3
ANSC 3301, Principles Nutrition	3	ANSC 3316, Animal Growth & Devel.	3
Lang., Phil., & Culture/Multicultural*	3	ANSC 3307, Feeds & Feeding	3
COMS 2300, Public Speaking	3	ANSC 3403, Sel./Care/Proc./Cook. Meats	4
ANSC 3402, Animal Genetics	4		
TOTAL	17	TOTAL	13

FOURTH YEAR

Fall		Spring	
Production Elective	4	Production Electives	8
ANSC 3100, Animal Science Seminar	1	Electives	8
Approved Electives†	6		
FDSC 3303 or 3309	3		
TOTAL	14	TOTAL	16

TOTAL HOURS: 120

* Choose from core curriculum requirements.

† Select 6 hours from the following: ANSC 2201, 2302, 2303, 2304, 3202, 3203, 3204, 3205, 3303, 3308, 3309, 4000, 4001, 4202, 4301, 4302, 4303, 4305, 4306, 4309, 4310; AAEC 3301, 3302, 3303, 3304, 3305, 3401, 4304, 4317; PSS 2432, 3321, 4421; or NRM 3303.

5303. **Advanced Beef Cattle Feedyard Management (3)**. 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)**. A study of differentiation, development, growth, and fattening of domestic animals and hereditary and environmental influences and interactions. S.
5305. **Advanced Therapeutic Riding (3)**. Advanced skills and theories of therapeutic riding, including lesson plan development, advanced knowledge of disabilities, and groundwork for instructor certification. F.
5306. **Advanced Animal Breeding (3)**. 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)**. Prerequisite: ANSC 5403 or equivalent. Computer programming, data inputs, and interpretation. Covers examples that relate to experimental designs in agricultural research. SSI.
5308. **Minerals and Vitamins in Animal Nutrition (3)**. An in-depth study of vitamin and mineral chemistry, metabolism, interrelationships, and requirements for production. SS.
5309. **Advanced Topics in Reproduction (3)**. A review of current literature and demonstrated techniques of the current procedures being used in assisted reproduction. S, odd years.
5311. **Ruminant Nutrition (3)**. 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)**. Advanced study of sheep and goat production and management. Application of research in genetics, reproduction, nutrition, health, management, wool, mohair, and marketing. S.

B.S. in Animal Science: Science Option**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
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, Exper. Principles of Chem. I	1	CHEM 1108, Exper. Principles of Chem. II	1
ENGL 1301, Essentials of Coll.	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1321, Trigonometry	3	ANSC 2301, Livestock & Meat Eval. I	3
		MATH 2300, Statistical Methods	3
TOTAL	14	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
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, Scientific Comm. in Ag.		CHEM 3106, Organic Chemistry Lab II	1
CHEM 3305, Organic Chemistry I	3	Lang., Phil., & Culture/Multicultural*	3
CHEM 3105, Experimental Org. Chem. I	1	ANSC 2306, Physiology of Dom. Animals	3
ANSC 2202, Anatomy of Dom. Animals	2		
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ANSC 3401, Reproductive Physiology	4	HIST 2301, History of U.S. Since 1877	3
ANSC 3301, Principles of Nutrition	3	FDSC 2300, Principles of Food Tech.	3
COMS 2300, Public Speaking	3	ANSC 3307, Feeds & Feeding	3
ANSC 3402, Animal Genetics	4	ANSC 3403, Sel./Care/Proc./Cook. Meats	4
Creative Arts/Multicultural*	3	ANSC 3100, Animal Science Seminar	1
TOTAL	17	TOTAL	14

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Production Elective	4	Production Electives	8
MBIO 3401, Principles of Microbiology	4	Electives	6
Approved Electives†	5		
TOTAL	13	TOTAL	14

TOTAL HOURS: 120

* Choose from core curriculum requirements.

† Select 5-6 hours from the following: ANSC 3306, 3309, 4000, 4201, 4202, 4203, 4301, 4303, 4305; AGSC 2300; PSS 2432; MBIO 3400, 3401; BIOL 1401, 3302, 3420; ZOO 2405, 3401, 4304, 4306, 4312, 4409; PHYS 1403, 1404; CHEM 3310, 3311, 3312, 3402; plus other approved courses.

5313. **Nutritional Biochemistry in Animals (3).** Nutrient metabolism and regulation in animals. Course integrates metabolic pathways with nutrition and physiology. S.
5314. **Animal Protein and Energy Utilization (3).** 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).** Prerequisite: Consent of instructor. Course will address current research on hypothalamic-pituitary regulation of physiological systems including reproduction, growth, immune function, digestion, and behavior.
5316. **Muscle Chemistry, Ultrastructure, and Physiology (3).** A study of muscle structure, composition, growth mechanisms of contraction, and rigor as related to livestock. S, odd years.
5318. **Topics in Animal Stress, Welfare, and Behavior (3).** 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.
5400. **Advanced Meat Science and Muscle Biology (4).** 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. SS.
5401. **Experimental Techniques in Meat Chemistry and Muscle Biology (4).** Histological, chemical, and biological properties of meat. Experimental techniques in meat science and muscle biology will be studied in lecture and individual lab study.
5402. **Advanced Horse Production (4).** An advanced study of equine science, including health, lameness, disease, genetics, reproductive physiology, nutrition, and research topics within the equine industry.
5403. **Biometry (4).** 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.

Pre-Veterinary 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>	
CHEM 1307, Principles of Chem. I	3	CHEM 1308, Principles of Chem. II	3
CHEM 1107, Experim. Prin. of Chem. I	1	CHEM 1108, Exper. Principles of Chem. II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1321, Trigonometry	3	MATH 2300, Statistical Methods	3
ANSC 1401, General Animal Science	4	COMS 2300, Public Speaking	3
TOTAL	14	TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3305, Organic Chemistry I	3	CHEM 3306, Organic Chemistry	3
CHEM 3105, Experimental Org. Chem. 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	PSY 1300, General Psychology	3
POLS 1301, American Govt. Org.	3	CHEM 3314, Biological Chemistry	3
TOTAL	13	TOTAL	16

5404. **Physiology of Reproduction (4).** 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).** Advanced application of scientific principles and practices to manufactured meat products. Interrelationships among muscle ingredients, processing technologies, storage conditions, and stability of cured muscle foods. S, even.
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)**Undergraduate Courses**

2300. **[AGRI 1329] Principles of Food Technology (3).** Basic information necessary to understand technological aspects of modern industrial food supply systems. A fundamental background in food classification, modern processing, and quality control. F, S, SS.
2302. **Elementary Analysis of Foods (3).** Basic laboratory practice in food product testing. Should have had a course in chemistry or other lab science. S.
3100. **Food Science Seminar (1).** Information to prepare students to function in a competitive work environment or professional/graduate school. F, S.
3301. **Food Microbiology (3).** Prerequisite: MBIO 3400 or 3401 or consent of instructor. Study of method for preservation of food with respect to control of microbiological growth and activity. S, even years. (Writing Intensive)
3302. **Advanced Food Analysis (3).** Prerequisites: 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).** Principles of sanitation in food processing and food service applications. Chemical, physical, and micro-

biological basis of sanitation. Equipment and food product care. F, S, and SSII.

3304. **Fruit and Vegetable Processing (3)**. Practice in preserving fruits and vegetables. Suitable for nonmajors. F.
3305. **Principles of Food Engineering (3)**. Prerequisites: MATH 1320 and 1321 or higher-level math. 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)**. Food safety and sanitation in food manufacturing and/or processing. Topics include FDA and USDA regulations, HACCP principles, and good manufacturing practices. F.
4001. **Food Science Problems (V1-6)**. Taught on an individual basis. May be repeated for credit with permission. F, S, SS.
4303. **Food Chemistry (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. (Writing Intensive) F, odd years.
4304. **Field Studies in Food Processing and Handling (3)**. Visits to food processing and handling facilities and discussions of operations. F.
4306. **Dairy Products Manufacturing (3)**. Physical and chemical characteristics of milk and milk products. Principles involved in processing dairy foods. S.
4307. **Poultry Processing and Products (3)**. Poultry meat and egg processing including functional properties, meat quality, and value-added products.

Graduate Courses

5210. **Grant Writing (2)**. 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)**. 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)**. Application of chemical, chromatographic, and spectroscopic methods in analysis of agricultural products. F, even years.
5303. **Study in Food Chemistry (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)**. 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.
5307. **Topics in Food Science (3)**. 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)**. 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)**. 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.
5311. **Modeling Transport in Food and Biomaterials (3)**. Modeling of transport processes for food and biomaterials using finite element method and commercial software. F.
6000. **Master's Thesis (V1-12)**.
6001. **Supervised Teaching (V1-3)**. Supervised teaching experience at the university level.

Department of Landscape Architecture

Charles Klein, Ph.D., Interim Chairperson

Professor: Kvashny

Associate Professors: Billing, Klein, Mills

Assistant Professors: Luo, Park

Instructors: Casanova, Nelson

CONTACT INFORMATION: 150 Plant Science Building, Box 42121, Lubbock, TX 79409-2121, T 806.834.4693, F 806.742.0770, www.larc.ttu.edu

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 CASNR annex.

Minor. A minor in landscape studies consists of 9 hours of required courses (LARC 1302, 2302, 4302) and 9 hours of directed electives (from LARC 2401, 2402, 2404, 3401, 4100, 4311). Approval of department chair is required for enrollment, and a grade of C or better is required for each course counted toward a minor.

Course Descriptions

(To interpret course descriptions, see page 23.)

Landscape Architecture (LARC)

Undergraduate Courses

1302. **Introduction to Landscape Architecture (3)**. 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. Fulfills core Creative Arts requirement (pending THECB approval).
1401. **Landscape Architecture Drawing and Drafting (4)**. Introduction to drafting equipment, drafting and drawing. Construction of one-point and two-point perspective, shade and shadow, elements of visual composition. F.
1402. **Landscape Architecture Graphics (4)**. Prerequisites: 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)**. Prerequisite: LARC 2401. Introduction to professional portfolio development for landscape architecture and preparation of each individual portfolio for faculty review. S.
2302. **History of Landscape Architecture (3)**. History of landscape architectural design as expression of culture and society's relationship to nature. Geographical, historical, and cultural

Graduate Program

For information on graduate programs offered by the Department of Landscape Architecture, visit the Graduate School section of the catalog on page 118.

context of major movements in landscape architecture. Fulfills core Language, Philosophy, and Culture requirements. F.

- 2308. Computer-Aided Design in Landscape Architecture (3).** Prerequisites: 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 Graphics in Landscape Architecture (3).** Prerequisites: LARC 2308, LA majors only. Exploration of contemporary applications of three dimensional modeling and computer rendering in the profession of landscape architecture. S.
- 2401. Basic Design in Landscape Architecture (4).** 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).** Prerequisites: LARC 1402, 2401 and PSS 2330. A continuation of basic design with emphasis on site inventory, analysis, and programming in relationship to the design process. S.
- 2404. Landscape Architecture Grading and Drainage (4).** Prerequisite: ARC 2402. Introduction to site layout, grading and drainage, earthwork and runoff computations, and site implementation drawing techniques. F.
- 3401. Landscape Architecture Site Design (4).** Prerequisites: LARC 2100 and 2402. Site analysis and design as they apply to projects of various scale, scope, and resolution. F.
- 3402. Master Planning (4).** Prerequisites: LARC 3401 and LARC 2404. Comprehensive design problems integrating aspects of site design, planting design and construction. S.
- 3403. Planting Design (4).** Prerequisites: 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).** Prerequisite: LARC 2404. Complex grading and drainage, drainage structures, horizontal and vertical circulation alignment in large scale site development. S.
- 4000. Internship (VI-6).** Minimum 8 weeks, prior departmental approval, and must be completed for graduation.
- 4001. Landscape Architecture Problems (VI-4).** An investigation of a problem in the profession of special interest to the student. Open to all advanced students.
- 4100. Seminar (1).** Prerequisite: Senior standing. Assigned readings, informal discussions, oral reports, and papers. F.
- 4101. Proposal Writing in Landscape Architecture (1).** Prerequisites: 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).** Prerequisites: 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).** Prerequisite: Fifth-year standing. Methods, procedures, and ethics of professional practice of landscape architecture. F.
- 4401. Urban Design (4).** Prerequisites: LARC 3402, 3403, 3404; 2.5 GPA. Public urban spaces and their surrounding built edges. Organization, form, and character of streets, parks, and plazas. F.
- 4402. Regional Planning and Design (4).** Prerequisites: LARC 2309, 4401; GEOG 3300; 2.5 GPA. Regional landscape planning and design in landscape architecture based on natural and cultural resource factors. S.
- 4404. Landscape Architecture Materials and Details (4).** Prerequisite: LARC 3404. Introduction of landscape architecture construction

Bachelor of Landscape Architecture

FIRST YEAR

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1320, College Algebra	3	MATH 1321, Trigonometry	3
HIST 2300, History of U.S. to 1877	3	BIOL 1305, Ecological & Environ. Probl.	3
LARC 1401, Land. Arch. Drawing & Drafting	4	BIOL 1113, Environ. Problems Lab.	1
LARC 1302, Intro. to Landscape Arch.	3	LARC 1402, Landscape Arch. Graphics	4
TOTAL	16	TOTAL	14

SECOND YEAR

Fall		Spring	
HIST 2301, U.S. History Since 1877	3	PSS 1411, Principles of Horticulture	4
CONE 2302, Surveying	3	LARC 2402, Land. Arch. Design Process	4
PSS 2330, Urban Soils	3	LARC, 2100, Land. Arch. Portfolio Prep.	1
LARC 2401, Basic Design in Land. Arch.	4	AAEC 2305, Fund. Ag. Appl. Econ. or Ind. or Group Behavior	3
LARC 2308, CAD in Landscape Arch.	3	LARC 2309, Adv. Comp. Graph. in Land. Arch	3
TOTAL	16	TOTAL	15

THIRD YEAR

Fall		Spring	
LARC 2302, Development of Land. Arch.	3	ENGL 2311, Technical Writing	3
PSS 3318, Woody Plants	3	LARC 3402, Master Planning	4
LARC 3401, Land. Arch. Site Design	4	LARC 3403, Planting Design	4
LARC 2404, Land. Arch. Grading & Drain.	4	LARC 3404, Land. Arch. 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, Land. Arch. Mat. & Details	4	Directed Electives	3
LARC 4302, Environmental Planning	3	LARC 4100, Seminar	1
		Creative Arts*/Multicultural	3
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, Land. Arch. Senior Project	5
LARC 4506, Collaboration Studio	5	Directed Electives	6
LARC 4311, Professional Practice	3		
LARC 4101, Proposal Writ. in Land. Arch.	1		
TOTAL	16	TOTAL	14

TOTAL HOURS: 148

* Choose from core curriculum list.

LARC 2302 fulfills the university multicultural and Language, Philosophy and Culture requirements.

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.

systems, materials, irrigation, retaining walls, lighting, structures, joining of materials, and implementation drawings. F.

- 4506. Collaboration Studio (5).** Prerequisites: LARC 2309 and 4402; 2.5 GPA. 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).** Prerequisites: LARC 4506 and 4101; 2.5 GPA. 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 (VI-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).** 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).** An introduction to environmental planning issues with

- emphasis on the integration of related disciplines to attain environmentally and socially sustainable development. F.
- 5304. Introduction to Natural Resources and Design (3).** 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).** 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).** Prerequisite: LARC 5308. Advanced application of CAD in landscape architecture. S.
- 5310. History of Landscape Architecture (3).** 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).** 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).** Introduction to site grading and drainage, earthwork and runoff computations and site implementation drawing techniques. F.
- 5315. Landscape Architecture Site Construction and Development (3).** 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).** 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).** An accelerated course emphasizing professional drafting and graphics, design principles and theory and the introduction of site analysis. F.
- 5402. Site Design (4).** Prerequisites: 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).** 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).** 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).** Introduction to the research process and methods used in the design-planning field. F.
- 6302. Administrative Aspects of Landscape Architecture (3).** The methods, procedures, and organizational structure of professional practice in landscape architecture. F.
- 6306. Special Problems (3).** 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).** Prerequisites: LARC 5402, 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).** Prerequisites: LARC 5308, 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).** Prerequisites: LARC 5308, 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).**



Photo credit: Zack Brame/Student Media

Department of Natural Resources Management

Mark C. Wallace, Ph.D., Chairperson

Bricker Endowed Chair in Wildlife Management: Conway
Burnett Foundation Professorship in Quail Ecology: Dabbert
Kleberg Professor of Wildlife Management: Gipson
Professors: Boal, Conway, McLendon, Patino, Perry, Wallace
Associate Professors: Cox, Farmer, Griffis-Kyle, Stevens, Villalobos
Assistant Professors: Barnes, Grabowski, Grisham, Kahl, Pease, Portillo-Quintero, Verble-Pearson
Adjunct Faculty: Alcumbrac, Arnett, Arsuffi, Baccus, Breck, Brewer, Coldren, DeMaso, Drawe, Haukos, Kamler, Krausman, LeVering, Peterson, Pope, Rhodes, Rideout-Hanzak, Wester

CONTACT INFORMATION: 102 Goddard Building, Box 42125, Lubbock, TX 79409-2125, T 806.742.2841, F 806.742.2280, www.nrm.ttu.edu

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Conservation Law Enforcement
- Bachelor of Science in Natural Resources Management
- Master of Science in Wildlife, Aquatic, and Wildlands Science and Management
- Professional Science Master's in Environmental Sustainability and Natural Resources Management
- Doctor of Philosophy in Wildlife, Aquatic, and Wildlands Science and Management

Undergraduate Program

The Department of Natural Resources Management is primarily concerned with the application of basic ecological principles to the management and use of natural resources. The curriculum for natural resources management prepares students for graduate school. The range management and wildlife biology tracks meet the Civil Service or certification requirements for positions as range conservationists or wildlife biologists for agencies such as the U.S. Fish and Wildlife Service, Natural Resource Conservation Service, Forest Service, and Bureau of Land Management.

Bachelor of Science in Natural Resources Management

Students pursuing a B.S. in Natural Resources Management must make a C or better in departmental courses to be eligible for graduation. The degree has five tracks (see curriculum tables, pages 179-181): (1) ranch management, (2) wildlife biology, (3) fisheries biology, (4) range conservation, and (5) conservation science. The wildlife biology track can meet the minimum requirements recommended by the Wildlife Society for wildlife biologist certification, and the fisheries biology track can meet the minimum certification requirements recommended by the American Fisheries Society for a fisheries professional. The range conservation track meets the accreditation standards of the Society for Range Management.

Bachelor of Science in Conservation Law Enforcement

Students seeking the 120-hour B.S. in Conservation Law Enforcement must first obtain an Associate of Arts in Criminal Justice from an approved institution. Designed to prepare students for careers as game wardens or similar positions, this degree requires 60 hours of coursework at Texas Tech University in addition to the initial 60 hours transferred from an approved collaborating institution.

Minor. This department offers a minor in natural resources 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.

Club Involvement. Students are encouraged to become actively involved in the clubs sponsored by the Natural Resources Management Department: Range, Wildlife, and Fisheries Club; Student Association for Fire Ecology; and the Texas Tech Chapter of The Society for Conservation Biology. 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.

Graduate Program

For information on graduate programs offered by the Department of Landscape Architecture, visit the Graduate School section of the catalog on page 119.

Course Descriptions

(To interpret course descriptions, see page 23.)

Natural Resources Management (NRM)

Undergraduate Courses

- 1300. Environmental Science as a Social Pursuit (3).** Application of scientific methods to global and environmental issues. Explores the impact of culture and science on core natural resources such as food and clean air. Fulfills core Social and Behavioral Sciences requirement F, S, SS.
- 1401. Introduction to Natural Resources Management (4).** Observe, describe, and understand phenomena in the natural world. Examines the roles of natural and social science in understanding interactions among humans and natural resources. Partially fulfills core Life and Physical Sciences requirement. F, S, SS.
- 2301. [AGRI 2330] Introductory Wildlife (3).** Introduction to the ecology and management of wildlife populations. Stresses principles, life histories, and management techniques. F, S.
- 2302. The Ecology and Conservation of Natural Resources (3).** An introduction to the ecology and conservation of renewable natural resources of native lands, including their multiple use for timber, water, range, recreation, and wildlife. F, S, SS, Distance.
- 2305. Introduction to Freshwater Ecology and Fisheries (3).** Survey and management of freshwater habitats: types of organisms, adaptations, and ecological interactions; and effects of solar radiation, temperature, currents, dissolved gases, chemicals, and pollution. F, S, SS.
- 2307. Diversity of Life (3).** Principles of evolution, genetics, and biodiversity as related to conservation and management of natural resources at scales ranging from genes to the biosphere. S, SS.
- 2406. Wildlife Anatomy and Physiology (4).** A systematic study of the body systems of wild animals emphasizing functional anatomy and physiology and their ecological implications. F.
- 3302. Range Plant Ecology (3).** The basic principles of autecology and synecology and their relationship to management of the range ecosystem. F.
- 3303. Range Management Principles and Practices (3).** Prerequisite: Sophomore standing. A general course in the principles and practices of range management designed for nonrange majors

B.S. in Conservation Law Enforcement

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
NRM 1401, Intro. Natural Res. Mgmt.	4	NRM Electives*	6
NRM 1300, Env. Sci. as Social Pursuit	3	Advanced Biology†	4
NRM 2305, Intro. Freshwater Ecol. & Fish.	3	NRM 4311, Wildlife Law	3
NRM 3402, Rng/Forest/Wet/Plant Ident	4	NRM 4000, Internship	3
TOTAL	14	TOTAL	16

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
NRM Electives*	3	Advanced NRM Electives‡	7
Advanced NRM Electives†	6	NRM 3407, Vegetation & Wildlife Inv.	4
Advanced Biology†	4	NRM 4315, Spatial Analysis in NRM	3
NRM 4320, Natural Resource Policy	3	or GEOG 3300, Geographic Info Syst.	
TOTAL	16	TOTAL	14

Years 3 and 4 represent additional 60 credits to be taken at Texas Tech. When combined with 60 hours transferred from an approved institution, the total required number of hours is 120. Students must be advised by the program coordinator before starting the program at Texas Tech.

* Choose 9 hours from NRM 2406 (F, S), 3303 (F, S), 3304 (S), 3307 (S), 4309 (F), 4335 (S even), 4408 (S).

† Choose 8 hours from Z00L 4406, 4408, 4410. Z00L 4406 and 4408 are also offered in the summer at Texas Tech Center at Junction.

‡ Choose 13 hours from NRM 3323 (S), 4305 (S even), 4306 (S odd), 4310 (F even), 4322 (S even); ENTX 4301, 4325.

who plan to enter the ranching industry. Field trips required. Not open to range or wildlife majors. F, S, SS.

- 3304. Principles of Range Management (3).** Prerequisite: C or better in NRM 3402. 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).** A survey of the theory and practices of conservation biology. Emphasis is placed on methods used to maintain plant and animal biodiversity. S.
- 3308. Quantitative Methods in Natural Resources (3).** Prerequisite: MATH 1330. Survey of quantitative and statistical methods used in natural resource management, conservation biology, and in assessing biodiversity.
- 3309. Restoration Ecology (3).** Case studies, literature, and hands-on experience illustrate the theory and practice of ecological restoration, including plants and animals. S, even years.
- 3323. Prescribed Burning (3).** Prerequisite: C or better in NRM 3402. Planning, implementing and evaluating prescribed fires. S.
- 3325. Integrated Natural Resources Management Skills (3).** Prerequisite: C or better in NRM 1300 or 1401. Develops skills in the generation and dissemination of scientific information to scientists, policy makers, and society. (Writing Intensive) F, SS.
- 3333. Pond Fish Management (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).** Prerequisite: C or better in BIOL 1401 and 1402; one semester of organic chemistry. Covers aspects of physiological processes, morphological development, and nutritional qualities in vascular plants. (BOT 3401)
- 3402. Range, Forest, Wetland Plants, and Plant Identification (4).** Native and naturalized forage plants of the U.S.; identification, distribution, ecology, plant communities, and economic value are stressed. F, SS.
- 3407. Vegetation and Wildlife Inventory and Analysis Techniques (4).** Prerequisite: Sophomore standing; C or better in NRM 1300 or 1401. Techniques for sampling and analyzing rangeland vegetation and wildlife habitats and populations. F.
- 4000. Internship (V1-12).** Prerequisite: Instructor consent.
- 4001. Undergraduate Research (V1-12).** Prerequisite: Instructor consent. Selected research problems according to the needs of the student. May be repeated.
- 4100. Seminar (1).** An organized discussion of current problems and research in natural resources management. May be repeated.

B.S. in Natural Resources Management CONSERVATION SCIENCE TRACK

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
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
BIOL 1401, Biology of Plants	4	BIOL 1402, Biology of Animals	4
NRM 1300, Env. Sci. as Social Pursuit	3	NRM 1401, Intro. Natural Res. Mgmt.	4
or NRM 2305, Intro. Freshwater Ecol.		HIST 2300, History of U.S. to 1877	3
POLS 1301, American Govt., Org	3		
TOTAL	16	TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
NRM 3407, Vegetation & Wildlife Inv.	4	CHEM 1307, Principles of Chem. I	3
NRM 3325, Integrated NRM Skills	3	CHEM 1107, Exper. Prin. of Chem. I	1
NRM 3402, Rng/Forest/Wet/Plant Ident	4	NRM 2307, Diversity of Life	3
AAEC 2305, Fund. of Ag. & Appl. Eco.	3	NRM 3308, Quantitative Methods in NR	3
or ECO 2301, Principles of Economics I		NRM 3307, Prin. Conservation Science	3
		Directed Elective‡	3
TOTAL	14	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 1308, Principles of Chem. II	3	Directed Physical Science Course†	4
CHEM 1108, Exper. Prin. of Chem. II	1	Creative Arts**	3
NRM 3302, Range Plant Ecology	3	Directed Elective§	10
Directed Physical Science Course†	4		
COMS 2300, Public Speaking	3		
Directed Elective‡	3		
TOTAL	14	TOTAL	17

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
HIST 2301, History of U.S. Since 1877	3	POLS 2302, American Public Policy	3
NRM 4314, Watershed Planning	3	Lang., Phil., & Culture/Multicultural*	3
NRM 4000, Internship	3	Directed Elective‡	3
Directed Elective‡	3	Directed Elective‡	3
Directed Elective‡	3	Directed Elective‡	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 124

* MATH 1451 may be substituted.

† Students will choose two courses from CHEM 2303 and 2103; ATMO 1300 and 1100; GEOG 1401; PSS 2432; PHYS 1403.

‡ Select one course from NRM 4324, LARC 4001, GEOG 4302, BIOL 4301, AAEC 4302, Z00L 4312.

Select one course from BIOL 4301; BOT 3404; PSS 2401; Z00L 3406, or 4406, or 4407, or 4408, or 4410.

Select one course from NRM 3304 or 4309 or 4335.

Select one course from NRM 4320 or AAEC 4309.

Select one course from NRM 4315 or GEOG 3300.

Select one course from NRM 4304, or 4401, or 4408.

§ 10 hours from 3000- or 4000-level NRM courses.

MATH 1550 may be substituted.

** Choose from core curriculum requirements.

- 4301. Problems (3).** Prerequisite: Instructor consent. Individual investigation of an assigned problem in range, wildlife, and fisheries management. Emphasis placed on the theory, methods, and practice of range, wildlife, or fisheries field work.
- 4302. Range Improvements (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. S, odd years.
- 4303. Rangeland Analysis and Management Planning (3).** Prerequisite: C or better in NRM 3304 or NRM 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)

**B.S. in Natural Resources Management
RANCH 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 [†]	3	MATH 1331, Intro. Math. Analysis II**	3
BIOL 1401, Biology of Plants	4	BIOL 1402, Biology of Animals	4
NRM 1300, Env. Sci. as Social Pursuit	3	NRM 1401, Intro. Natural Res. Mgmt.	4
or NRM 2305, Intro. Freshwater Ecol.		HIST 2300, History of U.S. to 1877	3
POLS 1301, American Govt., Org	3		
TOTAL	16	TOTAL	17
SECOND YEAR			
Fall		Spring	
NRM 3407, Vegetation & Wildlife Inv.	4	CHEM 1307, Principles of Chem. I	3
NRM 3325, Integrated NRM Skills	3	CHEM 1107, Exper. Prin. of Chem. I	1
NRM 3402, Rng/Forest/Wet/Plant Ident	4	NRM 2307, Diversity of Life	3
AAEC 2305, Fund. of Ag. & Appl. Eco.	3	NRM 3308, Quantitative. Methods in NR	3
or ECO 2301, Principles of Economics I		NRM 3304, Principles of Range Mgmt.	3
		ANSC 1401, General Animal Science	4
TOTAL	14	TOTAL	17
THIRD YEAR			
Fall		Spring	
CHEM 1308, Principles of Chem. II	3	PSS 2432, Prin. & Practice in Soils	4
CHEM 1108, Exper. Prin. of Chem. II	1	Creative Arts*	3
NRM 3302, Range Plant Ecology	3	NRM 3323, Prescribed Burning	3
Directed Physical Science Course [†]	4	HIST 2301, History of U.S. Since 1877	3
COMS 2300, Public Speaking	3	NRM 4303, Rangeland Anal. & Mgmt.	3
TOTAL	14	TOTAL	16
FOURTH YEAR			
Fall		Spring	
NRM 4302, Range Improvements	3	POLS 2302, American Public Policy	3
AAEC 3302, Agribusiness Finance	3	Lang., Phil., & Culture/Multicultural*	3
AAEC 3304, Farm & Ranch Bus. Mgmt.	3	ANSC 3305, Applied Animal Nutrition	3
Directed Elective [‡]	3	ANSC 3306, Animal Diseases	3
ACCT 2300, Financial Accounting [§]	3	ACCT 2301, Managerial Accounting [§]	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 124

* Choose from core curriculum requirements.

† Students will choose one course from CHEM 2303 and 2103, ATMO 1300 and 1100, GEOL 1303 and 1101, or GEOG 1401.

‡ Select one course from NRM 4305, 4306, 4309; or 3000-4000-level ANSC course.

§ Course requires 2.75 GPA.

MATH 1550 may be substituted.

** MATH 1451 may be substituted.

**B.S. in Natural Resources Management
RANGE CONSERVATION TRACK**

FIRST YEAR			
Fall		Spring	
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
BIOL 1401, Biology of Plants	4	BIOL 1402, Biology of Animals	4
NRM 1300, Env. Sci. as Social Pursuit	3	NRM 1401, Intro. Natural Res. Mgmt.	4
or NRM 2305, Intro. Freshwater Ecol.		HIST 2300, History of U.S. to 1877	3
POLS 1301, American Govt., Org	3		
TOTAL	16	TOTAL	17
SECOND YEAR			
Fall		Spring	
NRM 3407, Vegetation & Wildlife Inv.	4	CHEM 1307, Principles of Chem. I	3
NRM 3325, Integrated NRM Skills	3	CHEM 1107, Exper. Prin. of Chem. I	1
NRM 3402, Rng/Forest/Wet/Plant Ident	4	NRM 2307, Diversity of Life	3
AAEC 2305, Fund. of Ag. & Appl. Eco.	3	NRM 3308, Quantitative Methods in NR	3
or ECO 2301, Principles of Economics I		NRM 3304, Principles of Range Mgmt.	3
		NRM 3401, Plant Physiology	4
TOTAL	14	TOTAL	17
THIRD YEAR			
Fall		Spring	
CHEM 1308, Principles of Chem. II	3	Directed Physical Science Course [†]	4
CHEM 1108, Exper. Prin. of Chem. II	1	Creative Arts*	3
NRM 3302, Range Plant Ecology	3	PSS 3321, Forage and Pasture Crops	3
Directed Physical Science Course [†]	4	HIST 2301, History of U.S. Since 1877	3
COMS 2300, Public Speaking	3	NRM 4303, Rangeland Anal. & Mgmt.	3
TOTAL	14	TOTAL	16
FOURTH YEAR			
Fall		Spring	
NRM 4302, Range Improvements	3	POLS 2302, American Public Policy	3
NRM 4304, Fire Ecology & Management	3	Lang., Phil., & Culture/Multicultural*	3
NRM 4309, Range-Wildlife Hab. Mgmt.	3	ANSC 4403, Beef Production	4
PSS 4332, Soil Classification	3	or ANSC 4406, Sheep & Goat Prod.	
ANSC 3301, Principles of Nutrition	3	NRM 4314, Watershed Planning	3
		Directed Elective [‡]	2
TOTAL	15	TOTAL	15

TOTAL HOURS: 124

* Choose from core curriculum requirements.

† Students will choose two courses from CHEM 2303 and 2103, PSS 2432.

‡ 2 hours from 3000- or 4000-level NRM courses.

§ MATH 1550 may be substituted.

MATH 1451 may be substituted.

- 4304. Fire Ecology and Management (3).** Prerequisite: C or better in NRM 3402. 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).** 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).** Prerequisites: ZOOL 4408 and C or better in NRM 1401, or instructor consent. Ecological approach to the management of upland game populations. Stresses population mechanisms and habitat management of selected species. Field trips required. S, odd years, SS.
- 4309. Range-Wildlife Habitat Management (3).** Prerequisite: C or better in NRM 3304 and 3402, or instructor consent. A study of wildlife habitats based on major vegetation types and the management problems involved. Emphasis on how other resource demands can be integrated with wildlife. Field trips required. F (Writing Intensive)
- 4310. Principles of Waterfowl Management (3).** Prerequisite: C or better in NRM 1300. Ecology and management of continental waterfowl resources. Life histories, population management, and habitat manipulation are stressed. Field trips required. F, even years.
- 4311. Wildlife Law (3).** Prerequisite: C or better in NRM 1300 or 1401. Imparts understanding of the laws regulating the recre-

ational and commercial uses of wildlife. Includes their history and purposes. Available only during Intersession.

- 4314. Watershed Planning (3).** The watershed as a unit of resource-oriented planning and development. Principles and objectives of watershed management. Physical description of watershed. Relationship between land-use conditions and the water delivery character of watersheds. Watershed analysis, including techniques, collection of field data, and sources of information. F, S.
- 4315. Spatial Analysis in Natural Resource Management (3).** 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).** Prerequisite: C or better in NRM 1300. 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).** Prerequisite: C or better in NRM 1401. Ecological approach to nongame wildlife population management. Public policies, socioeconomic factors, population dynamics, and species-at-risk issues are examined.
- 4324. Tropical Ecology and Conservation (3).** An introductory survey of tropical ecology and conservation covering both theory and practice. Previous ecology course, instructor consent, and field trips are required. SS.
- 4330. Aquaculture (3).** Prerequisite: BIOL 1404 and CHEM 1308 or instructor consent. A global overview of aquaculture including

**B.S. in Natural Resources Management
FISHERIES BIOLOGY TRACK**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
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
BIOL 1401, Biology of Plants	4	BIOL 1402, Biology of Animals	4
NRM 1300, Env. Sci. as Social Pursuit	3	NRM 1401, Intro. Natural Res. Mgmt.	4
or NRM 2305, Intro. Freshwater Ecol.		HIST 2300, History of U.S. to 1877	3
POLS 1301, American Govt., Org.	3		
TOTAL	16	TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
NRM 3407, Vegetation & Wildlife Inv.	4	CHEM 1307, Principles of Chem. I	3
NRM 3325, Integrated NRM Skills	3	CHEM 1107, Exper. Prin. of Chem. I	1
NRM 3402, Rng/Forest/Wet/Plant Ident	4	NRM 2307, Diversity of Life	3
AAEC 2305, Fund. of Ag. & Appl. Eco.	3	NRM 3308, Quantitative Methods in NR	3
or ECO 2301, Principles of Economics I		Directed Electives [‡]	6
TOTAL	14	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 1308, Principles of Chem. II	3	Directed Physical Science Course [†]	4
CHEM 1108, Exper. Prin. of Chem. II	1	Creative Arts [*]	3
NRM 3302, Range Plant Ecology	3	NRM 4335, Freshwater Bio.	3
Directed Physical Science Course [†]	4	Directed Electives [‡]	4
COMS 2300, Public Speaking	3		
Total	14	TOTAL	14

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
HIST 2301, History of U.S. Since 1877	3	POLS 2302, American Public Policy	3
NRM 4401, Fisheries Conserv. & Mgmt.	4	Lang., Phil., & Culture/Multicultural [*]	3
Directed Elective [‡]	10	ZOOL 4410, Intro. to Ichthyology	4
		Directed Elective [‡]	6
TOTAL	17	TOTAL	16

TOTAL HOURS: 124

* Choose from core curriculum requirements.

† Students will choose two courses from CHEM 2303 and 2103, PSS 2432.

‡ Select 13 hours from NRM 3307, 4310, 4314, 4315, 4320, 4330, 4403, 4408.

§ Select 14 hours from PSS 2401; NRM 3304, 3323, 3401, 4000, 4001, 4302, 4303, 4304, 4305, 4306, 4309, 4322, 4324; BIOL 3309; ZOOL 3406, 4301, 4321, 4406 or 4408.

§ MATH 1451 may be substituted.

MATH 1550 may be substituted.

**B.S. in Natural Resources Management
WILDLIFE BIOLOGY TRACK**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
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
BIOL 1401, Biology of Plants	4	BIOL 1402, Biology of Animals	4
NRM 1300, Env. Sci. as Social Pursuit	3	NRM 1401, Intro. Natural Res. Mgmt.	4
or NRM 2305, Intro. Freshwater Ecol.		HIST 2300, History of U.S. to 1877	3
POLS 1301, American Govt., Org.	3		
TOTAL	16	TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
NRM 3407, Vegetation & Wildlife Inv.	4	CHEM 1307, Principles of Chem. I	3
NRM 3325, Integrated NRM Skills	3	CHEM 1107, Exper. Prin. of Chem. I	1
NRM 3402, Rng/Forest/Wet/Plant Ident.	4	NRM 2307, Diversity of Life	3
AAEC 2305, Fund. of Ag. & Appl. Eco.	3	NRM 3308, Quantitative Methods in NR	3
or ECO 2301, Principles of Economics I		NRM 2406, Wildlife Anat. & Physiology	4
TOTAL	14	TOTAL	14

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 1308, Principles of Chem. II	3	Directed Physical Science Course [†]	4
CHEM 1108, Exper. Prin. of Chem. II	1	Creative Arts [*]	3
NRM 3302, Range Plant Ecology	3	Directed Electives [§]	10
Directed Physical Science Course [†]	4		
COMS 2300, Public Speaking	3		
TOTAL	14	TOTAL	17

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
HIST 2301, History of U.S. Since 1877	3	POLS 2302, American Public Policy	3
Directed Elective [‡]	3	Lang., Phil., & Culture/Multicultural [*]	3
Directed Elective [‡]	3	NRM 4408, Wildlife Population	4
Directed Elective [‡]	3	Directed Elective [‡]	4
Directed Elective [‡]	3	Directed Elective [‡]	3
TOTAL	15	TOTAL	17

TOTAL HOURS: 124

* Choose from core curriculum requirements.

† Students will choose two courses from CHEM 2303 and 2103, PSS 2432.

‡ Select two courses from NRM 4305, 4306, 4309, 4310, 4322

Select two courses from ZOOL 4301, 4406, 4408, 4410

Select one course from NRM 3304 or 3307 or 4401

Select one course from NRM 4303 or 4314 or 4320

§ 10 hours from 3000- or 4000-level NRM courses.

MATH 1550 may be substituted.

** MATH 1451 may be substituted

fish, aquatic invertebrates, plants, and design and operation of production facilities.

- 4335. Freshwater Bioassessment (3).** Prerequisite: C or better in NRM 2305. No freshmen. An overview of the methods used to evaluate the condition of waterbodies, including surveys and other direct measurements of aquatic species attributes and habitats. S.
- 4401. Fisheries Conservation and Management (4).** Prerequisites: ZOOL 4410, C or better in NRM 2305 and either AAEC 2401, MATH 2300, or C or better in NRM 3308 or instructor consent. Theory and practice regarding conservation and management of aquatic resources, including ecology, population biology, sampling, restoration, and resource conflict. (Writing Intensive)
- 4403. Aerial Photo Interpretation in Natural Resource Management (4).** Fundamentals of aerial photograph reading, interpretation, and evaluation. Introduction to remote sensing techniques and geographic information systems. F.
- 4408. Wildlife Population Dynamics and Analysis (4).** Prerequisites: AAEC 2401 or MATH 2300 or C or better in NRM 3308; MATH 1331 and C or better in NRM 1401, or instructor consent. 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).** An organized discussion of current problems in natural resources management. May be repeated.
- 5201. Foundations of Ecology and Conservation Biology (2).** Examination of classic foundational papers in ecology and conservation biology, their influence in these fields, and their relevance to current research.
- 5302. Range Research Methods (3).** Prerequisite: C or better in 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).** 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.
- 5304. Fire Behavior and Ecology (3).** Prerequisite: Instructor consent. An assessment of the role of fire in succession and management of plants and animals in all major vegetation types of U.S. and Canada; effect of fire on litter and soil properties; fire temperatures and heat effects. Field trips required. S, odd years, F.

5305. **Plant Ecophysiology (3)**. Prerequisite: Instructor consent. 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)**. 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)**. Prerequisite: Instructor consent. Advanced study in the ecology and management of wetland ecosystems. F, odd years.
5308. **Advanced Restoration Ecology (3)**. Advanced study of restoring damaged ecosystems. Explores the history, practice, and theory of restoration ecology through case studies, literature, and hands-on experience. S, even years.
5309. **Population Estimation and Dynamics (3)**. Prerequisite: Instructor consent. 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)**. 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)**. An examination of conservation principles and management practices enhancing wildlife populations.
5312. **Ecology of Renewable Natural Resources (3)**. An introduction to the ecology of renewable natural resources such as vegetation, wildlife, soil, and water.
5313. **Advanced Big Game Ecology and Management (3)**. 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)**. 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)**. 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)**. An ecological examination of waterfowl behavior, breeding biology, and habitat requirements. Field trips required. F, even years.
5317. **Watershed Management (3)**. 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)**. Prerequisite: Instructor consent. 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.
5319. **Mammalian Predator-Prey Relationships (3)**. Examines evolution of predator-prey relationships and historical and current management practices. Only for NRM, ANSC, or BIOL graduate students.
5320. **Natural Resource Biopolitics (3)**. 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)**. Ecological approach to nongame wildlife population management. Public policies, socioeconomic factors, population dynamics, and species-at-risk issues are examined.
5323. **Prescribed Burning (3)**. Planning, implementing, evaluating prescribed fires, and expert systems. Field trips required. S.
5324. **Physiological Ecology of Aquatic Organisms (3)**. Regulatory mechanisms and adaptive significance of selected physiological processes in aquatic vertebrates. S, even years.
5330. **Advanced Aquaculture (3)**. Prerequisite: Instructor consent. A global overview of aquaculture including fish, aquatic invertebrates, plants, and design and operation of production facilities. F, odd years.
5335. **Advanced Freshwater Bioassessment (3)**. Prerequisite: Instructor consent. Overview of methods used to evaluate the condition of waterbodies, including surveys and other direct measurements of aquatic species attributes and habitats.
5336. **Field Ichthyology (3)**. Prerequisite: Instructor consent. Distribution, life history, and habitat associations of Texas freshwater, estuarine, and marine fishes. Emphasizes field identification and collection methods. Field trips required.
5337. **Fish and Wildlife Population Modelling (3)**. Prerequisite: Instructor consent. Distribution, life history, and habitat associations of Texas freshwater, estuarine, and marine fishes. Emphasizes field identification and collection methods. Field trips required..
5347. **Advanced Conservation Science (3)**. Prerequisite: Instructor consent. A survey of the theory and practice of conservation biology for advanced students.
5401. **Advanced Fisheries Conservation and Management (4)**. Prerequisite: Instructor consent. Theory and practice regarding the conservation and management of aquatic resources, including ecology, population biology, sampling, restoration, and resource conflict. F, even years.
5402. **Fisheries Ecology (4)**. Prerequisite: Statistics and basic fisheries. An examination of population dynamics, community ecology, bioenergetics, fisheries models and other quantitative aspects of fisheries ecology.
5403. **Experimental Design and Analysis (4)**. Prerequisite: Instructor consent. Principles and applications of experimental design and analysis (completely randomized designs, randomized blocks, covariance analysis, factorials, split plots, repeated measures, regression).
5404. **Aerial Terrain Analysis (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)**. A review of the philosophy of science, scientific methods, research activities, and the planning and execution of research programs.
6302. **Natural Resource Professionalism (3)**. Understanding and application of workplace professionalism; field, animal and office ethics; Texas Tech procedural trainings; inter- and intra-communication training. SS.
6303. **Imagery Interpretation for Natural Resource Management (3)**. 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)**. 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)**. Prerequisite: Instructor consent. A survey of tropical ecology for advanced students. Both theory and practice will be covered. Field trips required. F.
6330. **Plant Ecohydrology (3)**. Vegetation factors affecting hydrological dynamics of landscapes and water uses by different types of vegetation. Implications to land and vegetation management at multiple levels.
7000. **Research (V1-12)**.
7210. **Teaching Practicum (2)**. Prerequisite: Doctoral student in the Department of Natural Resources Management. Supervised teaching experience at the university level.
8000. **Doctor's Dissertation (V1-12)**.

Department of Plant and Soil Science

Eric Hequet Ph.D., Chairperson

B.L. Allen Endowed Chair of Pedology: Weindorf

J.A. Love Endowed Chair: Hequet

Rockwell Endowed Professor of Horticulture: McKenney

Leidigh Professor: Dotray,

Thornton Distinguished Chair: West

Professors: Hellman, Hequet, Maas

Associate Professors: Abidi, M. Burow, Montague, Moore-Kucera,

Ritchie, Sharma, Woodward, Wright, Xu

Assistant Professors: Lewis, Longing, Mendu, Udeigwe, Young

Research Professors: Ethridge, McLendon

Instructors: Elle, Plowman, Qualia

Adjunct Faculty: Acosta-Martinez, R. Allen, Baughman, Bouton, Burke, G. Burow, Cantrell, Casby-Horton, Dever, Gitz, Keeling, ascano, MLiebl, ahan, Mauge, Maunder, Morgan, Parajulee, Payton, Peterson, Porter, Rush, Sheetz, Stout, Trolinder, Trostle, Ulloa, Wallace, Wanjura, Wheeler, Zobeck

CONTACT INFORMATION: 263 Plant Science Building, Box 42122, Lubbock, TX 79409-2122, T 806.742.2838, F 806.742.0775, www.pssc.ttu.edu/index.php

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*
- Bachelor of Science in Plant and Soil Science
- Master of Science in Horticulture Science
- Master of Science in Plant Protection†
- Master of Science in Plant and Soil Science
- Master of Science in Soil Science†
- Doctor of Philosophy in Plant and Soil Science
- Graduate Certificate in Crop Protection
- Graduate Certificate in Fibers and Biopolymers
- Graduate Certificate in Horticultural Landscape Management
- Graduate Certificate in Soil Management

A total of 120 hours is required for a B.S. 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.

The department is the academic home to the Fiber and Biopolymer Research Institute (FBRI), which is internationally known for its expertise in cotton. FBRI focuses on research, education, and technology transfer pertinent to fibers, textiles, and biological based polymers. While it is an integral part 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.

Undergraduate Program

The department offers a Bachelor of Science in Plant and Soil Science degree designed to build on a foundation of basic biological and physical science principles. This foundation provides students a broad base of knowledge as well as hands-on experience in many aspects of the plant and soil sciences industry. Students learn the latest methods to produce agronomic, forage, horticultural, and turfgrass crops while conserving natural soil and water resources. In addition, students learn current management techniques to control

* Degree being phased out and consolidated with B.S. in Plant and Soil Science, January 1, 2016. No new students

† Degree being phased out. No new students.

or prevent plant diseases, insects, and weed species as well as efficient soil nutrient and water management.

A bachelor's degree in plant and soil science prepares students to manage properly a wide variety of plant and soil issues, such as fertilization and pesticide application, mitigation of urban heat load through appropriate use of landscape plants, improved crop production through plant breeding and biotechnology, and appropriate management practices for vineyard and wineries.

Students may focus on one of four areas of specialization: crop science, environmental soil and water science, horticulture and turfgrass science, or viticulture and enology. This degree prepares students to meet the challenges of sustainable production of plants for food, fiber, fuel, and aesthetic beauty while preserving natural resources and environmental integrity.

The Department of Plant and Soil Sciences offers both a resident and a distance program requiring 120 semester credit hours. For the distance program, students will need to complete a portion of their general coursework at another institution and complete the last 30 semester credit hours at Texas Tech University.

Minor. The department offers a minor in plant and soil science for students majoring outside the department. For information on requirements for completing the minor, refer to "Selecting a Minor" in the introductory information about the college or contact the department's lead academic advisor.

Graduate Program

For information on graduate programs offered by the Department of Plant and Soil Science, visit the Graduate School section of the catalog on page 119.

Course Descriptions

(To interpret course descriptions, see page 23.)

Plant and Soil Science (PSS)

Undergraduate Courses

1100. **Freshman and Transfer Student Seminar (1).** 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. F
1311. **The Science of Wine (3).** Introduction to the history of wine-making and application of biology, chemistry, and technology to modern grape and wine production. F
1321. **[AGRI 1307, 1407] Agronomic Plant Science (3).** Importance, distribution, and use of major world agronomic crops. Fundamentals of growth, structure, and improvements are also stressed. F
1411. **[AGRI 1415, HORT 1401] Principles of Horticulture (4).** Principles and practices of growth and development, structure, nomenclature, use of horticultural plants and how they are affected by the environment. Partially fulfills core Life and Physical Sciences requirement.
2114. **Wine Production Introduction Lab (1).** Prerequisites: BIOL 1401 or BIOL 1403 and a C or better in PSS 1311. 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).** Prerequisite: C or better in PSS 2330, concurrent enrollment allowed. Discussion and practical experience with soils in the urban environment. SS, F
2210. **Floral Design (2).** Prerequisite: PSS 1411. Floral design as a commercial enterprise. Emphasis on principles of floral design,

B.S. in Plant and Soil Science**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of U.S. to 1877	3	MATH 1320, College Algebra	3
CHEM 1307, Principles of Chemistry I	3	or MATH 1330, Intro. Math. Analysis	
CHEM 1107, Exper. Prin. of Chem. I	1	CHEM 1308, Principles of Chemistry II	3
PSS 1321, Agricultural Plant Science* or PSS 1411, Prin. of Horticulture	3-4	CHEM 1108, Exper. Prin. of Chem. II	1
		PSS 2401, Intro. Entomology*	4
		HIST 2301, History of U.S. Since 1877	3
TOTAL	13-14	TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
PSS 2432, Prin. & Practices in Soils*	4	ENGL 2311, Technical Writing	3
POLS 1301, American Govt., Org	3	or ENGL 3365, Prof. Report Writing	3
MATH 1321, Trigonometry	3	AAEC 2305 or ECO 2301*	3
or MATH 1331, Intro to Math Analysis II		POLS 2302, American Public Policy	3
PSS Specialization Course	3	COMS 2300, or 3358	3
		PSS Required Elective	3
TOTAL	13	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
BIOL 1401, Biology of Plants	4	PSS Specialization Course	6
PSS Required Courses	7	Lang., Phil., & Culture/Multicultural†	3
PSS 3323, Crop Physiology	3	PSS 3421, Fund. Principles of Genetics	4
		PSS Required Course	3
TOTAL	14	TOTAL	16

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
PSS 4100, Seminar*	1	PSS Required Courses	11
Creative Arts†	3	Electives	2-3
PSS Required Course	3	PSS Specialization Course‡	3
PS 4421, Principles of Weed Science	4		
PSS 4425, Agricultural Plant Pathology	4		
TOTAL	15	TOTAL	16-17

TOTAL HOURS: 120

* Major course requirement

† Students must fulfill the university's Multicultural/Language, Philosophy, and Culture/Creative Arts requirements.

‡ See www.pssc.ttu.edu/ProgramPages/CourseRot.php for rotation of courses**Specialization Course Requirements****Crop Science:**

- Required electives (27 hours): PSS 3321, 3322, 4305, 4321, 4325, 4331, 4335, 4337; CHEM 2303, 2103
- Specialization electives (12 hours): PSS 3309, 4000, 4001, 4330, 4332, 4411, 4415; AAEC 3401

Environmental Soil and Water Sciences:

- Required electives (27 hours): PSS 4301, 4325, 4330, 4331, 4332, 4411, 4435, 4337; GEOG 3000; CHEM 2301 or 3305, 2103 or 3105
- Specialization electives (12 hours): PSS 3309, 3321, 3322, 4000, 4001, 4305; AAEC 3401; GEOL 1303, NRM 4314; GEOG 3301, 4302

Horticulture and Turfgrass Science:

- Required electives (27 hours): PSS 2312, 3309, 3313, 3318, 4301, 4313, 4335; two from PSS 4314, 4411, 4415
- Specialization electives (12 hours): PSS 2210, 3311, 3317, 4000, 4001, 4305, 4316, 4318, 4321, 4325, 4331, 4337

Viticulture and Enology:

- Required electives (27 hours): PSS 1311, 2114, 2312, 2314, 3310, 4111, 4310, 4314 or 4411 or 4415, 4335, 4416
- Specialization electives (12 hours) PSS 4000, 4001, 4301, 4305, 4325; RHIM 4340, 4350; CHEM 2303, 2103; FDSC 3301; MBIO 3400

All PSS courses must be completed with a minimum grade of C.

All students will be advised prior to registration.

- patterns of arrangements, and elements of color composition. Field trips required.
- 2312. Propagation Methods (3).** Prerequisite: C or better in PSS 1411 or PSS 1321. Propagation techniques of commercial nurseries and greenhouse ranges; study of the physiological reaction and cutting material. (Writing Intensive) On campus (even), Distance (odd).
- 2313. Herbaceous Plant Materials (3).** Prerequisite: C or better in PSS 1411 or PSS 1321. Study of the principal herbaceous plants and plant families, palms, roses, and subtropic landscape plants. F (even).
- 2314. Wine Production Introduction (3).** Prerequisites: BIOL 1401 or BIOL 1403 and a C or better in PSS 1311. An overview of wine production technical aspects with an emphasis on prefermentation processes, options and strategies, and fermentation management. S (even).
- 2330. Urban Soils (3).** Utilization of soils in urban environments with emphasis on nutrients, water management, and physical properties. Credit not given for PSS 2330 and PSS 2432. SS, F

**B.S. in Plant and Soil Science
with a Specialization in Horticulture
(Distance Program)****FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of U.S. to 1877	3	MATH 1320, College Algebra	3
CHEM 1307, Principles of Chemistry I	3	HIST 2301, History of U.S. Since 1877	3
CHEM 1107, Exper. Prin. of Chem. I	1	CHEM 1308, Principles of Chemistry II	3
PSS 1411, Principles of Horticulture*	4	CHEM 1108, Exper. Prin. of Chem. II	1
		PSS Required Elective*†	3
TOTAL	14	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
PSS Required Elective*†	6	ENGL 2311, Technical Writing	3
PSS 2330, Urban Soils*†	3	PSS 2401, Intro. Entomology*	4
POLS 1301, American Govt., Org.	3	AAEC 2305, Fund. of Ag. & Appl. Eco.*	3
MATH 1330, Intro. Math. Analysis	3	POLS 2302, American Public Policy	3
TOTAL	15	TOTAL	13

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
BIOL 1401, Biology of Plants	4	PSS Specialization Elective*†	3
PSS 3323, Crop Physiology*	3	PSS 3421, Fund. Principles of Genetics*†	4
PSS Required Elective†	6	PSS 4314, Garden Center Mgmt.*†	3
PSS Specialization Elective*†	3	PSS Required Elective†	3
		Lang., Phil., & Culture/Multicultural†	3
TOTAL	16	TOTAL	16

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
PSS 4421, Prin. of Weed Science*†	4	PSS 4411, Greenhouse Crop Prod.*†	4
Creative Arts†	3	PSS Required Elective†	6
PSS Required Elective†	3	COMS 2300, Public Speaking	3
Electives	1	PSS Specialization Elective*†	3
PSS Specialization Elective*†	3		
TOTAL	14	TOTAL	16

TOTAL HOURS: 120

* Major course requirement

† Students must fulfill the university's Multicultural/Language, Philosophy, and Culture/Creative Arts requirements.

‡ See www.pssc.ttu.edu/ProgramPages/CourseRot.php for rotation of courses.**Required Electives (27 hours):** 2312, 3309, 3311, 3313, 3317, 4313, 4314, 4316, 4335**Specialization Electives (12 hours):** PSS 1311, 2314, 3310, 4000, 4001, 4310 or 4337.

All PSS courses must be completed with a minimum grade of C.

All students will be advised prior to registration.

- 2401 [AGRI 1413] Introductory Entomology (4).** 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. Partially fulfills core Life and Physical Sciences requirement.
- 2432. Principles and Practices in Soils (4).** Prerequisites: 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. Credit not given for PSS 2330 and PSS 2432. (Writing Intensive) S, F
- 3309. Introduction to Turfgrass Science (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. On campus (F), Distance (SS).
- 3310. Viticulture I: Principles of Viticulture (3).** Prerequisite: C or better in PSS 1411 or PSS 1321. Introduction to grapevine history, biology, physiology, and principles and practices of vineyard management. F; On campus (odd), Distance (even).
- 3311. Sustainable Vegetable Crop Production (3).** Prerequisite: C or better in PSS 1411 or PSS 1321. Study of principles and practices of sustainable vegetable production methods used by commercial growers. Focus will be on planning, production, and marketing of major vegetable crops within Texas. S (even).
- 3317. Interior Plants (3).** Prerequisite: C or better in PSS 1411 or PSS 1321. Selection and maintenance of interior plants and planting facilities. F (odd).
- 3318. Woody Plants (3).** Prerequisite: PSS 1411. Identification, culture, and use of woody plants in landscapes settings. Emphasis placed on plant material adapted to semi-arid climates.
- 3321. Forage and Pasture Crops (3).** The production and use of forage and pasture crops.
- 3322. Grain, Fiber, and Oilseed Crops (3).** History, distribution, use, plant form, growth and development, and cultural and production practices of important agronomic crops. S (odd).

- 3323. Crop Physiology (3).** Presents fundamental concepts underlying the science of crop physiology, including crop phenology, canopy development and light interception, photosynthesis and respiration, and dry matter partitioning. F
- 3324. Seed Science (3).** Analysis of seed for planting. Seed quality as related to production, processing, storing, and handling. Study of federal and state seed laws. S (even).
- 3421. Fundamental Principles of Genetics (4).** Prerequisites: BIOL 1401, BIOL 1402, or BIOL 1403 and a C or better in PSS 1321 or PSS 1411. Mendelian genetic principles and chromosomal basis of heredity and genetic analysis based on recombinant DNA. (Writing Intensive). F, S.
- 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).** Utilization of writing and oral presentation skills. Continued enhancement of education skills and adherence to professional ethics.
- 4301. Agricultural Compounds (3).** Prerequisites: PSS 2401; CHEM 1107, 1108, 1307, 1308; and consent of instructor. Nature, mode of action, and uses of insecticides, fungicides, herbicides, and other pesticides.
- 4305. Integrated Pest Management (3).** Prerequisite: C or better in PSS 2401. The principles and practices of integration of all available control strategies in the management of arthropod pest populations. S (odd).
- 4310. Viticulture II: Grape Production (3).** Prerequisite: PSS 3310. Advanced studies of grape production and management practices in commercial vineyards. S, On campus (even), Distance (odd).
- 4313. Arboriculture (3).** Prerequisite: C or better in PSS 1411 or PSS 1321. The physiological principles and industry practices in the production, moving, care, and maintenance of ornamental trees, shrubs, and ground covers. Required field trips. S (even).
- 4314. Garden Center Management (3).** Prerequisite: C or better in PSS 1411 or PSS 1321. The principles of management, marketing, structures, and distribution for retail establishments. (Writing Intensive). F (even).
- 4316. Turfgrass Physiology and Ecology (3).** Prerequisite: C or better in PSS 3309 or consent of instructor. Physiological response of turfgrass to stress. Effect of management practices on community dynamics, competition, and the environment. S.
- 4317. Golf Course Construction (3).** Prerequisite: C or better in PSS 3309. Phases of golf course construction with emphasis on how construction decisions impact future management practices and concerns. F (even).
- 4318. Turf Pest Management (3).** Prerequisite: C or better in PSS 1411 or PSS 3309. Provides background of the major turfgrass pests and their control with special emphasis on integrated pest management. S (even).
- 4321. Fundamental Principles of Plant Breeding (3).** Prerequisite: C or better in PSS 3421. Practical application of genetics and biotechnology in the breeding and improvement of plants. S (even).
- 4325. Crop Water Management (3).** 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. S.
- 4330. Environmental Soil Chemistry (3).** Prerequisite: C or better in 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. S.
- 4331. Soil Microbial Ecology (3).** Prerequisite: MBIO 3401 or BIOL 3309 or a C or better in PSS 2432 or consent of instructor. Introduction to soil organisms. Includes interactions between organisms, processes, and their ecological functions. S (odd).
- 4332. Soil Classification (3).** Approval of instructor for nonagriculture majors. Soil profile morphology. Classification systems with emphasis on the taxonomic system of the United States. F (even).
- 4335. Soil Fertility and Nutrient Management (3).** Prerequisite: C or better in PSS 2432. Nutrient availability as influenced by soil properties, modern methods of nutrient management, and tools for maximizing nutrient use efficiency. (Writing Intensive). F.
- 4336. Soil Physical Properties (3).** Prerequisites: C or better in PSS 2432 and 6 hours of mathematics. Physical properties of soils: structure and movement of water, air, and temperature. S.
- 4337. Environmental Soil Science (3).** Prerequisite: C or better in PSS 2432. Physical, chemical, and biological properties and processes of soil as they relate to environmental quality. S (even).
- 4411. Greenhouse Crop Production (4).** Prerequisite: C or better in PSS 1411 or PSS 1321. Greenhouse construction, heating, cooling, growing media, pest management, nutrition, fertility, growth regulation, irrigation, post-harvest handling, marketing of greenhouse crops. Required field trips. S (odd).
- 4415. Plant Biotechnology (4).** Prerequisite: C or better in PSS 3421. The study of plant biotechnology with emphasis on industry topics such as research, marketability, product development, and regulatory and intellectual property issues. S (odd).
- 4416. Winemaking Quality Control and Analysis (4).** Prerequisites: CHEM 1307, 1308, 1107, 1108; C or better in PSS 1311, 2314; FDSC 3301 or MBIO 3400 (may be taken concurrently). Quality control and analysis for winemaking. S (odd).
- 4421. Principles of Weed Science (4).** 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. F, On Campus (even), Distance (odd).
- 4425. Introductory Plant Pathology (4).** Identification and management of diseases of agricultural and horticultural plants. Diagnostic methods used to identify basic plant pathogens. F.
- 4426. Introduction to Genomics (4).** 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. F.

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).** Current research in all aspects of plant and soil science including presentations by internationally recognized scientists. May be repeated for credit. F, S.
- 5231. Applied Geostatistics (2).** Application of regionalized variable theory to surface and subsurface land forms using semivariograms and kriging. S (odd).
- 5232. International Agronomic Development (2).** 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. F (even).
- 5301. Advanced Genetics (3).** Prerequisite: BIOL 3416 or a C or better in PSS 3421. Examines the complex principles and applications of modern genetics. F (even).
- 5302. Statistical Applications in Natural Resources (3).** Introduction to statistical concepts and overview of statistical methods as applied to current research issues in plant and soil science and natural resource management. S.
- 5303. Host Plant Resistance to Arthropod Pests (3).** Applied co-evolution aspects of plant-insect interactions. Covers developmental, physiological and behavioral aspects of arthropod-plant interactions. F (odd).
- 5307. Pesticides (3).** Advanced study of the registration, development, and legal use of pesticides. S (even).
- 5310. Insect Ecology (3).** The effects of environmental factors on insect abundance, composition, complexity, and dynamics of insect community systems. S (odd).
- 5312. Vineyard Management (3).** Prerequisite: C or better in PSS 3310 or consent of instructor. Application of advanced knowledge of viticultural principles to the management of commercial vineyards. S, On campus (even), Distance (odd).
- 5314. Advanced Turf Pest Management (3).** Prerequisite: C or better in PSS 3309 or consent of instructor. Examines the biology and ecology of major turfgrass pests to develop best management practices for various turf environments. S (even).
- 5315. Aspects of Golf Course Construction (3).** Prerequisite: C or better in 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. F (even).

5316. **Advanced Arboriculture (3)**. Advanced principles associated with anatomical, physiological, and chemical changes in woody plants. S (even).
5317. **Advanced Nursery Management (3)**. Principles of nursery production, cultural management, and marketing of both wholesale and retail commodities. F (even).
5318. **Advanced Turfgrass Physiology and Ecology (3)**. Prerequisite: C or better in PSS 3309 or consent of instructor. Interaction between turfgrass and the environment. Focus on turfgrass adaptation and tolerance to environmental and mechanical stress. S.
5319. **Advanced Interiorscaping (3)**. 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. F (odd).
5321. **Plant Breeding Theory (3)**. Prerequisite: C or better in PSS 3421. Breeding and plant improvement presented at an advanced level. S (even).
5323. **Environmental Crop Physiology (3)**. The plant-environment interaction in relation to growth and production of crop communities. Radiant energy, carbon dioxide, water, and temperature relationships in crop stands. F (odd).
5324. **Mode and Mechanism of Herbicide Action (3)**. Prerequisite: Consent of instructor. Herbicide classification, activity, crop selectivity, and resistant plants. S, On campus (odd), Distance (even).
5325. **Transgenic and Plant Cell Genetics (3)**. Genome organization in plants, interspecific hybridization, cytoplasmic male sterility, self-incompatibility, tissue culture, in-vitro screening, and transformation technologies. S.
5326. **Advanced Seed Science (3)**. 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. S (even).
5327. **Soil-Plant-Animal Interrelationships in Grazing Lands (3)**. Prerequisite: C or better in PSS 3321. Ecological and nutritional principles of livestock grazing are established. Mineral cycling, antiquality factors, limitations to intake, and research methodology in forage-livestock systems are presented. S (even).
5328. **Forages and Livestock in Pasture Ecosystems (3)**. Systems of grazing management are presented from the perspective of ecosystems in pasture lands and other grazing lands with intensified management. S.
5329. **Precision Agriculture (3)**. Introduction to site-specific management of agricultural crops emphasizing collection and use of geospatial information in performing variable-rate farming practices. F (even).
5330. **Advanced Environmental Soil Chemistry (3)**. Prerequisite: C or better in 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. S.
5331. **Advanced Plant Nutrient Management (3)**. Prerequisite: C or better in 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. F.
5334. **Soils and Crops in Arid Lands (3)**. Potentials for utilizing soils, rainfall patterns, and plant characteristics for crop production in arid lands. F (odd).
5335. **Soil Physics (3)**. Physical characteristics of soils and porous media and principles underlying flow and distribution of water, air, and heat in soils. S.
5336. **Soil Mineralogy (3)**. The mineralogical makeup of sand, silt, and clay. The relation of physical and chemical soil properties to mineralogy. S (even).
5337. **Advanced Soil Classification (3)**. A study of the taxonomic System of Soil Classification as used in the United States. F (even).
5351. **Environmental Instrumentation and Measurements (3)**. Setting up and programming a data logger to collect environmental measurements related to soil, atmosphere, and plant conditions using a variety of sensors. S.
5370. **U.S. and Global Cotton Fiber-Textile Industries (3)**. Examination of factors affecting cotton production, processing, marketing, and utilization as an industrial raw material for textile manufacturing. F.
5371. **Structure and Functionalization of Cotton Fibers (3)**. Fundamental understanding of the structure of cotton fibers and their characterization. Presents techniques used to functionalize the cotton fabric to create "smart" textiles. S (even).
5373. **Biopolymers and Bioproducts (3)**. Prerequisite: Consent of instructor. Focuses on the chemistry of biopolymers and their transformation to bio-based products. S (odd).
5376. **Advanced Studies in Cotton Fibers (3)**. 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. Offered every 18 months.
5378. **Economics of Cotton as an Industrial Raw Material (3)**. Evaluates entire marketing chain pertinent to cotton and cottonseed, along with the industrial transformation required. Develops methodology for analyzing agriculture commodities as industrial raw materials. (AAEC 5393). S (even).
5415. **Advanced Greenhouse Crop Production (4)**. 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. S (odd).
5416. **Advanced Winemaking (4)**. 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)**. Prerequisite: BIOL 3416 or C or better in PSS 3421. Examines the contemporary methods and genetic principles of plant biotechnology and the commercialization of genetically modified plants. S (odd).
5425. **Advanced Agricultural Plant Pathology (4)**. Prerequisite: Consent 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. F.
5426. **Functional Genomics (4)**. Prerequisite: Consent of instructor. A comprehensive overview of gene regulation from genotype to phenotype using high-throughput platforms and bioinformatics to facilitate genome-wide analysis. May be repeated once for credit. F.
5429. **Advanced Principles of Weed Science (4)**. Prerequisite: Consent of the instructor. Weeds, weed control, plant identification, and equipment presented at an advanced level. F, On Campus (even), Distance (odd).
6000. **Master's Thesis (V1-6)**.
6001. **Selected Topics in Plant and Soil Science (V1-3)**. A general course in the theory and application of remote sensing to quantifying soil and vegetation characteristics relevant to agriculture and natural biosystems. S (odd).
6301. **Quantitative Agricultural Remote Sensing (3)**. 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)**. Development, testing, and application of mathematical models of plant growth relevant to agriculture and natural biosystems. F (even).
6315. **Mycorrhizal Symbiosis (3)**. Study of mycorrhizal fungi and their ecology. Types of mycorrhizal associations and their functional implications for plant growth and ecosystem functioning. F (odd).
6322. **Advanced Plant Breeding (3)**. Qualitative and quantitative inheritance, heterosis, selection theory and breeding methodology for crop plant improvement, genotype by environment interaction, and application of cellular and molecular techniques to plant breeding. S (odd).
6323. **Plant-Water Relations (3)**. Comprehensive understanding of biophysical factors affecting water status of plant tissue and resultant physiological responses. S.
6331. **Advanced Environmental Soil Science (3)**. Prerequisite: C or better in PSS 2432. Applications of soil chemical, physical, and biological principles to environmental issues. S (even).
6424. **Structural Genomics of Plants and Animals (4)**. 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).
6432. **Advanced Soil Microbial Ecology (4)**. Prerequisite: Introductory biology or microbiology, a C or better in PSS 2432, or instructor permission. Study of soil biota, emphasizing soil microorganisms' ecology, physiology, and biochemical functions. S (odd).
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

College of Architecture

Andrew Vernooy, M.Des.S., Dean

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Faculty

Horn Professor: Watkins

Professors: Aranha, Flueckiger, Haq, Loudon, Neiman, Perbellini, Pongratz, Vernooy, J.E. White, J.P. White

Associate Professors: Buelinckx, Davis, Driskill, Ellis, Gonzalez, Hill, Jaddo, Park, Perl, Shacklette, Smith, Taylor, Torres-McDonald, Zugay

Assistant Professors: Nesbit, Raab

Instructors: Barajas, Bergloff, Brown, Campbell, Chamy, Chinn, Clegg, Dalbin, Dixon, Fairbetter, Glassell, Gomez, Gonzales, Hoogeboom, Lievanos, Martin, McDonald, McReynolds, Quesada, Rivas, Robinson, Sinkewich, Svarbein, Velasquez, Wade, D. White, Wilson, Wright

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 Whitacre College of Engineering and the Rawls College of Business. 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 specific not only to the field but also fulfills the core curriculum of the university. Students who elect to study other disciplines after the first year of the architecture curriculum have a solid academic base.

Mission Statement. The College of Architecture educates students for future design practice and advances knowledge of the discipline for the benefit of society.

Admission. The undergraduate architecture program has two components: general architecture and preprofessional architecture. Admission to the general architecture program is open to all students admitted into the university. Admission into the preprofessional program in the second-year is competitive and based on a comprehensive review of the student's portfolio, essay, statement of intent, and grade point average.

Requirements for Licensure as an Architect. Becoming a licensed architect is a three-step process. Students must receive an accredited degree in architecture that has been approved by the National Architectural Accreditation Board (NAAB) (www.naab.org), successfully complete an internship with a licensed architect(s), and pass the Architect Registration Examination (ARE) (www.ncarb.org). The accredited program at Texas Tech University includes three components: general architecture, preprofessional, and professional. The general and preprofessional programs are undergraduate programs, while the accredited professional degree is the Master of Architecture.

Degree and Certificate 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 (post-professional degree)
- Doctor of Philosophy in Land-Use Planning, Management, and Design
- Graduate Certificate in Digital Design and Fabrication
- Graduate Certificate in Health Care Facilities Design
- Graduate Certificate in Historic Preservation
- Graduate Certificate in Urban and Community Design Studies

Dual Degree Programs

- Bachelor of Science in Architecture/Bachelor of Business Administration (General Business)
- Bachelor of Science in Architecture/Bachelor of Science in Civil Engineering
- Master of Architecture/Master of Business Administration

Undergraduate Program

Program Descriptions. The Bachelor of Science in Architecture consists of 131 credit hours of undergraduate courses. This program has two components: general architecture and preprofessional. The B.S. in Architecture degree will give students knowledge of and career opportunities in architecture, the building industry, and related fields. 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 academic advisor 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.

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. No student is allowed concurrent enrollment during the semester of expected graduation. 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.

Multicultural Requirement. Students may fulfill this requirement with courses as listed in the Undergraduate Academics section of this catalog. Other courses must be approved prior to enrollment for credit.

Graduate Program

For more information on graduate programs offered by the College of Architecture, visit the Graduate School section of the catalog on page 120.

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. All electives listed in the degree plan must be taken at the level listed in the degree plan.

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 at www.arch.ttu.edu.

Preferred: AutoCAD. AutoCAD experience is recommended to enroll in ARCH 1353.

Distance Education Courses. All distance education courses require approval from the academic advisor to apply to the degree program. No student is allowed to enroll in distance education courses during the semester of expected graduation.

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 academic advising 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 will 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 academic advisor is required for a course load of more than 18 semester hours (8 hours for a summer term). Distance education 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. Students should refer to the university's policy, procedures, and dates in regard to dropping a course and see their academic advisor for additional information.

Application for Degree. The Bachelor of Science degree candidate must file an "Application for Degree" with the academic advisor 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.

Bachelor of Science in Architecture (Pre-professional Program)

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

FIRST YEAR			
Fall: SEEING		Spring: FOUNDATION	
ARCH 1311, Design Environ. & Society	3	ARCH 1412, Architect. Design Studio I	4
ARCH 1341, Arch. Freehand Drawing	3	ARCH 1353, Digital Media I	3
MATH 1321, Trigonometry	3	PHYS 1403, General Physics w/lab	4
Core Curriculum (see below)	3	MATH 1350, Analytical Geometry	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. Students who have not been admitted to the preprofessional program are not eligible to take courses at the 2000 level and above, except ARCH 2311, 2315, and 3313.

SUMMER			
Core Curriculum—Life & Phys. Sciences*	4	Core Curriculum (see 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. I	3	ARCH 2315, History of World Arch. II	3
ARCH 2351, Architectural Construction I	3	ARCH 2342, Creative Process	3
ARCH 3341, Digital Media II	3	ARCH 2355, Arch. Environmental Syst.	3
Core (see below)	3	Multicultural Requirement*	3
TOTAL	17	TOTAL	17

THIRD YEAR			
Fall: BUILDING SYSTEMS		Spring: BUILDING ENCLOSURE	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 3350, Arch. Construction II	3	ARCH 3314, Contemporary Issues	3
ARCH 3373, Environ. Analysis/Site Plan.	3	ARCH 3352, Building Information	3
ARCH 3313, History of World Arch. III	3	ARCH 3355, Arch. Construction III	3
Elective	3	Elective	3
TOTAL	17	TOTAL	17

SUMMER I and II	
URBANISM	
ARCH 4601, Arch. Design Studio VI†	6

FOURTH YEAR	
Fall	
ARCH 4341, Media Elective	3
ARCH 4354, Integrative Systems	3
ARCH Elective	3
Elective	3
TOTAL	12

TOTAL HOURS: 131

Core Curriculum

ENGL	1301	Essentials of College Rhetoric
ENGL	1302	Advanced College Rhetoric
MATH	1321	Trigonometry or
MATH	1350	Analytical Geometry
PHYS	1403	General Physics I w/lab (4 hrs.)
Life & Phys. Sciences‡		(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 or 3358	

Students who will graduate under a catalog previous to 2012-2013 must meet the Technology and Applied Science requirement of the university's core curriculum.

* Multicultural requirement course offerings are available on the College of Architecture website (www.arch.ttu.edu)

† ARCH 4601 is a prerequisite for ARCH 5901

‡ Choose from the university's core curriculum requirements.

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 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.

Minor. 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.

Course Descriptions

(To interpret course descriptions, see page 23.)

Architecture (ARCH)

Courses marked with an asterisk are open only to architecture majors or to students with the dean's permission.

Undergraduate Courses

- 1311. [ARCH 1311] Design, Environment, and Society (3).** 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 requirement. F.
- 1341. Architectural Freehand Drawing (3).** Basic skills and techniques in representational drawing. Subjects include the human figure, architectural interiors and exteriors, landscapes and cityscapes, black and white media. F.
- 1353. Digital Media I (3).** 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. S.
- 1402. [ARCH 1403] Architectural Design Studio I (4).** 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. S.
- 2311. [ARCH 1301] History of World Architecture I (3).** Survey of the development of world architecture from pre-history to the Middle Ages. Fulfills core Language, Philosophy, and Culture requirement. F.
- 2315. [ARCH 1302] History of World Architecture II (3).** Survey of the development of world architecture from the Renaissance through the 19th century. Fulfills core Creative Arts requirement. S.
- 2342. Creative Process (3).** Prerequisite: ARCH 1341. Exploration of graphic, drawing, and art-media skills to strengthen design process and judgment. S.
- 2351. [ARCH 2312] Architectural Construction I (3).** Prerequisite or corequisite: ARCH 2501 or equivalent. Introduction to construction systems, methods, and materials with emphasis on the wall section. Introduction to issues of sustainability and envelope performance. F.
- 2355. Architectural Environmental Systems (3).** Introduction to thermal design; daylighting; analysis of mechanical, electrical, and plumbing systems; and acoustical design. F.
- 2501.* [ARCH 1404] Architectural Design Studio II (5).** 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.* Architectural Design Studio III (5).** 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. S.
- 3313. History of World Architecture III (3).** Survey of the development of world architecture during the 20th century. F. (Writing Intensive)
- 3314. Contemporary Issues in Architecture (3).** Contemporary issues in architectural theory and history utilizing precedents from early 20th century to present. May be repeated for credit. (Writing Intensive)
- 3341. Digital Media II (3).** Prerequisite: ARCH 1353. The use of 3-D computer graphics and modeling or design development with an emphasis on multimedia design presentations. F.
- 3350. Architectural Construction II (3).** 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. F.

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

<i>Fall: SEEING</i>		<i>Spring: FOUNDATION</i>	
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
ENGL 1301, Essentials of Coll. Rhetoric	3	PHYS 1403, General Physics I w/lab	4
MATH 1321, Trigonometry	3	MATH 1350, Analytical Geometry	3
POLS 1301, American Govt., Org.	3	ENGL 1302, Advanced College Rhetoric	3
TOTAL	15	TOTAL	17

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, GPA, statement of intent, and successful completion of PHYS 1403. Students who have not been admitted to the preprofessional program are not eligible to take courses at the 2000 level and above, except ARCH 2311, 2315, and 3313.

SUMMER

ACCT 2300, Financial Accounting	3	ACCT 2301, Managerial Acct.	3
HIST 2300, History of U.S. to 1877	3	MATH 2345, Intro. to Stat. with App. to Bus.	3
TOTAL	6	TOTAL	6

SECOND YEAR

<i>Fall: BASIC-INTERNAL</i>		<i>Spring: BASIC-EXTERNAL</i>	
ARCH 2501, Arch. Design Studio II	5	ARCH 2502, Arch. Design Studio III	5
ARCH 2311, History of World Arch. I	3	ARCH 2315, History of World Arch. II	3
ARCH 2351, Architectural Construction I	3	ARCH 2342, Creative Process	3
ARCH 3341, Digital Media II	3	ARCH 2355, Arch. Environmental Syst.	3
ECO 2301, Principles of Economics I	3	ECO 2302, Principles of Economics II	3
TOTAL	17	TOTAL	17

SUMMER

FIN 3320, Financial Management	3	Life & Phys. Sciences †	4
MGT 3370, Organization & Mgmt.	3	MKT 3350, Intro. to Marketing	3
TOTAL	6	TOTAL	7

THIRD YEAR

<i>Fall: BUILDING SYSTEMS</i>		<i>Spring: BUILDING ENCLOSURE</i>	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 3350, Arch. Construction II	3	ARCH 3314, Contemporary Issues	3
ARCH 3373, Environ. Analysis/Site Plan	3	ARCH 3352, Building Information	3
ARCH 3313, History of World Arch. III	3	ARCH 3355, Arch. Construction III	3
POLS 2302, American Public Policy	3	FIN 3332, Real Estate Fund.	3
TOTAL	17	TOTAL	17

SUMMER

ARCH 4601, Arch. Design Studio VI	6
TOTAL	6

FOURTH YEAR

<i>Fall: COLLABORATION</i>		<i>Spring</i>	
MGT 3373, Managerial Communication	3	Advanced BA course*	3
FIN 4336, Urban Land Develop.	3	Advanced BA course*	3
ISQS 3344, Intro. Prod/Oper. Mgt	3	Economics Course †	3
BLAW 3391, Business Law I	3	MGT 4380, Strategic Mgt.	3
Advanced BA course*	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 161

Students continuing in the M.Arch. program require a Multicultural Requirement.

* These courses must be selected from ACCT, ECO, ISQS, MGT, and MKT. There must be at least one course chosen from at least two of the five areas.

† Choose from the university's core curriculum

‡ Must be junior- or senior-level ECO course except for ECO 3323 or 4332.

- 3352.* Building Information Technology (3).** Prerequisites: 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).** Prerequisite: ARCH 3350. Study of structural capacity, connection design, and envelope performance and cost with emphasis on cladding. Introduction to system integration. Outside assignments required. S.
- 3361. Design Workshop (3).** Special projects and project development in architectural design. May be repeated for credit.
- 3362. Product Design Workshop (3).** 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).** Basic course to develop a working knowledge of the techniques and principles

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 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
CE 1130, Civil Engr. Seminar I	1	CE 1305 or ENGR 1315	3
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
HIST 2300, History of U.S. to 1877	3	PHYS 1408, Prin. Physics I	4
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
TOTAL	17	TOTAL	21

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, statement of intent, GPA, and successful completion of PHYS 1408. Students who have not been admitted to the preprofessional program are not eligible to take courses at the 2000 level and above, except ARCH 2311, 2315, and 3313.

SUMMER			
MATH 2450, Calculus III	4	MATH 3350, Higher Math for Engr.	3
HIST 2301, History of U.S. Since 1877	3	ECE 3301, General Elec. Engr.*	3-4
		or PHYS 2401, Principles of Physics	
TOTAL	7	TOTAL	6-7

SECOND YEAR			
Fall: BASIC-INTERNAL		Spring: BASIC-EXTERNAL	
ARCH 2501, Arch. Design Studio II	5	ARCH 2502, Arch. Design Studio III	5
ARCH 2311, History of World Arch. I	3	ARCH 2315, History of World Arch. II	3
ARCH 2351, Arch. Construction I	3	ARCH 2342, Creative Process	3
CE 2301, Statics	3	ARCH 2355, Arch. Environmental Syst.	3
CE 2101, Construction Materials Lab	1	CE 3303, Mechanics of Solids	3
POLS 1301, American Govt. Org.	3	CE 3103, Mechanics of Solids Lab.	1
TOTAL	18	TOTAL	18

SUMMER			
CHEM 1307, Principles of Chemistry I	3	CHEM 1308, Principles of Chemistry II	3
CHEM 1107, Principles of Chem. I Lab	1	CHEM 1108, Principles of Chem. II Lab	1
POLS 2302, Amer. Public Policy	3	COMS 2300 or 3358	3
TOTAL	7	TOTAL	7

THIRD YEAR			
Fall: BUILDING SYSTEMS		Spring: BUILDING ENCLOSURE	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
CE 3321, Intro. to Geotechnical Eng.	3	ARCH 3352, Building Information	3
CE 3121, Geotechnical Engineering Lab.	1	IE 3341 or MATH 3342	3
CE 3440, Structural Analysis I	4	CONE 2302, Surveying	3
ARCH 3313, History of World Arch. III	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 3354, Engr. Hydrology	3	CE 4340, Structural Analysis II †	3
CE 3309, Environmental Engineering	3	CE 4342, Design of Steel Struc. †	3
CE 3171, Environmental Eng. Lab. I	1	CE 3372, Water Systems Design	3
CE 3302, Dynamics	3	ARCH 3314, Contemporary Iss. in Arch.	3
Multicultural Requirement	3		
TOTAL	16	TOTAL	15

SUMMER I and II			
URBANISM			
ARCH 4601, Arch. Design Studio VI ‡	6		

FIFTH YEAR			
Fall			
ARCH Elective	3		
CE 4330, Design or Engineering Syst.	3		
CE 4361, Transport. Engineering	3		
IE 3301 or ME 2322	3		
TOTAL	12		

Total Hours: 183-184

* PHYS 2401 may be substituted.

† CE 4340 and 4342 offered during spring semesters only.

‡ ARCH 4601 is a prerequisite for Master of Architecture.

Master of Architecture (Professional Program)

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

FIRST YEAR			
Fall: SEEING		Spring: FOUNDATION	
ARCH 1311, Design Environ. & Society	3	ARCH 1412, Arch. Design Studio I	4
ARCH 1341, Arch. Freehand Drawing	3	ARCH 1353, Digital Media I	3
MATH 1321, Trigonometry	3	PHYS 1403, General Physics w/lab	4
Core Curriculum*	3	MATH 1350, Analytical Geometry	3
Core Curriculum*	3	Core Curriculum*	3
TOTAL	15	TOTAL	17

SUMMER			
Core Curriculum—Life & Phys. Sciences*	4	Core Curriculum*	3
Core Curriculum*	3	Core Curriculum*	3
TOTAL	7	TOTAL	6

Preprofessional Program. Competitive placement based on comprehensive review including student portfolio, written essay, GPA, and statement of intent and completion of PHYS 1403. Students who have not been admitted to the preprofessional program are not eligible to take courses at the 2000 level and above, except ARCH 2311, 2315, and 3313.

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. I	3	ARCH 2315, History of World Arch. II	3
ARCH 2351, Architectural Construction I	3	ARCH 2342, Creative Process	3
ARCH 3341, Digital Media II	3	ARCH 2355, Architectural Environ. Syst.	3
Core Curriculum*	3	Multicultural Requirement †	3
TOTAL	17	TOTAL	17

THIRD YEAR			
Fall: BUILDING SYSTEMS		Spring: BUILDING ENCLOSURE	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 3350, Arch. Construction II	3	ARCH 3314, Contemporary Issues	3
ARCH 3373, Environ. Analysis/Site Plan.	3	ARCH 3352, Building Information	3
ARCH 3313, History of World Arch. III	3	ARCH 3355, Arch. Construction III	3
Elective	3	Elective	3
TOTAL	17	TOTAL	17

SUMMER I and II			
URBANISM			
ARCH 4601, Arch. Design Studio VI ‡	6		

FOURTH YEAR			
Fall		Spring: (Professional Level)	
ARCH 4341, Media Elective	3	ARCH 5901, Comprehensive Studio	9
Elective	3		
ARCH Elective	3		
Elective	3		
TOTAL	12	TOTAL	9

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. Check the university catalog or college website 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:		Spring	
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 5362, Theory in Architecture	3	Elective	3
TOTAL	11	TOTAL	11

SIXTH YEAR			
Fall			
ARCH 5503, Adv. Arch. Design Studio	5		
Elective	3		
ARCH Elective	3		
TOTAL	11		

TOTAL HOURS: 173

Students who will graduate under a catalog previous to 2012-2013 must meet the Technology and Applied Science requirement of the core.

* Choose from core curriculum list in the B.S. in Architecture curriculum table.

† Multicultural Requirement course offerings available on the College of Architecture website (www.arch.ttu.edu).

‡ 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, Trigonometry	3	PHYS 1403, General Physics I w/lab	4
Core Curriculum †	3	MATH 1350, Analytical Geometry	3
Core Curriculum †	3	Core Curriculum †	3
TOTAL	15	TOTAL	17

SUMMER

Core Curriculum–Life & Phys. Sciences †	4	Core Curriculum †	3
Core Curriculum †	3	Core Curriculum †	3
TOTAL	7	TOTAL	6

Preprofessional Program. Competitive placement based on comprehensive review, including student portfolio, written essay, GPA, and statement of intent and completion of PHYS 1403. Students who have not been admitted to the preprofessional program are not eligible to take courses at the 2000 level and above, except ARCH 2311, 2315, and 3313.

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. I	3	ARCH 2315, History of World Arch. II	3
ARCH 2351, Arch. Construction I	3	ARCH 2342, Creative Process	3
ARCH 3341, Digital Media II	3	ARCH 2355, Arch. Environ. Systems	3
Core Curriculum †	3	Multicultural Requirement ‡	3
TOTAL	17	TOTAL	17

THIRD YEAR

Fall: BUILDING SYSTEMS		Spring: BUILDING ENCLOSURE	
ARCH 3501, Arch. Design Studio IV	5	ARCH 3502, Arch. Design Studio V	5
ARCH 3350, Arch. Construction II	3	ARCH 3314, Contemporary Issues	3
ARCH 3373, Environ. Analysis/Site Plan.	3	ARCH 3352, Building Information	3
ARCH 3313, History of World Arch. III	3	ARCH 3355, Arch. Construction III	3
Elective	3	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 Elective	3		
Elective	3		
Elective	3		
TOTAL	12	TOTAL	9

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

ISQS 5331, Info. Tech. for Managers	3	ISQS 5345, Statistical Concepts	3
ACCT 5301, Fin. & Manag. Accounting	3	MKT 5360, Marketing Concepts/Strat.	3
TOTAL	6	TOTAL	6

FIFTH YEAR

Fall		Spring	
ARCH 5501, Adv. Arch. Design Studio	5	ARCH 5502, Adv. Arch. Design Studio	5
ARCH 5334, Adv. Studies in Const. Tech.	3	ARCH 5362, Theory in Architecture	3
M.B.A. Core §	3	M.B.A. Core §	3
TOTAL	11	TOTAL	11

SUMMER

ISQS 5330, Managerial Dec. Theory	3	MGT 5391, Strategic and Global Mgmt.	3
MGT 5372, Leadership and Ethics	3	FIN 5320, Financial Mgmt. Concepts	3
TOTAL	6	TOTAL	6

SIXTH YEAR

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

SOME M.B.A. COURSES MAY BE DELAYED TO THE FALL SEMESTER.

Total Hours: 197

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.

Students who will graduate under a catalog previous to 2012-2013 must meet the Technology and Applied Science requirement of the core.

* Prerequisite for ARCH 5901.

† Choose from core curriculum list in the B.S. in Architecture curriculum table.

‡ Multicultural Requirement offerings available on the college's website (www.arch.ttu.edu).

§ Choose 6 hours from MGT 5371 and either BECO 5310 or ECO 5310.

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 University 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. 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 3373, Environ. Analysis/Site Plan.	3	ARCH 2355, Arch. Environ. Systems	3
ARCH 3350, Arch. Construction II	3	ARCH 3355, Arch. Construction III	3
ARCH 3341, Digital Media II	3	ARCH 3352, Building Information Tech.	3
ARCH 3313, History of World Arch.	3	ARCH 3314, Contemporary Iss. in Arch.	3
TOTAL	17	TOTAL	17

SUMMER I and II

General Elective*	3
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FOURTH YEAR

Fall		Spring	
ARCH 4601, Arch. Design Studio VI	6	ARCH 4602, Collaboration Studio	6
ARCH 4354, Integrative Systems	3	ARCH Elective	3
ARCH 4341, Media Elective	3	General Elective*	3
ARCH 4324, Intro. to Historic Preserv.	3		
ARCH 4000, Research in Arch. & Urban	1		
TOTAL	16	TOTAL	12

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

* General elective must be sophomore level or higher Texas Tech course.

Master of Science in Architecture with a Field of Specialization in Urban and Community Design

FIRST YEAR

Fall		Spring	
ARCH 5501, Adv. Arch. Design (Topical UD)	5	ARCH 5502, Adv. Arch. Design (Topical UD)	3
ARCH 7000, GIS Workshop I	1	ARCH 7000, GIS Workshop II	2
ARCH 5315, Systems of Arch. Inquiry	3	ARCH 5384, Community Des. & Devel.	3
ARCH 5382, Urban Theory	3	ARCH 7000, Research (Final Thesis)	2
TOTAL	12	5000-Level Approved ARCH (Urban) Elec.	3
		TOTAL	13

SUMMER I and II

ARCH 5301, Special Probs. (Int'l Urban)*	3	ARCH 6000, Master's Thesis	3
TOTAL	3	TOTAL	3

SECOND YEAR

Fall		Spring	
ARCH 6000, Master's Thesis	3		
TOTAL	3		

Total Program Hours: 34

Master of Science in Architecture with a Field of Specialization in Digital Design and Fabrication

FIRST YEAR

Fall		Spring	
ARCH 5501, Adv. Arch. Design (Topical DDF)	5	ARCH 5502, Adv. Arch. Design (Topical DDF)	5
ARCH 5315, Systems of Arch. Inquiry	3	ARCH 7000, Research - Thesis Proposal	3
ARCH 7000, Digital Workshop I	1	ARCH 7000, Research - Digital Workshop I	2
ARCH 5304, Design Process	3	ARCH 5303, Adv. Arch. Design (Smart Mat.)	3
or ARCH 5352, Computer Apps. to Arch.		or ARCH 5302, Prod. Design Workshop*	
or ARCH 5301, Special Probs. (Robotics)		or Approved Elective	
TOTAL	12	TOTAL	13

SUMMER I and II

ARCH 5301, Special Probs. (International)	3	ARCH 6000, Master's Thesis	3
or Approved Elective			
TOTAL	3	TOTAL	3

SECOND YEAR

Fall		Spring	
ARCH 6000, Master's Thesis	3		
TOTAL	3		

Total Program Hours: 34

- involved in site planning to provide optimum living and working environments. F
- 3501.* **Architectural Design Studio IV (5)**. Prerequisite: ARCH 2502. Building systems. Teaches design skills centered on the building as a technological system and ecological device. Introduces life safety, accessibility, and building codes. Open only to architecture majors or to students having permission of the dean. F
- 3502.* **Architectural Design Studio V (5)**. Prerequisite: ARCH 3501. Building frame and skin. Teaches design skills centered on the technology of enclosure in building design. Considers site and building details. Open only to architecture majors or to students having permission of the dean. S
4000. **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.
4311. **Architecture in Nonwestern Societies (3)**. A study of multicultural architectural contributions, interrelationships of culture and architecture, diversity of traditions, meanings, modernity, and change in the nonwestern world. (Writing Intensive)
4324. **Introduction to Historic Preservation (3)**. An introduction to the history and contemporary practice of historic preservation, including the preservation of buildings, landscapes, and material culture.
4325. **Cultural Heritage Tourism (3)**. Prerequisite: ARCH 4324. Study of the practice and theory of heritage tourism and strategies for the sustainable development and management of cultural heritage tourism initiatives.
4341. **Media Elective (3)**. Analog or digital media options chosen from approved list. May be repeated for credit.
4361. **Architectural Studies Seminar (3)**. The study, presentation, and discussion of issues regarding architecture as an aspect of culture. May be repeated for credit.
- 4391.* **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.
4392. **Historic Preservation Internship (3)**. Prerequisites: ARCH 4324 and 4325. Supervised internship designed to provide students with practical experience. Practicum includes a report, an oral presentation, and a minimum work commitment of 160 hours.
- 4601.* **Architectural Design Studio VI (6)**. 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. (Field Trip or Study Abroad Required)
- 4602.* **Collaboration Studio (6)**. 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) S

Graduate Courses

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)**. Introduction to the design and executed construction of a prototypical piece of furniture or other design product using an architectural design process. S
5303. **Smart Materials (3)**. Studies emerging materials and how properties and performances affect design thinking. Investigates advanced technologies facilitating design innovation in building components and their assemblies. S
5304. **Design Process (3)**. Explores emerging methods of computation as generative tools of the design process in which design intent captured through algorithmic processes and parametric modeling enables design alternatives.
5315. **Systems of Architectural Inquiry (3)**. 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. F
5319. **History of American Architecture: Pre-Contact to 1865 (3)**. 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. F
5320. **History of American Architecture: 1865 to the Present (3)**. 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. S
5321. **Historic Building Technology and Documentation (3)**. 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. S
5324. **History and Theory of Historic Preservation (3)**. Survey of theory and practice of historic preservation and restoration; overview of the history of the preservation movement in the U.S. F
5325. **Conservation Policies (3)**. Survey of federal and state enabling legislation; federal, state, and local policies on historic preservation and urban design, discussion of redevelopment strategies. S
5333. **Special Studies in the History of Architecture (3)**. Prerequisites: 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)**. Prerequisite: ARCH 3355. Approved technology elective dealing with the advanced study of technical building methods and means. F S
5352. **Computer Applications to Architecture (3)**. Survey of digital computer applications to the issues and processes of architecture and planning. May be repeated for credit. F
5354. **Integrative Building Modeling (3)**. Corequisite: C or better in ARCH 5601. Integration of structural, mechanics, electrical, plumbing, and code with life safety systems into building design, through a comprehensive building model.
5361. **Architectural Theory Seminar (3)**. 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)**. 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. F S
5366. **Evidence-Based Architecture (3)**. Historical development and theoretical fundamentals of research based "evidence" in architecture. Challenges and opportunities for different stakeholders. Finding and using "evidence" in design. Case studies. F
5382. **Urban Theory (3)**. An extensive writing course exploring a comprehensive investigation from selected conceptual and philosophical topics based upon the critical relationship between culture and the urban environment. F
5383. **Infrastructure in the Urban Environment (3)**. Addresses the relationship between infrastructure and city form and function in large urban (above 200,000 population) areas. Emphasis is on the city of Houston as a contextual laboratory for learning. S
5384. **Community Design and Development Resources (3)**. Investigation of the development resources available to community and designers emphasizing partnerships and collaboration. S
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)**. 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. F S
5501. **Advanced Architectural Design Studio (5)**. Topical studio that explores design, theoretical and/or technological issues that affect current architectural thought and practice. F S
5502. **Advanced Architectural Design Studio (5)**. Topical studio that explores design and theoretical and/or technological issues that affect current architectural thought and practice. F S
5503. **Advanced Architectural Design Studio (5)**. Topical studio that explores design, theoretical, and/or technological issues that affect current architectural thought and practice. F S
5506. **Collaboration Studio (5)**. An interdisciplinary studio for the design professions addressing the process and skills necessary for collaboration as well as team-development products. (Field Trip Required) F
5601. **Integrative Design Studio (6)**. Corequisite: ARCH 5354. Design of a comprehensive architectural project based on a building program and site that includes understanding of structural and environmental systems, building assemblies, and principles of sustainability.
5622. **Preservation Studio (6)**. Research on current preservation issues. Individual projects required.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Land-Use Planning, Management, and Design (LPMD)

Graduate Courses

7000. **Research (V1-12)**
8000. **Doctor's Dissertation (V1-12)**.

College of Arts and Sciences

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About the College

The College of Arts and Sciences offers a broad spectrum of programs and courses in the liberal arts; humanities; mathematics; and social, behavioral, and natural sciences. The primary function of the college is to impart to students the knowledge, skills of thinking and communicating, and values and attitudes that constitute a liberal education. The faculty of the college seek to instill in their students a humanistic spirit, an appreciation of creativity, a commitment to excellence and truth, an ability to think critically and communicate effectively, and a desire for lifelong learning.

The courses and programs in the college also provide a base of knowledge and skills from which students may enter such professional fields of study as law and medicine.

Undergraduate Curriculum

General Degree Requirements

Baccalaureate Degrees. 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, honors, human sciences, media and communication, 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 at Texas Tech.

Students should have selected their major and minor fields by the time they reach their sophomore 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 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.

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. 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.

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 a 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 room 102 Holden Hall to help with selecting general degree requirements, electives, and a major. Skill/interest testing is available to students at 79 Holden Hall. After taking courses that are required for most majors (e.g., English, American history, political science, mathematics), students have the flexibility to begin working toward any of the major fields offered within the College of Arts and Sciences. **ONLY STUDENTS WITH FEWER THAN 45 HOURS MAY BE LISTED AS ARTS AND SCIENCES UNDECLARED. Students who have completed 45 or more hours will have a hold placed on their records until they declare a major and minor.**

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 45 hours of coursework, including transfer courses and awarded credit. In addition, the Intention to Graduate form must be submitted at the same time the degree plan is submitted. Students who have completed 45 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 teacher certification by taking the required courses in the College of Education. Those students planning to become high school teachers should minor in secondary education. Students beginning their teacher education program in the spring of 2013 or later will participate in a program that includes a full year of student teaching during the two semesters of their senior year. 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 must be in the major. These hours are in addition to the courses counted toward the first bachelor's degree. Credit by examination 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. The College of Arts and Sciences does not allow students with an undergraduate degree who are seeking to take only “prerequisite” coursework for eventual application to a professional health school to enter a second undergraduate degree program. These students should contact the Graduate School and seek permission to enter an interdisciplinary studies program.

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 Undergraduate Admissions section of this catalog for information on credit provided by test scores to meet these requirements. Students must take the specified number of hours in the areas listed below. With a few exceptions, courses from the major and minor may be used to satisfy these requirements. Courses taken at State of Texas non-public or out-of-state institutions and transferred to Texas Tech will be evaluated on a case-by-case basis and, if acceptable, will be applied to core and general education requirements as applicable. 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 may be used as equivalent to fulfill 3 hours of this requirement. Literature courses taken at the junior/senior level and transferred in will be reviewed to determine applicability to requirements.	
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 total 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. 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 Learning 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	6
MATH 1300, 1320, 1321, 1330, 1331, 1350, 1420, 1430, 1451, 1452, 1550, 2300, 2345, 2450, 2360, 2370, or 2371. Only one of MATH 1320 or 1420 may apply. Only one of MATH 1330 or 1430 may apply. Students cannot receive credit for more than one of AAEC 2401; MATH 2300, 2345; PSY 2400. PHIL 2310 or PSY 2400 may be used to satisfy 3 hours of this requirement. At least 3 hours of mathematics (from the list of courses above) must be taken to fulfill the mathematics requirement.	
Life and Physical Sciences	8
Courses must be selected from the list of core curriculum options.	

Social and Behavioral Sciences 6
 Courses must be selected from the list of core curriculum options.

United States History 6
 Courses must be selected from the list of core curriculum options.

United States and Texas Government 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.

Language, Philosophy, and Culture 6
 One course must be selected from the core curriculum options. The other course can be selected from the core curriculum options or from the college general education requirements. See www.depts.ttu.edu/artsandsciences/students/undergraduate/.

Creative Arts 6
 One course must be selected from the core curriculum options. The other course can be selected from the core curriculum options or from the college general education requirements. See www.depts.ttu.edu/artsandsciences/students/undergraduate/.

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). 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.

In addition to the general degree requirements for the Bachelor of Arts, students will have to complete majors and minors based on the various individual departmental requisites. Sample curriculum tables have been provided in the departmental sections for nearly all majors and minors. In some cases, degree requirements may be fewer than the hours presented in the tables.

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; Geosciences; Health, Exercise, and Sport Sciences; Mathematics and Statistics; and Physics. A minimum of 24 hours at the junior/senior level is required in the major. **Requirements for the B.A. degree apply unless specifically shown to the contrary.** The following courses are required (see details of each subject area in the previous list of B.A. general requirements):

Semester Hours

English 12

Oral Communication 3

Foreign Language 11-16
 Although foreign language requirements for a B.A. degree also apply to B.S. degrees, the dean may exempt the B.S. second-year foreign language requirement for students who wish to pursue certain dual degrees between another college and the College of Arts and Sciences when the other college does not have a second-year foreign language requirement. Exemption requests may be completed and submitted to Holden Hall 102 at any time prior to the semester of graduation. NOTE: Dual degree students who cancel their other degree program for any reason or become ineligible to continue in the other degree program will be required to complete the 6 hours of a single foreign language at the sophomore level in their Arts and Sciences B.S. degree program.

Mathematics 6

United States History 6

United States and Texas Government 6

Life and Physical Sciences 8

Social and Behavioral Sciences 3

Language, Philosophy, and Culture 3

Creative 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.

In addition to the general degree requirements for the Bachelor of Science, students will have to complete majors and minors based on the various individual departmental requisites. Sample curriculum tables have been provided in the departmental sections for nearly all majors and minors. In some cases, degree requirements may be fewer than the hours presented in the tables.

Bachelor of General Studies

The 120-hour Bachelor of General Studies (B.G.S.) is a challenging and rewarding option for students who wish a greater degree of flexibility in their course of study. As an interdisciplinary degree, it is not based on a specific major or minor. Instead, the student's curriculum will consist of courses from three areas of concentration, at least two of which should be established minors (or interdisciplinary programs) recognized within the 2012-2013 catalog or later. **Further, two of the three areas must be within the College of Arts and Sciences.** Thus, a well-designed B.G.S. degree can help a student prepare to pursue a particular intellectual interest, a professional ambition, or graduate study. The three concentration areas form a coherent specialization that is unavailable elsewhere in the university as an organized plan of study.

A 2.0 GPA is required for admission into this program. In addition, a 2.0 GPA at Texas Tech University is required for graduation. Completion of the B.G.S. is possible through on-campus or a combination of on-campus and web-based courses. Development of more web-based offerings is on-going

B.G.S. Policies and Procedures

- Each degree plan must be reviewed by the Student Division of the College of Arts and Sciences to be considered official. This is done to ensure conformity with graduation and B.G.S. area requirements. Degree plans must be submitted to the Student Division of the College of Arts and Sciences one semester after a student has achieved 45 hours of total coursework. Intentions to graduate must be submitted at the same time.
- Nine hours in each area must be taken in residence at Texas Tech. A minimum of six of those hours must be taken at the junior/senior level. Some minors (areas of concentration) may require more than 9 hours.
- A minimum of 24 hours of junior-/senior-level courses must be taken within the three areas of study.
- No block credit from another university will be permitted.
- Students must complete a minimum of 6 hours of designated writing intensive coursework within one or more of the selected Arts and Sciences areas of study. Writing intensive coursework that applies to the student's degree plan must be taken in residence at Texas Tech University; transfer credit may not fulfill the writing intensive requirement.
- CLEP cannot be used to meet residency requirements.
- The Student Division (in cooperation with the department[s] for each area of concentration) will determine course substitutions.
- The Student Division (in cooperation with the department[s] for each area of concentration) will be responsible for approval

Bachelor of General Studies Curriculum

FIRST YEAR

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
Life and Physical Sciences Elective	4	Life and Physical Sciences Elective	4
Social & Behavioral Sciences	3	Social & Behavioral Sciences	3
Mathematics	3	Mathematics	3
TOTAL	16	TOTAL	16

SECOND YEAR

Fall		Spring	
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
Language, Phil., & Culture Elective	3	Language, Phil., & Culture Elective	3
Oral Communication Elective	3	Elective	3
Multicultural Requirement	3	Elective	2
Creative Arts Elective†	3	Creative Arts Elective	3
Personal Fitness & Wellness	1	Personal Fitness & Wellness	1
TOTAL	16	TOTAL	15

THIRD YEAR

Fall		Spring	
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
Concentration Area	3	Concentration Area	3
Concentration Area	3	Concentration Area	3
Concentration Area	3	Elective	3
Concentration Area	3	Concentration Area (WI)	3
Concentration Area (WI)	3		
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

Prerequisites for courses selected in the concentration areas must be completed and, depending on the concentration, may or may not count toward the 18-hour minimum in each concentration.

If an entering student has not completed two years of a single foreign language in high school or has not transferred at least two semesters of a single foreign language from another college, the student must complete at least two semesters of a single foreign language at the first-year level as a graduation requirement.

ing transfers during the last 30 hours of a degree program, as well as concurrent enrollment.

- If a student has not completed two years of a foreign language in high school, they must complete two semesters of a single foreign language. Courses such as SPAN 1507, which is only 5 hours, will not fulfill this requirement.
- Each of the three areas of concentration must include at least 18 hours of coursework. If all three concentrations are within the College of Arts and Sciences, the student may apply 24 hours of coursework taken outside the college. If one of the areas is outside of Arts and Sciences, the student may apply 30 hours of coursework taken outside of Arts and Sciences.
- A total of 40 hours of junior/senior level coursework is required for the 120-hour degree.

The B.G.S. is administered and supervised by the Student Division of the College of Arts and Sciences. For more information contact Dr. Jorge Iber, Associate Dean, Student Division, College of Arts and Sciences, 806.742.3831 or Jorge.Iber@ttu.edu.

Bachelor of Science in International Economics

The 120-hour Bachelor of Science in International Economics (B.S.I.E.) provides understanding of international economic and commercial relationships through concentrations of coursework in international economics, international politics, and international business. This understanding is important for a variety of careers with either direct or indirect international aspects. Requirements for the B.S. degree apply unless specifically shown to the contrary. The sample curriculum table below reflects the general degree requirements for a B.S. in International Economics. For more information and academic advisement, contact the Department of Economics.

FIRST YEAR

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
ECO 2301, Principles of Economics I	3	ECO 2302, Principles of Economics II	3
Life and Physical Sciences Elective*	4	Life and Physical Sciences Elective*	4
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
IS 1100, Freshman Seminar	1	Creative Arts Elective*	3
TOTAL	14	TOTAL	16

SECOND YEAR

Fall		Spring	
ENGL 2311, Intro. to Technical Writing	3	ENGL Literature	3
ECO 3312, Intermediate Econ. Theory§	3	ECO 3311, Intermed. Macroeconomics§	3
MATH 1330, Intro. to Math. Analysis I††	3	MATH 1331, Intro. to Math. Analysis II††	3
HIST 2300, History of the U.S. to 1877‡‡	3	HIST 2301, Hist. of the U.S. Since 1877‡‡	3
Foreign Language†	3	Foreign Language†	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
TOTAL	16	TOTAL	16

THIRD YEAR

Fall		Spring	
ECO 3333, International Economics	3	ECO 4331, Econ. of Multinat. Enterprise	3
ECO Elective	3	ECO Elective	3
MATH 2300 or 2345	3	Oral Communications Elective*	3
International POLS Course‡	3	International POLS‡	3
IB/ME/C and Q Elective#	3	IB/ME/C and Q Elective#	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
ECO Elective	3	ECO 4332, International Finance	3
International POLS Course‡	3	Elective	3
IB/ME/C and Q Elective#	6	IB/ME/C and Q Elective#	3
Multicultural Elective**	3	Electives	4
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

* See Arts and Sciences General Degree Requirements for more information. 3 hours of English literature coursework will fulfill 3 hours of Language, Philosophy, and Culture requirements for B.S.I.E. degree.

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ Choose from POLS 3360, 3361, 3363, 3364, 3366, 3368, 3371, 3372, 3373, 3375, 3376. Note that not all courses will be offered in a given semester.

§ The order in which the student takes ECO 3311 and 3312 may be switched.

Choose from the International Business, Managerial Economics, Cultural and Quantitative Tools component (in addition to MATH 2300 or 2345). Approved courses are ACCT 2301; MKT 4358; MGMT 4375; ECO 3305, 3320, 4305; AAEC 4302, 4306, 4312, 4317; FIN 3320, 4328; ISQS 3344; FREN 2390, 4304; SPAN 3306, 3344, 3390, 4344; GERM 3301, 4309; RUSN 2304; TURK 3307. The courses listed in bold will also satisfy the multicultural requirement. Note that not all courses will be offered in a given semester.

** Choose from the multicultural requirement list.

†† Or more advanced MATH course.

‡‡ HIST 2310 may be substituted for HIST 2300 or 2301.

Interdisciplinary Programs in College of Arts and Sciences

Undergraduate Degrees

B.A. in Global Studies

A Bachelor of Arts in Global Studies encompasses interdisciplinary study of global, international, and regional politics, economics, culture, and society. The global studies degree will provide students with training and education appropriate to individuals seeking careers in diplomatic service, non-governmental organizations, international organizations, and foreign policy. Students will be prepared to undertake graduate studies in a variety of fields with international orientation. Graduates of the program will be able to contribute to Texas Tech's vision of championing global engagement, educating a diverse and globally competitive work force, and enhancing the cultural and economic development of the state, nation, and world. The global studies major requires students to take 21 semester credit hours of required courses, and 21 semester credit hours of prescribed electives. In addition, this degree requires 6 hours of 3000- or 4000-level foreign language. Substitutions may be made to these requirements with the consent of director. A minor is not required for completion of this degree.

Contact information: Dr. John Barkdull, Department of Political Science, 806.742.4043, john.barkdull@ttu.edu

Course Descriptions

(To interpret course descriptions, see page 23.)

Global Studies (GLST)

Undergraduate Course

- 3300. Selected Topics (3).** Various topics relevant to interdisciplinary study of global affairs. Open to all students. Repeatable for up to 6 hours subject to approval from advisor.
- 4300. Global Studies Capstone (3).** Prerequisite: Consent of instructor. Students will develop a synthetic comprehensive understanding of global studies, demonstrating the ability to draw connections among diverse disciplines and issues. (Writing Intensive)

Graduate Programs

For information on interdisciplinary graduate programs offered by the College of Arts and Sciences, visit the Graduate School section of the catalog on page 122.

Undergraduate Minors

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 (**bold** courses are required): **MATH 2356, 4342, 4343**; FIN 3320, 3322, 4329; and ECO 2301 (or AAEC 2305), 2302, and 4305 (or AAEC 4302).

B.A. in Global Studies Sample Curriculum

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Oral Communications*	3	POLS 2302, American Public Policy	3
Mathematics*	3	Creative Arts*	3
Language, Philosophy & Culture*	3	Mathematics and Logic*	3
POLS 1301, American Govt. Org.	3	Life & Physical Sciences*	4
TOTAL	15	TOTAL	16
SECOND YEAR			
Fall		Spring	
2000-Level English Literature	3	2000-Level English Literature	3
2000-Level Foreign Language †	3	2000-Level Foreign Language †	3
Life & Physical Sciences*	4	HIST 2301, Hist. of the U.S. Since 1877	3
U.S. History*	3	GEOG 2351, Regional Geog. of World	3
Personal Fitness and Wellness*	1	Personal Fitness and Wellness*	1
Elective	1	Elective	1
TOTAL	15	TOTAL	14
THIRD YEAR			
Fall		Spring	
HIST 2323, World History Since 1500	3	EMC 3358, International Electronic Media	3
Creative Arts*	3	Prescribed Elective §	6
POLS 3361, International Politics ‡	3	3000- or 4000-Level Foreign Language †	3
3000- or 4000-Level Foreign Language*	3	POLS 3368, Transnational Issues	3
Prescribed Elective §	3	TOTAL	15
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Prescribed Elective §	6	GLST 4300, Global Studies Capstone	3
Elective	6	Prescribed Elective §	6
Writing Intensive Elective #	3	Elective	6
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* Choose from General Core Curriculum Requirements.

† A student must complete 12 hours at the designated level in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5 hour review course, or, in some cases, the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ Political science majors may substitute with POLS 3360, 3363, 3364, 3365 or 3366.

§ Students will choose prescribed electives with the guidance and consent of the major advisor or program director.

Choose one from: AAEC 4306, 4309; ACCT, 4314; ADM 3312; ARCH 3313, 4311; ARTH 3303, 3320, 3345, 3366, 4314, 4320, 4335, 4340, 4389; BIOL 3307; CLAS 4300, 4310; ECO 4331, 4322, 4332; HIST 4301, 4308, 4309, 4310, 4343, 4347, 4348, 4349, 4350, 4351, 4353, 4355, 4360, 4363, 4365, 4373, 4375, 4376, 4377, 4378, 4379, 4381, 4382, 4383, 4384, 4385, 4386, 4391, 4392, 4393, 4394, 4395, 4396; MUHL 2302, 2303; NS 4380; PHIL 3301, 3303; RTL 3340; RUSN 4301; 4302; SLAV 4300; and a writing intensive section from POLS 3300, 3301, 3363, 3364, 3366, 3371, 3372, 3373, 3375, 3376 (the course chosen for this requirement may not also be applied as a prescribed elective).

Contact: Dr. Alexandre Trindade, Department of Mathematics and Statistics, 806.834.6164, alex.trindade@ttu.edu, or Dr. Lih-Ing Roeger, Department of Mathematics and Statistics, 806.834.6265, lih-ing.roeger@ttu.edu.

Asian Studies

The minor in Asian studies allows students throughout the university to develop a more in-depth understanding of the history, literature, and culture of a vital part of the world. Besides taking core courses and electives drawn from a wide range of disciplines, including anthropology, architecture, English, geography, history, philosophy, political science, and theater arts, students may also study Asian languages such as Chinese, Japanese, or Vietnamese and are encouraged to take part in study abroad programs in South Asia, East Asia, Southeast Asia, and Central/Inner Asia. The minor in Asian Studies requires 18-22 hours of coursework in addition to the courses taken to fulfill a student's major. A minimum of 6 hours of junior/senior coursework is required for this minor, of which 3 hours must be completed in residency at Texas Tech. No more than 3 courses from one department can be counted toward the minor. Course offerings: ANTH 3304; ARCH 4311; CHIN 1501, 2301, 2302, 4300; CMLL 1501, 1502, 2301, 2302, 4300; ENGL 3387, 3391,

3394; GEOG 2351; HIST 2322, 3330, 3333, 3389, 3394, 3398, 4383, 4384, 4385, 4392, 4393, 4394, 4395, 4396; HONS 3303-H02; JAPN 1501, 1502, 2301, 2302, 4300; PHIL 2350, 3302; POLS 3300, 3361, 3364, 3368, 3371, 3376; SOC 4307; VIET 4300.

Contact: Dr. Yuan Shu; Department of English, 806.834.8810; yuan.shu@ttu.edu

Book History and Digital Humanities

The interdisciplinary minor in book history and digital humanities allows students to investigate many disciplines, including but not limited to the history of ideas, the history of religion, literature, technical communication, economics, fine art and art history, the study of cognition and education, communication studies, and anthropology. Courses in the minor include information related to materiality of texts (writ large); technological change; reading, readership, reception; cognition and the brain; historical contexts related to text production; censorship and seditious printing; etc.

The minor consists of 18 hours of coursework, at least 6 hours of which come from ENGL 2312, 3360 (when taught as Technologies of Writing), and HIST 3354. Electives may come from ANTH 3348; ENGL 3382, 4313 (when subtitled History of the Book); GEOL 3323, 4318; HIST 3327, 3328, 3352, 3354, 3350, 3360, 4348, 4373; PHIL 2350, 3340, 3341, 4331; PSY 4343. Students may also choose up to six hours from outside of the College of Arts and Sciences, including ARTH 4307, 4334, 4340; and ARCH 4324.

Contact: Dr. Ann Hawkins; Department of English, 806.742.2501; ann.hawkins@ttu.edu

Community and Urban Studies

The College of Arts and Sciences offers an interdisciplinary minor in community and urban studies. This program exposes students to a variety of perspectives on conditions and problems of urban life, including issues of sociology, education, economics, politics, race and ethnicity, law, poverty, crime, environment, physical and mental health, art and design, planning, and others. The program is highly flexible and adaptable to each student's needs.

To complete the minor in community and urban studies, students must complete 18 hours of courses approved by the director. The minor requires a minimum of 6 hours of upper division (3000-level courses or higher) coursework, of which 3 hours must be completed in residency at Texas Tech (as opposed to abroad). No more than 9 hours of coursework from one program can be counted toward the minor. Students must receive a grade of C or better in all courses applied toward the minor. A list of approved courses can be found on the program's website (www.depts.ttu.edu/artsandsciences/cus/). Other applicable courses may be approved at the director's discretion.

Contact: Dr. Patricia Maloney, Department of Sociology, Anthropology, and Social Work, 806. 834.8969, patricia.maloney@ttu.edu

Comparative Literature

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; CMLL 2305; ENGL 3337, 3384, 3389; GERM 2312; HUM 2301, 2302; SLAV 2301; 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: Dr. Kanika Batra, Department of English, 806.252.0086, kanika.batra@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).** Introduction to the most important contemporary theories on the nature and origin of meaning in culture.
- 4317. Readings in Comparative Literature and Culture (3).** 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 Department of English, Department of Theatre and Dance, and College of Media and Communication 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 18 hours—12 in writing and 6 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 2351, 3351, 4351; EMC 4370, 4375, 4380; and THA 4303 (may be repeated for credit). The 6 hours in analysis will include THA 4300 and one course from the following: EMC 3345, ENGL 2388, 3388, 4312, 4315. Courses in which the student earns less than a C may not be counted toward the minor. This 18-hour requirement may not include courses taken to fulfill requirements in the student's major field.

Contact: Dr. Norman Bert, Maedgen Theatre, norman.bert@ttu.edu, 806.834.7590

Environmental Studies

The college offers an interdisciplinary minor in environmental studies. This minor is nontechnical in nature and specifically designed for students seeking the Bachelor of Arts degree. It focuses on the interaction of humans and the natural environment and the consequences of that interaction. The minor does not train professional environmentalists but will, in combination with existing major programs, give students a broad foundation as preparation for more advanced environmental studies programs; professional work in law, regional planning, or resource management; and various environmental positions in government, business, or teaching. The minor also will provide students with a better understanding of basic ecology and the nature of environmental problems in order to make more knowledgeable value judgments on environmental issues.

The minor consists of 18 hours of elective courses. No more than two courses from any department or program may count toward the minor. At least 6 hours must be from upper-division courses. Courses that students use to fulfill their major requirements may not be applied toward fulfillment of requirements for an environmental studies minor. A course may count toward a major or minor, but not both. Electives in the program include AAEC 4309; ARCH 1311; ATMO 1300, 2301; BIOL 1305, 1401, 1402, 3303, 3307, 3309; ECO 3336; EVHM 1301, 1302, 2302, 3300, 3305, 3306, 3350; GEOG 1300, 1401, 3301, 3310, 3335, 3353, 3360, 4301, 4321, 4357; GEOL 1303, 3322, 3323, 3328; HLTH 2302; HIST 3327, 4323; LARC 2302, 4302; NRM 1300, 2301, 2302, 2305, 2307, 3302, 3307; PHIL 3325; WE 1300, 2300, 3315.

Contact: Dr. Mark Stoll, Department of History, 806.742.3744, mark.stoll@ttu.edu

Ethnic Studies

The college offers an interdisciplinary minor in ethnic studies. The goal of the program is to increase students' understanding of the nature and development of race relations in a globalized society. 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; ARTH 3333, 4335; COMS 3332; ENGL 3322; HIST 3311, 3312, 3318, 3324, 3325, 3326, 3395, 4326, 4383; MUHL 3304; PSY 3398; SOC 3324, 4362; SPAN 4320, 4360.

Contact: Dr. Julian Perez, Department of Classical and Modern Languages and Literatures; 806.834.6332; julian.perez@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. Basic courses and sophomore-level English courses will not count towards the minor.

Contact: Dr. Aliza Wong, Department of History, 806.742.3744, aliza.wong@ttu.edu

Family Life Studies

The Colleges of Arts and Sciences and Human Sciences jointly offer an interdisciplinary minor in family life studies. The program involves an integrated course of study that provides the student with diverse 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, 3313, 3314, 4312; HDFS 2300, 2303, 2322, 3301, 3320, 3321, 3322, 3324, 3326, 3331, 3332, 3350; HIST 3311, 3322, 3323, 3341, 3394, 4325, 4326, 4375, 4380, PFP 1305, 3301; PSY 2301, 2305, 3341, 4300, 4301; SOC 2331, 3325, 3331, 3335; SW 3311, 3312.

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

Film and Media Studies

The interdisciplinary minor in film and media studies allows students to focus on the history and criticism of film and media while encouraging courses in multiple disciplines. Because of its interdisciplinary nature, the minor complements many majors and allows students to learn about the cinema cultures of diverse countries and language groups. It offers students the freedom to explore such questions as the role of media in historical and social change, issues of media preservation, the relationship between technology and artistic expression, the relationship of media to cognition, and the study of film as a means of appreciating cultural diversity.

Although the curriculum focuses on film, courses in other media such as television, radio, photography, sound recording, video games, digital art, or media industries also can apply to the minor. Students who are seeking professional training in media production

will be encouraged to pursue those interests through cooperative programs in the College of Media and Communication and/or the College of Visual and Performing Arts.

The minor in film and media studies requires 18 credit hours taken from courses in at least three departments. Students in the College of Arts and Sciences must take at least 6 hours from upper-division courses. Students should consult with the director concerning course selection and progress toward the minor. For details on eligible courses, visit www.depts.ttu.edu/english/undergrad_info/FMS_minor.php.

Contact: Dr. Allison Whitney, Department of English, 806.742.2501, allison.whitney@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 ANTH 2308.

Students must choose one of the following tracks from which 15 credit hours must be chosen:

- **Physical and Biological Sciences:** CHEM 3141, 3341, 4010, 4114, 4314; BIOL 3416; MBIO 3401; ZOOL 4321; ENTX 4325, 4326; ANTH 2305, 4343; and AHMT 4305.
- **Social and Behavioral Science:** ANTH 3303, 4320; PSY 4000, 4384; SOC 2335, 3326, 3327, 3335, 4325; GIST 3300; and GEOG 3301.

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 ANTH 3303) do not count toward the minor. Cross-listed courses that are required by the major cannot be counted toward the minor.

Contact: Dr. Robert Paine; Department of Sociology, Anthropology, and Social Work; robert.paine@ttu.edu

Health Professions

An interdisciplinary minor in health professions is for students who are planning to apply to post-graduate health profession programs with very specific prerequisite requirements. The minor will meet the needs of pre-professional health careers students who may require courses outside their major. All students who are enrolled in the health professions minor will be required to complete ZOOL 2403 (Anatomy). The requirements for the minor are as follows:

- A minimum of 18 hours of approved classes.
- A minimum 2.0 GPA to declare the health professions minor.
- No more than three classes from any department or program may count toward the minor. Classes with a corresponding lab (e.g., CHEM 1305/1105) will count as one class for this requirement.
- A minimum of 6 hours at the junior or senior level taken at Texas Tech.
- Substitutions to the existing course list (see below) may be made with prior approval of the advisor if a course is shown to be a prerequisite for a specific health professions program.
- Courses used to fulfill requirements for the student's major may not be applied toward fulfillment of the health professions minor (does not include adjunct requirements).

Approved courses for the minor include the following: BIOL 1402; CHEM 1305/1105, 1307/1107, 1308/1108, 2303/2103, 3305/3105, 3306/3106; ENGL 2311; ESS 3301, 3303, 3305; HDFS 2303, 3321, 3332, 4343; HUSC 3221; MATH 1451, 2300; MBIO 3400 or 3401; NS 1325, 1410, 4220; PHYS 1403, 1404, 1408, 2401; PSY 2400, 4301, 4305; ZOOL 2403, 2404, 3303.

Contact: Pamela Hellman, Department of Biological Sciences, 806.742.2710, pamelahellman@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.

Contact: Dr. John Barkdull, Department of Political Science, 806.742.4043, john.barkdull@ttu.edu

Linguistics

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 English; Classical and Modern Languages and Literatures; Communication Studies; English; Philosophy; Psychology; Sociology, Anthropology, and Social Work; and Curriculum and Instruction.

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 and hearing sciences, psychology, anthropology, sociology, literature, philosophy, and computer science. It is, therefore, an interesting and useful minor area for students majoring in these fields and one that can help to develop a more focused area of academic or professional specialization. Of the 18 hours of credit required for a linguistics minor, 3 hours (i.e., one course) must be taken from each group listed below. The remaining 6 hours may be taken from courses within Groups B, C and D, but only 3 hours can be taken from Group A. Students should work with a linguistics professor to construct a 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; LING 4315

Group C — EDBL 3337; ENGL 3372, 4373; LING 4311, 4327, 4332

Group D — ANTH 3351; LING 4383; COMS 3332; EDBL 3334; EDLL 3352; ENGL 2371, 4300, 4371; PHIL 4310, 4331; PSY 4324, 4343

Contact: Dr. Min-Joo Kim, Department of English, 806.742.2501, min-joo.kim@ttu.edu

Undergraduate Courses in Linguistics (LING)

- 4311. Methods of Teaching Second and Foreign Languages (3).** 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).** 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).** Prerequisite: Consent of instructor. Raises awareness of the social and educational implications of teaching English as a second language.

4332. Child Language Acquisition (3). 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). 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). 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.

Literature of Social Justice and Environment

The minor in the Literature of Social Justice and Environment (LSJE) provides a structured program that allows students to benefit from the creative possibilities of interdisciplinary research. Because of its interdisciplinary nature, the LSJE minor compliments many majors and allows students to investigate courses committed to empowering them as responsible and conscientious global citizens. This minor is intended to engage students with the most important contemporary developments in the study of race, gender, sexuality, global studies, and the natural environment. The program offers the freedom to explore diverse interdisciplinary approaches while developing a global consciousness rooted in a broad, yet practical understanding of the institutions that shape our human efforts.

Core courses in the Department of English focus on issues of social justice within the context of specific cultures and peoples. Within the LSJE curriculum, students may further explore discourses ranging from the gendered politics of the world of sports to historical treatments of nature and identity. They may choose to focus on topics of environmental ethics, political philosophy, and international politics. The program is flexible and adaptable to each student's needs.

The LSJE minor requires 18 credit hours, 6 of which are required ENGL courses. No more than two courses from any department or program may count toward the minor. The College of Arts and Sciences requires that at least 9 hours be from upper-division courses.

Contact: Dr. Cordelia Barrera, Department of English, 806.742.2501, cordelia.barrera@ttu.edu

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.

Core Courses: ANTH 3323; CLAS 3302, 3350; ENGL 3383, 3384; HIST 3328, 3344, 4347, 4349, 4384, 4385; PHIL 2350, 3302, 3324; POLS 3339, PSY 3310; SOC 4331

Other Courses: ANTH 3325, 3346; ARTH 3320, 3345, 4340; HIST 3301, 3302, 3342, 3348, 3394, 3395, 3398; PHIL 2320; POLS 3330, 3332

Contact: Dr. Mark Webb, Department of Philosophy; 806.742.0373; mark.webb@ttu.edu

Department of Biological Sciences

Llewellyn D. Densmore, Ph.D., Chairperson

Professors: Bradley, Carr, Chesser, Densmore, Heintz, Holaday, McIntyre, Patino, Phillips, Rice, M. San Francisco, Sheridan, Strauss, Wilde, Zak, H. Zhang

Associate Professors: Cannon, Collie, Diamond-Tissue, Dini, Gollahon, Held, Jeter, Kingston, McGinley, Olson, Ray, Reilly, Rock, Rodgers, Salazar-Bravo, Schmidt, Schwilk, Xie, K. Zhang

Assistant Professors: Butler, Keyel, McGuire, Serra-Moreno

Research Assistant Professor: Carr, Harris

Instructors: Boros, Lockwood, McMichael

Adjunct Faculty: Acosta-Martinez, Allen, Arsuffi, Boal, Dowd, Kottapalli, Lyte, Owen, Parajulee, Payton, Phillips, Reece, Rodriguez, Rylander, S. San Francisco, Shi, Torres, Tripathy

CONTACT INFORMATION: 108 Biology Building, Box 43131, Lubbock, TX 79409-3131, T 806.742.2715, F 806.742.2963, www.biol.ttu.edu/default.aspx

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 Microbiology
- Master of Science in Zoology
- Professional Science Master's in Environmental Sustainability and Natural Resources Management
- Doctor of Philosophy in Biology
- Doctor of Philosophy in Zoology
(Program being consolidated with Ph.D. in Biology, effective August 31, 2018. No new students will be accepted for this degree.)

Undergraduate Program

Bachelor of Science in Biology. Students majoring in biology must complete a total of 120 credit hours for graduation, including a minimum of 39 hours taken from this department. Requirements for the B.S. in Biology are as follows:

- 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.
- CHEM 1307, 1308, 1107, 1108, 3305, 3306, 3105, 3106
- PHYS 1403, 1404 or 1408, 2401
- MATH 2300 or 1451

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. Requirements for this specialization are as follows:

- BIOL 1403, 1404, 3416, 3309, and 4305.
- Group I—At least one course from BIOL 3306, BOT 3401 or NRM 3401, MBIO 3401, ZOOL 4409, or BIOL 3320 and 3120.
- Group II—At least one course from BOT 3404; ZOOL 3405, 3406, 4407.
- Group III—At least four courses from BIOL 3307, 3405, 4301, 4310, 4330; MBIO 4401; ZOOL 3403, 4312, 4321, 4406, 4408, 4410.
- Group IV—Additional 3000- or 4000-level courses from BIOL, BOT, MBIO, or ZOOL as needed to bring the total to 39 hours. Either PHIL 3322 or 3325 may be substituted.
- CHEM 1307, 1308, 1107, 1108, 3305, 3306, 3105, 3106
- PHYS 1403, 1404 or 1408, 2401
- MATH 2300 or 1451

Bachelor of Science in Cell and Molecular Biology. Students majoring in cell and molecular biology must complete a total of 120 credit hours for graduation, including a minimum of 39 hours taken from this department. Requirements for the B.S. in Cell and Molecular Biology are as follows:

- BIOL 1403, 1404, 3120, 3302, 3320, 3416, 4320.
- Four courses, at least one of which must include a laboratory from: BIOL 3410, 4300 (counts as a laboratory course), 4305, 4307; either BOT 3401 or NRM 3401; MBIO 3401, 4303, 4310, 4367, 4402, 4404, 4406; ZOOL 3401, 4304, 4409.
- Additional 3000- or 4000-level courses from BIOL, BOT, MBIO, or ZOOL as needed to bring the total to 39 hours. Either PHIL 3322 or 3325 may be substituted.
- CHEM 1307, 1308, 1107, 1108, 3305, 3306, 3105, 3106, and either 3310 or both 3311 and 3312.

Bachelor of Science in Microbiology. Students majoring in microbiology must complete a total of 120 credit hours for graduation, including a minimum of 39 hours taken from this department. Requirements for the B.S. in Microbiology are as follows:

- BIOL 1403, 1404, 4305; BIOL 3416 or MBIO 4406; MBIO 3401.
- At least five courses from BIOL 3320, 4300, 4301 plus 4110 (Fungal Biology); MBIO 4303, 4310, 4367, 4401, 4402, 4404, 4406; FDSC 3301.
- 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.

Bachelor of Science in Zoology. Students majoring in zoology must complete a total of 120 credit hours for graduation, including a minimum of 39 hours taken from this department. Requirements for the B.S. in Zoology are as follows:

- 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.
- CHEM 1307, 1308, 1107, 1108, 3305, 3306, 3105, 3106
- PHYS 1403, 1404 or 1408, 2401
- MATH 2300 or 1451.

Departmental Requirements. 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 and zoology majors and students in the ecology and environmental biology specialization must take either MATH 1451 (calculus) or MATH 2300 (statistics). Cell and molecular biology majors must take one semester of calculus (MATH 1451). Microbiology majors must take either MATH 1451, 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.

Writing Intensive Courses. Six hours of coursework taken in this department for use toward the major must be writing intensive (BIOL 1403, 1404, 3405, 3410, 3416, 4101, 4305, 4307, 4320; BOT 3404; MBIO 4303; ZOOL 4409, 4410, 4421).

Courses with a grade of D cannot be counted toward fulfillment of requirements for a major or minor (including adjunct require-

Sample Curriculum for Bachelor of Science in Biology (Assuming a Chemistry Minor)

NOTE: Students in specialty majors zoology, cell and molecular biology, and microbiology take the identical courses that biology majors take during the first two years. For the third and fourth years, students in these majors should consult with departmental advisors about the appropriate 3000- and 4000-level biological sciences course requirements for their majors. All four majors require the same 39 total hours of biological science classes. Non-science courses required for all four majors are identical

FIRST YEAR			
Fall		Spring	
CHEM 1307, Principles of Chemistry I*	3	CHEM 1308, Principles of Chemistry II	3
CHEM 1107, Exp. Prin. of Chemistry I	1	CHEM 1108, Exp. Prin. of Chemistry II	1
MATH 1320, College Algebra	3	MATH 2300, Statistical Methods†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
Social & Behavioral Sciences Elective †	3	Creative Arts Elective §	3
TOTAL	16	TOTAL	16

SECOND YEAR			
Fall		Spring	
BIOL 1403, Biology I	4	BIOL 1404, Biology II	4
CHEM 3305, Organic Chemistry I	3	CHEM 3306, Organic Chemistry II	3
CHEM 3105, Exp. Organic Chemistry I	1	CHEM 3106, Exp Organic Chemistry II	1
ENGL Literature §	3	ENGL Literature §	3
U.S History §	3	U.S History §	3
Personal Fitness and Wellness §	1	Personal Fitness and Wellness §	1
TOTAL	15	TOTAL	15

THIRD YEAR			
Fall		Spring	
BIOL 3416, Genetics	4	BIOL 3320, Cell Biology	3
BIOL 3309, Principles of Ecology	3	BIOL 3120, Cell Biology Lab	1
PHYS 1403, General Physics I	4	PHYS 1404, General Physics II	4
Foreign Language #	5	Advanced BIOL Elective	3
		Foreign Language #	5
TOTAL	16	TOTAL	16

FOURTH YEAR			
Fall		Spring	
CHEM Elective (for minor)	3	Advanced BIOL Electives**	10
Oral Communication Elective §	3	Multicultural Elective	3
Advanced BIOL Elective**	4		
BIOL 4305, Organic Evolution	3		
TOTAL	13	TOTAL	13

TOTAL HOURS: 120

The university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for those beginning their teacher education program in spring 2013 or later. See "Teacher Education" text in the next column.

* Students may have to take CHEM 1301 the first semester if they do not pass the Chemistry Placement Exam.

† Because cell and molecular biology majors are required to take calculus, some students may want to substitute MATH 1550, Precalculus.

‡ MATH 1451 is required for the degree in cell and molecular biology.

§ Select from College of Arts and Sciences General Degree Requirements. When choosing a Creative Arts or a Social and Behavioral Sciences elective, choose a course that also fulfills the multicultural requirement of the university.

A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

** Students should check with their academic advisor for complete listing of approved electives.

ments and minors from other departments) in any program in this department.

Minors. 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, animal science, environmental crop and soil science, and natural resources management. A chemistry minor is required of cell and molecular biology and microbiology majors.

Students from other departments may minor in biology. Students wishing to minor in biology must complete 18 hours in biological sciences (includes courses with BIOL, BOT, MBIO, and ZOO prefixes). Either BIOL 1401 and 1402 or BIOL 1403 and 1404 must account for 8 of these hours; another 6 hours must come from junior- and senior-level courses. 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.

Research Opportunities. 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 website at www.biol.ttu.edu. No more than 6 hours of undergraduate research credit may be counted toward any major in the 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.

Teacher Education. Students who complete a major in biology and satisfy other requirements for the B.S. degree, including 18 hours of professional educational courses, will be qualified to teach high school biology in the public schools of Texas. The following courses meet both the major and the certification requirements in life science:

- BIOL 1403 and 1404, 3320, 3120, 3416; MBIO 3401; BOT 3403, 3404 or 3401; ZOO 2403 or 3405; ZOO 3406 or 4407.
- At least one of BIOL 3309, 3307, 4305, or ZOO 4312.
- PHYS 1403 and 1404 or 1408 and 2401; CHEM 1307, 1107, 1308, 1108, and one semester of organic chemistry, which may be satisfied with CHEM 3305 and 3105.

Students may also satisfy the requirements for the teaching of high school biology under the multidisciplinary science major, with an emphasis in biology. This major is administered by the College of Education.

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 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.

Graduate Program

For information on graduate programs offered by the Department of Biological Sciences, visit the Graduate School section of the catalog on page 125.

Those students planning to become high school teachers should minor in secondary education. They will be required to take EDSE 4000 for their student teaching experience. The university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for students beginning their teacher education program in spring 2013 or later. Please see a College of Education advisor to complete a certification plan.

Course Descriptions

(To interpret course descriptions, see page 23.)

Biological Informatics (BINF)

Graduate Course

5301. **Biological Informatics (3)**. Introduction to assessment of data in computer data bases, management of multiple layers of biological information, and exploring hidden patterns in the data.

Biology (BIOL)

Undergraduate Courses

1110. **Basic Lab in Biology (1)**. Prerequisite: Instructor consent. Laboratory topics not included in other courses. Content may differ each time offered. May be repeated up to 3 credit hours.
1113. [BIOL 2106, 2206, ENVR 1101] **Environmental Problems Laboratory (1)**. Prerequisite: BIOL 1305 (or concurrent enrollment) or permission of instructor. Laboratory and field studies of environmental problems. Not for major credit. Partially fulfills core Life and Physical Sciences requirement.
1301. **Basic Topics in Biology (3)**. Prerequisite: Instructor consent. Areas of interest not included in other courses. Content is normally different each time offered. May repeat for credit three times with different content.
1305. [BIOL 2306, 2406, ENVR 1301, 1401] **Ecology and Environmental Problems (3)**. 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 core Life and Physical requirement.
1306. **Biology of Sex (3)**. 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 1311+1111, 1411] **Biology of Plants (4)**. 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. Partially fulfills core Life and Physical Sciences requirement. BIOL 1401 and 1402 may be taken in any sequence or simultaneously.
1402. [BIOL 1313+1113, 1413] **Biology of Animals (4)**. 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. Partially fulfills core Life and Physical Sciences requirement.
1403. [BIOL 1306+1106, 1406] **Biology I (4)**. Enrollment as a freshman is only recommended with 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 3. Students on probation cannot take BIOL 1403. Fundamentals of molecular biology, cell biology, genetics, and evolutionary theory. First semester of an integrated course recommended for students majoring in biological sciences or related disciplines. (Writing Intensive)
1404. [BIOL 1307+1107, 1407] **Biology II (4)**. Prerequisite: BIOL 1403. Fundamentals of organismal biology, population biology, and biological diversity. Second semester of an integrated course recommended for majors in biological and related sciences. (Writing Intensive)
2120. **Introductory Cell and Molecular Biology (1)**. An introduction to current areas of research and to recent technological advances in the field of cellular and molecular biology.
2202. **Interdisciplinary Science Issues (2)**. Online interdisciplinary science laboratory course emphasizing the impact of science to contemporary human activities. Intended for non-major transfer students needing laboratory credit towards graduation requirements.
3109. **Principles of Ecology Laboratory (1)**. 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)**. Prerequisite or corequisite: BIOL 3320. A survey of the experimental techniques used to study cells and cellular processes.
3301. **Field Ecology (3)**. Teaches students how to design, conduct, analyze, and report on the results of field studies in aquatic and terrestrial environments.
3302. **Developmental Biology (3)**. Prerequisite or corequisite: BIOL 3416. A synthesis of animal and plant development, stressing the basic principles of molecular, cellular, and organismic development.
3303. **Tropical Marine Biology (3)**. Introduces students to the ecology and diversity of tropical marine communities.
3304. **Human Genetics (3)**. 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.
3306. **Principles of Plant Biology (3)**. Prerequisites: BIOL 1403 and 1404. A survey of plant structure and function relationships, plant evolution and the issues of plant reproduction, and plant responses to the environment.
3307. **Population Biology (3)**. Prerequisite: BIOL 3309. Introduction to population biology theory with emphasis on interaction between genetics and ecology.
3309. **Principles of Ecology (3)**. Prerequisite: BIOL 1305, or 1401, or 1402, or 1404. An examination of ecological systems emphasizing populations, communities, and ecosystems.
3320. **Cell Biology (3)**. Prerequisites: C or higher in BIOL 1403, 1404, 3416, and junior standing. An integrated study of the basic principles of cell structure and function.
3405. **Ecological Strategies of Plants (4)**. Prerequisite: BIOL 3309 or instructor consent. Concepts relating to plant traits and their influence on ecological processes and relationships with the environment. (Writing Intensive)
3410. **Experimental Molecular Biology (4)**. Prerequisite: BIOL 3320 or instructor consent. Introduction to modern molecular biology research techniques used to study eukaryotic cells. Offered odd years only. (Writing Intensive)
3416. **Genetics (4)**. Prerequisite: BIOL 1401, 1402, or 1403. Genetic principles with emphasis on mechanisms and problem solving. (Writing Intensive)
4100. **Undergraduate Research in Biology (1)**. Instructor consent. 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)**. 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: Instructor consent. 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)**. Instructor consent. 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: Instructor consent. Special areas of current interest not commonly included in other courses. Content normally differs with section number. May be repeated for credit with different course content. Some sections may be designated Writing Intensive.
4303. **Population Genetics (3)**. 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.
4305. **Organic Evolution (3)**. 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)**. Prerequisite: BIOL 3320; ZOO 4304 is recommended. 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. (Writing Intensive)
4310. **Community Ecology (3)**. Prerequisite: BIOL 3309 or instructor consent. An investigation of theoretical and experimental approaches to understanding the composition, diversity, and structure of plant, animal, and microbial communities.
4320. **Molecular Biology (3)**. 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.
4330. **Landscape Ecology (3)**. Prerequisite: BIOL 1404 or 3309. An examination of how we quantify patterns and effects of spatial heterogeneity on organisms and ecological processes.
4350. **Physiological Plant Ecology (3)**. 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)**. Prerequisites: 1403 and 1404. Introduction to the study of marine organisms and their environments.

Graduate Courses

5301. **Advanced Genetics (3)**. Prerequisite: 8 hours of biology, 8 hours of chemistry, one semester of organic chemistry, or instructor consent. Genetic and molecular analyses of inheritance. Course is offered to graduate students with limited knowledge in genetics.
5302. **Advanced Cell Biology (3)**. Prerequisite: 8 hours of biology, 8 hours of chemistry, plus at least one semester of organic chemistry; or instructor consent. 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)**. Prerequisite: Instructor consent. 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)**. 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)**. Prerequisite: BIOL 3320; ZOO 4304 is recommended. 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)**. Prerequisite: Background in organismal biology or undergraduate ecology or instructor consent. A detailed examination of the structural and functional relationships underlying the organization of populations, communities, and ecosystems.
5310. **Advanced Community Ecology (3)**. Prerequisite: A course in ecology or instructor consent. An investigation of both theoretical and experimental approaches to understanding the composition, diversity, and structure of plant, animal, and microbial communities.
5311. **Ecology for Teachers (3)**. Prerequisite: Admission to the Master of Science in Multidisciplinary Science program or instructor consent. An investigation into ecology for individuals, populations, communities, and ecosystems for practicing teachers.
5312. **Cell and Molecular Biology for Teachers (3)**. Prerequisite: Admission to the Admission to the Master of Science in Multidisciplinary Science program or instructor consent. An investigation into cellular and molecular biology intended for practicing teachers.
5320. **Advanced Molecular Biology (3)**. 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)**. Prerequisite: Instructor consent. In-depth examination of how we quantify patterns and effects of spatial heterogeneity on organisms and ecological processes. Discussion section is required.
5407. **Advanced Population Biology (4)**. Prerequisites: BIOL 3301, 3303, or equivalent. Introduction to the genetics or ecology of populations including a survey of topical, historic, and current literature with emphasis on experimental evaluation of testable hypotheses. S.
6000. **Master's Thesis (V1-6)**.
6100. **Advanced Topics in Biology (1)**. Prerequisite: Instructor consent. 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)**. Prerequisite: Instructor consent. Various topics in modern biology. May be repeated for credit.
6202. **Preparation for Graduate Learning and Teaching in Biology (2)**. Prerequisite: Acceptance in a graduate degree program in the Department of Biological Sciences or instructor consent. 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)**. Prerequisites: MBIO 4402 with minimum grade of B and instructor consent. 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)**. Prerequisite: BIOL 4305 or 5305; ZOO 6302 recommended. Character, analysis, phylogeny reconstruction, consensus procedures, and phylogenetic classification, using morphologic and molecular data.
6305. **RNA Silencing and Regulatory Small RNAs (3)**. Prerequisites: BIOL 3320 and 3416. Covers the most recent development in small RNA biology, an emerging field in molecular and cell biology.
6309. **Advanced Topics in Quantitative Biology (3)**. Prerequisite: Instructor consent. 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.
6325. **R as a Research Tool: Introduction to Programming (3)**. A workshop course that teaches the basics of the computer language "R," an open-source, interactive programming language designed for scientific numerical computation.
6350. **Advanced Physiological Plant Ecology (3)**. 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)**. Prerequisite: Undergraduate degree in biology or instructor consent. The study of marine organisms and their environments.
6408. **Research Techniques in Electron Microscopy (4)**. Prerequisite: B.A. or B.S. 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.
6520. **Advanced Experimental Cell Biology (5)**. Modern cell biology research techniques used in biomedical research. Offered odd years only.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Botany (BOT)

Undergraduate Courses

3401. **Plant Physiology (4)**. 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. (NRM 3401)
3404. **Evolution and Classification of Plants (4)**. 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)**. Prerequisite: BOT 3404 or instructor consent. 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)**. Prerequisites: BIOL 1403, 1404, 3416, and 3320. Molecular analysis of plant metabolism and signaling. S, alternate years.
4409. **Plant Development (4)**. Prerequisites: 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)**. 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)**. 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)**. 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)**. 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)**. Molecular and cellular analysis of plant development with emphasis on experimental approaches. Alternate years.

Microbiology (MBIO)

Undergraduate Courses

3400. **Microbiology (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)**. Prerequisite: BIOL 1402 or BIOL 1403 and 1404; prerequisite or corequisite CHEM 3305. Morphology, physiology, and classification of microorganisms.
4303. **Physiology of Bacteria (3)**. Prerequisite: MBIO 3401. Anatomy and physiology of the bacterial cell. A molecular approach. (Writing Intensive)
4310. **Introduction to Virology (3)**. Prerequisite: MBIO 3401 or BIOL 3320 or instructor consent. An introduction to basic concepts in the structure, replication, and ecology of viruses from animals, plants, and prokaryotes.
4367. **Molecular Pathogenesis of Protozoans (3)**. Prerequisite: MBIO 3401. The basic biology and fundamental mechanism of pathogenesis of protozoan parasites. (Writing Intensive)
4401. **Microbial Ecology (4)**. 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)**. Prerequisite: MBIO 3401 or BIOL 3320 or instructor consent; or 10 hours of chemistry. Theories of infection and resistance, the production and demonstration of antibodies, the action of antigens, and diagnostic tests.
4404. **Pathogenic Microbiology (4)**. Prerequisite: MBIO 3401; MBIO 4402 recommended. A detailed study of pathogenic microorganisms. Laboratory discussion of medical case studies.
4406. **The Genetics of Microorganisms (4)**. Prerequisite: Instructor consent. The principles of genetic systems existing among microorganisms, with emphasis upon bacteria and bacteriophages.

Graduate Courses

5301. **Advanced General Microbiology (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)**. 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)**. Prerequisite: BIOL 3309, or MBIO 3401, or equivalent; or instructor consent. 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)**. Prerequisite: Instructor consent. 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)**. Prerequisite: C or better in MBIO 3401 or 5401; 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)**. Prerequisite: MBIO 3401, or 5301, or equivalent; or instructor consent. Topics include current techniques of genetic analysis, molecular biology, molecular genetics, nucleic acid metabolism, and gene regulation in microorganisms, with emphasis on bacteria and bacteriophages. May not be taken for credit by students who have taken MBIO 4406. F.
6000. **Master's Thesis (VI-6)**.
6302. **Advanced Bacterial Physiology (3)**. Prerequisite: MBIO 3401 or 5301; 12 semester hours of chemistry, including biochemistry or concurrent registration; instructor consent. Advanced study of bacterial physiology. S.
6306. **General Virology (3)**. Prerequisite: Instructor consent. An introduction to the biology of animal, bacterial, and plant viruses. S.
6367. **Molecular Biology of Parasitism (3)**. Prerequisites: MBIO 3401, BIOL 3320, or equivalent. The molecular biology and pathogenesis of parasites.

Zoology (ZOOL)

Undergraduate Courses

2403. **[BIOL 2101, 2301, 2401] Human Anatomy and Physiology I (4)**. Three hours of chemistry recommended. Human gross and microscopic anatomy for allied health majors. Not for major credit. Partially fulfills core Life and Physical Sciences requirement.
2404. **[BIOL 2102, 2302, 2402] Human Anatomy and Physiology II (4)**. ZOOL 2403 strongly recommended, plus 3 hours of college chemistry. Human physiology for allied health majors. Not for major credit.
2406. **Comparative Anatomy of Game Animals (4)**. 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.
3303. **Basic Concepts of Pathophysiology (3)**. Prerequisites: ZOOL 2403 and 2404. Study of the physiologic basis of disease for healthcare professionals. Emphasis on application of pathophysiology concepts to the recognition of pathologic conditions across the lifespan.
3401. **Animal Histology (4)**. Prerequisites: 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)**. 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)**. Prerequisite: BIOL 1402 or BIOL 1404. The comparative study of vertebrate structure and embryological development.
3406. **Comparative Invertebrate Zoology (4)**. Prerequisites: BIOL 1401 and 1402 or 1403 and 1404. Structure, life history, and evolution of the invertebrates.
4304. **General Endocrinology (3)**. Prerequisite: BIOL 3320. Hormones as chemical coordinators of bodily functions.
4312. **Animal Behavior (3)**. 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)**. Prerequisites: BIOL 1403 and 1404; BIOL 3309 recommended. An advanced exploration of the behavior, ecology, and evolution of insects.
4406. **Introduction to Mammalogy (4)**. Prerequisite: BIOL 1402 or BIOL 1404. Study of the classification, natural history, and ecology of mammals.
4407. **Natural History of the Vertebrates (4)**. Prerequisites: BIOL 1401 and 1402 or BIOL 1403 and 1404. Evolutionary relationships, identification, and ecology of vertebrates. Local fauna emphasized.
4408. **General Ornithology (4)**. Prerequisite: BIOL 1402 or 1404 or instructor consent. Emphasis on laboratory and field work in systematics, ecology, and anatomy of birds. Local field trips.
4409. **Comparative Animal Physiology (4)**. Prerequisites: CHEM 1308 and BIOL 1404. A comparison of physiological functions of animals in the major phyla. (Writing Intensive)
4410. **Introduction to Ichthyology (4)**. Prerequisite: BIOL 1402 or 1404. Diversity, evolutionary relationships, ecology, and anatomy of fishes. (Writing Intensive)
4421. **Field Herpetology (4)**. Prerequisite: Instructor consent. Evolutionary history, anatomy and physiology, and behavior of reptiles and amphibians. Field component includes trips to sites in central and west Texas. (Writing Intensive)

Graduate Courses

5304. **Comparative Endocrinology (3)**. Prerequisite: ZOO 3405, 3416, BIOL 1404, or equivalent. Hormones as chemical coordinators of bodily functions. S.
5312. **Advanced Animal Behavior (3)**. Comparative animal behavior with emphasis on genetics and neurophysiology and how they relate to survival. F.
5401. **Animal Histology for Advanced Students (4)**. 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 ZOO 3401 or equivalent.
5402. **Advanced Mammalogy (4)**. Studies of recent advances in mammalogy. For students who have not taken ZOO 4406. F.
5408. **Advanced Ornithology (4)**. Prerequisite: Instructor consent. Selected topics including avian systematics, migration, physiology, ecology, and comparative behavior. S.
5406. **Advanced Invertebrate Zoology (4)**. Prerequisite: Instructor consent. 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)**. Diversity, evolutionary relationships, and adaptations of vertebrates. Field trips required. Open to students who have not taken ZOO 4407.
5409. **Comparative Physiology for Advanced Students (4)**. Prerequisite: ZOO 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)**. Prerequisite: Instructor consent. 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)**. 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)**. Prerequisite: Instructor consent. 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.
6305. **Molecular Systematics and Evolution (3)**. Prerequisites: BIOL 5305, ZOO 6302, or instructor consent. Principles and theories relating to molecular systematics and molecular evolution.
6321. **Advanced Herpetology (3)**. Prerequisite: Instructor consent. Covers the biology of amphibians and reptiles. Stresses classification, evolution, ecology, and anatomy of the various groups.

Department of Chemistry and Biochemistry

Joachim Weber Ph.D., Interim Chairperson

Horn Professors: Hase, Knaff, Li, Nes

Piper Professor: Casadonte

Welch Chair: Hase

Professors: Birney, Gellene, Hope-Weeks, Korzeniewski, Mechref, Paré, Poirier, Quitevis

Associate Professors: Harned, Krempner, Mayer, Morales, Pappas, Shaw, Shi, Thompson, Weber, Whittlesey

Assistant Professors: Cozzolino, D'Auria, Gamez, Findlater, Latham, Wylie

Research Professors: Aquino, Lischka

Instructors: Lee, Mason, Pool, Roberts

Adjunct Faculty: Conn, Perera

Joint Faculty: Horita, Ridley, Weeks

CONTACT INFORMATION: 104 Chemistry Building, Box 41061, Lubbock, TX 79409-1061, T 806.742.3067, F 806.742.1289, www.depts.ttu.edu/chemistry

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

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.

Graduate Program

For information on graduate programs offered by the Department of Chemistry and Biochemistry, visit the Graduate School section of the catalog on page 125.

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 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.

Bachelor of Science in Chemistry. The B.S. in Chemistry 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. This degree requires 120 credit hours and has a heavier chemistry requirement than the B.A. degree program. As a result, students have fewer elective courses to pursue other interests. Completion of the B.S. curriculum leads to automatic American Chemical Society certification of a student as the recipient of a professional degree.

Bachelor of Arts in Chemistry. The B.A. in Chemistry degree requires 120 credit hours for graduation and has a curriculum primarily designed for those 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 for entry into a graduate program leading to the M.S. or Ph.D. degree in chemistry.

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.

Bachelor of Science in Biochemistry. The B.S. in Biochemistry degree requires 120 credit hours for graduation and 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. in 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 bachelor's degree.

Bachelor of Arts in Biochemistry. The B.A. in Biochemistry degree requires 120 credit hours for graduation and 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.

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 6 hours of junior/senior level courses must be taken at Texas Tech.

Chemistry Minor. The chemistry minor consists of CHEM 1307, 1107, 1308, 1108 and 11 credit hours of chemistry courses at the 3000 level or higher (excluding CHEM 3000, 3101, 4010, and 4300). At least 6 credit hours of 3000- or 4000-level chemistry courses must be taken at Texas Tech (see residency requirements above). Two hours of laboratory coursework must be included in the 11-hour total.

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 are expected to earn a bachelor's degree (B.A. or B.S.) with a major in either chemistry or biochemistry. Students also may satisfy the requirements for the teaching of high school chemistry by majoring in multidisciplinary science with an emphasis in chemistry. This major is administered by the College of Education. Those students in the College of Arts and Sciences who plan to become high school teachers should minor in secondary education. They will be required to take EDSE 4000 for their student teaching experience. The university has implemented a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for new students. See a College of Education advisor to complete a certification plan.

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.

Course Descriptions

(To interpret course descriptions, see page 23.)

All undergraduate CHEM courses require a C or better in all prerequisite courses.

Chemistry (CHEM)

Undergraduate Courses

- 1100. Introduction to Biochemistry Research (1).** Prerequisite: Biochemistry and chemistry majors only. A structured seminar series on contemporary biochemical research topics. May not be repeated for credit.
- 1101. General Chemistry Bridge Course (1).** Prerequisite: 43 percent or higher on Chemistry Placement Exam. Review of high school chemistry and preview of college chemistry for students intending to take CHEM 1307. Recommended preparation for student success.
- 1105. [CHEM 1105, 1405] Experimental Chemical Basics (1).** Prerequisite or corequisite: CHEM 1305. Experimental chemistry course complementary to CHEM 1305. Partially fulfills core Life and Physical Sciences requirement when coupled with CHEM 1305.
- 1106. [CHEM 1107, 1407] Chemistry Experiments That Matter (1).** Prerequisite or corequisite: CHEM 1306. Experimental chemistry course complementary to CHEM 1306. Partially fulfills core Life and Physical Sciences requirement when coupled with CHEM 1306.
- 1107. [CHEM 1111, 1411] Experimental Principles of Chemistry I (1).** Prerequisite or corequisite: CHEM 1307. Experimental chemistry course complementary to CHEM 1307. Partially fulfills core Life and Physical Sciences requirement when coupled with CHEM 1307.
- 1108. [CHEM 1112, 1412, 1414] Experimental Principles of Chemistry II (1).** Prerequisite or corequisite: CHEM 1107, 1308. Experimental chemistry course complementary to CHEM 1308. Partially fulfills core Life and Physical Sciences requirement when coupled with CHEM 1308.

1110. **Teaching Methods in Chemistry (1)**. 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.
1117. **Support for CHEM 1307 (1)**. Corequisite: CHEM 1307. A weekly interactive course using a class-room response system designed to be coordinated with and improve performance in CHEM 1307.
1118. **Support for CHEM 1308 (1)**. Corequisite: CHEM 1308. A weekly interactive course using a class-room response system designed to be coordinated with and improve performance in CHEM 1308.
1301. **Preparatory Chemistry (3)**. Prerequisite: Score of 0 or better on the Chemistry Placement Exam. Prepares students for CHEM 1307. This course has no lab.
1305. **[CHEM 1305, 1405] Chemical Basics (3)**. A survey of basic chemical concepts, properties, and reactions. Partially fulfills core Life and Physical Sciences requirement when coupled with CHEM 1105.
1306. **[CHEM 1307, 1407] Chemistry That Matters (3)**. Description of polymers, drugs, agricultural chemicals, food/nutrition, fuels, and genetic engineering for non-science majors. Partially fulfills core Life and Physical Sciences requirement when coupled with CHEM 1106.
1307. **[CHEM 1311, 1411] Principles of Chemistry I (3)**. Prerequisite: CHEM 1301 or meet CHEM 1307 placement criteria of the Chemistry Placement Exam; completion of MATH 1320 or 1420 or approval for registration in MATH 1321. 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. Recommended for students who plan careers in the physical and biological sciences as well as medicine and engineering. Partially fulfills core Life and Physical Sciences requirement when coupled with CHEM 1107.
1308. **[CHEM 1312, 1412, 1414] Principles of Chemistry II (3)**. 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. Serves as a prerequisite to all advanced chemistry courses. Partially fulfills core Life and Physical Sciences requirement when coupled with CHEM 1108.
2103. **[CHEM 1419] Experimental Introductory Organic Chemistry (1)**. Prerequisite: CHEM 1105 and 1106, or 1108. Prerequisite or corequisite: CHEM 2303. Experimental chemistry course complementary to CHEM 2303 for students in agriculture and human sciences.
2303. **[CHEM 1419] Introductory Organic Chemistry (3)**. Prerequisites: CHEM 1305 and 1306 or 1308. A brief study of the chemistry of carbon compounds for students in agriculture and human sciences. Does not satisfy any requirements of B.A. or B.S. in chemistry or biochemistry or a chemistry minor.
3000. **Undergraduate Research (V1-6)**. Individual research project under the guidance of a staff member. May be repeated for credit.
3101. **Organic Chemistry Bridge Course (1)**. Prerequisite: CHEM 1308. Review of general chemistry concepts most relevant to organic chemistry and introduction to organic nomenclature and simple organic chemistry concepts. Offered online only.
3105. **Experimental Organic Chemistry I (1)**. Prerequisite: CHEM 1108 and 3305 (concurrent enrollment allowed). Experimental chemistry course complementary to CHEM 3305 addressing fundamental techniques of organic chemistry.
3106. **Experimental Organic Chemistry II (1)**. Prerequisite: CHEM 3105; prerequisite or corequisite: CHEM 3306. Experimental chemistry course complementary to CHEM 3306 addressing fundamental techniques of organic chemistry.
3107. **Experimental Physical Chemistry I (1)**. Prerequisite or corequisite: CHEM 3307, CHEM 4311, or CHE 3322. An introduction to physical chemical experimental methods, including calorimetry, phase equilibria, surface phenomena, and viscosity. (Writing Intensive)
3108. **Experimental Physical Chemistry II (1)**. Prerequisite or corequisite: CHEM 3308. An introduction to physical chemical methods, including spectroscopy, high-vacuum techniques, and electric and magnetic phenomena. (Writing Intensive)
3141. **Experimental Analytical Chemical Methods (1)**. Prerequisite or corequisite: CHEM 3341. Experimental chemistry course complementary to CHEM 3341 with emphasis on analytical techniques important to biological and medical sciences.
3201. **Advanced Experimental Organic Chemistry (2)**. Prerequisite: CHEM 3106. Advanced synthesis, purification, and analysis of organic compounds. Required for B.S. majors in chemistry.
3251. **Experimental Analytical Chemistry (2)**. Prerequisite or corequisite: CHEM 3351. Experimental chemistry course complementary to CHEM 3351 with emphasis on the major analytical techniques.
3301. **Descriptive Inorganic Chemistry (3)**. Prerequisite: CHEM 1308. A broad descriptive survey of modern topics in inorganic chemistry, including coordination compounds, acid-base chemistry, periodicity, transitional and main-group elements, common inorganic structures and compounds, and application of inorganic compounds. (Writing Intensive)
3305. **Organic Chemistry I (3)**. Prerequisite: CHEM 1308. First semester of a thorough foundation course in organic chemistry.
3306. **Organic Chemistry II (3)**. Prerequisite: CHEM 3305. Second semester of a thorough foundation course in organic chemistry.
3307. **Physical Chemistry I (3)**. Prerequisites: CHEM 1308, MATH 1452, and PHYS 1404 or 2401. The study of gases, thermodynamics, chemical and phase equilibria, solutions, and statistical mechanics.
3308. **Physical Chemistry II (3)**. Prerequisites: C or better in CHEM 1308, MATH 1452, and PHYS 1404 or PHYS 2401. The study of kinetic theory, chemical kinetics, electrochemistry, transport properties, surface chemistry, and quantum chemistry.
3310. **Molecular Biochemistry (3)**. 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)**. Prerequisites: CHEM 3306 and BIOL 1402 or 1404. First semester of a three-semester course in general biochemistry.
3312. **Biological Chemistry II (3)**. Prerequisite: CHEM 3311. Second of a three-part course in general biochemistry.
3313. **Experimental Biological Chemistry (3)**. Prerequisite: CHEM 3106, 3311. Techniques for the isolation, purification, and characterization of biomolecular species. (Writing Intensive)
3314. **Biological Chemistry III (3)**. Prerequisite: CHEM 3311. Third of a three-part course in general biochemistry. Emphasis on gene replication, expression, and regulation.
3341. **Analytical Chemical Methods (3)**. 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)**. Prerequisites: CHEM 1308 and MATH 1452. 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. **Experimental Inorganic Chemistry (1)**. Prerequisite: CHEM 3105. Techniques used in the synthesis and characterization of inorganic compounds.
4114. **Experimental Instrumental Analytical Methods Chemistry (1)**. Prerequisite or corequisite: CHEM 4314. Experimental chemistry course complementary to CHEM 4314 providing experience and practice with several important chemical instruments. (Writing Intensive)
4300. **Senior Research (3)**. 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)**. Prerequisites: CHEM 3306. Organic chemistry at an advanced level. Emphasis on developments in mechanistic organic chemistry.
4309. **Advanced Inorganic Chemistry (3)**. Prerequisite: CHEM 3305. A theoretical treatment of inorganic chemistry, including symmetry, group theory, bonding principles, spectroscopy, inorganic reaction mechanisms, transition metals, and organometallic chemistry. (Writing Intensive)

Bachelor of Science in Chemistry**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
CHEM 1307, Principles of Chemistry I	3	CHEM 1308, Principles of Chemistry II	3
CHEM 1107, Exp. Prin. of Chemistry I	1	CHEM 1108, Exp. Prin. of Chemistry II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
American History*	3	American History*	3
MATH 1451, Calculus I†	4	MATH 1452, Calculus II†	4
Creative Arts Elective*‡	3	POLS 1301, American Govt., Org.	3
TOTAL	17	TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3305, Organic Chemistry I	3	CHEM 3306, Organic Chemistry II	3
CHEM 3105, Exp. Organic Chemistry I	1	CHEM 3106, Exp. Organic Chemistry II	1
MATH 2450, Calculus III	4	CHEM 3301, Desc. Inorganic Chemistry	3
PHYS 1408, Principles of Physics I	4	POLS 2302, American Public Policy	3
English*	3	PHYS 2401, Principles of Physics II	4
Personal Fitness and Wellness*	1	Personal Fitness and Wellness*	1
TOTAL	16	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3307, Physical Chemistry I	3	CHEM 3308, Physical Chemistry II	3
CHEM 3107, Exp. Physical Chemistry I	1	CHEM 3108, Exp. Physical Chemistry II	1
CHEM 4309, Adv. Inorganic Chemistry	3	CHEM 3351, Analytical Chemistry	3
CHEM 4105, Exp. Inorganic Chemistry	1	CHEM 3251, Exp. Analytical Chemistry	2
Foreign Language*§	3	Foreign Language*§	3
Math Minor Course#	3		
TOTAL	14	TOTAL	12

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3310, Molecular Biochemistry	3	CHEM 4314, Instr. Analytical Methods	3
Math Minor Course#	3	CHEM 4114, Exp. Instr. Analytical Meth.	1
English*	3	Elective ††	2
Advanced Elective**	3	Math Minor Course#	3
Oral Communications*	3	Social & Behavioral Sciences Elective*	3
		CHEM 3201, Adv. Exp. Organic Chem	2
TOTAL	15	TOTAL	14

TOTAL HOURS: 120

* Select from Arts and Sciences General Requirements for B.S. degree.

† 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 coursework.

‡ Can also be multicultural; if one of these is not, you will need an additional 3-hour multicultural course.

§ Can substitute PHYS 1403 and 1404 for 1408 and 2401. A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

Selecting a minor other than math may require additional hours.

** Three advanced elective hours from CHEM 3000 (1-3), 4300, 4302, 4310.

†† May be outside of major.

For those who wish to pursue teacher certification, the university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for students beginning their teacher education program in spring 2013 or later.

- 4310. Polymer Chemistry (3).** Prerequisite: CHEM 3306. An introduction to the chemistry of macromolecules, including the synthesis, structures, properties, and applications of polymers.
- 4311. Physical Chemistry for the Biological Sciences (3).** Prerequisites: CHEM 3306, MATH 1452, and either PHYS 1403 or 1408. A physical chemistry course for majors in biochemistry and the biological sciences. Topics include quantum chemistry, thermodynamics, electrochemistry, and kinetics.
- 4312. Physical Biochemistry (3).** Prerequisites: CHEM 3312, 3313, 3314, 3351 and 4311 or 3307; PHYS 2401. Applications of physical chemical techniques to proteins, nucleic acids, and membranes.
- 4314. Instrumental Analytical Methods (3).** Prerequisites: CHEM 3341 or 3351. Lecture course covering theories and application of instrumental chemical analysis methods. (Writing Intensive)

Graduate Courses

- 5010. Individual Studies in Chemistry (V1-6).** Prerequisite: Instructor consent. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.

Bachelor of Arts in Chemistry**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
CHEM 1307, Principles of Chemistry I	3	CHEM 1308, Principles of Chemistry II	3
CHEM 1107, Exp. Prin. of Chemistry I	1	CHEM 1108, Exp. Prin. of Chemistry II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
American History*	3	American History*	3
MATH 1451, Calculus I†	4	MATH 1452, Calculus II†	4
Creative Arts Elective*‡	3	Oral Communications*	3
TOTAL	17	TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3305, Organic Chemistry I	3	CHEM 3306, Organic Chemistry II	3
CHEM 3105, Exp. Organic Chemistry I	1	CHEM 3106, Exp. Organic Chemistry II	1
Social & Behavioral Sciences Elective*‡	3	Foreign Language*#	3
PHYS 1408, Principles of Physics I§	4	PHYS 2401, Principles of Physics II§	4
English*	3	English*	3
TOTAL	14	TOTAL	14

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3341, Analy. Chemical Meth.‡‡	3	CHEM 3301, Des. Inorganic Chemistry	3
CHEM 3141, Exp. Analy. Chem. Meth.‡‡	1	Creative Arts Elective*‡	3
CHEM 3310, Molecular Biochemistry‡‡	3	Minor**	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
Foreign Language*#	3	Language, Phil., & Culture Elective*‡	3
TOTAL	13	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3307, Physical Chemistry I§§	3	Advanced Elective††	3
CHEM 3107, Exp. Physical Chemistry I##	1	Language, Phil., & Culture Elective*‡	3
Minor**	3	Social & Behavioral Sciences Elective*‡	3
Advanced Elective ††	3	Minor**	3
Language, Phil., & Culture Elective*‡	3	Personal Fitness and Wellness*	1
Personal Fitness and Wellness*	1	Elective***	3
TOTAL	14	TOTAL	16

TOTAL HOURS: 120

* Select from Arts and Sciences General Requirements for B.A. degree.

† 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 coursework.

‡ Can also be multicultural; if one of these is not, you will need an additional 3-hour multicultural course.

§ Can substitute PHYS 1403 and 1404 for 1408 and 2401.

A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

** Minor can be in English or a foreign language without requiring additional courses that will cause the degree hours to be more than 120.

†† Six advanced elective hours: 1 course from CHEM 4300, 4309, 4314, 3201; and the remaining hours from CHEM 3000 (1-3), 3308, 4105, 4114, 4302, or 4310.

‡‡ Can substitute CHEM 3351 and 3251 for 3341 and 3141

§§ Can substitute CHEM 4311 or 3308 for 3307.

If taking CHEM 3308, substitute CHEM 3108 for 3107. CHEM 3107 must be taken with CHEM 4311.

*** May be outside the minor.

For those who wish to pursue teacher certification, the university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for students beginning their teacher education program in spring 2013 or later.

- 5101. Seminar (1).** Required of all graduate students majoring in chemistry.
- 5102. Seminar (1).** Required of all graduate students majoring in chemistry.
- 5104. Topics in Chemistry (1).** Prerequisite: Instructor consent. 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.
- 5301. Advanced Inorganic Chemistry I (3).** Prerequisite: Instructor consent. Principles of coordination chemistry. Structure, bonding, properties, and reactions of complex compounds.
- 5302. Advanced Inorganic Chemistry II (3).** Prerequisite: Instructor consent. Reaction mechanisms of inorganic compounds.
- 5304. Topics in Chemistry (3).** Prerequisite: Instructor consent. 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.

Bachelor of Science in Biochemistry**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
CHEM 1307, Principles of Chemistry I	3	CHEM 1308, Principles of Chemistry II	3
CHEM 1107, Exp. Princ. of Chemistry I	1	CHEM 1108, Exp. Princ. of Chemistry II	1
BIOL 1403, Biology I*	4	BIOL 1404, Biology II*	4
American History†	3	American History†	3
MATH 1451, Calculus I‡	4	MATH 1452, Calculus II‡	4
CHEM 1100, Intro to Biochem. Research	1	Personal Fitness and Wellness†	1
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3305, Organic Chemistry I	3	CHEM 3306, Organic Chemistry II	3
CHEM 3105, Exp. Organic Chemistry I	1	CHEM 3106, Exp. Organic Chemistry II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	CHEM 3351, Analytical Chemistry	3
PHYS 1408, Principles of Physics I	4	PHYS 2401, Principles of Physics II	4
BIOL 3416, Genetics	4	ENGL 1302, Advanced College Rhetoric	3
TOTAL	15	TOTAL	14

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3311, Biological Chemistry I	3	CHEM 3312, Biological Chemistry II	3
MBIO 3401, Principles of Microbiology	4	CHEM 3313, Exp. Biological Chemistry	3
English†	3	CHEM 3314, Biological Chemistry III	3
Creative Arts Elective†§	3	Foreign Language†#	3
Personal Fitness and Wellness†	1	POLS 1301, American Govt., Org.	3
TOTAL	14	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 4311, Phys. Chem. for Biol. Sci.	3	CHEM 4312, Physical Biochemistry	3
Social & Behavioral Sciences Elective†§	3	English†	3
Foreign Language†#	3	Advanced Elective**	3
Advanced Elective**	3	POLS 2302, American Public Policy	3
Oral Communications†	3	Elective§	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* Failure to complete BIOL 1403 and 1404 in the first year will make the B.S. degree difficult to complete in four years without taking courses during summer sessions.

† Select from Arts and Sciences General Requirements for B.S. degree.

‡ 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 coursework.

§ Can also be multicultural; if one of these is not, you will need an additional 3 hour multicultural course.

A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

** Six advanced elective hours: 1 course from BIOL 3320; MBIO 4402 or 4404; and 1 course from CHEM 3000 (3), 3301, 4300, 4309, or 4314.

Taking CHEM 3251, 4105, and either 3301 or 4309 will complete American Chemical Society requirements.

For those who wish to pursue teacher certification, the university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for students beginning their teacher education program in spring 2013 or later.

Bachelor of Arts in Biochemistry**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
CHEM 1307, Principles of Chemistry I	3	CHEM 1308, Principles of Chemistry II	3
CHEM 1107, Exp. Princ. of Chemistry I	1	CHEM 1108, Exp. Princ. of Chemistry II	1
BIOL 1403, Biology I*	4	BIOL 1404, Biology II*	4
American History†	3	American History†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
CHEM 1100, Intro to Biochem. Research	1	Personal Fitness and Wellness†	1
TOTAL	15	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3305, Organic Chemistry I	3	CHEM 3306, Organic Chemistry II	3
Personal Fitness and Wellness†	1	Social/Behavioral Sciences Elective†‡	3
Creative Arts Elective†‡	3	Foreign Language†#	3
CHEM 3341, Analy. Chemical Meth.‡‡	3	BIOL 3416, Genetics	4
CHEM 3141, Exper. Analy. Chem. Meth.‡‡	1	MATH 1452, Calculus II§	4
MATH 1451, Calculus I§	4	TOTAL	17
TOTAL	15	TOTAL	17

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 3311, Biological Chemistry I	3	CHEM 3312, Biological Chemistry II	3
PHYS 1408, Principles of Physics I	4	CHEM 3313, Exp. Biological Chemistry	3
or PHYS 1403, General Physics I	3	CHEM 3314, Biological Chemistry III	3
English†	3	Creative Arts Elective†‡	3
Foreign Language†#	3	POLS 2302, American Public Policy	3
POLS 1301, American Govt., Org.	3	TOTAL	15
TOTAL	16	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
CHEM 4311, Phys. Chem. for Biol. Sci.	3	Minor (BIOL 3000-level)**	3
Social & Behavioral Sciences Elective†‡	3	English†	3
BIOL 3320, Cell Biology	3	Language, Phil., & Culture Elective†‡	6
Oral Communications	3	Elective†††	3
TOTAL	12	TOTAL	15

TOTAL HOURS: 120

* Failure to complete BIOL 1403 and 1404 in the first year will make the B.A. degree difficult to complete in four years without taking courses during summer sessions.

† Select from Arts and Sciences General Requirements for B.A. degree.

‡ Can also be multicultural; if one of these is not, you will need an additional 3-hour multicultural course.

§ 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 coursework.

A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

** Selecting a minor other than biology may require additional hours.

†† May be outside of major.

††† Can substitute CHEM 3351 and 3251 for CHEM 3341 and 3141.

For those who wish to pursue teacher certification, the university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for students beginning their teacher education program in spring 2013 or later.

- 5310. Polymer Chemistry (3).** Prerequisite: Instructor consent. An introduction to the chemistry of macromolecules, including the synthesis, structures, properties, and applications of polymers.
- 5314. Advanced Analytical Chemistry (3).** Prerequisite: Instructor consent. General principles and special methods of analytical chemistry.
- 5315. Atmospheric Chemistry (3).** Prerequisite: Instructor consent. An advanced course covering the production, monitoring, and fate of gases, vapors, and particulates in planetary atmospheres.
- 5318. Analytical Separation Science and Technology (3).** Prerequisite: Instructor consent. The science and technology of analytical separation techniques, including chromatography, electrophoresis, field flow fractionation, and capillary separation.
- 5319. Electrochemical Analysis (3).** Prerequisite: Instructor consent. Principles and applications of electrochemistry with emphasis on topics in electroanalytical chemistry.
- 5320. Analytical Spectroscopy (3).** Prerequisite: Instructor consent. A detailed fundamental assessment and survey of the important techniques in analytical spectroscopy.
- 5321. Advanced Organic Chemistry I (3).** Prerequisite: Instructor consent. Principles and reactions of organic chemistry, with emphasis on the most recent developments from the current literature.

- 5322. Advanced Organic Chemistry II (3).** Prerequisite: Instructor consent. Principles and methods of synthesis of organic compounds.
- 5323. Modern Principles of Organic Chemistry I (3).** Prerequisite: Instructor consent. 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).** Prerequisite: Instructor consent. 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).** Prerequisite: Instructor consent. Theory and interpretation of spectra of organic compounds: MS, IR, carbon and proton NMR, 2D-NMR.
- 5327. Physical Organic Chemistry I (3).** Prerequisite: Instructor consent. 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).** Prerequisite: Instructor consent. 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)**. Prerequisite: Instructor consent. 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)**. Prerequisite: Instructor consent. 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)**. Prerequisite: Instructor consent. Chemical and physical properties of proteins. Primary and conformational structure determination.
5334. **Principles of Biochemistry (3)**. Prerequisite: Instructor consent. 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)**. Prerequisite: Instructor consent. Biophysical methods and approaches to the study of structure-function relationships in biopolymers.
5336. **Lipids (3)**. Prerequisite: Instructor consent. Structure and function of lipids. Emphasis is placed on the methods of characterization, evolution, biosynthetic pathways, and biological roles of lipids.
5337. **Enzymes (3)**. Prerequisite: Instructor consent. Structure, mode of action, and kinetics of enzymes.
5339. **Nucleic Acids (3)**. Prerequisite: Instructor consent. Structure, biosynthesis, modification, and function of DNA and RNA. Emphasis on eukaryotic gene expression and regulation.
5340. **Physical Chemistry Principles I (3)**. Prerequisite: Instructor consent. A foundation course for the graduate student minoring in chemistry. Covers a wide range of principles and is a prerequisite for other chemistry courses. Not appropriate for graduate students in the department.
5341. **Physical Chemistry Principles II (3)**. Prerequisite: Instructor consent. A foundation course for the graduate student minoring in chemistry. Prerequisite for other courses in chemistry. Not appropriate for graduate students in the department.
5342. **Introduction to Quantum Chemistry (3)**. Prerequisite: Instructor consent. Introduction to quantum mechanics, spectroscopy, and the electronic structures of atoms and molecules.
5343. **Quantum Chemistry (3)**. Prerequisite: Instructor consent. The application of non-relativistic wave mechanics to problems of chemical structure and reactivity.
5344. **Kinetics of Chemical Reactions (3)**. Prerequisite: Instructor consent. A survey of chemical kinetics and dynamics, including transition state theory, scattering theory, state-to-state kinetics, cross sections, and the master equation.
5345. **Molecular Spectroscopy (3)**. Prerequisite: Instructor consent. Principles of electronic, vibrational, and rotational spectroscopy and applications for determining molecular structure and other properties.
5346. **Statistical Mechanics and Thermodynamics (3)**. Prerequisite: Instructor consent. Equilibrium and non-equilibrium systems including ensembles, density matrices, and time-correlation functions.
5349. **Physical Chemistry Principles for Biological Sciences (3)**. Prerequisite: Instructor consent. 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)**. Prerequisite: Instructor consent. 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)**. Prerequisite: Instructor consent. 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

Erin Collopy, Ph.D., Interim Chairperson

Horn Professor: Larmour

Professors: Barta, Beusterien, Gorsuch, Pérez, Scarborough, Suppe

Associate Professors: Bains, Borst, Cole, Collopy, Edwards, Elola, Farley, Grair, Guengerich, Ladeira, Lavigne, Pereira-Muro, Qualin, Stratton, Surluga, Witmore, Zamora

Assistant Professors: Corbett, Friedman, Kelly, Kleinhans, Matta Jara, McChesney, Nakatsukasa, Pascual Cabo, Price, Priestaf, Tecedro Cabrero

Instructors: Beretta, Drigalenko, Griffee, Hays, Mallory, Meier, Selker, Thrasher, Zaier

Adjunct Faculty: Le

CONTACT INFORMATION: 207 Foreign Language Building, Box 42071, Lubbock, TX 79409-2071, T 806.742.3145, F 806.742.3306, www.depts.ttu.edu/classic_modern

About the Program

This department supervises the following degree programs and certificate:

- Bachelor of Arts in Languages and Cultures
Fields of Specialization: * Classics, French, German, Russian Language and Area Studies
- Bachelor of Arts in Spanish
- Master of Arts in Languages and Cultures
Fields of Specialization: Applied Linguistics, Classics, German
- Master of Arts in Romance Languages
Fields of Specialization: French, Spanish
- Doctor of Philosophy in Spanish
- Graduate Certificate in Teaching English in International Contexts

Dual Degree Program

- Master of Arts in Romance Languages (French or Spanish) and Master of Business Administration (General Business)
- Master of Arts in Languages and Cultures (German) and Master of Business Administration (General Business)

The department participates in the Ethnic Studies, Honors, Linguistics, Comparative Literature, and teacher education programs (see introductory section of the College of Arts and Sciences catalog text). The department also operates in the Texas Tech Center in Seville, Spain year-round and offers summer language study abroad programs in Brazil, France, Germany, Mexico, Russia, and Spain. During the summer, the department hosts the International Teaching Assistant Workshop for international students.

* B.A. degrees in Classics, French, German, and Russian Language and Area Studies are being consolidated as specializations within the new B.A. in Languages and Cultures. No new students are being accepted into the phased-out degrees.

Undergraduate Degrees

Bachelor of Arts in Languages and Cultures

The Bachelor of Arts in Languages and Cultures consists of 33 hours at the 2000-level and above, including CMLL 2305. As part of the required hours, each of the degree's four specializations must include the following:

- **Classics** – A minimum of 6 hours of 4000-level Classics courses
- **French** – A minimum of four 4000-level French courses (12 hours)
- **German** – A minimum of four 4000-level German courses (12 hours).
- **Russian Language and Area Studies** – A minimum of 6 hours of 4000-level Russian courses

This major also requires 6 hours of writing intensive courses. Students must make a C or better in departmental courses to be eligible for graduation.

Bachelor of Arts in Spanish

The Bachelor of Arts in Spanish consists of 30 hours at the 2000-level and above, including a minimum of four 4000-level courses. The Spanish major also requires 6 hours of writing intensive courses. Students must make a C or better in departmental courses to be eligible for graduation.

Undergraduate Program

Minors. A minor can be obtained in Arabic, American Sign Language, Chinese, Classics, Comparative Literature, French, German, Greek, Italian, Japanese, Latin, Linguistics, Portuguese, Russian, Russian Area and Language Studies, and Spanish. 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, Italian, 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, Italian, Latin, Russian, and Spanish). Courses taught in English do not count toward the German, French, and Spanish minors. Only one course taught in English may count for the Italian minor.

Students may not complete all 9 hours of their upper-level requirement in one semester. Classics, Linguistics, and Russian Language and Area Studies minors will complete at least 18 hours from the approved course lists of these areas. An Arabic minor can include, with approval of the student's minor advisor, 3 hours taught in English from Arab 3305, History 3398 or History 4385. For more information on minors, consult the department advisors in the Foreign Language Building or the appropriate faculty advisor.

Students wishing to obtain information on one of these languages should consult the department advisors. 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.

Accelerated Bachelor's-to-Master's Degrees. Exceptional undergraduate students who wish to complete both a bachelor's and a master's degree in a timely manner may apply for admission into one of four accelerated degree programs:

- B.A. and M.A. in Languages and Cultures–Classics
- B.A. in Languages and Cultures–French and M.A. in Romance Languages–French
- B.A. and M.A. in Languages and Cultures–German
- B.A. in Spanish and M.A. in Romance Languages–Spanish

Admission to these programs allows student to count 9 hours of graduate-level work toward both their undergraduate and graduate degrees. Application should be made during the second semester of

their junior year by following procedures from the graduate program coordinators in the department. Students should also consult with their respective undergraduate advisors in 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), including 6 hours of writing intensive, 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. The department operates summer programs in Seville, Spain; Germany; San Luis Potosi, Mexico; France; and, in alternate years, Salvador, Brazil, and Russia. In addition, the department offers a classical archaeology summer field course. 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 2390; GERM 2312, 2313; ITAL 2315, 3390; SPAN 3390, 3391, 3392; and RUSN 2304, 3301, 3302, 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 1502 or 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 6 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, 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 (offered fall semesters only) as part of the teaching field, preferably before their student teaching. Students seeking bilingual education endorsement, ESL endorsement, or secondary certification in French, German, or Spanish should consult with advisors in the College of Education and in the Department of Classical and Modern Languages and Literatures.

Graduate Program

For information on graduate programs offered by the Department of Classical and Modern Languages and Literatures, visit the Graduate School section of the catalog on page 126.

Students who plan to become high school teachers should minor in secondary education. They will be required to take EDSE 4000 for their student teaching experience. The university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for students who began their teacher education program in spring 2013 or later. Please see a College of Education advisor to complete a certification plan.

Placement and Credit by Examination. Students at Texas Tech University may attempt credit by examination for degree credit during their freshman, sophomore, junior, and senior years. Students can get more information on the CLEP test at the Academic Testing Center in West Hall. 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 the successful completion of 6 hours at the sophomore level or above in a single language. Therefore, Arts and Sciences students who wish to attempt credit by examination for degree credit in a language other than English should do so before or during their freshman year. In this way, students will have time to complete their 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.

Course Descriptions

(To interpret course descriptions, see page 23.)

American Sign Language (ASL)

Undergraduate Courses

- 1301. [SGNL 1301, 1401, 1501] **Beginning Course in American Sign Language I (3).** Introduction and development of receptive and expressive language skills in American Sign Language.
- 1302. [SGNL 1302, 1402, 1502] **Beginning Course in American Sign Language II (3).** Prerequisite: ASL 1301. Introduction and development of receptive and expressive language skills in American Sign Language.
- 2301. [SGNL 2301] **Second Course in American Sign Language III (3).** Prerequisites: ASL 1302. Development of intermediate receptive and expressive skills in American Sign Language.
- 2302. [SGNL 2302] **Second Course in American Sign Language IV (3).** Prerequisite: ASL 2301. Development of intermediate receptive and expressive skills in American Sign Language.
- 3301. **Third Course in American Sign Language V (3).** Prerequisite: ASL 2302. Development of advanced expressive and receptive ASL skills. English-ASL translation.
- 3302. **Third Course in American Sign Language VI (3).** Prerequisite: ASL 3301. Development of advanced expressive and receptive ASL skills. English-ASL translation.
- 3312. **Introduction to Deaf Culture and Linguistics (3).** Prerequisite: ASL 2302 (may be taken concurrently with department permission). Overview of deaf culture and history including deaf community values and issues. ASL linguistic structure.
- 4300. **Individual Studies in ASL (3).** Prerequisite: ASL 2302 or instructor consent. Independent study in American Sign Language under the guidance of a faculty member. May be repeated for credit up to 9 hours with instructor consent.

Arabic (ARAB)

Undergraduate Courses

- 1501. [ARAB 1311, 1411, 1511] **Beginning Course in Arabic I (5).** Introduction and development of the four language skills in Arabic. Listening comprehension, speaking, reading, and writing.
- 1502. [ARAB 1312, 1412, 1512] **Beginning Course in Arabic II (5).** Prerequisite: ARAB 1501. Introduction and development of the four language skills in Arabic. Listening comprehension, speaking, reading, and writing.

- 2301. [ARAB 2311] **Second Course in Arabic I (3).** Prerequisites: ARAB 1502. Reading, cultural background, grammar review, conversation and composition.
- 2302. [ARAB 2312] **Second Course in Arabic II (3).** Prerequisite: ARAB 2301. Reading, cultural background, grammar review, conversation and composition.
- 3301. **Advanced Arabic Conversation (3).** Prerequisite: ARAB 2302 or instructor consent. A proficiency-based course in Modern Standard Arabic. Can be repeated with new content and dialects. Independent study.
- 3305. **Introduction to Arab-Muslim Civilization (3).** Overview of Arab-Muslim civilization to include such topics as culture, Islam, cinema, art, and women. In English. Fulfills multicultural requirement.
- 4300. **Individual Studies in Arabic (3).** Prerequisite: ARAB 2302 or instructor consent. 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. [CHIN 1311, 1411, 1511] **A Beginning Course in Chinese I (5).** Introduction and development of the four language skills in Chinese. Listening comprehension, speaking, reading, and writing.
- 1502. [CHIN 1312, 1412, 1512] **A Beginning Course in Chinese II (5).** Prerequisite: CHIN 1501. Introduction and development of the four language skills in Chinese. Listening comprehension, speaking, reading, and writing.
- 2301. [CHIN 2311] **A Second Course in Chinese I (3).** Prerequisite: CHIN 1502. Reading, cultural background, grammar review, conversation, and composition.
- 2302. [CHIN 2312] **A Second Course in Chinese II (3).** Prerequisite: CHIN 2301. Reading, cultural background, grammar review, conversation, and composition.
- 4300. **Individual Problems in Chinese (3).** Prerequisite: CHIN 2302 or instructor consent. Contents will vary to meet the needs of the student. May be repeated up to 12 credit hours. Independent work under the guidance of a faculty member.

Classics (CLAS)

Undergraduate Courses

- 1310. **Latin and Greek Terminology (3).** Analysis of English words through the study of Latin and Greek roots, prefixes, and suffixes. Does not count in the major or minor in classics.
- 2302. **Classical Mythology (3).** 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 Language, Philosophy, and Culture requirement.
- 2303. **Sports and Public Spectacles in the Ancient World (3).** Survey of Greek and Roman athletics, the Roman Triumph, gladiatorial combat, and other spectacles in the Ancient World. Fulfills core Language, Philosophy, and Culture requirement.
- 2304. **The Ancient World: Prophets, Warriors, Poets (3).** Survey of literature, religion, warfare of Ancient Greece, Rome and Near East, focusing on cultural and intellectual origins of Western Civilization. Fulfills core Language, Philosophy, and Culture requirement.
- 2305. **Ancient Technology (3).** Examination of the science and engineering of the ancient Egyptians, Greeks, and Romans through archeological remains and literary sources. Fulfills core Social and Behavioral Sciences requirements.
- 2335. **Archaeologies of the Classical World (3).** Introduction to the materials, methods, practices, and theories of archaeologies related to the classical world. Addresses questions of how archaeology helps (re)construct Greco-Roman societies and why the classical world matters today. Fulfills core Social and Behavioral Sciences requirement.
- 3315. **World of Egypt and the Near East (3).** Examination of the literature and/or art and archaeology of ancient Egypt, and the Near East in its cultural context. Fulfills multicultural requirement.
- 3320. **The World of Greece (3).** Examination of the literature and/or art and archeology of ancient Greece in its cultural context. Fulfills multicultural requirement.

**Bachelor of Arts in Languages and Cultures with
 a Specialization in Classics: Sample Curriculum**

FIRST YEAR			
Fall		Spring	
Foreign Language	5	Foreign Language	5
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301, Hist. of the U.S. Since 1877	3
CMLL 2305, Intro. to Lang. and Culture	3	Personal Fitness and Wellness*	1
Personal Fitness and Wellness*	1	Social & Behavioral Sciences Elective*	3
TOTAL	15	TOTAL	15

SECOND YEAR			
Fall		Spring	
Foreign Language	3	Foreign Language	3
English Literature (2000 Level)	3	English Literature (2000 Level)	3
Life & Physical Sciences Elective*	4	Life & Physical Sciences Elective*	4
MATH Elective (1000 Level)	3	MATH Elective (1000 Level) or PHIL 2310	3
CLAS (2000 or 3000 Level)	3	CLAS (3000 Level)	3
TOTAL	16	TOTAL	16

THIRD YEAR			
Fall		Spring	
Creative Arts Elective*	3	Creative Arts Elective*	3
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
Minor Elective (1000 or 2000 Level)	3	Minor Elective (3000 Level)	3
CLAS (3000 Level)	3	CLAS (3000 Level)	3
Oral Communication Elective*	3	CLAS 4310, Seminar in Classics †	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
CLAS 4310, Seminar in Classics †	3	CLAS 3350, Comparative Mythology	3
Minor Elective (3000 or 4000 Level)	3	CLAS (3000 or 4000 Level)	3
Social and Behavioral Sciences Elective*	3	Free Elective (3000 or 4000 Level)	4
CLAS (3000 or 4000 Level)	6	Minor Elective (4000 Level)	3
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

* Refer to the General Degree Requirements of Arts and Sciences for a complete list of qualifying courses.

† Writing Intensive

- A summer or semester of study abroad is strongly recommended.
- See an advisor for courses that fulfill the Language, Philosophy & Culture and Multicultural requirements.

**Bachelor of Arts in Languages and Cultures with
 a Specialization in French: Sample Curriculum**

FIRST YEAR			
Fall		Spring	
FREN 1507, Comp. French Review -First	5	FREN 2301, Second Course in French I	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301, Hist. of the U.S. Since 1877	3
Personal Fitness and Wellness*	1	MATH (1000-Level)*	3
MATH (1000-Level)*	3	Oral Communication Elective*	3
TOTAL	15	TOTAL	15

SECOND YEAR			
Fall		Spring	
FREN 2302, Second Course in French II	3	FREN 3303, French Conversation	3
ENGL (2000 Level)*	3	FREN 3304, Grammar: Comp. Review	3
POLS 1301, American Govt. Org.	3	ENGL (2000 Level)*	3
Social & Behavioral Sciences Elective*	3	Social & Behavioral Sciences Elective*	3
CMLL 2305, Intro. to Lang. and Culture	3	Minor (1000 or 2000 Level)	3
TOTAL	15	TOTAL	15

THIRD YEAR			
Fall		Spring	
FREN 3302, Major French Writers †	3	FREN 4303, Advanced Conversation	3
FREN 4302, Adv. Grammar & Comp. †	3	FREN 3000 or 4000 Level	3
POLS 2302, American Public Policy	3	Natural Lab Science Elective*	4
Natural Lab Science Elective	4	Creative Arts Elective*	3
Minor (2000 Level)*	3	Minor (2000 Level)	3
TOTAL	16	TOTAL	16

FOURTH YEAR			
Fall		Spring	
FREN 4000-Level Elective	3	FREN 4000-Level Elective	3
Minor (3000 Level)	6	Minor (4000 Level)	3
Language, Phil. & Culture Elective*	3	Language, Phil. & Culture Elective*	3
Personal Fitness and Wellness*	1	Creative Arts Elective*	3
		Multicultural Elective*	3
TOTAL	13	TOTAL	15

TOTAL HOURS: 120

* Refer to the General Degree Requirements of Arts and Sciences for a complete list of qualifying courses.

† Writing Intensive

- A summer or semester of study abroad is strongly recommended.
- See an advisor for courses that fulfill the Language, Philosophy & Culture and Multicultural requirements.

- 3330. The World of Rome (3).** Examination of the literature and/or art and archeology of ancient Rome in its cultural context. Fulfills multicultural requirement.
- 3340. Gender and Sexuality in the Classical World (3).** Examination of the social and cultural dimensions of gender and sexuality in the ancient Greco-Roman world. Readings in English. Fulfills multicultural requirement. (WS 3340)
- 3350. Comparative Mythology (3).** Ancient myths in various cultures and their influence on modern literature and film. Fulfills multicultural requirement.
- 4300. Research in Classics (3).** Prerequisite: Instructor consent. Undergraduate research in classics under direction of instructor. May be repeated for up to 15 credit hours. (Writing Intensive)
- 4310. Seminar in Classics (3).** Prerequisite: Instructor consent. Intensive study of a topic in ancient culture. Repeatable for up to 9 hours credit. (Writing Intensive)
- 4601. Classical Field Archaeology (6).** Prerequisite: Instructor consent. Intensive undergraduate research in classics under the direction of instructor. Taught during study abroad. May be repeated once for credit with different content.

Graduate Courses

- 5101. Classical Language Pedagogy (1).** Systematic formal training in language pedagogy for Latin and ancient Greek.
- 5102. Classical Culture Pedagogy (1).** Systematic formal training in pedagogy for diverse classical culture courses.
- 5301. Studies in Greco-Roman Literature (3).** Selected studies in major authors, genres, or themes. May be repeated up to 9 credit hours with different content.
- 5305. Aims and Methods of Classical Scholarship (3).** A general overview of aims and methods of ancient studies covering primary and secondary sources.
- 5311. Classical Art and Archaeology (3).** Examines architecture, sculpture, and painting of the Greco-Roman World. May be repeated up to 6 credit hours with different content.

- 5315. Topics in Classics (3).** A problem-oriented approach to contemporary themes in the scholarship of Greco-Roman antiquity. Repeatable for up to 9 credit hours with different content.
- 5350. The Classical Tradition (3).** 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. [CZEC 1311; KORE 1311, 1411; VIET 1311, 1411] Individual Studies in Modern Languages I (3).** Introduction and development of skills in a modern language, including listening comprehension, speaking, reading, and writing.
- 1302. [CZEC 1312; KORE 1312, 1412; VIET 1312, 1412] Individual Studies in Modern Languages II (3).** Prerequisite: CMLL 1301. Introduction and development of skills in a modern language, including listening comprehension, speaking, reading, and writing.
- 1501. [CZEC 1411, 1511; KORE 1511; VIET 1511] Individual Studies in Modern Languages I (5).** Introduction and development of the four languages skills: listening comprehension, speaking, reading, and writing. May be repeated twice for credit when language is different.
- 1502. [CZEC 1412, 1512; KORE 1512; VIET 1512] Individual Studies in Modern Languages II (5).** 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. [CZEC 2311, KORE 2311, VIET 2311] Individual Studies in Modern Languages III (3).** Prerequisite: CMLL 1302 or 1502. Continuation of study of a modern language. Introduction and

Bachelor of Arts in Languages and Cultures with a Specialization in German: Sample Curriculum

FIRST YEAR			
Fall		Spring	
GERM 1507, Comp. German Rev.-First	5	GERM 2301, Second Course in German I	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301, Hist. of the U.S. Since 1877	3
Personal Fitness and Wellness*	1	MATH (1000 Level) or PHIL 2310, Logic	3
MATH (1000 Level)	3	Oral Communication Elective*	3
TOTAL	15	TOTAL	15
SECOND YEAR			
Fall		Spring	
GERM 2302, Second Course in German II	3	GERM 3303, Conversation & Comp. †	3
ENGL (2000 Level)	3	GERM 3304, Introduction to Literature †	3
POLS 1301, American Govt. Org.	3	ENGL (2000 Level)	3
Social & Behavioral Sciences Elective*	3	Social & Behavioral Sciences Elective*	3
CMLL 2305, Intro. to Lang. and Culture	3	Minor (1000 or 2000 Level)	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
GERM 3301, Germ. Culture and Society †	3	GERM 4305, Read. in Germ. Lang. & Lit. †	3
GERM (3000 Level)	3	GERM 4301, Grammar	3
POLS 2302, American Public Policy	3	Natural Lab Science Elective*	4
Natural Lab Science Elective*	4	Creative Arts Elective*	3
Minor (2000 Level)	3	Minor (2000 Level)	3
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
GERM 4309, Business German	3	GERM (4000 Level)	3
Minor (3000 or 4000 Level)	6	Minor (3000 or 4000 Level)	3
Multicultural Elective*	3	Language, Phil. & Culture Elective*	3
Language, Phil. & Culture Elective*	3	Creative Arts Elective*	3
		Personal Fitness and Wellness*	1
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

* Refer to the General Degree Requirements of Arts and Sciences for a complete list of qualifying courses.

† Writing Intensive

- A summer or semester of study abroad is strongly recommended.
- See an advisor for courses that fulfill the Language, Philosophy & Culture and Multicultural requirements.

Bachelor of Arts in Languages and Cultures with a Specialization in Russian Language and Area Studies: Sample Curriculum

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Col. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
RUSN 1501, Beginning Russian I	5	RUSN 1502, Beginning Russian II	5
MATH (1000 Level)*	3	MATH (1000 Level)*	3
CMLL 2305 Intro. to Lang. and Culture	3	HIST 2300 History of the U.S. to 1877	3
Personal Fitness & Wellness*	1	Personal Fitness and Wellness*	1
TOTAL	15	TOTAL	15
SECOND YEAR			
Fall		Spring	
Creative Arts Elective*	3	ENGL (2000 Level)*	3
RUSN 2301, Second Course in Russian I	3	RUSN 2302, Second Course in Russian II	3
POLS 1301, American Govt. Org.	3	Minor (1000 or 2000 Level)	3
HIST 2301 Hist. of the U.S. Since 1877	3	Life & Physical Sciences Elective*	4
Life & Physical Sciences Elective*	4	POLS 2302, American Public Policy	3
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
ENGL (2000 Level)*	3	Creative Arts Elective*	3
RUSN 3304, Russian Culture	3	RUSN 3305, Studies in Adv. Russian	3
RUSN 3305, Studies in Adv. Russian	3	RUSN 4302, Contemp. Russian Lit. †	3
Minor (3000 or 4000 Level)	6	Minor (3000 or 4000 Level)	3
		Oral Communication Elective*	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
RUSN 4301, Great Russian Realists†	3	RUSN 3301 or RUSN 3302	3
Minor (3000 or 4000 level)	3	HIST 3372 or HIST 3374 or HIST 4379	3
Individual or Group Behavior Elective*	3	Individual or Group Behavior Elective*	3
HIST 3372 or HIST 3374 or HIST 4379	3	Minor (4000 Level)	3
Upper-Division Free Elective	3	Free Elective	1
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

* Refer to the General Degree Requirements of Arts and Sciences for a complete list of qualifying courses.

† Writing Intensive

- A summer or semester of study abroad is strongly recommended.
- See an advisor for courses that fulfill the Language, Philosophy & Culture and Multicultural requirements.

development of skills in a modern language, including listening comprehension, speaking, reading, and writing.

- 2302. [CZEC 2312, KORE 2312, VIET 2312] **Individual Studies in Modern Languages IV (3)**. Prerequisite: 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.
- 2305. **Introduction to Language and Culture (3)**. Explores such topics as how culture is expressed in languages, how people learn languages, and how people benefit from learning languages. Fulfills core Language, Philosophy, and Culture requirement.
- 2306. **Introduction to World Cinema (3)**. Introduction to the global world of classic films produced in Africa, Asia, Europe, and Latin America.
- 4300. **Individual Studies in Modern Language (3)**. Prerequisite: CMLL 2302 or instructor consent. Independent study in modern language under the guidance of a faculty member. May be repeated once for credit with instructor consent.

Graduate Courses

- 5301. **Fundamentals of Research and Scholarship (3)**. Systematic study of research methods, bibliographical materials and problems in the fields of languages and literatures. May be repeated for credit with different content.
- 5302. **Theoretical Foundations (3)**. Theories and practices of literary analysis and criticism with emphasis on critical/analytic thinking, reading, and writing. May be repeated for credit with different content.
- 5305. **Seminar in Language Studies (3)**. Issues related to language and language learning. Repeatable for up to 9 credit hours with different content.
- 5307. **Studies in World Language and Culture (3)**. Examines the language and/or character of distinctive world cultures, including their products, perspectives, and practices. Repeatable for credit with different content.

- 5309. **Studies in Literature and Culture (3)**. Interpretation and analysis of the literature and culture of distinctive world civilizations. Repeatable for up to 9 credit hours with different content.
- 6000. **Master's Thesis (V1-6)**.
- 7000. **Research (V1-12)**.

English as a Second Language (ESL)

Graduate Courses

- 5301. **Advanced Writing for International Students (3)**. 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)**. Teaches listening, note-taking, interrogative and verbal skills to students who are non-native speakers of English. May be repeated once.
- 5310. **Spoken English Fluency (3)**. Foundation of English-speaking fluency and pronunciation for international teaching assistant candidates. May be repeated once.
- 5312. **Academic Communication for International Teaching Assistants (3)**. Prerequisite: Instructor consent. Communicating in U.S. academic classrooms for international teaching assistants.
- 5315. **Academic Writing (3)**. Prepares non-native speakers of English for graduate-level academic writing. May be repeated once.

French (FREN)

Undergraduate Courses

- 1501. [FREN 1411, 1412] **A Beginning Course in French I (5)**. Prerequisite: Permission of department.
- 1502. [FREN 1511, 1512] **A Beginning Course in French II (5)**. Prerequisite: FREN 1501.

Bachelor of Arts in Spanish: Sample Curriculum
FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
SPAN 1507, Comp. Spanish Rev.-First	5	SPAN 2301, Second Course in Spanish I	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301, Hist. of the U.S. Since 1877	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
Math Elective	3	Math Elective or PHIL 2310, Logic	3
		Oral Communication Elective	3
TOTAL	15	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
SPAN 2302, Second Course in Spanish II	3	SPAN 3303, Intermed. Span. Conv.	3
ENGL 2000 Level	3	SPAN 3305, Intro. to Hispanic Life & Cult.	3
POLS 1301, American Govt. Org.	3	ENGL 2000 Level	3
Social & Behavioral Sciences Elective	3	Social & Behavioral Sciences Elective	3
Multicultural Elective	3	Minor	3
TOTAL	15	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
SPAN 3306, Intro. Hispanic Life & Cult.	3	SPAN 4303, Advanced Conversation	3
SPAN 3307, Intro. Hispanic Literatures*	3	SPAN 4000 Level †	3
POLS 2302, American Public Policy	3	Natural Lab Science Elective	4
Natural Lab Science Elective	4	Creative Arts Elective	3
Minor	3	Minor	3
TOTAL	16	TOTAL	16

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
SPAN 4000 level	3	SPAN 4000 level	3
Minor	3	Minor	6
Junior/Senior Elective	3	Language, Phil. & Culture Elective	3
Language, Phil. & Culture Elective	3	Creative Arts Elective	3
TOTAL	12	TOTAL	15

TOTAL HOURS: 120

* Writing intensive course.

† Must be writing intensive. Students must take 6 hours of writing intensive courses.

- A summer or semester of study abroad is strongly recommended.
- The multicultural requirement can be met by some SPAN courses. See an advisor.
- See an advisor for specific courses that fulfill the Language, Philosophy & Culture requirement.

1507. **Comprehensive French Review First Year (5)**. Prerequisite: Two years of high school French or permission of department. A comprehensive one-semester review.
2301. **[FREN 2311] A Second Course in French I (3)**. Prerequisite: FREN 1502 or 1507. Readings, cultural background, conversation, and composition.
2302. **[FREN 2312] A Second Course in French II (3)**. Prerequisite: FREN 2301. Readings, cultural background, conversation, and composition.
2390. **French Culture (3)**. 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 Language, Philosophy, and Culture requirements.
2607. **Intensive French Second Year (6)**. Intensive immersion development. Reading, writing, culture, conversation, and composition. Equivalent to FREN 2301 and 2302. Taught in France.
3302. **Major French Writers (3)**. Prerequisites: FREN 2302. A survey of major French writers. (Writing Intensive)
3303. **French Conversation (3)**. Prerequisites: FREN 2302, or equivalent. Designed to increase vocabulary and attain oral fluency. May be taken concurrently with FREN 3304 or 3302.
3304. **Grammar: A Comprehensive Review (3)**. Prerequisites: FREN 2302. A comprehensive overview of French grammar.
3306. **Business French (3)**. Prerequisites: FREN 2302. Oral and written French with special attention to idiomatic expressions currently used in marketing, advertising, and the stock market.
4100. **Advanced Individual Problems in French (1)**. Prerequisite: Instructor consent. 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: Any course from FREN 3000-3999. 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)**. Prerequisite: Any course from FREN 3000-3999. 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)**. Prerequisite: Any course from FREN 3000-3999. Designed to increase fluency in the spoken language. May be repeated once for credit for purposes of study abroad.
4304. **Commercial French (3)**. Prerequisite: Any course from FREN 3000-3999. Oral and written French, with special attention to idiomatic expressions currently in use in business and technical fields.
4305. **Cultures of the French-Speaking World (3)**. Prerequisite: Any course from FREN 3000-3999. Survey of French-speaking cultures of the world. Includes history, arts, customs, and daily life.
4308. **French and Francophone Culture Through Film (3)**. Prerequisite: Any course from FREN 3000-3999. Analysis of cinematographic and cultural elements across Francophone films. May be repeated with different content.
4315. **The French Short Story (3)**. Prerequisite: Any course from FREN 3000-3999. Traces the development of the French short story from Voltaire's "Candide" to Boris Vian's "Les Lulettes Furrees." May be repeated once for credit for purposes of study abroad. (Writing Intensive)
4317. **Readings in French Literature and Culture (3)**. Prerequisite: Any course from FREN 3000-3999. May be repeated once for credit with consent of instructor. Conducted in French. (Writing Intensive)
4322. **Civilisation Francaise: French Civilization (3)**. Prerequisite: Any course from FREN 3000-3999. A survey of French civilization from the Middle Ages to the present: literature, art, music, philosophy, science, and architecture. Readings, slides, films, and tapes. Conducted in French. May be repeated once for credit for purposes of study abroad. (Writing Intensive)
4345. **History of the French Language (3)**. Prerequisite: Any course from FREN 3000-3999. The historical, linguistic, and literary evolution of French from its Latin origins to the present day.

Graduate Courses

5301. **Practicum in Language Teaching: Teaching Methods (3)**. Introduction to principles and techniques of effective language teaching through course observations, creation and evaluation of lesson plans, skill-based activities, and course materials.
5310. **Medieval and Renaissance Literature (3)**. Reading, analysis, and interpretation of selected works of the Middle Ages and the Renaissance.
5311. **From the Baroque to the Revolution (3)**. Reading, analysis, and interpretation of selected works of the 17th and 18th centuries.
5315. **Studies in French Language and Literature (3)**. Concentrates on topics in French civilization, linguistics, and literature with content varying to meet the needs of students. Repeatable with different content.
5319. **Nineteenth Century Literature (3)**. Readings, analysis, and interpretation of selected works of the 19th century. Course content may vary. May be repeated once for credit.
5320. **Twentieth Century Literature (3)**. Readings, analysis, and interpretation of selected works of the 20th century. Course content may vary. May be repeated once for credit.
5321. **French Cinema (3)**. 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)**. 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)**. 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)**. 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. **Intensive French for Graduate Research I (3)**. 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.

5342. **Intensive French for Graduate Research II (3)**. 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. [GERM 1411, 1412] **A Beginning Course in German I (5)**. Prerequisite: Permission of department. Oral practice, elementary reading, and grammar.
1502. [GERM 1511, 1512] **A Beginning Course in German II (5)**. Prerequisite: GERM 1501. Oral practice, elementary reading, and grammar.
1507. **Comprehensive German Review – First Year (5)**. Prerequisite: Two years of high school German or permission of department. A comprehensive one-semester review.
1607. **Intensive German Review (6)**. Intensive immersion development of the four language skills in German: oral comprehension, speaking, reading, and writing. Taught in Germany.
2301. [GERM 2311] **A Second Course in German I (3)**. Prerequisite: GERM 1502 or 1507. Reading, cultural background, grammar review, and conversation.
2302. [GERM 2312] **A Second Course in German II (3)**. Prerequisite: GERM 2301. Reading, cultural background, grammar review, and conversation.
2312. **Literature of the Holocaust (3)**. Examination of the Holocaust as represented in literature, film, and art. Conducted in English. Fulfills core Language, Philosophy, and Culture requirements.
2313. **Northern Myths and Legends (3)**. Introduction to Germanic myths, epics, sagas, legends, and fairy tales. Selected readings in translation with lectures and discussions in English. Fulfills core Language, Philosophy, and Culture requirement.
2607. **Intensive German Second Year (6)**. Intensive immersion development. Reading, writing, culture, conversation, and composition. Equivalent to GERM 2301 and 2302. Taught in Germany.
3301. **German Culture and Society (3)**. Prerequisite: GERM 2302 or 2607. Study of video, Internet, and textual resources on culture and current issues. Conducted in German. (Writing Intensive)
3303. **Conversation and Composition (3)**. Prerequisite: GERM 2302 or 2607. 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)**. Prerequisite: GERM 2302 or 2607. An introduction to periodization of German literature, literary genres, and literary theory. Conducted in German. (Writing Intensive)
3305. **German Language Studies (3)**. Prerequisite: GERM 2302 or 2607. 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)**. Prerequisite: GERM 2302 or 2607. Readings in cultural history and literature, lectures, and tours on location. Taught in German. May not be repeated for credit toward major or minor. (Writing Intensive)
3314. **Cultural Excursions in Germany (3)**. Prerequisite: GERM 2302 or 2607. Students participate in lectures on German culture and history, visit sites of cultural and historical interest, and discuss social and cultural topics. Taught in German-speaking countries.
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)**. Prerequisites: GERM 3301 and 3303 or equivalent. Review of grammatical structure. Practice in pronunciation and in written and spoken German.
4303. **German Classics (3)**. Prerequisites: 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)**. Prerequisites: GERM 3303 and 3304. Readings from a particular period or study of a literary theme. May be repeated once for credit with instructor consent. Conducted in German. (Writing Intensive)
4309. **Business German (3)**. Prerequisites: 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)**. Prerequisites: Completion or concurrent enrollment in German at least one 3000- or 4000-level course and instructor consent. Teaching experience and service learning in community schools, while improving German language and communication skills. May be repeated once for credit.

Graduate Courses

5303. **Intensive German for Graduate Research I (3)**. 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.
5304. **Intensive German for Graduate Research II (3)**. 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.
5311. **German Literature of the Nineteenth Century (3)**. A study of German literature from 1830 to 1895, including Biedermeier, junges Deutschland, poetic realism, and naturalism.
5312. **Weimar and Exile Literature (3)**. A study of German literature from 1920 to 1945, including the Weimar Republic and the years of inner and outer emigration.
5314. **History of the German Language (3)**. Development of German from its origins to the present with emphasis on its phonological, morphological, and syntactic change.
5315. **Literature of Divided Germany (3)**. A study of German literature from the post-war period to the fall of the Berlin Wall, 1945 to 1989.
5316. **Literature of the New Germany (3)**. A study of contemporary German literature and culture from the reunification of Germany to the present.
5318. **German Romanticism (3)**. Study of German literature from 1790 to 1830.
5319. **The German "Klassik" (3)**. Introduction to the classical works of Goethe and Schiller and other authors of the period.
5321. **Seminar in Modern German Literature (3)**. Study of various genres of 20th century German literature, with special emphasis on philosophical and psychological aspects. May be repeated for credit up to 12 hours.
5324. **German Literature of the Enlightenment (3)**. A study of German literature from 1700 to 1785, including "Aufklärung," "Sturm und Drang," and "Empfindsamkeit."
5326. **German Modernism (3)**. Readings, analysis, and interpretation of selected works from 1890-1940.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Greek (GRK)

Undergraduate Courses

1501. [GREE 1311, 1312] **A Beginning Course in Greek I (5)**.
1502. [GREE 1511, 1512] **A Beginning Course in Greek II (5)**. Prerequisite: GRK 1301.
2301. [GREE 2311] **A Second Course in Greek I (3)**. Prerequisite: GRK 1302. Review; selected readings from standard authors.
2302. [GREE 2312] **A Second Course in Greek II (3)**. Prerequisite: GRK 2301. Review; selected readings from standard authors.
4300. **Individual Problems in Greek (3)**. Prerequisites: GRK 2302. Contents will vary to meet the needs of students. May be repeated once for credit with instructor consent. Independent readings under guidance of a staff member.

Graduate Courses

5330. **Greek Prose (3)**. Selected readings from Greek texts in history, philosophy, oratory, rhetoric, biography, and the novel. Topics may vary. May be repeated up to 9 credit hours with different content.
5340. **Greek Poetry (3)**. Selected readings in Greek poetic texts from various genres. Topics may vary. May be repeated up to 9 credit hours with different content.
7000. **Research (V1-12)**.

Italian (ITAL)**Undergraduate Courses**

1501. [ITAL 1411, 1511] **A Beginning Course in Italian I (5)**.
1502. [ITAL 1412, 1512] **A Beginning Course in Italian II (3)**. Prerequisite: ITAL 1501.
2301. [ITAL 2311] **A Second Course in Italian I (3)**. Prerequisite: ITAL 1302. Reading, cultural background, conversation, and composition.
2302. [ITAL 2312] **A Second Course in Italian II (3)**. Prerequisite: ITAL 2301. Reading, cultural background, conversation, and composition.
2315. **Italian Filmmakers (3)**. An analysis of the development and main themes of major Italian film-makers such as Fellini, Antonioni, Wertmuller, Avati, and Moretti. Taught in English. Fulfills core Creative Arts requirement.
3303. **Italian Conversation (3)**. Prerequisite: ITAL 2302. Through discussions on contemporary Italian culture, students will improve their fluency in Italian.
3390. **Italian Cinema (3)**. Covers the development of Italian cinema from the 1940s to the present. Taught in English.
4300. **Individual Problems in Italian (3)**. Contents will vary to meet the needs of students. May be repeated for credit up to 9 hours with instructor consent. Independent work under guidance of a staff member.
4301. **Topics in Italian Literature (3)**. Prerequisite: ITAL 2302 or instructor consent. A study of selected classical masterpieces or contemporary Italian literary works. May be repeated once when content is different.
4303. **Advanced Italian Conversation (3)**. Prerequisite: ITAL 3303. 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)**. 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. [JAPN 1411, 1412] **A Beginning Course in Japanese I (5)**. Introduction and development of the four language skills: listening comprehension, speaking, writing, and reading.
1502. [JAPN 1511, 1512] **A Beginning Course in Japanese II (5)**. Prerequisite: JAPN 1501. Introduction and development of the four language skills: listening comprehension, speaking, writing, and reading.
2301. [JAPN 2311] **A Second Course in Japanese I (3)**. Prerequisite: JAPN 1502. Reading, cultural background, grammar review, conversation, and composition skills.
2302. [JAPN 2312] **A Second Course in Japanese II (3)**. Prerequisite: JAPN 2301. Reading, cultural background, grammar review, conversation, and composition skills.
4300. **Individual Studies in Japanese (3)**. Prerequisite: JAPN 2302 or instructor consent. Independent study in the Japanese language under the guidance of a faculty member. May be repeated for credit up to 24 hours with instructor consent.

Latin (LAT)**Undergraduate Courses**

1501. [LATI 1411, 1412] **A Beginning Course in Latin I (5)**.
1502. [LATI 1511, 1512] **A Beginning Course in Latin II (5)**. Prerequisite: LAT 1501.
1507. **Comprehensive Latin Review First Year (5)**. 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. [LATI 2311] **A Second Course in Latin I (3)**. Prerequisite: LAT 1502 or 1507. Review; selected readings from standard authors.

2302. [LATI 2312] **A Second Course in Latin II (3)**. Prerequisite: LAT 2301. Review; selected readings from standard authors.
4300. **Individual Problems in Latin (3)**. Prerequisite: LAT 2302 or instructor consent. Contents will vary to meet the needs of the students. May be repeated for credit up to 18 hours with instructor consent. Independent reading under guidance of a staff member.
4305. **Individualized Readings in Latin Literature (3)**. Contents will vary to meet the needs of students. May be repeated once for credit with instructor consent. Major works of selected Latin writers.

Graduate Courses

5304. **Latin Poetry: Epic, Lyric, Elegiac, and Pastoral (3)**. Study of one or more poetic genres. May be repeated up to 9 credit hours with different content.
5310. **Seminar in Latin Literature (3)**. Content will vary to meet the needs of the students.
5341. **Intensive Latin for Graduate Research I (3)**. 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)**. Continuation of LAT 5341. Equivalent to completion of LAT 2302. Not for classics majors or Latin minor graduate degree requirements.
5360. **Latin Prose (3)**. Selected readings from Latin texts in history, philosophy, oratory, rhetoric, epistolography, satire, biography, and the novel. Topics may vary. May be repeated up to 9 credit hours with different content.
7000. **Research (V1-12)**.

Linguistics (LING)**Undergraduate Courses**

4311. **Methods of Teaching Second and Foreign Languages (3)**. 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)**. Prerequisite: Instructor consent. 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)**. Prerequisite: Instructor consent. Raises awareness of the social and educational implications of teaching English as a second language.
4332. **Child Language Acquisition (3)**. Prerequisite: Instructor consent. 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)**. 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)**. Prerequisite: Instructor consent. 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)**. Concepts in linguistics and linguistics analysis as they relate to bilingual and second language education.
5320. **Second Language Writing (3)**. 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)**. Study of theory and research underlying current language teaching with an emphasis on communicative approaches.
5325. **Technology in Teaching Second Languages (3)**. 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)**. Analysis of second and foreign language teaching curriculum design models and application to current language teaching.
- 5328. **Teaching English in International Contexts (3)**. Designed to prepare students methodologically and professionally for teaching English in international contexts.
- 5330. **Second Language Acquisition (3)**. An introduction to second language acquisition as a research field, including basic and major research findings with emphasis on adult learners.
- 5332. **Instructed Second Language Acquisition (3)**. Prerequisite: instructor consent. Focuses on the theory and research related to the effect of instruction on linguistic development.
- 5340. **Second Language Testing (3)**. 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)**. 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)**. Study of current topics of interest in second language acquisition. Course content will vary. May be repeated as topic varies for a maximum of 12 credits.
- 6000. **Master's Thesis (V1-6)**.
- 7000. **Research (V1-12)**.

Portuguese (PORT)

Undergraduate Courses

- 1501. [PORT 1411, 1412] **Elementary Portuguese I (5)**. Introduction and development of the four language skills in Portuguese: Listening comprehension, speaking, reading, and writing.
- 1502. [PORT 1511, 1512] **Elementary Portuguese II (5)**. Prerequisite: PORT 1501. Introduction and development of the four language skills in Portuguese: Listening comprehension, speaking, reading, and writing.
- 1507. **Intensive Portuguese for Spanish Speakers (5)**. Prerequisite: Instructor consent. 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. [PORT 2311] **Intermediate Portuguese I (3)**. Prerequisite: PORT 1502 or 1507. Reading, cultural background, grammar review, conversation, and composition.
- 2302. [PORT 2312] **Intermediate Portuguese II (3)**. Prerequisite: PORT 2301. Reading, cultural background, grammar review, conversation, and composition.
- 3303. **Studies in Portuguese (3)**. 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)**. 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.
- 4300. **Individual Studies in Portuguese (3)**. Prerequisites: PORT 2302 and instructor consent. Contents will vary to meet the needs of the student. May be repeated up to 12 credit hours. Individual study under the guidance of a faculty member.

Graduate Courses

- 5307. **Luso-Brazilian Civilization and Literature (3)**. 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 up to 9 credit hours with different content.
- 5341. **Intensive Portuguese for Graduate Students I (3)**. Intensive introduction to the Portuguese language for graduate students proficient in Spanish. Supports the Portuguese minor for the Spanish M.A. and Ph.D. programs.
- 5342. **Intensive Portuguese for Graduate Students II (3)**. Intensive introduction to the Portuguese language for graduate students proficient in Spanish. Supports the Portuguese minor for the Spanish M.A. and Ph.D. programs.

- 5355. **Readings in Luso-Brazilian Literature (3)**. Advanced topics in Luso-Brazilian literature. May be repeated up to 12 credit hours with different content.
- 7000. **Research (V1-12)**.

Russian (RUSN)

Undergraduate Courses

- 1501. [RUSS 1411, 1412] **A Beginning Course in Russian I (5)**. Introduction and development of the four language skills: listening comprehension, speaking, reading, and writing.
- 1502. [RUSS 1511, 1512] **A Beginning Course in Russian II (5)**. Prerequisite: RUSN 1501. Introduction and development of the four language skills: listening comprehension, speaking, reading, and writing.
- 2301. [RUSS 2311] **A Second Course in Russian I (3)**. Prerequisite: RUSN 1502. Training in oral and written expression and in aural and reading comprehension, including optional work in the language laboratory.
- 2302. [RUSS 2312] **A Second Course in Russian II (3)**. Prerequisite: RUSN 2301. Training in oral and written expression and in aural and reading comprehension, including optional work in the language laboratory.
- 2304. **Russian Culture (3)**. 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 Language, Philosophy, and Culture requirements.
- 3301. **Russian Civilization Through Literature in the 19th Century (3)**. A survey course of 19th century Russian literature. Includes the works of the century's most important writers from Alexander Pushkin to Anton Chekhov. Taught in English.
- 3302. **20th Century Russian Civilization Through Literature in Translation (3)**. 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.
- 3305. **Studies in Advanced Russian (3)**. Prerequisites: RUSN 2302 and instructor consent. 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)**. Examines the significance of masterpieces by Tolstoy and Dostoevsky. The works will be read in translation. Conducted in English. (Writing Intensive)
- 4302. **Contemporary Russian Literature in Translation (3)**. Examines the works of major Russian authors such as Aleksandr Solzhenitsyn and Tatyana Tolstaya from 1953 to the present. (Writing Intensive)

Graduate Courses

- 5301. **Russian Language for Graduate Students (3)**. 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)**. 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)**. 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

- 2301. **The Vampire in East European and Western Culture (3)**. An investigation of the myth of the vampire from its inception in

early East European culture to its popularization in the West. Fulfills core Language, Philosophy, and Culture and multicultural requirement.

4300. **Individual Studies in Slavistics (3)**. Prerequisite: Instructor consent. 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 instructor consent. (Writing Intensive)

Spanish (SPAN)

Undergraduate Courses

1101. **Practical Survival Spanish (1)**. Spanish skills for studying or living abroad. Focus is on listening comprehension and speaking.
1501. **[SPAN 1411, 1511] A Beginning Course in Spanish I (5)**. Prerequisite: Consent of department.
1502. **[SPAN 1412, 1512] A Beginning Course in Spanish II (5)**. Prerequisite: SPAN 1501.
1507. **[SPAN 1305] Comprehensive Spanish Review - First Year (5)**. Prerequisite: Two years high school Spanish. A comprehensive one-semester review.
1607. **Intensive Spanish First Year (6)**. Intensive immersion development of the four language skills in Spanish: Oral comprehension, speaking, reading, and writing. Course is taught in Spain.
2301. **[SPAN 2311] A Second Course in Spanish I (3)**. Prerequisite: SPAN 1502 or 1507, or consent of department. Reading, cultural background, conversation, and composition. (Honors section offered.)
2302. **[SPAN 2312] A Second Course in Spanish II (3)**. Prerequisite: SPAN 2301.. Reading, cultural background, conversation, and composition. (Honors section offered.)
2303. **[SPAN 2313] Intermediate Spanish for Hispanic Students I (3)**. 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.
2304. **[SPAN 2315] Intermediate Spanish for Hispanic Students II (3)**. 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)**. Prerequisite: B or better in any of the following courses: SPAN 1402, 1502, 1507, 1607; SPCS 1305, 1512. Reading, culture, conversation, and composition. Equivalent to 2301 and 2302.
3303. **Intermediate Spanish Conversation (3)**. Prerequisite: SPAN 2302 or 2304 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 3303, 3315 or 4303. May not be taken following 4000-level work. (for Span 3315).
3305. **Intermediate Spanish Grammar (3)**. Prerequisite: SPAN 2302 or 2304 or 2607. An overview of important Spanish grammar concepts.
3306. **Introduction to Hispanic Life and Culture (3)**. Prerequisite: SPAN 3303 or 3305 or department consent. May not be taken after completion of Span 4346 Origins, development, and characteristics of Hispanic life and culture. Conducted in Spanish.
3307. **Introduction to Hispanic Literatures (3)**. Prerequisites: SPAN 3305 and one other 3000-level SPAN course. Introduction to Spanish and Spanish American literatures through selected works and authors. Highly recommended as a prerequisite to all 4000 level literature courses. (Writing Intensive)
3315. **Intermediate Spanish Conversation for Bilingual Students (3)**. Designed to increase communicative proficiency for students whose home/family language is Spanish. Emphasis is on the development of literacy and academic language skills.
3343. **Spanish Language Development (3)**. Prerequisite: SPAN 2302, 2304, or 2607. Development of listening, speaking, reading, and writing skills on location in Mexico. Offered in Mexico each summer.
3344. **Mexican Life and Culture (3)**. Prerequisite: SPAN 2302, 2304, or 2607. A basic survey of Mexico, with emphasis on its history and cultural patterns. Offered in Mexico each summer.
3389. **Individual Studies in Spanish (3)**. Prerequisite: SPAN 2302 or 2607 or instructor consent. 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. May not be taken following 4000-level work.
3390. **Hispanic Culture and Civilization (3)**. 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 requirement.
3391. **Hispanic Film in Translation (3)**. A study of Hispanic film and its relationship to literature and culture. Taught in English. Not for Spanish majors or minors, but recommended as supplementary.
3392. **Hispanic Literature in Translation (3)**. A study of major literary themes and writers of the Hispanic world. Taught in English. Not for Spanish majors or minors, but recommended as supplementary.
4000. **Individual Studies in Spanish (VI-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 instructor consent. Specifically designed for individual projects calling for fewer than 3 semester credit hours.
4303. **Advanced Conversation (3)**. 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)**. Prerequisites: SPAN 3305 and any 3000-level SPAN course. Spanish language, syntax, and grammar.
4307. **Advanced Composition (3)**. Prerequisites: SPAN 3305 and any 3000-level SPAN course. Principles of correct writing and stylistics. (Writing Intensive)
4308. **Business Spanish (3)**. Prerequisites: 6 hours of 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)**. Prerequisites: 6 hours of 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)**. 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)**. 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)**. 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)**. 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)**. Prerequisites: 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)**. Prerequisites: 6 hours of SPAN courses at the 3000 level. 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)**. Prerequisites: Two SPAN courses at the 3000 level or consent of department. Work experience in a community agency that deals with native Spanish speakers. Emphasis on cultural understanding and communicative skills. (Writing Intensive)
4337. **Cultural Topics-Hispanic World (3)**. Prerequisites: 6 hours of SPAN 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)**. Prerequisite: SPAN 3303 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)**. Prerequisites: 6 hours of SPAN at the 3000 level. A study of the various facets of contemporary Mexico: history, arts, politics, and economics. Offered only in Mexico each summer.
4346. **Spanish Life and Culture (3)**. Prerequisite: SPAN 3303 or 3305. 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)**. 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. (Writing Intensive)
4361. **Spanish for the Southwest (3)**. Prerequisites: 6 hours of SPAN courses at the 3000 level. Study of similarities and differences between “standard” and “regional” Spanish.
4373. **Capstone Conversational Spanish (3)**. Prerequisite: SPAN 4303, or 4343, or departmental consent. For majors and teacher certification candidates. Additional development of aural/oral skills.
4389. **Individual Problems in Spanish (3)**. Prerequisites: Two SPAN courses at the 3000 level or consent of department. 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.
4392. **The Play in Spanish (3)**. Prerequisites: Two SPAN courses at the 3000 level or consent of department. 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.

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.
5301. **Writing for the Profession (3)**. Prepares students to conduct independent research in the fields of Hispanic literature, linguistics, and cultures and to write effectively.
5304. **Advanced Business Spanish I (3)**. Prerequisite: Instructor consent. 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)**. Spanish phonology, dialectology, morphology, or Spanish syntax. May be repeated once for credit with different emphasis.
5341. **Intensive Spanish for Graduate Research I (3)**. 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.
5342. **Intensive Spanish for Graduate Research II (3)**. 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)**. 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)**. Prerequisite: One year of Latin or equivalent. The development of the Spanish language from its earliest forms to the present.
5347. **Language Development (3)**. Mastery of language skills through readings, compositions, and directed oral projects. Offered only in programs abroad each summer.
5348. **Culture and Literature (3)**. 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)**. Theories and practices of literary analysis and criticism.
5354. **Hispanic Literary Concepts (3)**. 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)**. Advanced topics in Hispanic literature and literary theory. May be repeated for credit up to 12 hours.
5361. **Medieval Literature (3)**. Spanish literature from its earliest monuments to the end of the Middle Ages.
5362. **Golden Age Literature (3)**. Selected authors, works, and genres.
5364. **Nineteenth-Century Spanish Literature (3)**. A history of Spanish literature in the 19th century.
5365. **Spanish in the U.S. (3)**. Examines the social and linguistics properties of the Spanish language as is currently spoken in the United States.
5366. **Twentieth-Century Spanish Prose (3)**. 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)**. A comprehensive study of the principal literary currents, authors, and works with emphasis on the contemporary period.
5370. **Colonial Spanish American Literature (3)**. 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)**. A comprehensive study of the principal literary currents, authors, and works of the 19th century.
5375. **Modernism (3)**. A detailed study of Spanish American Modernism.
5376. **Twentieth-Century Spanish American Prose (3)**. The development of prose fiction in Spanish America during the 20th century.
5378. **Twentieth-Century Spanish American Theatre and Poetry (3)**. The development of the theatre and poetry in Spanish America during the 20th century.
5381. **Hispanic Literature of the Southwest (3)**. 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).
5382. **Spanish in the U.S. (3)**. Examines the social and linguistics properties of the Spanish language as is currently spoken in the United States.
5383. **Spanish in Contact with Other Languages (3)**. Introduces students to the dynamic nature of bilingualism in the Spanish-speaking world. Topics include childhood/adult bilingualism, borrowing, and code-switching. May be repeated for credit.
5384. **Acquisition and Development of Skills in Spanish as a Second Language (3)**. Offers graduate students the possibility to explore and work on projects related to Spanish language skills such as writing, speaking, reading and listening. May be repeated for credit.
5392. **The Play in Spanish (3)**. Prerequisite: Instructor consent. 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

3307. **Turkish Culture (3)**. Turkish history, culture, and civilization. Course utilizes resources from Archives of Turkish Oral Narrative. May be repeated once with different content. Taught in English.
4300. **Individual Studies in Turkish (3)**. Prerequisite: TURK 2302. Independent studies in the language under the guidance of a faculty member. May be repeated once for credit with instructor consent.

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.

Department of Economics

Klaus G. Becker Ph.D., Chairperson

Associate Professors: Al-Hmoud, Becker, McComb, Noel, Rahnama, von Ende

Assistant Professors: Abo-Zaid, Avetisyan, DeAngelo, Gittings, Lopez

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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
- 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.

Undergraduate Program

Students with either a major or minor in the Department of Economics must have at least a C in all economics courses in all programs. Moreover, a minimum grade of C is required in all core courses in the B.S. in International Economics degree. Courses specifically required in the core by course number for the B.S.I.E. may not be taken pass/fail. Courses required for the major or minor in the B.A. or B.S. in Economics degree 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.

Students choosing any of the undergraduate programs offered by the Department of 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.

Bachelor of Arts in Economics. The undergraduate program leading to the Bachelor of Arts degree is offered to students who want to pursue a broad liberal arts education while at the same time studying the complex interrelationships between consumers, producers, and governments in an economic system. A minimum of 33 semester hours in economics courses is required for the major, including ECO 2301, 2302, 3311, 3312, and 4314 plus 18 hours of advanced economics courses. Additional requirements for the Bachelor of Arts in Economics include an adjunct course in statistics (MATH 2345 or Math 2300 or equivalent) and 18 semester hours in a minor field of choice. A minimum of 120 credit hours is required to complete the degree. Candidates for the B.A. degree in economics are encouraged to consult with their advisors for more information. Other requirements appear in the "Undergraduate General Degree Requirements" listed on page 194.

Bachelor of Science in Economics. The undergraduate program leading to the 120 credit hour 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

Graduate Program

For information on graduate programs offered by the Department of Economics, visit the Graduate School section of the catalog on page 127.

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 "Undergraduate General Degree Requirements" on page 194. The adjunct requirements include a two-semester course sequence in statistics (MATH 4342 and 4343) in addition to the math minor.

Bachelor of Science in International Economics. The B.S.I.E. is a unique degree program that provides correlated emphasis on international economics, international politics, and international business. Course requirements for this degree are listed on page 196.

Minor in Economics. Requirements for the minor in economics are ECO 2301, 2302, 3311, 3312, and two elective courses in advanced economics.

Course Descriptions

Economics (ECO)

Undergraduate Courses

2301. [ECON 2302] **Principles of Economics I (3).** 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 requirement.
2302. [ECON 2301] **Principles of Economics II (3).** An introduction to modern economic society and theories of production and exchange. Emphasis upon monetary and fiscal policy and macroeconomics. Fulfills core Social and Behavioral Sciences requirement.
2305. **Principles of Economics (3).** 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 requirement.
3305. **Game Theory (3).** Analysis of strategic interaction. Strategies of rational choice will be derived and analyzed in economics and other environments.
3311. **Intermediate Macroeconomics (3).** 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).** 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).** Prerequisite: ECO 2301. The application of economic theory to problems of business enterprise.
3323. **Principles of Money, Banking, and Credit (3).** Prerequisites: 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).** Explores the justification for and effects of the entrance of government into the U.S. marketplace.
3325. **Special Topics in Applied Economics (3).** Prerequisites: ECO 2301 and 2302 or consent of instructor. Analysis of selected economic issues, theories, and policies in microeconomics or

Bachelor of Arts in Economics

FIRST YEAR

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Life and Physical Sciences Elective*	4	Life and Physical Sciences Elective*	4
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
IS 1100, Freshman Seminar	1	Creative Arts Elective*	3
ECO 2301, Principles of Economics I	3	ECO 2302, Principles of Economics II	3
TOTAL	14	TOTAL	16

SECOND YEAR

Fall		Spring	
ENGL Literature	3	ENGL Literature	3
MATH	3	MATH 2300 or 2345	3
HIST 2300, History of the U.S. to 1877†	3	HIST 2301, Hist. of the U.S. Since 1877†	3
ECO 3312, Intermediate Econ. Theory†	3	ECO 3311, Intermed. Macroeconomics‡	3
Minor	3	Minor	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
TOTAL	16	TOTAL	16

THIRD YEAR

Fall		Spring	
ECO Elective	3	ECO 4314, Develop. Econ. Doctrines**	3
Foreign Language§	3	Foreign Language§	3
Language, Phil., & Culture Elective*	3	Oral Communications Elective*	3
Multicultural Elective#	3	Creative Arts Elective*	3
Minor	3	Minor	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
ECO Elective, 4000 Level**	3	ECO Elective	3
ECO Electives	6	ECO Elective	3
Language, Phil., & Culture Elective*	3	Minor	3
Minor	3	Elective	3
		Elective	1
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

* Select from the university's core curriculum or the list of courses approved by the College of Arts and Sciences.

† HIST 2310 may be substituted for HIST 2300 or 2301.

‡ The order in which the student takes ECO 3311 and 3312 may be switched.

§ A student must complete 6 hours at the sophomore level or above in a single language.

The prerequisite for all sophomore language courses is credit for the freshman level.

This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

Select from the university multicultural requirements.

** Writing intensive course

Bachelor of Science in Economics

FIRST YEAR

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
ECO 2301, Principles of Economics I	3	ECO 2302, Principles of Economics II	3
Life and Physical Sciences Elective*	4	Life and Physical Sciences Elective*	4
IS 1100, Freshman Seminar	1	Personal Fitness and Wellness	1
TOTAL	15	TOTAL	15

SECOND YEAR

Fall		Spring	
ENGL Literature	3	ENGL Literature	3
MATH 2450, Calculus III	4	MATH 2360, Linear Algebra	3
ECO 3312, Intermediate Econ. Theory†	3	ECO 3311, Intermed. Macroeconomics†	3
HIST 2300, History of the U.S. to 1877‡	3	HIST 2301, Hist. of the U.S. Since 1877‡	3
Foreign Language§	3	Foreign Language§	3
		Personal Fitness and Wellness	1
TOTAL	16	TOTAL	16

THIRD YEAR

Fall		Spring	
ECO Elective	3	ECO Elective	3
ECO Elective	3	ECO Elective	3
MATH 4342, Mathematical Statistics	3	MATH 4343, Mathematical Statistics	3
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
Elective	3	Oral Communications Elective*	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
ECO 4305, Intro. to Econometrics#	3	ECO Elective, 4000 Level#	3
ECO Elective	3	ECO Elective	3
Creative Arts Elective*	3	Multicultural Elective††	3
MATH Elective**	3	MATH Elective	3
Elective**	1	Elective	3
TOTAL	13	TOTAL	15

TOTAL HOURS: 120

* See Arts and Sciences General Degree Requirements for more information. 3 hours of English literature coursework will fulfill 3 hours of Language, Philosophy, and Culture requirements for B.S. degree.

† The order in which the student takes ECO 3311 and 3312 may be switched.

‡ HIST 2310 may be substituted for HIST 2300 or 2301.

§ A student must complete 6 hours at the sophomore level or above in a single language.

The prerequisite for all sophomore language courses is credit for the freshman level.

This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

Writing intensive course

** MATH 3430 may be taken in place of the MATH elective and 1-hour elective in this semester.

†† Select from the university multicultural requirements.

macroeconomics. May be repeated once for credit when topics vary.

- 3326. Industrial Organization and Competitive Strategy (3).** Prerequisite: ECO 2301. Analyzes strategic behavior firms in imperfectly competitive markets. Includes price discrimination, price fixing, price wars, oligopoly, entry deterrence, mergers, and vertical restraints
- 3327. Antitrust Law and Economic Regulation (3).** Competition strategy and legal limits on what firms can and cannot do when competing. In-depth review of antitrust laws and full-blown economic regulation.
- 3333. International Economics (3).** Prerequisites: ECO 2301 and 2302 or consent of instructor. Principles of international trade, balance of payments, trade policies, and agreements.
- 3336. Environmental Economics (3).** Prerequisites: ECO 2301 and 2302 or consent of instructor. Applies economic models to current local and global environmental issues with an emphasis on evaluating policies.
- 3350. Behavioral and Experimental Economics (3).** Prerequisite: ECO 2301. Shows developments in the testing of economic theory through experiments with a strong emphasis on behavioral models/phenomena in explaining economic decision-making.
- 3356. Energy Economics (3).** Prerequisites: ECO 2301 and 2302 or consent of instructor. Application of economic models to current local and global energy markets with an emphasis on evaluating policies.
- 4300. Economic Research (3).** Prerequisites: ECO 3311 and 3312 and consent of instructor and the director of undergraduate

studies or the department chairperson. Directed undergraduate student research in selected areas under the supervision of selected departmental faculty. (Writing Intensive)

- 4305. Introduction to Econometrics (3).** Prerequisites: 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).** Prerequisites: 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).** 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).** 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).** 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)**. 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)**. Designed for graduate students who need intensive study of intermediate economic price and income theory.
5311. **Macroeconomic Theory and Policy (3)**. Prerequisite: ECO 3311 or consent of instructor. 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)**. Prerequisite: 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)**. Prerequisite: Consent of instructor. The application of mathematical techniques to economic model-building.
5314. **Econometrics I (3)**. Prerequisite: 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)**. 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)**. 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)**. 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)**. Examines various historical episodes and their influence on the development of economic theories.
5319. **Advanced Topics in Environmental Economics (3)**. Prerequisite: ECO 5317 or consent of instructor. Students will use economic models to consider current environmental issues from both a theoretical and an empirical perspective.
5321. **Labor Markets Theory and Policy (3)**. Prerequisites: 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)**. 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)**. 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)**. 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)**. Prerequisite: Consent of instructor. Analysis of major economic issues, theories, or policies. May be repeated for credit.
5328. **Monetary Theory II (3)**. 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)**. 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)**. 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)**. Prerequisite: ECO 3333 or consent of instructor. Advanced study of theory, problems, and policies in international economics.
5337. **Health Care Economics (3)**. 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)**. Introduction to game theory with an emphasis on economic applications.
5347. **Industrial Organization Theory (3)**. Prerequisites: 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)**. Prerequisite: ECO 5347 or consent of instructor. Focuses on recent developments in empirical industrial organization, public utility, and regulation literature.
5350. **Behavioral and Experimental Economics (3)**. Prerequisite: ECO 5312 or consent of instructor. Shows developments in the testing of economic theory through experiments with a strong emphasis on behavioral models/phenomena in explaining economic decision-making.
5356. **Advanced Topics in Energy Economics (3)**. Prerequisite: ECO 5317 or consent of instructor. Students will use economic models to analyze current local and global energy markets from both theoretical and empirical perspectives.
5381. **Empirical Studies in Macroeconomics (3)**. 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)**. 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)**.



Photo credit: Duncan Stanley/Student Media

Department of English

Bruce Clarke, Ph.D., Chairperson

Horn Professor: Clarke

Professors: Baehr, Cargile Cook, Covington, Dragga, Hawkins, Hurst, Kimball, Koerber, Kolosov-Wenthe, Lang, Patterson, Poch, Purinton, Rickly, Spurgeon, Wenthe

Associate Professors: Baake, Batra, Bauer, Baugh, Borshuk, Carter, Couch, Crowell, Desens, Eaton, Kim, Kvande, McFadden, Ransdell, Rice, Samson, Shelton, Shu, Snead, Still, Whitney, Zdenek

Assistant Professors: Barrera, Braver, Cortese, Faris, Hackenbracht, Hooley, McNamara, Moore, Mullen, Rukavina, Selzer King, Wilson

Lecturers: Alvarez, Duke, Fricke, Hanson, Hiemstra, McLaughlin, Myers, Rylander

CONTACT INFORMATION: 212 English/Philosophy Building,
Box 43091, Lubbock, TX 79409-3091, T 806.742.2501,
F 806.742.0989, www.english.ttu.edu

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 Book History and Digital Humanities
- Graduate Certificate in Linguistics
- Graduate Certificate in Publishing and Editing
- Graduate Certificate in Teaching Technical Communication

In addition to its degree and certificate programs, the Department of English cooperates in interdepartmental programs in linguistics and comparative literature at both the undergraduate and graduate levels. The department also sponsors both the local chapter of Sigma Tau Delta (the national English honorary society) and a chapter of the Society for Technical Communication and supports the publication of two journals, *The Eighteenth Century: Theory and Interpretation* and *The Iron Horse Literary Review*.

Undergraduate Program

Bachelor of Arts in English

The program in English requires 120 semester credit hours, including the core curriculum, the major, and a minor. English majors must specialize in literature and language, creative writing, or the certificate program for teaching in the secondary schools. A maximum of 9 advanced hours of transfer credit in English will be accepted for the major.

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 at the college level, studying creative writing and literature in graduate school, and preparing for professional graduate schools, such as law and business. Permission to take 4351 requires submission of a writing sample, the prerequisite of at least one ENGL 3351 (preferably in the same genre), 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 planning to become high school teachers should minor in secondary education, which includes student teaching (EDSE 4000). They will

be required to take EDSE 4000 for their student teaching experience. The university has implemented a new teacher education program that includes a full year of student teaching (two semesters of the senior year). Students wishing to obtain teacher certification should consult with the department's undergraduate advisor and see a College of Education advisor to complete a certification plan.

Graduate Program

For information on graduate programs offered by the Department of English, visit the Graduate School section of the catalog on page 127.

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, website developers, information architects, and publications managers in a variety of professional domains, including publishing, education, government, health care, biology, chemistry, physics, and engineering. It also will prepare students for graduate education in technical communication as well as in law, business, science, and medicine.

The technical communication program requires 120 semester credit hours consisting of the core curriculum, 30 hours in a major field, and a required minor.

Requirements

- I. **2000-Level**
 - A. ENGL 2311
- II. **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 be used only once)
- III. **4000-Level**
 - A. Three of the following: 4360, 4365, 4366, 4367, 4368, 4369, 4378
 - B. ENGL 4380

Minors

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). 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 3 advanced hours of transfer credit will be accepted for the minor.

Students wishing to use an English minor to complete the core Language, Philosophy, and Culture requirement must choose two courses from ENGL 2305, 2306, 2307, 2308, 2351, 2388, and 2391 for their sophomore-level courses. At least two of their three upper-level courses must be numbered 3302 to 3351 and/or 3381 to 3391, but not 3360 to 3373.

Minor in Technical Communication. A minor in technical communication consists of ENGL 2311 and 4380 and 12 hours from ENGL 3360, 3362, 3365, 3366, 3367, 3368, 3369, 4360, 4365, 4366, 4367, 4368, 4369, and 4378. To graduate with the minor, students must earn at least a C in each of these courses. A maximum of 3 hours of transfer credit will be accepted toward 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 78 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 and 3366).

Course Descriptions

(To interpret course descriptions, see page 23.)

WRITING IS REQUIRED IN ALL UNDERGRADUATE ENGLISH COURSES, BUT SOME COURSES HAVE BEEN OFFICIALLY DESIGNATED AS "WRITING INTENSIVE."

English (ENGL)

Developmental Course

- 0301. Developmental Writing (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 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).** 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. Partially fulfills core Communication (Written) requirement.
- 1302. [ENGL 1302] Advanced College Rhetoric (3).** Prerequisite: Successful completion of ENGL 1301. Focuses on writing from sources, research methods, and documentation. Partially fulfills core Communication (Written) requirement.
- 2305. Introduction to Poetry (3).** Prerequisites: ENGL 1301, 1302. Critical study of and writing about a variety of poems. Fulfills core Language, Philosophy, and Culture requirement.
- 2306. Introduction to Drama (3).** Prerequisites: ENGL 1301, 1302. Critical study of and writing about a variety of plays. Fulfills core Language, Philosophy, and Culture requirement.
- 2307. Introduction to Fiction (3).** Prerequisites: ENGL 1301, 1302. Critical study of and writing about a variety of short stories and novels. Fulfills core Language, Philosophy, and Culture requirement.
- 2308. Introduction to Nonfiction (3).** Prerequisites: 1301, 1302. Critical study of and writing about a variety of historical, biographical, and scientific writings. Fulfills core Language, Philosophy, and Culture requirement.
- 2311. [ENGL 2311] Introduction to Technical Writing (3).** Prerequisites: ENGL 1301 and 1302. Introduction to patterns of writing used in reports and letters for business, industry, and technology.
- 2312. Texts, Discourse, and Technologies (3).** Survey of technologies of text production, publication, and consumption across cultures, extending from manuscripts through the printing press and to the internet.

**Bachelor of Arts in English:
Sample Four-Year Curriculum**

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH	3	MATH or PHIL 2310	3
POLS 1301, American Govt. Org.	3	American History	3
Creative Arts* †	3	Oral Communication*	3
Social & Behavioral Sciences* †	3	Social & Behavioral Sciences* †	3
TOTAL	15	TOTAL	15
SECOND YEAR			
Fall		Spring	
ENGL 2000-level ‡	3	ENGL 2000-level ‡	3
Foreign Language (2000 level) §	3	Foreign Language (2000 level) §	3
POLS 2302, American Public Policy	3	Creative Arts* †	3
Life and Physical Sciences*	4	Life and Physical Sciences*	4
Elective	3	Elective	1
TOTAL	16	TOTAL	14
THIRD YEAR			
Fall		Spring	
ENGL 3000-level	3	ENGL 3000-level	3
ENGL 3000-level	3	ENGL 3000-level	3
Minor Elective	3	ENGL 3000-level	3
Minor Elective	3	Minor Elective	3
Elective	3	Elective	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
ENGL 4000-level	3	ENGL 4000-level	3
ENGL 4000-level	3	ENGL 4000-level	3
Minor Elective	3	Minor Elective	3
American History	3	Minor Elective	3
Minor Elective	3	Elective	1
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
TOTAL	16	TOTAL	14

TOTAL HOURS: 120

For those who wish to pursue teacher certification, the university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for students beginning their teacher education program in spring 2013 or later.

* Select from the university's core curriculum.

† To satisfy the 3-hour multicultural requirement, select from the university's multicultural list a course that also satisfies either the Creative Arts or Social and Behavioral Sciences core requirement.

‡ Select a course that also fulfills the Language, Philosophy, and Culture requirement.

§ A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

**Bachelor of Arts in Technical Communication:
Sample Four-Year Curriculum**

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
American History	3	Oral Communication*	3
MATH or Logic	3	American History	3
POLS 1301, American Govt. Org.	3	MATH	3
Social & Behavioral Sciences* †	3	Creative Arts* †	3
TOTAL	15	TOTAL	15
SECOND YEAR			
Fall		Spring	
ENGL 2000-level Literature	3	ENGL 2311, Intro. to Technical Writing	3
Foreign Language (2000 level) §	3	Foreign Language (2000 level) §	3
Life and Physical Sciences*	4	Lang., Philos., and Culture Elective* †	3
POLS 2302, American Public Policy	3	Life and Physical Sciences*	4
Elective	3	Elective	1
TOTAL	16	TOTAL	14
THIRD YEAR			
Fall		Spring	
ENGL 3365, Professional Report Writing	3	ENGL 3368 or 3369	3
ENGL 3371 or 3373	3	ENGL 3369 or 4366	3
Lang., Philos., and Culture Elective* †	3	Creative Arts* †	3
Elective	3	Elective	3
Minor Elective	3	Minor Elective	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
ENGL 3366 or 3367	3	ENGL 4380, Prof. Issues in Tech Comm.	3
ENGL 4378, Intern. in Technical Comm.	3	ENGL 4366 or 4378	3
ENGL 4367 or 4369	3	Social & Behavioral Sciences/Minor ‡	3
Minor Elective	3	Minor Elective	3
Minor Elective	3	Elective	1
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

* Select from the university's core curriculum.

† To satisfy the 3-hour multicultural requirement, select from the university's multicultural list a course that also satisfies either the Language, Philosophy, and Culture, Creative Arts, or Social and Behavioral Sciences core requirement.

‡ Select a course for the minor that also satisfies the Social and Behavioral Sciences core requirement.

§ A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

- 2351. [ENGL 2307, 2308] **Introduction to Creative Writing (3)**. Prerequisites: ENGL 1301 and 1302. Fundamentals of creative writing with much practice in writing poetry and short fiction. Fulfills core Language, Philosophy, and Culture requirement.
- 2371. **Language in a Multicultural America (3)**. Prerequisites: ENGL 1301 and 1302. Examines language in the U.S. as it relates to race, gender, class, religion, and ethnicity. Fulfills multicultural requirement.
- 2388. **Introduction to Film Studies (3)**. Prerequisites: ENGL 1301 and 1302. Introduction to the history, aesthetics, and criticism of avant-garde, documentary, and narrative film. Fulfills core Language, Philosophy, and Culture requirement.
- 2391. **Introduction to Literary Studies (3)**. Prerequisites: ENGL 1301, 1302. Extensive practice in writing critical essays about literature. Fulfills core Language, Philosophy, and Culture requirement.
- 3302. **Old and Middle English Literature (3)**. Prerequisites: 6 hours of 2000-level English. Poetry, prose, and drama from 700 to 1500. May be repeated once for credit when topics vary.

- 3304. **Medieval and Renaissance Drama (3)**. Prerequisites: 6 hours of 2000-level English courses. English drama to 1642. May be repeated for credit once when topics vary.
- 3305. **British Renaissance Literature (3)**. Prerequisites: 6 hours of 2000-level English courses. British poetry, prose, and drama from 1485 to 1660. May be repeated for credit once when topics vary.
- 3307. **Restoration and Eighteenth Century British Literature (3)**. Prerequisites: 6 hours of 2000-level English courses. British poetry, prose, and drama from 1660 to 1800. May be repeated for credit once when topics vary.
- 3308. **Nineteenth Century British Literature (3)**. Prerequisites: 6 hours of 2000-level English courses. British poetry, prose, and drama from 1780 to 1900. May be repeated for credit once when topics vary.
- 3309. **Modern and Contemporary British Literature (3)**. Prerequisites: 6 hours of 2000-level English courses. British poetry, prose, and drama since 1900. May be repeated for credit once when topics vary. (Writing Intensive)

- 3323. Early American Literature (3).** Prerequisites: 6 hours of 2000-level English courses. American poetry and prose to 1800. May be repeated for credit once when topics vary.
- 3324. Nineteenth Century American Literature (3).** Prerequisites: 6 hours of 2000-level English courses. American poetry, prose, and drama from 1800 to 1900. May be repeated for credit once when topics vary.
- 3325. Modern and Contemporary American Literature (3).** Prerequisites: 6 hours of 2000-level English courses. American poetry, prose, and drama since 1900. May be repeated for credit once when topics vary. (Writing Intensive)
- 3335. Ancient and Medieval World Literature (3).** Prerequisites: 6 hours of 2000-level English courses. Representative works in translation, primarily Greek and Roman. May be repeated for credit once when topics vary.
- 3336. Early Modern World Literature (3).** Prerequisites: 6 hours of 2000-level English courses. Representative works in translation from 1400 to 1900. May be repeated for credit once when topics vary.
- 3337. Modern and Contemporary World Literature (3).** Prerequisites: 3 hours of 2000-level English courses. Representative works in translation since 1900. May be repeated for credit once when topics vary. Fulfills multicultural requirement.
- 3338. Global South Literatures (3).** Prerequisites: 3 hours of 2000-level ENGL courses. Representative African, Asian, Caribbean, and/or Latin American authors. May be repeated once for credit when topic varies. Fulfills multicultural requirement.
- 3351. Creative Writing (3).** Prerequisites: 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. Fulfills multicultural requirement.
- 3360. Issues in Composition (3).** Prerequisites: 6 hours of 2000-level English courses. Exploration of principles and practices in rhetoric and writing. (Writing Intensive)
- 3362. Rhetorical Criticism (3).** 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. Writing required.
- 3365. Professional Report Writing (3).** Prerequisite: Junior standing. Preparation of professional and academic reports and publications through the use of communication analysis.
- 3366. Style in Technical Writing (3).** Prerequisite: Junior standing. Investigation of the varieties, characteristics, and function of prose style in technical and professional writing.
- 3367. Usability Testing (3).** 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.
- 3368. World Wide Web Publishing of Technical Information (3).** Prerequisite: ENGL 2311 or 3365. Principles and techniques of designing usable websites, with emphasis on needs assessment, information architecture, and navigation.
- 3369. Information Design (3).** Prerequisite: ENGL 2311 or 3365. Principles of design, visual rhetoric, and visual communication and application of those principles in document design.
- 3371. Linguistic Science (3).** Prerequisites: 3 hours of 2000-level English courses. Modern theory and practice in the description and analysis of natural languages.
- 3372. History of the English Language (3).** Prerequisites: 3 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.
- 3373. Modern English Syntax (3).** Prerequisites: 3 hours of 2000-level English courses. The syntactic and morphological analysis of modern English.
- 3381. Literature of the Fantastic (3).** Prerequisites: 3 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.
- 3382. Women Writers (3).** Prerequisites: 3 hours of 2000-level English courses. Significant works by women. (WS 3382)
- 3383. Bible as Literature (3).** Prerequisites: 3 hours of 2000-level English courses. The styles and forms of biblical lyrics and narration as well as various theories of biblical interpretation.
- 3384. Religion and Literature (3).** Prerequisites: 3 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.
- 3385. Selected Plays of Shakespeare (3).** Prerequisite: 6 hours of 2000-level English courses. Survey of comedies, histories, tragedies, and romances.
- 3386. Literature and Science (3).** Prerequisites: 3 hours of 2000-level English courses. An exploration of the relations between science and technology and literature and discourse.
- 3387. Multicultural Literatures of America (3).** Prerequisites: 3 hours of 2000-level English courses. Representative works by Americans of different cultures. May be repeated once for credit when topic varies. Fulfills multicultural requirement. (Writing Intensive)
- 3388. Film Genres: Avant-Garde, Documentary, Narrative (3).** Prerequisites: 3 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.
- 3389. Short Story (3).** Prerequisites: 6 hours of 2000-level English courses. Short stories around the world.
- 3390. Literatures of the Southwest (3).** Prerequisites: 6 hours of 2000-level English courses. Examines the diverse literatures and cultures of the Southwest.
- 3391. Literature and War (3).** Prerequisites: 3 hours of 2000-level English courses. Explores the representation of war and conflict in literature and emphasizes diverse perspectives involved. May be repeated once for credit when topic varies. Fulfills multicultural requirement.
- 3392. African American Literature (3).** Prerequisites: 3 hours of 2000-level ENGL courses. African American or African diasporic writers. May be repeated once for credit when topic varies. Substantial writing required.
- 3393. U.S. Latina/o Literature (3).** Prerequisites: 3 hours of 2000-level ENGL courses. Latina/o writers (e.g., Mexican-, Dominican-, Cuban-American). May be repeated once for credit when topic varies. Substantial writing required.
- 3394. Asian American Literature (3).** Prerequisites: 3 hours of 2000-level ENGL courses. Asian American writers (e.g., Chinese, Japanese). May be repeated once for credit when topic varies. Substantial writing required.
- 3395. Native American Literatures (3).** Prerequisites: 3 hours of 2000-level ENGL courses. Works by indigenous peoples of the Americas. May be repeated once for credit when topic varies. Substantial writing required.
- 4300. Individual Studies in English (3).** Prerequisites: Junior or senior standing; 6 hours of 3000 level ENGL courses; approval of the instructor and department chairperson. Independent study under the guidance of a member of the faculty. May be repeated once. (Writing Intensive)
- 4301. Studies in Selected Authors (3).** Prerequisites: 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).** Prerequisites: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
- 4312. Studies in Drama (3).** Prerequisites: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
- 4313. Studies in Fiction (3).** Prerequisites: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
- 4314. Studies in Nonfiction (3).** Prerequisites: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
- 4315. Studies in Film (3).** Prerequisites: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
- 4321. Studies in Literary Topics (3).** Prerequisites: 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.
- 4342. Studies in Literary Theory (3).** Prerequisites: 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.
- 4351. Advanced Creative Writing (3).** Prerequisites: Submission of a writing sample; 3 hours of ENGL 3351 in the same genre and

instructor consent. 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)**. Prerequisite: Junior or senior standing. 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)**. Prerequisite: Junior standing; ENGL 2311 or 3365 or instructor consent. Development of complex documents, such as manuals, proposals, and newsletters. May be repeated once for credit when topics vary. Writing required.
4366. **Technical and Professional Editing (3)**. Prerequisite: Junior or senior standing. 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)**. Prerequisite: Junior or senior standing or consent of instructor. Preparation of instructions for complex procedures with focus on task and user analysis, organization, format, and usability testing.
4368. **Advanced Web Design (3)**. Prerequisite: Junior or senior standing or consent of instructor. Advanced study of content design for database websites, interactive design using single sourcing, and scripting technologies.
4369. **Interaction Design (3)**. Prerequisite: Junior or senior standing or consent of instructor. 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.
4371. **Language and Community (3)**. Prerequisites: 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.
4373. **Studies in Linguistics (3)**. Prerequisites: 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.
4374. **Senior Seminar in English (3)**. Prerequisites: 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)**. Prerequisites: 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.
4380. **Professional Issues in Technical Communication (3)**. Prerequisites: Senior standing, declared major or minor in technical communication, 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)
4390. **Internship in Literature, Creative Writing, and Linguistics (3)**. Prerequisites: 6 hours of 3000-Level ENGL courses, major/minor in English or related interdisciplinary field, LCWL approval. Supervised work in literature, linguistics, film, creative writing. Portfolio.

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.
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)**. 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)**. Survey of the grammar and vocabulary of Old English together with readings.
5303. **Studies in Medieval British Literature (3)**. Concentrated studies in British literature to 1500, treating in various semesters poetry, prose, drama, and major authors.
5304. **Studies in Renaissance British Literature (3)**. Concentrated studies in British literature, 1500-1600, treating in various semesters poetry, prose, drama, and major authors.
5305. **Studies in Shakespeare (3)**. Emphasis on the comedies, tragedies, histories, poetry, or a combination of these.
5306. **Studies in Seventeenth-Century British Literature (3)**. 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)**. 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)**. 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)**. Concentrated studies in British literature, 1900-present, treating in various semesters poetry, prose, drama, and major authors.
5315. **Studies in British Fiction (3)**. Concentrated studies in British fiction, treating in various semesters major figures and movements.
5317. **Studies in Postcolonial Literature (3)**. 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)**. 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)**. 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)**. Concentrated studies in American literature, 1900-present, treating in various semesters poetry, prose, drama, and major authors.
5325. **Studies in American Fiction (3)**. Concentrated studies in American fiction, treating in various semesters major figures and movements.
5327. **Studies in Multicultural American Literature (3)**. 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)**. 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)**. 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)**. Special topics. May be repeated when the topic varies.
5338. **Syntax (3)**. Surveys syntactic analysis and generative syntactic theory.
5339. **Phonology (3)**. Surveys the study of sound patterns, phonological description and analysis, and generative phonological theory.
5340. **Research Methods in Literature and Languages (3)**. Survey of research methods in literature and languages, providing experience with enumerative and analytical bibliography, bibliographic theory, and textual criticism.
5341. **Histories and Theories of the Book (3)**. Surveys the global history of written communication from the earliest writing systems to the rise of digital technologies.
5342. **Critical Methods (3)**. Survey of contemporary critical methods with special attention to their application to literature.
5343. **Studies in Literary Criticism (3)**. Concentrated study of specific problems in literary theory and its application to literature.

5344. **Teaching History of the Book (3)**. Surveys the best practices for integrating book history and material studies into the postsecondary and graduate classroom in the humanities.
5345. **Letterpress Printing History and Practice (3)**. Surveys the historical rise of printing from Gutenberg, with practical experience in letterpress printing on a 19th century historic iron handpress.
5346. **Digital Humanities (3)**. Surveys the theories, best practices, and technologies (i.e., TEI, CSS, XSLT, and GIS) associated with transforming cultural, historical, and literary texts into digital form.
5347. **Scholarly Editing in Digital Environments (3)**. Surveys the theories and best practices for textual editors and examines the implications associated with transforming cultural artifacts into digital form.
5348. **Studies in History of the Book (3)**. Concentrated study of specific problems in the history of the book and material culture. May be repeated when topics vary.
5349. **Religion and Material Texts (3)**. Explores the relationship between religion and material texts across histories and cultures.
5350. **Studies in Drama (3)**. Concentrated studies in American, British, or world drama.
5351. **Studies in Film and Literature (3)**. Readings, analysis, and research in the interrelationships between film and literature.
5352. **Studies in Fiction (3)**. Concentrated studies in world fiction.
5353. **Studies in Poetry (3)**. Concentrated studies in American, British, or world poetry.
5355. **Studies in Comparative Literature (3)**. Theory and practice of the study of comparative literature, with emphasis on themes and motifs.
5361. **Introduction to Rhetorical Theory (3)**. Classical and modern theories of rhetoric.
5362. **Rhetorical Analysis of Text (3)**. Classical and modern theories of rhetorical analysis.
5363. **Research Methods in Technical Communication and Rhetoric (3)**. Survey of research methods in technical communication, rhetoric, and composition studies with emphasis on current research trends.
5364. **History of Rhetoric (3)**. Survey of history and theories of rhetoric with an emphasis on applications to written communication.
5365. **Studies in Composition (3)**. Consideration of classical and modern theories and research in written composition.
5366. **Teaching Technical and Professional Writing (3)**. 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)**. History and theories of written argumentation.
5369. **Discourse and Technology (3)**. 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)**. 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)**. Theory and practice of technical communication.
5372. **Technical Reports (3)**. Theory and practice of reports and proposals.
5373. **Technical Manuals (3)**. Theory and practice of manual development and design.
5374. **Technical Editing (3)**. Substantive editing and design of technical documents.
5375. **Document Design (3)**. Theory and practice of creating comprehensible, usable, and persuasive texts.
5376. **Online Publishing (3)**. Design and testing of online materials to support instruction and information retrieval.
5377. **Theoretical Approaches to Technical Communication (3)**. Intensive analysis and application of one or more theories of technical communication.
5378. **Graduate Internship (3)**. 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)**. Prerequisite: B or better in ENGL 5363. Empirical research methods in technical communication and rhetoric.
5380. **Advanced Problems in Literary Studies (3)**. Concentrated studies in works, authors, or approaches.
5381. **Global Technical Communication (3)**. Introduction to theories and practices in global technical communication.
5382. **Theory and Research in the Written Discourses of Health and Medicine (3)**. 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)**. Theoretical issues and practical experience dealing with the genre and process of writing grants and proposals.
5384. **Rhetoric of Scientific Literature (3)**. Study of the role of rhetoric in the texts of scientific inquiry.
5385. **Ethics in Technical Communication and Rhetoric (3)**. Definitions, philosophies, and applicability of ethics to technical communication problems and solutions.
5386. **Written Discourse and Social Issues (3)**. Study of uses of written discourse in problem solving on social issues involving science or technology.
5387. **Publications Management (3)**. Strategies of managing processes and knowledge that support publication.
5388. **Usability Testing and Research (3)**. Methods of planning, conducting, and analyzing usability tests.
5389. **Field Methods of Research (3)**. Survey of methods such as ethnography, observation, and participatory design with application to research in rhetoric and technical communication.
5390. **Writing for Publication (3)**. Designed to teach students in graduate programs how to write clear and effective articles for professional journals in their field.
5391. **Grants and Proposals for Nonprofits (3)**. Strategies and techniques for researching, writing, and editing grant proposals for nonprofit organizations.
5392. **Teaching College Literature (3)**. Survey of pedagogical issues associated with the teaching of university-level literature courses.
5393. **Grants and Proposals for the Academy and Industry (3)**. Strategies and techniques for researching, writing, and editing grant proposals and business plans for the academy and industry.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.



Department of Environmental Toxicology

Todd A. Anderson, Ph.D., Chairperson

Professors: Anderson, Kendall, Presley, Ramkumar

Associate Professors: Cañas-Carrell, Gao, Godard-Codding, Klein, Maul, Mayer, Singh, E. Smith, P.N. Smith

Assistant Professor: Paton

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About the Program

This department offers 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

Graduate 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.

The Institute of Environmental and Human Health (TIEHH) integrates the efforts of Texas Tech University, the School of Law, and the Texas Tech University 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.tieh.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.

Course Descriptions

(To interpret course descriptions, see page 23.)

Environmental Toxicology (ENTX)

Undergraduate Courses

4000. **Undergraduate Research in Environmental Toxicology (V1-3).** Prerequisites: 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).** 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).** 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).** Prerequisite: ENTX 4325. Second half of two-semester course. Covers remaining toxicity mechanisms, toxic agents and applied toxicology. (Writing Intensive)

Graduate Courses

6000. **Master's Thesis (V1-6).**
6100. **Graduate Seminar (1).** 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).** 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).** 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.
6300. **Advanced Topics in Environmental Toxicology (3).** 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).** 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).** Coverage of chemical warfare agents, their protective measures, and technologies. Suitable for science and engineering majors.
6325. **Principles of Toxicology I (3).** 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).** Prerequisite: ENTX 6325. Second half of two semester course. Covers remaining mechanisms, toxic agents, and applied toxicology.
6327. **Molecular Toxicology (3).** Prerequisites: 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.
6328. **Molecular Methods in the Toxicology Laboratory (3).** Theoretical background and hands-on experience with molecular methods to understand and analyze adverse effects of toxicants at the molecular level.
6331. **Reproductive and Developmental Toxicology (3).** Prerequisites: 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.

- 6351. Analytical Toxicology Lecture (3).** Prerequisite: Consent of instructor. Corequisite: ENTX 6352. Theory of isolation, detection, identification, and quantification of toxic substances and their transformation products in environmental and biological samples.
- 6352. Analytical Toxicology Laboratory (3).** Corequisite: ENTX 6351. Extraction, cleanup, and quantitative analysis of environmental chemicals and their degradates. Reinforces and applies theories taught in ENTX 6351.
- 6365. Fundamentals of Aquatic Ecotoxicology (3).** 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).** Prerequisites: 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).** 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).** 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).** 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.
- 6445. Chemical Sources and Fates in Environmental Systems (4).** 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

Jeffrey Lee, Ph.D., Interim Chairperson

Horn Professor: Chatterjee

Pevehouse Professor: Sylvester

Professors: Asquith, Barnes, Barrick, Elbow, Haragan, Horita, Lee, Lehman, Nellis, Ridley, Schroeder, Templer, Yoshinobu

Associate Professors: Carter, Gurrola, Hetherington, Karlsson, Leverington, Mulligan, Nagihara, Weiss

Assistant Professors: Ancell, Bruning, Cao, Dahl, Kang, Sweet, Vanos

Instructors: Barbato, Cobb, Jones, Weaver

Adjunct Faculty: Holterhoff, Johnson, McGovern, Polyakov, Stout

CONTACT INFORMATION: 125 Science Building, Box 41053, Lubbock, TX 79409-1053, T 806.742.3102, F 806.742.0100, www.depts.ttu.edu/gesc

Field work is a requirement for the B.S. degree. If this is a concern, the B.A. should be considered. However, the B.A. degree also requires field work that may be strenuous.

Geology Concentration (B.S. or B.A.). This concentration offers students the choice of either a Bachelor of Science or a Bachelor of Arts degree.

- **Bachelor of Science** — The geology concentration for the B.S. 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 Geosciences with a geology concentration with a minimum of 40 hours in geosciences, 18 hours in the minor, and 24 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.
- **Bachelor of Arts** — The geology program leading to the B.A. 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 concentration in geology requires GEOL 1303, 1101, 2401, 3401, 3402, 4101, 4312, and at least 15 hours of junior-senior level geosciences electives, 9 hours of which must include a laboratory. Adjunct requirements include MATH 1321 or 1550, CHEM 1307, 1107, PHYS 1403. The minor may be in any area approved by the college.

Geophysics Concentration (B.S.). The Bachelor of Science degree allows students to prepare for employment as a professional geophysicist or enter a graduate program in geophysics, atmospheric sciences, or related areas. Unlike geology, the geophysics concentration includes only a Bachelor of Science and requires a minor in mathematics. The courses required for the geophysics concentration are GEOL 1303, 1101, 2401, 3401, 3402, 4101; either GEOL 4312 or ATMO 4312; GCH 3303; GPH 3300, 3310, 4321, 4323; STEM electives and geosciences electives. Adjunct courses include CHEM 1307, 1107; PHYS 1408, 2401. The senior research project (GEOL 4312 or ATMO 4312) must be in a field related to geophysics or atmospheric sciences.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Geography
- Bachelor of Arts in Geosciences
- Bachelor of Science in Geosciences
- Master of Science in Atmospheric Science
- Master of Science in Geography
- Master of Science in Geosciences
- Doctor of Philosophy in Geosciences
- Graduate Certificate in Geographic Information Science and Technology

The geography faculty participates in the Asian Studies, Environmental Studies, International Studies, and Community and Urban Studies programs.

Undergraduate Program

Major in Geosciences

The undergraduate program offers a 120-credit-hour major in geosciences with a concentration in geology or geophysics. Students are required to earn at least a C in the major, minor, and adjunct courses. Successful completion of adjunct courses with a C or better is required before upper-division geoscience courses may be taken.

Major in Geography

Texas Tech University offers a 120-hour Bachelor of Arts in Geography and a minor in geography, both of which appeal 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.

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 can provide 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, 3340, 4300; and GIST 3300. An additional 15 hours of junior- and senior-level GEOG and GIST courses. 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.

Graduate Program

For information on graduate programs offered by the Department of Geosciences, visit the Graduate School section of the catalog on page 128.

Minors

The department offers six minors: geography, geology, geophysics, atmospheric science, geographic information science and technology, and a composite minor.

- The geography minor requires GEOG 1401, 2300 or 2351; GIST 3300; and 9 hours of upper-division GEOG or GIST courses.
- The geology minor requires GEOL 1303, 1101 (petroleum engineering majors may substitute GEOL 3324), but GEOL 1350 and 1105 may not be included, 2401; one lab course from GEOL 3301, 3401, 3450, or 4334; and additional upper-division GEOG, GPH, GCH hours to total 18 hours in the minor.
- The geophysics minor requires 9 hours in upper-division geophysics and 9 hours of related science or mathematics coursework.
- The atmospheric science minor requires ATMO 1300, 1100, 2301, 2316, 3301 and approved elective courses to total 18 hours. Six hours must be junior-senior level. A list of approved elective courses is available from the department.
- The minor in geographic information science and technology requires GIST 3300, GIST 4304 and four approved electives to total 18 hours. A list of approved electives is available from the department.
- The composite minor is comprised of courses in mathematics, science, or engineering and is available only to students pursuing a B.S. in Geosciences. The minor consists of 18 hours of electives, at least 6 of which must be at the junior-senior level. Electives in the minor include, but are not limited to, the

following courses: ATMO 1300, 1100, 2301, 2316, 3301, 4300; ASTR 1100, 1400, 2401, 4301, 4302; BIOL 1401, 1402, 1403, 1404; CHEM 1307, 1107, 1308, 1108, 3105, 3106, 3107, 3108, 3141, 3301, 3305, 3306, 3307, 3308, 3341, 3351; CE 1305, 2301, 3302, 3303, 3305, 3321; CS 1382, 1411, 1412; CONE 2302, ECE 3301, 1305, 1315, 1206, 1207; GCH 4308, 4405, 3303, GPH 3310, 4300, 4321, 4323; GIST 3300, 4302, 4304, 4308, 4310, 4312; GEOG 3301, 3335; IE 1305; MATH 1451, 1452, 2450, 2460, 3310, 3322, 3342, 3350, 3351, 3354, 3360, 3370, 3371, 3430, 4310, 4312, 4324, 4330, 4331, 4342, 4343, 4350, 4351, 4354, 4356, 4360, 4362, 4363, 4370, 4371; ME 1315, 2301, 2302, 2322, 3322, 3370, 3371, 3403; NS 3302, 4320; NRM 4314, 4315, 4405; PHYS 1403, 1404, 1408, 2401, 2402, 3302, 3304, 3305, 3306, 3401, 4301, 4302, 4304, 4307, 4308, 4309, 4312; PSS 2432; ZOO 3405, 3406, 4321, 4406, 4407, 4408, 4409, 4410. Other science, math or engineering courses may be included subject to the approval of the department's undergraduate committee.

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. 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.

Course Descriptions

Atmospheric Science (ATMO)

Undergraduate Courses

1100. [GEOG 1147, 1447] **Atmospheric Science Laboratory (1)**. Discussion and practical experience in weather analysis, methods of instrumentation, and observational meteorology. Partially fulfills core Life and Physical Sciences requirement.
1300. [GEOG 1347, 1447] **Introduction to Atmospheric Science (3)**. An investigation of atmospheric properties and physical processes that determine current weather events and long-term climate conditions. Partially fulfills core Life and Physical Sciences requirement.
2301. **Weather, Climate, and Human Activities (3)**. Prerequisites: ATMO 1100, 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.
2316. **Severe and Hazardous Weather (3)**. Prerequisites: ATMO 1100, 1300. A study of the meteorology behind severe and hazardous weather phenomena focusing on events affecting the U.S., especially the Great Plains and adjacent regions of Texas.
3301. **General Meteorology (3)**. Prerequisites: ATMO 1100, 1300, and MATH 1451. An exploration of the quantitative foundation for atmospheric processes built on basic radiative, fluid and thermodynamic physics and applied over a range of scales.
4300. **Independent Studies in Atmospheric Science (3)**. Prerequisites: ATMO 1100, 1300, and consent of instructor. Atmospheric sciences minors only. Independent studies in atmospheric science. May be repeated once for credit.
4312. **Undergraduate Research (3)**. Prerequisites: Senior standing and consent of instructor. Geosciences majors only. Independent research in an area of current interest in atmospheric sciences. (Writing Intensive)

Graduate Courses

5101. **Atmospheric Science Seminar (1)**. 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)**. 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)**. Basic principles of atmospheric science, with particular emphasis on applications, including severe weather, air pollution, and global climate change.
5316. **Dynamics of Severe Storms (3)**. Observations and theoretical studies of severe storms. Conceptual and numerical models of storm structure and development.
5319. **Boundary Layer Meteorology (3)**. Boundary-layer turbulent transfer processes are examined, including diffusion, mixing, diabatic modification, low-level jet formation, and moisture discontinuities.
5321. **Cloud and Precipitation Physics (3)**. Processes of cloud droplet nucleation; initial growth of droplets and cloud droplet size spectra; theories of natural precipitation processes and microphysical parameterizations.
5322. **Atmospheric Electricity (3)**. 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)**. 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)**. Basic techniques of interpreting meteorological data. Applications of analysis techniques to basic research and weather forecasting.
5331. **Analysis of Geophysical Data Fields (3)**. Theory, computation, and application of Fourier, time series, spectral, statistical, and data assimilation techniques.
5332. **Regional Scale Numerical Weather Prediction (3)**. Numerical solutions of geophysical systems, predictability of the atmosphere, and data assimilation techniques.
5351. **Meteorological Data Acquisition and Instrumentation Systems (3)**. Exploration, design, integration and application of meteorological data acquisition and instrumentation systems.
5353. **Meteorologic Field Experiments (3)**. An overview of designing, planning, and completing atmospheric field experiments.
6000. **Master's Thesis (VI-6)**.
7000. **Research (VI-12)**.

Geochemistry (GCH)

Undergraduate Courses

3303. **Introduction to Geochemistry (3)**. Prerequisites: C or better in GEOL 3401; MATH 1451, 1452; CHEM 1308, 1108 (MATH 1452 may be taken concurrently). Principles and concepts of inorganic geochemistry with an emphasis on applications of geologic and environmental problems.
4308. **Techniques and Applications in Mineral Sciences (3)**. Prerequisites: C or better in GEOL 3401, CHEM 1308, PHYS 1403 or 1408. Fundamental and practical aspects of mineral science with application to properties of natural crystalline phases.
4405. **Inorganic Geochemistry (4)**. Prerequisite: C or better in GCH 3303. Origin of elements and isotopes, theory and application of isotopic systems, element mobility, thermodynamics, solution geochemistry, and geochemical cycles.

Graduate Courses

5300. **Individual Studies in Geochemistry (3)**. 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)**. 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)**. Prerequisite: C or better in GCH 5405 or consent of instructor. Theoretical and applied aspects of geochemistry occurring in the upper crust. May be repeated for credit.
5308. **Techniques and Applications in Mineral Sciences (3)**. Prerequisite: Consent of instructor. Fundamental and practical

aspects of mineral science with application to properties of natural crystalline phases.

5350. **Isotope Geochemistry (3)**. Principles of isotope chemistry as applied to the earth and solar system. Radioactive and stable isotope systematics.
5405. **Inorganic Geochemistry (4)**. Origin of elements and isotopes. Theory and application of isotopic systems, element mobility, thermodynamics, solution geochemistry, and geochemical cycles.

Geographic Information Science and Technology (GIST)

Undergraduate Courses

3300. **Geographic Information Systems (3)**. An introduction to geographic information systems (GIS) for thematic mapping and spatial analysis. Laboratory emphasizes experience with professional GIS software.
4302. **Spatial Analysis and Modeling (3)**. Prerequisite: GIST 3300 or equivalent. A second course in geographic information systems. Focuses on the analysis of spatial data and modeling.
4304. **Advanced Geographic Information Systems (3)**. Prerequisite: GIST 3300. An advanced course in GIS focused on spatial data management, editing, topology, models, and cartographic representations.
4308. **Cartographic Design (3)**. Prerequisite: GIST 3300 or equivalent. Theory and practice of cartographic design with an emphasis on visual thinking and communication using GIS.
4310. **GPS Field Mapping (3)**. Prerequisite: GIST 3300 or equivalent. Use of the global positioning systems (GPS) and mobile field mapping software for navigation and the acquisition of spatial data.
4312. **Internet Mapping (3)**. Prerequisite: GIST 3300 or equivalent. Study of the technology used to distribute maps over the internet. Emphasis is on the development of interactive web mapping applications.

Graduate Courses

5300. **Geographic Information Systems (3)**. Introduction to geographic information systems (GIS) for thematic mapping and spatial analysis. Laboratory emphasized experience with professional GIS software.
5302. **Spatial Analysis and Modeling (3)**. Prerequisite: GIST 5300 or equivalent. A second course in geographic information systems focused on the analysis of spatial data and modeling.
5304. **Advanced Geographic Information Systems (3)**. Prerequisite: GIST 5300 or equivalent. An advanced course in GIS focuses on spatial data management, editing, topology, models, and cartographic representations.
5308. **Cartographic Design (3)**. Prerequisite: GIST 5300 or equivalent. Theory and practice of cartographic design with an emphasis on visual thinking and communication using GIS.
5310. **GPS Field Mapping and Data Acquisition (3)**. Prerequisite: GIST 5300 or equivalent. Use of the Global Position Systems (GPS) and mobile field software for navigation and the acquisition of spatial data.
5312. **Internet Mapping (3)**. Prerequisite: GIST 5300 or equivalent. Study of the technology used to distribute maps over the Internet. Emphasis on the development of interactive web mapping applications.

Geography (GEOG)

Undergraduate Courses

1101. **Physical Geography Laboratory (1)**. Laboratory course for transfer students with previous lecture credit for Physical Geography (TCCN GEOG 1301).
1300. **Fundamentals of Geography (3)**. 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)**. Study of the atmospheric and terrestrial systems that shape our natural environment, especially the global patterns of climate, landforms, and

**Bachelor of Arts in Geography:
Sample Curriculum**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
GEOG 1401, Physical Geography	4	GEOG 2300, Intro to Human Geography	3
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Oral Communications*	3	Life and Physical Sciences (GEOL/ATMO)*	4
HIST 2300, History of the U.S. to 1877	3	HIST 2301, Hist. of the U.S. Since 1877	3
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 1330, Intro Mathematical Anal.	3	MATH 2300 or 2345	3
GEOG Jr./Sr. Elective	3	GIST 3300, Geographic Info. Systems	3
ENGL Literature	3	ENGL Literature	3
Foreign Language †	3	Foreign Language †	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
Language, Philosophy, and Culture*	3	Language, Philosophy, and Culture*	3
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
Creative Arts*	3	Creative Arts*	3
GEOG Jr./Sr. Elective	3	GEOG Jr./Sr. Elective	3
Minor	3	Minor	6
Junior/Senior Elective	3	Junior/Senior Elective	2
Elective	3		
TOTAL	15	TOTAL	14

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
GEOG Jr./Sr. Elective	3	GEOG Jr./Sr. Elective	3
GEOG 3340, Intro to Res. in Human Geog.	3	GEOG 4300, Seminar in Geography	3
Minor	3	Minor (Jr./Sr.)	6
Junior/Senior Elective	6		
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

NOTE: GEOG 4310 (Internship) is open to seniors with a 3.0 GPA or better and may be substituted for 3 hours of courses in either of the two geography course blocks.

* Select from Arts and Sciences General Degree Requirements. Students have the option of choosing either a Creative Arts or a Language, Philosophy, and Culture course that also satisfies the multicultural requirement.

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

**Bachelor of Arts in Geosciences: Sample
Curriculum for a Concentration in
Geology with a Minor in Geography***

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
GEOL 1303/1101 Physical Geology	4	GEOL 2401, Historical Geology	4
CHEM 1307/1107, Principles of Chem. I	4	MATH 1321, Trigonometry	3
MATH Elective*	3	HIST 2301, Hist. of the U.S. Since 1877	3
HIST 2300, History of the U.S. to 1877	3	ENGL 1301, Essentials of Coll. Rhetoric	3
		GIST 3300, Geographic Info. Systems	3
TOTAL	14	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
GEOL 3401, Mineralogy and Petrology	4	Geosciences Jr./Sr. Lab Science Elective	3
PHYS 1403, General Physics I	4	POLS 2302, American Public Policy	3
Geosciences Jr./Sr. Elective	3	Foreign Language †	3
POLS 1301, American Govt. Org.	3	ENGL 1302, Advanced College Rhetoric	3
Personal Fitness & Wellness*	1	Creative Arts*	3
		Personal Fitness & Wellness*	1
TOTAL	15	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
GEOL 3402, Structural Geology	4	Geosciences Jr./Sr. Lab Science Elective	3
Geosciences Jr./Sr. Elective	3	English Literature	3
Foreign Language †	3	SOCIAL & Behavioral Sciences*	3
Oral Communications*	3	GIST 4312, Internet Mapping	3
Personal Fitness and Wellness*	1	Language, Philosophy, and Culture*	3
Elective	1		
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
GEOL 4101, Undergraduate Seminar	1	GEOL 4312, Research	3
Geosciences Jr./Sr. Elective	3	English Literature	3
Creative Arts*	3	GEOG 2300 or 2351	3
GEOG 1401, Physical Geography	4	GIST 4304, Adv. Geographic Info. Syst.	3
GIST 4302, Spatial Analysis & Modeling	3	Language, Philosophy, and Culture (Jr/Sr)*	3
TOTAL	14	TOTAL	15

TOTAL HOURS: 120

Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. The student must take the Mathematics Placement Examination.

Students who will graduate under a catalog previous to 2012-2013 must meet the Technology and Applied Science requirement of the core.

* Select from Arts and Sciences General Degree Requirements.

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ Students may select any minor approved by the university.

vegetation. Partially fulfills core Life and Physical Sciences requirement.

- 2300. [GEOG 1302] Introduction to Human Geography (3).** 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 requirement.
- 2351. [GEOG 1303] Regional Geography of the World (3).** 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 requirement.
- 3301. Remote Sensing of the Environment (3).** 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).** Prerequisite: GEOG 1401 or equivalent natural science course. 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).** Seminar conducted in field setting to provide students with first-hand opportunity for observing actual physical and human aspects of study area.

- 3337. Economic Geography (3).** Consideration of the characteristics and distribution of production and consumption of goods and services and of variation and interaction of economic activities.
- 3340. Introduction to Research in Human Geography (3).** An introduction to research and research methods in geography. (Writing Intensive) (WS 3342)
- 3350. Social and Cultural Geography (3).** An examination of the spatial dimensions of human social, cultural, economic, and historical interactions. Fulfills multicultural requirement.
- 3351. Geography of Urban Places (3).** 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 U.S. and Canada (3).** 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).** Study of the inter-related problems of population growth, efficient use of natural resources, and human disruption of the earth's environment.
- 3356. Geography of Texas (3).** Study of the physical and human geography of Texas.

Bachelor of Science in Geosciences: Sample Curriculum for a Concentration in Geology

FIRST YEAR			
Fall		Spring	
GEOL 1303/1101, Physical Geology	4	GEOL 2401, Historical Geology	4
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
CHEM 1307/1107, Principles of Chem. I	4	CHEM 1308/1108, Prin. of Chem. II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
TOTAL	15	TOTAL	15
SECOND YEAR			
Fall		Spring	
GEOL 3401, Mineralogy and Petrology	4	GCH 3303, Intro. to Geochemistry	3
GPH 3300, Geophysics	3	GEOL 4320, Optical Mineralogy	3
Physics §	4	Physics #	4
Foreign Language*	3	Foreign Language*	3
		HIST 2300, History of the U.S. to 1877	3
TOTAL	14	TOTAL	16
THIRD YEAR			
Fall		Spring	
GEOL 3402, Structural Geology	4	GEOL 4321, Igneous/Metamorph. Petrog.	3
GEOL 4325, Sediment. & Stratigraphy	3	GEOL 4201, Field Meth. in Sedim. Geol.	2
English Literature †	3	Minor #	3
POLS 1301, American Govt. Org.	3	English Literature †	3
Personal Fitness and Wellness ‡	1	POLS 2302, American Public Policy	3
		Personal Fitness and Wellness ‡	1
TOTAL	14	TOTAL	15
SUMMER			
GEOL 4301, Advanced Fields Methods	3		
FOURTH YEAR			
Fall		Spring	
GEOL 4101, Undergraduate Seminar	1	GEOL 4312, Research	3
Minor (Jr/Sr) #	4	Minor (Jr/Sr) #	3
Social & Behavioral Sciences ‡	3	Jr./Sr. Geosciences Elective	3
Oral Communications ‡	3	Creative Arts ‡	3
Elective	2	HIST 2301, Hist. of the U.S. Since 1877	3
TOTAL	13	TOTAL	15

TOTAL HOURS: 120

Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. The student must take the Mathematics Placement Examination.

* A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

† Students have the option of choosing an English literature course that also fulfills the 3-hour Language, Philosophy, and Culture requirement.

‡ Select from Arts and Sciences General Degree Requirements. Students have the option of choosing a Creative Arts or a Social and Behavioral Sciences course that also satisfies the multicultural requirement.

§ PHYS 1408, 2401 or PHYS 1403, 1404

Minor coursework must be in mathematics, sciences, engineering, or a composite of these fields. Typically 8 hours from adjunct requirements will apply toward the 18-hour minor.

Bachelor of Science in Geosciences: Sample Curriculum for a Concentration in Geophysics with a Minor in Mathematics

FIRST YEAR			
Fall		Spring	
GEOL 1303/1101, Physical Geology	4	PHYS 1408, Principles of Physics I	4
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
CHEM 1307/1107, Principles of Chem. I	4	GEOL 2401, Historical Geology	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
		Personal Fitness and Wellness*	1
TOTAL	15	TOTAL	16
SECOND YEAR			
Fall		Spring	
GEOL 3401, Mineralogy and Petrology	4	GCH 3303, Intro. to Geochemistry	3
GPH 3300, Geophysics	3	MATH 2360, Linear Algebra	3
MATH 2450, Calculus III	4	Oral Communications*	3
PHYS 2401, Principles of Physics II	4	Social & Behavioral Sciences*	3
		GPH 3310, Intro. to Geophys. Data	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
GEOL 3402, Structural Geology	4	GPH 4323 Potential Field & Electro. Meth.	3
GPH 4321, Seismic Exploration Methods	3	HIST 2300, History of U.S. to 1877	3
MATH 3350, High Math for Eng. & Sci.	3	English Literature †	3
Foreign Language †	3	POLS 1301, American Govt. Org.	3
Personal Fitness and Wellness*	1	Foreign Language †	3
TOTAL	14	TOTAL	15
FOURTH YEAR			
Fall		Spring	
GEOL 4101, Undergraduate Seminar	1	GEOL 4312 or ATMO 4312, Research	3
Math Jr/Sr Minor Elective	3	STEM Jr./Sr. Elective	3
Geosciences Jr/Sr Elective §	3	Geosciences Jr/Sr Elective §	2
POLS 2302, American Public Policy	3	Creative Arts Elective*	3
English Literature †	3	HIST 2301, Hist. of the U.S. Since 1877	3
STEM Elective	3		
TOTAL	16	TOTAL	14

TOTAL HOURS: 120

* Select from Arts and Sciences General Degree Requirements. Students have the option of choosing a Creative Arts or a Social and Behavioral Sciences course that also satisfies the Multicultural requirement.

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ Students have the option of choosing an English literature course that also fulfills the 3-hour Language, Philosophy, & Culture requirement.

§ Students will select major electives from a list of approved electives in geosciences and STEM fields.

- 3360. Technology and the Human Landscape (3).** Study of the relationship of technological development and energy use with human use of the earth from pre-humans to the present.
- 3363. Geography of South America (3).** Study of the physical and human geography of South America, with special emphasis on contemporary issues.
- 4300. Seminar in Geography (3).** Enrollment restricted to geography majors or minors unless approved by course instructor. 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).** 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.
- 4310. Internship in Geography (3).** Prerequisites: 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.

- 4320. Special Topics in Geography (3).** Prerequisite: Consent of instructor. Seminar-led exploration in current topics and research. May repeat when topics vary.
- 4321. Biogeography (3).** Prerequisite: GEOG 1401 or consent of instructor. Study of plants and animals in their spatial context, functional interaction, and as related to human impacts.
- 4324. Geography of Health (3).** Consideration of the environmental and social factors that affect the distribution of health conditions at local, national, and global scales.
- 4334. Field Seminar in Human Geography (3).** Seminar conducted in field setting. Students will conduct a research project and reflect on human geography of the region. May be repeated when specific region and topic vary.
- 4357. Geography of Arid Lands (3).** 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)

Graduate Courses

5301. **Remote Sensing of the Environment (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.
5303. **Advanced Human Geography (3)**. 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)**. 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)**. 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.
5309. **Seminar in Regional Analysis (3)**. 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.
5312. **Seminar in Geographic Thought (3)**. Discussions on the history and philosophy of geography and the breadth of geographical research.
5320. **Special Topics in Geography (3)**. Prerequisite: Consent of instructor. Seminar-led exploration in current topics and research. Topics may vary.
5334. **Field Seminar in Human Geography (3)**. Seminar conducted in field setting. Primary focus is original research projects by students. May be repeated when region and topic vary.
5340. **Research Design and Methodology in Geography (3)**. Core course in geography designed to develop the student's research design and analysis skills.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Geology (GEOL)

Undergraduate Courses

1101. **[GEOL 1103] Physical Geology Laboratory (1)**. Prerequisite: GEOL 1303 (may be taken concurrently). Laboratory study of rocks, minerals, and geologic mapping. Partially fulfills core Life and Physical Sciences requirement.
1102. **[GEOL 1104] Historical Geology Laboratory (1)**. Prerequisite: GEOL 1101. Laboratory study of fossils, geologic maps, and geologic structure.
1105. **History of Life Laboratory (1)**. Introduction to and applications of methods employed by paleontologists to interpret the fossil record. Not for credit for majors or minors.
1303. **[GEOL 1303] Physical Geology (3)**. Introduction to earth structure and composition, minerals and rocks, surface processes, orogeny, and the principle of plate tectonics. Partially fulfills core Life and Physical Sciences requirement.
1350. **History of Life (3)**. 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 or minors.
2401. **[GEOL 1304] Historical Geology (4)**. Prerequisites: C or better in GEOL 1303 and 1101. Survey of the earth's geological history and the evolution of life and its interaction with geological processes. Interpretation of rocks, fossils, and geological maps.
3301. **Geomorphology (3)**. Prerequisites: GEOL 1303 and 1101 or GEOL 3324 or GEOG 1401. Introductory course regarding the landforms and surface processes of the earth and other solar system bodies.
3322. **Oceanography (3)**. Prerequisite: GEOL 1303 or 3324, 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)**. Prerequisite: GEOL 1303 or 3324. Study of geological processes that affect human activities, emphasizing natural hazards, water resources, waste disposal, energy, mineral resources, and land use and planning.
3324. **Geology for Petroleum Engineers (3)**. Prerequisites: C or better in ME 2322. Petroleum engineering majors only. Survey of geology with emphasis on concepts and processes important for hydrocarbon exploration and extraction.
3328. **Geology of Energy Resources (3)**. Prerequisite: GEOL 1303 or 3324. Origin, distribution, and exploitation of geological resources of energy, with emphasis on hydrocarbons, coal, and nuclear energy.
3401. **[GEOL 2309, 2409] Mineralogy and Petrology (4)**. Prerequisites: C or better in GEOL 1303, 1101, 2401; CHEM 1307 and 1107; CHEM 1308 and 1108 (may be taken concurrently); 2.5 cumulative GPA. Classification and origin of minerals and rocks. Relationships of rock and mineral stability to pressure, temperature, and tectonic processes. Requires field trip that includes strenuous activity.
3402. **Structural Geology (4)**. Prerequisite: PHYS 1403 or PHYS 1408 (concurrent enrollment allowed); C or better in GEOL 3401. Structural analysis of deformed rocks. Laboratory includes fieldwork, stereonet, map and cross-section construction. Required field trip that includes strenuous activity. (Writing Intensive)
3450. **Paleontology and Paleocology (4)**. Prerequisites: C or better in GEOL 2401. 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: Instructor consent. Independent study under guidance of faculty member.
4101. **Undergraduate Seminar (1)**. Prerequisites: Senior standing and majors only.
4201. **Field Methods in Sedimentary Geology (2)**. Prerequisite: C or better in GEOL 3402 and 4325. Description of sediments and sedimentary rocks in the field, measurement of stratigraphic sections, mapping of surficial deposits and stratified rocks, interpretation of depositional environments. Field work requires strenuous physical activity.
4300. **Independent Studies in Geology (3)**. Prerequisite: Instructor consent. Independent studies in geology. May be repeated for credit.
4301. **Advanced Fields Methods (3)**. Prerequisites: C or better in GEOL 3402, 4201, 4321. Field mapping of igneous, metamorphic, and sedimentary rocks. Field work requires strenuous physical activity.
4310. **Planetary Geology (3)**. Prerequisites: GEOL 3401, GPH 3300. An introduction to the solid bodies of the solar system beyond Earth, with an emphasis on surface processes and landforms.
4312. **Undergraduate Research (3)**. Prerequisites: Senior standing, GEOS majors only, prior approval from specific professor. Independent research in an area of current interest in the geosciences. (Writing Intensive)
4318. **Geology of Texas (3)**. Prerequisites: GEOL 1303 and 1101 or GEOL 3324. A comprehensive study of the structure, stratigraphy, and economic geology of Texas and parts of adjacent states.
4320. **Optical Mineralogy and Crystallography (3)**. Prerequisite: C or better in GEOL 3401. Crystal symmetry groups and classes; principles of transmitted light microscopy; the relationships between crystal structure, chemical composition, and optical properties of minerals and use of these relationships in identification of common rock-forming minerals.
4321. **Igneous and Metamorphic Petrography (3)**. Prerequisites: C or better in GCH 3303 and GEOL 4320. The study of rock texture and paragenesis in thin section. Required field trip that includes strenuous activity.
4324. **Geology of Hydrocarbons (3)**. Prerequisites: C or better in GEOL 3324; for petroleum engineering majors making progress in the PE program only. A study of the world-wide distribution and geologic setting of petroleum in addition to methods of exploration.
4325. **Sedimentology and Stratigraphy (3)**. Prerequisites: GEOL 2401, 3401, 4320. Sedimentary textures and structures, classification, petrography, and diagenesis of sedimentary rocks, lithostratigraphy, facies, and basin models.
4331. **Digital Imagery in Geosciences (3)**. Prerequisites: Senior standing, GEOL 1303 and 1101, GEOG 1401 or GEOL 3324, MATH 1320 or higher. 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)**. Prerequisites: GIST 3300 and MATH 1451. Introduction to

- vector GIS data manipulation, geostatistics, and spatial modeling applied to geosciences. Involves computer lab exercises.
4334. **Structural Analysis in Hydrocarbon Systems (3)**. Prerequisites: C or better in GEOL 3324 and 4324, petroleum engineering majors making progress in the PE program only. Structural and geological analysis of hydrocarbon systems.
4361. **Advanced Structural Geology (3)**. Prerequisites: Senior standing in major, GEOL 3402. Topics include deformation mechanisms and rheology, tectonic evolution of oceanic lithosphere and evolution of arcs.
4362. **Tectonics (3)**. Prerequisites: Senior standing in the major and GEOL 3402. Survey of the plate tectonic paradigm in terms of historical development and modern application.

Graduate Courses

5001. **Problems in Geosciences (V1-6)**. Prerequisite: Instructor consent. Independent study under guidance of a faculty member.
5101. **Seminar (1)**.
5300. **Individual Studies in Geology (3)**. Prerequisite: Instructor consent. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
5303. **Advanced Igneous Petrology (3)**. Phase relations, geochemistry, and tectonic setting of igneous rocks. Emphasis on modern concepts of magma origin and differentiation. May be repeated for credit.
5311. **Micropaleontology (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.
5322. **Sedimentary Processes (3)**. Principles of fluid dynamics important in sedimentation, interpretation of primary sedimentary structures, and description of depositional environments.
5325. **Petrophysics (3)**. 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)**. 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)**. 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)**. 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)**. Introduction to vector GIS data manipulation, geostatistics, and spatial modeling applied to geosciences. Involves computer lab exercises.
5361. **Advanced Structural Geology (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)**. Survey of the plate tectonics paradigm in terms of its historical development and modern application.
5399. **Advanced Petrophysics (3)**. 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)**. An introduction to the principles of paleontology governing evolution, morphology, and phylogeny of major groups of vertebrates.
5420. **Geological Correlation (4)**. 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)**. Classification and interpretation of carbonate rocks, processes that control their deposition and diagenesis, evolution of carbonate systems through times.
5424. **Clastic Sedimentology (4)**. Origins, classification, petrology, diagenesis, and facies analysis of clastic sedimentary rocks. Survey of modern and ancient clastic depositional systems.

5426. **Sequence Stratigraphy (4)**. Fundamental concepts of sequence stratigraphy and application to interpretation of sedimentary basins across a range of depositional systems. Application to petroleum exploration and production.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Geophysics (GPH)

Undergraduate Courses

3300. **[GEOL 2310] Geophysics (3)**. Prerequisites: 2.5 overall GPA, C or better in MATH 1451 and either GEOL 1303 and 1101 or GEOL 3324. An overview of geophysical principles and methods with case studies in the use of geophysics to understand the three-dimensional structures of Earth.
3310. **Introduction to Geophysical Data Processing (3)**. Prerequisites: C or better in MATH 2450, PHYS 1403 or 1408, and GPH 4321 (concurrent enrollment allowed). Emphasis is on geophysical data analysis and modeling using Matlab.
4300. **Independent Studies in Geophysics (3)**. Prerequisite: Consent of instructor. Independent studies in geophysics. May be repeated for credit.
4321. **Seismic Exploration Methods (3)**. Prerequisites: MATH 1452, PHYS 1403 or 1408, and a C or better in GEOL 3401 or equivalent. Methods to collect, process, and interpret seismic data are discussed.
4323. **Potential Field and Electromagnetic Methods in Geophysics (3)**. Prerequisites: GPH 3300, GEOL 3401, MATH 2450, PHYS 1402 or 2401. Covers methods of exploring Earth's subsurface using gravity, magnetic, electrical, and electromagnetic methods.

Graduate Courses

5300. **Individual Studies in Geophysics (3)**. Prerequisite: Consent of instructor. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
5303. **Seismic Data Analysis (3)**. Prerequisite: Instructor consent. Principles and methods for analyzing digital seismic data, including sampling, Fourier analysis, filtering, deconvolution, and introduction to seismic migration and tomography.
5305. **Velocity Model Building (3)**. Prerequisite: Instructor consent. Principles and usage of major seismic velocity model building approaches, including seismic refraction, semblance, migration, and tomographic velocity model building methods.
5307. **Seismic Migration (3)**. Prerequisites: C or better in GPH 5303 and instructor consent. Theory and practicality of Kirchhoff, f-k, FD, and reverse-time migrations for subsurface imaging.
5310. **Geophysical Fluid Dynamics (3)**. 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.
5321. **Advanced Seismic Exploration Methods (3)**. Prerequisites: MATH 1451 and GEOL 2303 or consent of instructor. Discusses methods to collect, process, and interpret seismic reflection data.
5323. **Advanced Potential Field and Electromagnetic Methods in Geophysics (3)**. Prerequisite: C or better in GEOL 2303 and MATH 2450, or instructor consent. Covers methods to explore Earth's subsurface using gravity, magnetic, electrical, and electromagnetic methods.
5324. **Radiative Transfer (3)**. Principles of radiation, the radiative transfer equation. Applications to absorption, emission, and scattering processes. Determination of physical properties from satellite measurements.
5330. **Geophysical Data Processing (3)**. Prerequisites C or better in MATH 2450. Emphasizes geophysical data analysis and modeling using Matlab.

Department of History

Sean P. Cunningham, Ph.D., Interim Chairperson

Professors: Bell, D'Amico, Howe, Iber, McBee

Associate Professors: Adams, Barenberg, Bjerk, Calkins, Cunningham, Forsythe, Hahn, Hart, Hill, Levario, Milam, Mosher, Pelley, Stoll, Swingen, Willet, Wong

Assistant Professors: Baum, Brittsan, Franklin, Johnson, Keyes, Legacey, Skidmore, Walker

CONTACT INFORMATION: 131 Holden Hall, Box 41013, Lubbock, TX 79409-1013, T 806.742.3744, F 806.742.1060, www.depts.ttu.edu/historydepartment

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 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, 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 36 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
- 24 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, including HIST 4398.
- 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.

Graduate Program

For information on graduate programs offered by the Department of History, visit the Graduate School section of the catalog on page 129.

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.

Military History Minor. A minor in military history consists of 18 hours, including the following:

- 3 hours of courses from HIST 1300, 1301, 2300, 2301, 2322, 2323.
- 9 hours of core courses from HIST 3330, 3331, 3332, 3333, 3340, 3348, 3366, 3367, 4302, 4337, 4338, 4343, 4355, 4396.
- 6 hours of elective courses from HIST 3304, 3308, 3309, 3346, 3350, 3359, 3374, 3396, 3398, 4309, 4310, 4311, 4351, 4353, 4356, 4372, 4379, 4383, 4393
- 6 hours must be in U.S. history.
- 6 hours must be in non-U.S. history.
- At least 3 hours must be taken at the 4000 level.
- At least 6 of the 18 hours required for a military history minor must be taken in residence, including the 3 at the 4000 level.

Other courses may be substituted with the consent of the Department of History's undergraduate advisor, 145 Holden Hall, 806.742.3744.

All courses numbered above 3000 are advanced courses. All courses above 4000 are writing intensive 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. The Department of History cooperates with the College of Education in offering a plan for teacher certification in social studies for grades 7-12. A student must have a grade of C or better in each course counted toward the secondary-education composite certification.

Students planning to become high school teachers should minor in secondary education. They will be required to take EDSE 4000 for their student teaching experience. The university recently implemented a teacher certification program that includes a full year of student teaching (one semester in the junior year and two semesters in the senior year) for students beginning the teaching program.

Students wishing to obtain teacher certification should consult with the department's undergraduate advisor in Holden Hall room 145, and see a College of Education advisor to complete a certification plan.

The minimum requirements for the teaching field in social studies at the secondary level are as follows:

- HIST 1300, 1301, 2301, 2310, 2322, 2323
- 3000-level U.S. history
- 3000-level European history
- 3000-level Asian, African, or Latin American history
- 4000-level HIST
- HIST 4398
- ECO 2301, 2302
- GEOG 2300, 1401
- PSY 1300
- SOC 1301
- POLS 1301, 2302.

Course Descriptions

(To interpret course descriptions, see page 23.)

History (HIST)

Courses are identified as follows: United States history = US; European history = E; African, Asian or Latin American history = AAL.

Undergraduate Courses

1300. [HIST 2311] **Western Civilization I (3).** Western civilization from its dawn to the 17th century. Culture and the arts stressed alongside politics. Fulfills core Language, Philosophy, and Culture requirement. (E)

1301. [HIST 2312] **Western Civilization II (3)**. 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 Language, Philosophy, and Culture requirement. (E)
2300. [HIST 1301] **History of the United States to 1877 (3)**. 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. Partially fulfills core American History requirement. (Honors section offered.) (US)
2301. [HIST 1302] **History of the United States Since 1877 (3)**. Continuation of HIST 2300. Partially fulfills core American History requirement. (Honors section offered.) (US)
2302. **Wealth and the Nation: The History of American Business (3)**. Surveys the history of business in America from colonial times to the 21st century. (US)
2310. [HIST 2301] **History of Texas (3)**. 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. Partially fulfills core American History requirement. (US)
2322. [HIST 2321] **World History to 1500 (3)**. Introduction to basic narrative and major themes in world history from origins to 1500. Fulfills core Language, Philosophy, and Culture requirement. (AAL)
2323. [HIST 2322] **World History Since 1500 (3)**. Introduction to basic narrative and major themes in world history since 1500. Fulfills core Language, Philosophy, and Culture requirement. (AAL)
3301. **Ancient Civilization I (3)**. Introduction to the study of the ancient Near East and classical Greece. (E)
3302. **Ancient Civilization II (3)**. Introduction to the study of ancient Rome. (E)
3303. **Introduction to Roman Law (3)**. Surveys all major areas of Roman private and criminal law within the setting of Roman history. (E)
3304. **The Southern Frontier (3)**. 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)**. 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)**. 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)**. 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)**. 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)**. A survey of U.S. diplomatic history from 1913 to the present with an emphasis on the U.S. as a world leader. (US)
3311. **Social and Cultural History of the Southwest (3)**. Survey of the history of the varied cultures of the American Southwest, emphasizing Anglo-American, Spanish-Mexican, and Indian backgrounds. (US)
3312. **Presidential Politics from Kennedy to Reagan (3)**. Explores developments and transformations in Americans' political attitudes, values, ideologies, and behaviors, seen through the lens of modern presidential politics. (US)
3313. **The Old South (3)**. Explores the society, politics, economics, and race relations of the antebellum South, the development of sectionalism, and the impact of the Civil War. (US)
3314. **The South Since the Civil War (3)**. Explores the degree to which the South has remained a separate region socially, politically, economically, and in race relations from Reconstruction to the present. (US)
3315. **North American Ranching History (3)**. A history of North American ranching from Columbus to the present. (US)
3316. **Mexican American History of Texas (3)**. 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)**. 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)

Sample Curriculum for Bachelor of Arts in History

FIRST YEAR

Fall		Spring	
HIST 2300, History of the U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
HIST 1300 or 2322	3	HIST 1301 or 2323	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH*	3	MATH* or PHIL 2310	3
Multicultural †	3	Creative Arts*	3
TOTAL	15	TOTAL	15

SECOND YEAR

Fall		Spring	
HIST 3000 Level ‡	3	HIST 3000 Level ‡	3
ENGL 2000 Level	3	ENGL 2000 Level	3
Foreign Language §	5	Foreign Language §	5
Life and Physical Sciences*	4	Personal Fitness & Wellness	1
		Minor Elective	3
TOTAL	15	TOTAL	15

THIRD YEAR

Fall		Spring	
HIST 3000 Level ‡	3	HIST 4000 Level	3
Elective	3	HIST 3000 or 4000 Level	3
POLS 1301, American Govt. Org.	3	Social and Behavioral Sciences*	3
Oral Communication*	3	Life and Physical Sciences*	4
Minor Elective	3	Elective	1
TOTAL	15	TOTAL	14

FOURTH YEAR

Fall		Spring	
HIST 4000 Level ‡	3	HIST 4398, Senior Research Seminar#	3
POLS 2302, American Public Policy	3	HIST 3000 or 4000 Level	3
Social and Behavioral Sciences*	3	Minor Elective	6
Minor Elective	3	Personal Fitness & Wellness	1
Minor Elective	3	Creative Arts*	3
TOTAL	15	TOTAL	16

TOTAL HOURS: 120

Forty hours must be junior or senior level courses.

* Select from the university's core curriculum

† Select from the university's Multicultural Requirement list

‡ Must take one U.S., one EUR, and one AAL.

§ A student must complete 6 hours at the sophomore level or above in a single language.

The prerequisite for all sophomore language courses is credit for the freshman level.

This credit can be determined through a credit by examination. The score attained

on the exam will determine whether the student is placed in a second-year course, a

5-hour review course, or in some cases the first or second semester of a beginning

(first-year) language course. See Arts and Sciences General Degree Requirements for

further explanation.

May be repeated once for credit.

3318. **The Plains Indians (3)**. Culture and history of the Plains Indians; cultural developments prior to contact with the Whites; Plains Indians-White relations; Plains Indians in the 20th century. (US)
3319. **American Migrations (3)**. A survey of migrations in North American history. (US)
3320. **History of Film and American Society (3)**. 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)**. An examination of the history and development of the American West from ca. 1900 to the present. (US)
3322. **Women in Early America (3)**. Explores the history of women and gender in the United States from the 16th century to 1877. Fulfills multicultural requirement. (US)
3323. **Women in Modern America (3)**. Explores the social and cultural history of women and gender in the United States since 1877. Fulfills multicultural requirement. (WS 3323) (US)
3325. **History of Mexican Americans in the United States (3)**. Survey of the history of Mexican Americans of the United States during the 20th century, relating their daily life and institutional experience to United States and Mexican history. (US)
3326. **History of Native Americans in the United States (3)**. Survey of the history of American Indians from their earliest migrations through the acculturation, termination, and civil rights movements of the twentieth century. (US)
3327. **Earth, Wind, and Fire: Nature and History in America (3)**. Prerequisite: Junior standing. Surveys nature's role in American history from pre-Columbian Indian societies to the present,

- including such areas as natural disasters, global warming, wildlife, resources, health, and recreation. (US)
3328. **History of Religion in America (3)**. 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)**. 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)**. Prerequisite: C or better in HIST 2300 and 2301, or equivalent. Explores the military, diplomatic, political, and social dimensions of the war from its origins in the 1940s through its conclusion in the 1970s. (US)
3331. **History of United States Military Affairs to 1900 (3)**. Explores American military history from the Colonial period through the Spanish-American War, with an emphasis on strategy and the development of military institutions. (US)
3332. **History of United States Military Affairs Since 1900 (3)**. Examines 20th century American military history up to the present. (US)
3333. **United States in the Second World War (3)**. Prerequisite: Junior standing. History of the political and military involvement of the United States in the Second World War. (US)
3334. **Technology in Modern America (3)**. An analysis of major developments in American technology since 1870 and their impact on society, culture, politics, and the economy. (US)
3336. **History of Mass Incarceration (3)**. Introduces students to the origins, implementation, and consequences of mass incarceration in the United States. (US)
3335. **Sport and the Black Experience (3)**. Explores black Americans' contributions to American sport from the era of slavery to the present. (US)
3337. **Science in American Society (3)**. 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)**. 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)**. 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)
3340. **War and Memory (3)**. Examines how the experience and trauma of war (victory, defeat, heroism, war crimes, loss) are later integrated into a society's sense of identity. (US)
3341. **Women in European Civilization (3)**. What women were supposed to do; what women did, from prehistory to the vote in 1920. (WS 3341) (E)
3343. **Development of Modern Medicine (3)**. A chronological study of concepts and treatment of disease and medicine as a social institution in Western culture. (E)
3344. **History of Christianity (3)**. 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)**. 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)**. 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)**. 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)
3350. **War, Religion, and Revolution: Early Modern Europe (3)**. Explores the political, social, economic, and intellectual transformations that took place during Europe's early modern period. (E)
3351. **History of Spain (3)**. 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)**. 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)**. Surveys French political, social, and cultural history from the middle of the 18th century to the present. (E)
3354. **Twentieth Century Europe (3)**. Survey of European history from the immediate origins of World War I to the present. (E)
3355. **Europe in Transformation, 1815-1914 (3)**. 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)
3357. **International Radical Movements (3)**. Surveys theories, national, and transnational sources and impacts of radical and revolutionary movements and societies and governments based on radical or revolutionary ideologies. (AAL)
3358. **Origins of Modern Germany, 1517-1871 (3)**. Surveys the history of Germany from the Protestant Reformation (1517) to Unification (1871). Emphasis on formative role of religion and politics in this period. (E)
3359. **The Nazi Era, 1919-1945 (3)**. 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)**. 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)**. 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)**. Surveys the social, political, and cultural effects of the First World War, which brought down the last major empires and created the modern world. (E)
3367. **The Second World War (3)**. A history of the major diplomatic, military, social, and economic developments associated with the Second World War. (E)
3372. **Tsarist Russia (3)**. 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)
3374. **History of Soviet and Post-Soviet Russia (3)**. 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)**. 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)**. 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)**. Covers major themes in Mexico and Central America since Independence. (AAL)
3384. **History of Brazil (3)**. 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)**. Studies the growth of the British Empire in the 19th century and its later decline in the 20th century under the impact of war and nationalism. (E)
3394. **Religion, Family, and the State in Asia (3)**. 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)**. 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)**. 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)**. 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)**. Prerequisites: Junior standing and consent of instructor. An independent study course involving in-depth reading. May be repeated for credit.
4301. **The Atlantic World (3)**. 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. (Writing Intensive) (US)
4302. **The Era of the American Revolution (3)**. Prerequisite: Junior standing or consent of instructor. An exploration of the causes, progress, and consequences of the American Revolution as both a domestic and global event from 1750-1820. (Writing Intensive) (US)
4304. **Civil War and Reconstruction, 1850-1877 (3)**. 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. (Writing Intensive) (US)
4305. **Rise of Modern America, 1877-1919 (3)**. 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. (Writing Intensive) (US)
4306. **Roaring Twenties, Depression, and War, 1920-1945 (3)**. 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. (Writing Intensive) (US)
4307. **The United States, 1945 to the Present (3)**. 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. (Writing Intensive) (US)
4308. **United States Urban and Immigration History (3)**. 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. (Writing Intensive) (US)
4309. **United States and the Cold War (3)**. 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. (Writing Intensive) (US)
4310. **United States Foreign Relations Through Film (3)**. Prerequisite: Junior standing or permission of instructor. A study of major issues in modern U.S. foreign relations as presented and interpreted through film. (Writing Intensive) (US)
4311. **The Nuclear Age (3)**. 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. (Writing Intensive) (US)
4312. **The Rise of Modern American Conservatism (3)**. Prerequisite: Junior standing. Explores the causes and consequences of modern American conservatism's popular and electoral ascendancy between 1932 and the present. (Writing Intensive) (US)
4315. **Slavery in the Atlantic World (3)**. Investigates the growth of chattel slavery, the slave trade, plantation slavery, slave resistance, and the Abolitionist movement in the British American Empire and Atlantic World. (Writing Intensive) (US)
4317. **The American Culture of Curiosity, 1800-1860 (3)**. 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. (Writing Intensive) (US)
4320. **Monuments, Memory, and Commemoration (3)**. Explores within specific social and political contexts the ways in which societies remember heroes, villains, tragedies, and triumphs. (Writing Intensive) (US)
4323. **Nature and Americans (3)**. Prerequisite: Junior standing or consent of instructor. History of the relationship between Americans and their land from prehistory to the present. (Writing Intensive) (US)
4324. **History of Capitalism (3)**. Prerequisite: Junior standing or consent of instructor. Examines the development of modern business enterprise, firms and corporations, entrepreneurship, and the business-government relationship. (Writing Intensive) (US)
4325. **Major Issues in U.S. Women's History (3)**. Prerequisite: Junior standing or consent of instructor. In-depth study of the evolution of gender roles, women in literature, the suffrage movement, and modern feminism. (Writing Intensive) (US)
4326. **A History of Sexuality in the United States (3)**. 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. (Writing Intensive) (US)
4328. **Bad Girls in Early America (3)**. Explores the lives of disorderly women, including alleged witches, prostitutes, escaped slaves, cross-dressers, suffragists, and others who defied social expectations in early America. (Writing Intensive) (US)
4329. **Race, Identity, and Citizenship in the United States (3)**. A research course that covers legal, political, and social definitions of racial identity and citizenship in the United States. Fulfills multicultural requirement. (Writing Intensive) (US)
4330. **History of Lynching and Racial Violence in America (3)**. Prerequisite: Junior standing or consent of the instructor. Explores the historical development and influence on society of lynching and racial violence in America. Fulfills multicultural requirement. (Writing Intensive) (US)
4335. **The History of Hip Hop (3)**. Surveys the development of hip hop music in post-civil rights urban America to its emergence as a global phenomenon in the 21st century. Fulfills multicultural requirement. (Writing Intensive) (US)
4337. **History of American Seapower (3)**. 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. (Writing Intensive) (US)
4338. **History of "Small Wars" (3)**. A research seminar focusing on insurgencies involving both American and international forces. (Writing Intensive) (US)
4341. **Ancient Greece (3)**. 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. (Writing Intensive) (E)
4342. **Ancient Rome (3)**. 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. (Writing Intensive) (E)
4343. **Alexander the Great (3)**. Prerequisite: Junior standing or consent of instructor. A detailed study of the rise of ancient Macedonia, the reign of Alexander the Great, and the Hellenistic world. (Writing Intensive) (E)
4347. **History of the Medieval Church (3)**. 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. (Writing Intensive) (E)
4348. **The Renaissance (3)**. 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. (Writing Intensive) (E)
4349. **The Protestant Reformation (3)**. 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. (Writing Intensive) (E)
4350. **European Urban History 1300 to 1800 (3)**. Prerequisite: Junior standing or consent of instructor. Explores social, economic, political, and cultural structures of Western European cities from the 14th to the 18th century. (Writing Intensive) (E)
4351. **Origins of the British Empire to 1783 (3)**. Explores the origins of the British Empire in the early modern era. Topics include exploration, colonization, trade, encounters, and ideas of imperialism and empire-building. (Writing Intensive) (E)
4352. **Witchcraft and Witch Hunting in the Early Modern Western World (3)**. Prerequisite: Junior standing or consent of instructor. Examines the evolution of beliefs in witchcraft and the persecution of alleged witches in Europe and European colonies in the Americas from 1300 to 1800. (Writing Intensive) (E)
4353. **The French Revolution and Napoleon (3)**. 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? (Writing Intensive) (E)
4354. **From Vampires to Death Tourism: The Dead in Europe since 1700 (3)**. Examines the different ways that Europeans have handled, represented, and thought about the dead in the early modern period. (Writing Intensive) (E)
4355. **Let's Talk Women; Let's Talk War: Women and Conflict in 20th Century Europe (3)**. Prerequisite: Junior standing or consent of instructor. Examines the involvement and reactions of European women to situations of war and revolution in the 20th century. (WS 4355) (Writing Intensive) (E)
4360. **Germany Since 1945: A Divided Nation Confronts Its Past (3)**. 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. (Writing Intensive) (E)
4361. **The USSR and the Cold War (3)**. Examines the successes, failures, and legacies of Soviet leaders who attempted to build the world's first Communist society after World War II. (Writing Intensive) (E)
4363. **Emergence of New Nations in Latin America (3)**. Prerequisite: Junior standing or consent of instructor. This nineteenth-century course covers the formation of political systems, challenges to social stability, abolition of slavery, and relationship to North Atlantic world. (Writing Intensive) (AAL)
4365. **Foundations of Contemporary Mexico (3)**. Prerequisite: Junior standing or consent of instructor. Examines major themes of post-nineteenth century Mexico and their political, social, and cultural relevance. (Writing Intensive) (AAL)
4370. **Great Cities (3)**. 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 intel-

- lectual development over time. May be repeated when topics vary. (Writing Intensive) (E)
4371. **Race, Nation, and Identity (3)**. Prerequisite: Junior standing or consent of instructor. Nineteenth and 20th century concepts of difference as construed by race, nation, and identity. (Writing Intensive) (E)
4372. **History of Comparative Genocide (3)**. 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) (E)
4373. **Tudor-Stuart England, 1450-1688 (3)**. Prerequisite: Junior standing or consent of instructor. Deals with enormous and seminal changes religious, political, constitutional, intellectual, and geographical that took place in England from 1450 to 1688. (Writing Intensive) (E)
4375. **Social and Cultural History of Europe, 1800 to the Present (3)**. 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. (Writing Intensive) (E)
4376. **History of the Italian Mafia (3)**. Prerequisite: Junior standing or consent of instructor. Discusses the origins and development of the Mafia in the context of Italian politics, economy, and society in the 19th and 20th centuries. (Writing Intensive) (E)
4377. **Twentieth Century Britain in Film (3)**. Prerequisite: Junior standing or consent of instructor. Examines the history of Britain and British entities in the 20th century through the study of film. (Writing Intensive) (E)
4378. **History of Italian Fascism (3)**. Prerequisite: Junior standing or consent of instructor. Examines the origins of Italian Fascism and its development from the 1920s through 1940s, including the topics of propaganda, race, imperialism, gender, and war. (Writing Intensive) (E)
4379. **Revolutionary Russia (3)**. Examines Russia/USSR during its revolutionary period, ca. 1900-1950. Topics studied include the 1917 revolutions, civil war, NEP, Stalinism, terror, the Gulag and WWII. (Writing Intensive) (E)
4380. **A History of Masculinity (3)**. Prerequisite: Junior standing or consent of instructor. Examines the history of masculinity and manhood in Great Britain and the United States since the mid-19th century. (Writing Intensive) (US)
4381. **Colonial Mexico and the Spanish Borderlands (3)**. 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. (Writing Intensive) (AAL)
4382. **Walking the Line: The History of U.S.-Mexico Border Relations since 1836 (3)**. A research course that covers the social, political, and economic histories of specific borderland region between the United States and Mexico since 1836. Fulfills multicultural requirement. (Writing Intensive) (US)
4383. **History of Central Asia (3)**. Explores the history of Central Asia from ancient nomadic empires to the present. Topics include nomadic pastoralism, Mongols, competing imperialisms, everyday life, Islam, and politics. (Writing Intensive) (AAL)
4384. **Global Buddhism (3)**. Examines the emergence and global diffusion of Buddha Dharma. Emphasizes innovations in doctrine and practice as Buddhism has spread globally. (Writing Intensive) (AAL)
4385. **Global Islam: Past and Present (3)**. Examines Islam not only as a religion but also as a global phenomenon that helps shape the lives of people globally. Fulfills multicultural requirement. (Writing Intensive) (AAL)
4386. **Slavery in Africa (3)**. Explores the history of slavery in Africa, addressing varying definitions of slavery. Emphasizes West African slave kingdoms. Fulfills multicultural requirement. (Writing Intensive) (AAL)
4391. **Modern South Africa (3)**. 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. (Writing Intensive) (AAL)
4392. **Modern South Asia (3)**. 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) (AAL)
4393. **Modern China (3)**. 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. (Writing Intensive) (AAL)
4394. **Modern Japan (3)**. 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. (Writing Intensive) (AAL)
4395. **Modern Vietnam (3)**. 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. (Writing Intensive) (AAL)
4396. **Studies Abroad in Southeast Asia (6)**. 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. (Writing Intensive) (AAL)
4397. **Readings and Research in History (3)**. 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)**. Prerequisite: Junior or senior standing or consent of instructor. An intensive study in historical methodology, primary document analysis, retrieval and collection of data, and synthesis that hones research skills, critical analysis, writing, and communication. May be repeated once for credit. (Writing Intensive)

Graduate Courses

5101. **Teaching of History in College (1)**. 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.
5301. **Independent Study (V1-6)**. A structured independent study under the guidance of a member of the graduate faculty. May be repeated for credit up to a maximum of 6 hours.
5303. **Oral History Methodology (3)**. 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. **The Nature of History (3)**. Introduces graduate students to the development of historical thinking, the historical profession, critical theory, methodologies, and research skills.
5305. **Historiography of European History (3)**. 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)**. A survey of recent major works discussing chronological periods and topics in American history. Required of some master's and doctoral students.
5308. **Historical Studies of Religion (3)**. 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)**. Examines the intersection of intellectual and cultural history at various periods in American history. May be repeated once for credit when topics vary.
5314. **Studies in Post-1945 United States History (3)**. Special topics examining the social, cultural, and political history of the United States since the end of World War II. May be repeated for credit.
5315. **Studies in Texas History (3)**. 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)**. 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)**. 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.
5318. **Studies in History and Memory (3)**. A study of the theories and methodology used in the sub-field of history and memory.
5319. **Studies in Native-American History (3)**. 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)**. Explores a series of problems in the developing field of Atlantic history. May be repeated once for credit when topics vary.
5322. **Studies in United States Diplomatic History (3)**. 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)**. 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).** 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).** 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).** 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).** Explores a series of problems in United States immigration and urban history since the mid-19th century.
5328. **Studies in U.S. Military History (3).** A readings summary on military history with emphasis on development of institutions and national struggles.
5329. **Studies in U.S. Sea Powers (3).** 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).** 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).** A readings seminar to introduce the classic works of military strategists, theorists, tacticians, and historians.
5332. **Studies Abroad in Southeast Asia (6).** 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.
5333. **Studies in African-American History (3).** 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).** An extensive reading program and sustained dialogue centering on Mexican-American history with emphasis on theoretical approaches and methods of historical inquiry.
5335. **Studies in U.S. Labor (3).** Examines trends and topics central to the history of U.S. labor and working-class studies.
5336. **Studies in American Sexuality (3).** Examines trends and topics central to the key debates in the history of American sexuality.
5337. **Studies in Modern U.S. Women's History (3).** 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).** 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).** 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).** 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).** 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).** Study of selected topics in the intellectual or religious history of the Renaissance or the Reformation. Individual reports discussed in a seminar situation.
5343. **Studies in Russian History (3).** Examines key topics and debates in the history of Russia and the Soviet Union. May be repeated once for credit when topics vary.
5344. **Readings in European Nationalism (3).** 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).** 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).** Examines the social, cultural, and political history of Europe from 1815 to the present.
5347. **Studies in British History (3).** An organized studies course covering selected topics in British history. Topics vary according to the students' needs.
5348. **Studies in Roman Law (3).** Topics in the historical development of classical Roman law. Designed to meet the needs of both law and graduate students.
5350. **Studies in African History (3).** 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).** An examination of the main areas and epochs in which slavery institutions were central: Antiquity, Medieval Europe, Pre-Colonial Africa, the West Indies, and Southern U.S.
5352. **Studies in Asian History (3).** Explores key themes in Asian history. May be repeated for credit.
5353. **Studies in the History of the U.S. Civil War (3).** Introduces students to the key themes and debates in the history of the American Civil War.
5354. **Studies in Modern Revolution (3).** Explores the causes, courses, and consequences of revolutionary movements in the modern era.
5355. **Studies in Colonial Latin American History (3).** Explores the principal historical literature and interpretations for Colonial Spanish America from the conquest to independence.
5356. **Studies in National Latin American History (3).** 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.
5357. **Studies in LGBT History (3).** Explores the history of gays, lesbians, bisexuals, and transgender individuals in the United States from about 1600 to 1980.
5358. **Islamic Reform, Revival, and Politics in the Middle East (3).** Focuses on various Islamic reform and revival movements in the Middle East and their impact on society and politics.
5359. **Studies in Borderlands History (3).** Examines the broad concept of borderlands studies through a historical lens and its applicability across disciplines.
5360. **Studies in French History (3).** Explores problems in the social, cultural, and political history of France since the 17th century. May be repeated.
5361. **Studies in the History of Insurgency (3).** 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.
5362. **Family, Gender, Race, and Empire (3).** Explores the influence of imperial expansion and colonialism on familial ties, gender roles, racial identity, and sexuality.
5363. **Women in Early America (3).** Explores the history of women and gender in the United States from the 16th century to 1877.
5366. **Studies in Religious History (3).** Investigations of the development of religious institutions, the relationship between religion and society, and cross-cultural religious phenomena.
5367. **Studies in U.S. Masculinity (3).** Explores a series of problems in the history of U.S. masculinity from the 18th century to the present.
5368. **The U.S. and the World (3).** Explores the historiography of the U.S. and the world, considering the history of the U.S. in a world history context.
5369. **Studies in U.S. Social Movements (3).** Introduces students to the advanced study of U.S. social movements.
5370. **Readings in Mass Incarceration (3).** Covers the emerging historiography of prisons and mass incarceration. The geographical focus of the course will vary.
6000. **Master's Thesis (V1-6).** Prerequisite: C or better in HIST 5304.
6301. **Research Methods Seminar (3).** Prerequisite: C or better in 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).** A research course featuring formal papers on selected topics. Topics chosen in consultation with the instructor.
6305. **Seminar in European History (3).** 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.
6307. **Historiography of the World (3).** Examines the major themes and interpretations of world history, emphasizing both the global past and methodological debates.
6311. **Historiography of Early America (3).** Examines the major themes and interpretations in 16th, 17th, and 18th century North America.
6312. **Historiography of 19th Century America (3).** Examines the major themes and interpretations in 19th century American history.
6313. **Historiography of 20th Century America (3).** Examines the major themes and interpretations in 20th century American history.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Department of Kinesiology and Sport Management

Angela Lumpkin, Ph.D., Chairperson

Professors: Hart, Lochbaum, Lumpkin, McComb

Associate Professors: Roncesvalles, Tacón

Assistant Professors: Chung, Cohen, Gonzales, Kim, Massengale, Melton, Nite, Sobolewski, Stock, Thompson, Umeda

Instructors: Hinojosa, Key, Reeve, Wiedenfeld

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About the Program

This department supervises the following degree programs:

- Bachelor of Science in Exercise and Sport Sciences
- Bachelor of Science in Sport Management[†]
- Master of Science in Exercise and Sport Sciences
- Master of Science in Sport Management[†]

These programs prepare individuals for professional careers in the fitness, rehabilitative services, and sport fields, advanced graduate study, and entry into allied health programs.

Undergraduate Program

Undergraduate students with majors in this department complete 36 junior/senior-level hours plus a minimum of an 18-hour minor of their choice. Each student must meet with a departmental advisor to develop a plan of study to verify the appropriate courses needed to complete degree requirements. Students in pre-allied health fields are encouraged to consult with a departmental advisor for information about required courses and acceptable substitutions. Department faculty provide information about potential careers in exercise science and sport sciences and sport management.

B.S. in Exercise and Sport Sciences. Students majoring in exercise and sport sciences study the foundations of human movement and physical activity. Students complete courses in biomechanics, exercise physiology, sport and exercise psychology, resistance training and science of strength, anatomical kinesiology, physiological application of nutrition to exercise and physical activity, exercise testing and prescription, motor behavior, and management of exercise science programs. Students pursuing entry into allied health programs (i.e., physical therapy, occupational therapy, medical school, and athletic training) often choose this degree.

B.S. in Sport Management (pending THECB approval). Students majoring in sport management study the application of management and business theories and principles to the sport industry. Students take courses in personnel management, sport communication, social issues in sport, sport facilities and event management, sport marketing, financial and economic aspects of sport, leadership and management in sport, sport law and governance, sales and fundraising in sport, and international sport management. Students prepare to pursue management and leadership positions in professional, intercollegiate, community, and international sport organizations. Students are encouraged to obtain an 18-hour business minor as a part of this degree.

Minors Offered by the Department

Athletic Coaching. The minor in athletic coaching requires 19 hours. Although designed for College of Education students who want to teach in elementary, middle, and high schools as well as coach, this minor is open to all students. Students complete courses in motor behavior, first aid or care and prevention of athletic injuries, science and practice of strength training, or youth conditioning, adapted physical activities, principles of coaching, and teaching physical activities and sports.

Exercise Science. The 19-hour minor in exercise science is designed for students interested in expanding their understanding about the scientific principles of human movement. Students study an overview of exercise science, motor behavior, exercise physiology, anatomical kinesiology, science and practice of strength training, and the physiological application of nutrition to exercise and physical activity.

Health. The minor in health is designed for students interested in expanding knowledge and understanding of fundamental health issues and healthy lifestyle behaviors. Students take courses in communicable and chronic diseases, community health, death and dying, mental health, health program planning and evaluation, and health for preadolescents, adolescents, or special populations.

Public Health. The 18-hour public health minor introduces students across five core areas of public health: epidemiology, biostatistics, environmental, social and behavioral science, and health policy and management. Students complete courses in epidemiology, environmental health and awareness, communicable and chronic diseases, biostatistics, and health for special populations, health program planning and evaluation, or mental health. This minor can be completed entirely through online courses.

Sport Management. The 21-hour minor in sport management introduces students to the fundamentals of the field of sport management. Students study personnel management, social issues in sport, sport marketing, financial and economic aspects of sport, leadership and management in sport, and sport law and governance.

Athletic Training Emphasis

Students who wish to become licensed as a high school athletic trainer in Texas can participate in a collaborative program offered by the department in conjunction with the Texas Tech University Department of Athletics. Students interested in this opportunity must be accepted into the student athletic training program and complete specified courses and internship hours. Required courses offered by the department include biomechanics; exercise physiology; care and prevention of athletic injuries; advanced techniques of athletic training; therapeutic exercise and modalities; first aid, CPR, and AED; and practicum in athletic training. After satisfactory completion of these requirements, students will be qualified to take the Texas Athletic Training Licensure Examination.

Personal Fitness and Wellness Program

All students interested in learning sport skills, improving their health and physical fitness, and developing knowledge about sport, exercise, and physical activity can enroll in courses in the personal fitness and wellness program. To satisfy the College of Arts and

Graduate Program

For information on graduate programs offered by the Department of Kinesiology and Sport Management, visit the Graduate School section of the catalog on page 130.

[†] Degree pending Texas Higher Education Coordinating Board approval.

Sciences requirement of two hours of fitness and wellness, students may complete any two personal fitness and wellness (PFW) courses. For a specific activity or course, 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, with a maximum of 1 credit hour per academic year per sport.

Course Descriptions

(To interpret course descriptions, see page 23.)

Exercise and Sport Sciences (ESS)

Undergraduate Courses

- 1301 [PHED 1164, 1238, 1301]. **Introduction to Exercise Science (3)**. An introduction to the professions in the exercise sciences, including the history, ideas, events, people, and programs that shaped those professions.
1302. **Introduction to Sport Management (3)**. Overview of the various components, contexts, and functions of the sport industry.
2199. **Practicum in Athletic Training (1)**. Student athletic trainers will gain knowledge and practical skills working with intercollegiate athletic teams under the supervision of certified athletic trainers.
3301. **Introduction to Biomechanics (3)**. Prerequisite: ZOO 2403 or equivalent and a C or better in ESS 1301. The mechanical analysis of human motion with emphasis on biomechanical principles and techniques.
3303. **Motor Learning (3)**. A study of the many aspects of learning and performance of motor skills. (Writing Intensive)
3305. **Exercise Physiology (3)**. Prerequisite: C or better in ESS 1301 and ZOO 2403 or equivalent. Study of the physiological response to exercise with emphasis on bioenergetics, neuroendocrine activity, skeletal muscle function, and the cardiopulmonary system.
3314. **Life Span Motor Development (3)**. Prerequisite: C or better in ESS 1301. Examines factors that influence 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)**. Prerequisite: C or better in ESS 1301. Emphasis on the social and psychological factors pertaining to participation in sport and exercise.
3321. **First Aid, CPR, and AED (3)**. Skills and knowledge in First Aid, cardiopulmonary resuscitation (CPR), and automated external defibrillator (AED). American Red Cross certification is possible.
3322. **Resistance Training and Conditioning (3)**. Prerequisite: C or better in ESS 1301 and ZOO 2403 or equivalent. Scientific and applied principles of strength training with an emphasis on physiological mechanisms, training adaptation responses, program planning and implementation, and practical performance applications. (Writing Intensive)
3323. **Care and Prevention of Athletic Injuries (3)**. Prerequisite: C or better in ZOO 2403 or equivalent. An introduction to athletic training and the qualifications and functions of the athletic trainer including emphasis on common athletic injuries.
3324. **Teaching Physical Activities and Sports (3)**. Theory, practice, and instructional methodologies appropriate for teaching physical activities and sports in elementary and secondary school settings.
3335. **Health and Physical Education for Children (3)**. Prerequisite: Junior standing. Knowledge and experiences in planning and implementing developmentally appropriate health and physical education programs for early childhood settings and elementary schools.
3345. **Adapted Physical Activities (3)**. Theory, practice, and instructional strategies as they pertain to the teaching of individuals with disabilities in the physical education environment.
3346. **Anatomical Kinesiology (3)**. Prerequisite: C or better in ESS 1301 and 3305. Study of movement-specific musculoskeletal anatomical structures and the respective neuromuscular fundamentals associated with movement analysis and their application to performance-based human movement.
3347. **Physiological Application of Nutrition to Exercise and Physical Activity (3)**. Prerequisites: C or better in ESS 1301 and 3305. Physiological application to exercise and physical activity of nutritional strategies for energy systems, body composition and weight management, and exercise recovery and muscular health.
3348. **Youth Conditioning (3)**. An exploration and examination of the scientific principles underpinning the field of youth fitness and sport training. Students will learn to apply these principles practically.
3352. **Gender Issues in Sport (3)**. Examination of the ways sport experiences differ for males and females emphasizing historical, social, behavioral, and physiological dimensions. (WS 3307)
3354. **Sport in World Cultures (3)**. Historical and philosophical aspects of contemporary sport and leisure patterns across cultures, emphasizing the role of sport in society.
3356. **Principles of Sport Coaching (3)**. 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)**. Prerequisite: C or better in ESS 3305. Physiological theory and its practical application to exercise testing and prescription. Emphasis on hands-on physiological testing.
3373. **Sport Communication (3)**. Prerequisite: ESS 1302 or ESS 3358 with a C or better. An overview of the various methods and modalities of communication within the sport industry.
3374. **Personnel Management in Sport (3)**. Prerequisite: C or better in ESS 1302 or ESS 3358. An overview of interpersonal, cultural, and legal aspects of managing human resources within sport organizations.
3401. **Introduction to Motor Behavior (3)**. Prerequisite: C or better in ESS 1301 and ZOO 2403 or equivalent. Introduction to the discipline of motor behavior. Covers mechanisms of movement; coordination, control skill acquisition (learning), and motor changes through the lifespan (development).
4000. **Independent Study (VI-6)**. Prerequisite: Departmental approval. A structured independent study under the guidance of a faculty member.
4076. **Sport Management Internship (VI-6)**. Prerequisite: C or better in ESS 1302 or ESS 3358. Students may complete an internship prior to completion of the program. This serves as the student's integrative and capstone experience.
4325. **Advanced Techniques of Athletic Training (3)**. Prerequisite: C or better in ESS 3323 and instructor consent. Includes the use of therapeutic modalities and the advanced care, prevention, and treatment of athletic injuries.
4326. **Practicum in Athletic Training (3)**. Prerequisite: C or better in ESS 3323 and ESS 4325 and departmental approval. Supervised clinical experience in athletic training. May be repeated once for credit.
4327. **Therapeutic Exercise and Modalities (3)**. Prerequisites: C or better in 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)**. Methods of measurement and evaluation, including statistical applications, used in assessing fitness and motor skills.
4353. **Social Issues in Sport (3)**. Prerequisite: C or better in ESS 1302 or ESS 3358. Analysis and understanding of various ways in which cultural, racial, and socioeconomic diversity impacts those within sport. Fulfills multicultural requirement.
4355. **Sporting Facilities and Event Management (3)**. Prerequisite: C or better in ESS 1302 or ESS 3358; or instructor consent. Examination of principles, practices, and procedures of managing sporting events and sport related facilities.
4356. **Fundamentals of Sports Marketing (3)**. Prerequisite: C or better in ESS 1302 or ESS 3358. Overview of the nature and theories of sport product marketing and the relationship between consumer behavior and marketing research.
4357. **Financial and Economic Aspects of Sport (3)**. Prerequisite: C or better in ESS 1302 or ESS 3358. Examination and application of financial and economic principles and theories within the sport industry.

Bachelor of Science in Exercise and Sport Sciences

FIRST YEAR

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1451, Calculus I (recommended)	4	MATH 1452 (recommended)	4
CHEM 1307 & 1107 (recommended)	4	HIST 2300, History of the U.S. to 1877	3
ESS 1301, Intro. to Exercise Science	3	POLS 1301, American Govt., Org.	3
COMS 2300 or 2358 or CFAS 2300	3	ZOOL 2403, Human Anatomy	4
TOTAL	17	TOTAL	17

SECOND YEAR

Fall		Spring	
ENGL 2311 (recommended)	3	ENGL 2300-level (except ENGL 2371)†	3
HIST 2301 or HIST 2310	3	ESS 3301, Intro. to Biomechanics	3
Sophomore Foreign Language*	3	Sophomore Foreign Language*	3
ESS 4372, Mgmt. in Exercise Science	3	PFW	1
POLS 2302, American Public Policy	3	Creative Arts †	3
PFW	1		
TOTAL	16	TOTAL	13

THIRD YEAR

Fall		Spring	
ESS 3322, Resistance Training	3	ESS 3347, Physiological App. of Nutrition	3
ESS 3305, Exercise Physiology	3	ESS 3368, Exercise Testing & Prescrip.	3
ESS 3318, Exercise & Sport Psychology	3	ESS 3401 Intro. to Motor Behavior	3
ESS 3346, Anatomical Kinesiology	6	Social and Behavioral Sciences †	3
TOTAL	15	TOTAL	12

FOURTH YEAR

Fall		Spring	
ESS 4368, Applied Exercise Physiology	3	ESS Designated Electives ‡	6
Minor	9	Minor	9
Multicultural §	3		
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

The above curriculum model is a suggested set of courses/hours to complete the track in four years. The program requires 120 hours for graduation.

* A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

† Choose from the university's core curriculum. Choose an ENGL 2300-level course that fulfills the Language, Philosophy, and Culture requirement.

‡ Choose 6 hours from: PHYS 1401; ESS 3323, 4000, 4075, 4363, 4392

§ Choose from the university's multicultural requirement list.

A minor of 18 minimum hours is required.

Bachelor of Science in Sport Management

(degree pending approval by Texas Higher Education Coordinating Board)

FIRST YEAR

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1300 or 1320	3	MATH or PHIL 2310	3
COMS 2300 or 2358 or CFAS 2300	3	HIST 2300, History of the U.S. to 1877	3
BIOL 1402 or CHEM 1305 & 1105	4	POLS 1301, American Govt., Org.	3
or PHYS 1401*		ZOOL 2403, Human Anat. & Physiology I	4
ESS 1302, Intro. to Sport Management	3		
TOTAL	16	TOTAL	16

SECOND YEAR

Fall		Spring	
ENGL 2300-level (except ENGL 2371)	3	ENGL 2300-Level Literature ‡	3
POLS 2302, American Public Policy	3	Creative Arts ‡	3
Sophomore Foreign Language †	3	Sophomore Foreign Language †	3
HIST 2301 or HIST 2310	3	Minor	3
Social and Behavioral Sciences ‡	3	PFW	1
PFW	1	ESS 3358, Fund. of Sport Mgmt.	3
TOTAL	16	TOTAL	16

THIRD YEAR

Fall		Spring	
ESS 3374, Personnel Mgmt. in Sport	3	ESS 4357, Financial and Eco. Aspects	3
ESS 4353, Social Issues in Sport	3	ESS 4358, Leadership & Mgmt. in Sport	3
ESS 4355, Sporting Facilities & Event	3	ESS Designated Elective**	3
ESS 4356, Fund. of Sports Marketing	3	Minor	3
Minor	3	ESS 3373, Sport Communication	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
Multicultural §	3	ESS 4373, Sales & Fundraising in Sport	3
Minor	6	ESS 4374, International Sport Mgmt.	3
ESS 4359, Sport Law and Governance	3	ESS Designated Elective**	3
Elective #	2	Minor	3
TOTAL	14	TOTAL	12

TOTAL HOURS: 120

The above curriculum model is a suggested set of courses/hours to complete the track in four years. The program requires 120 hours for graduation.

* Or higher.

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. See Arts and Sciences General Degree Requirements for further explanation.

‡ Choose from the university's core curriculum. Choose an ENGL 2300-level course that fulfills the Language, Philosophy, and Culture requirement.

§ Choose from the university's multicultural requirement list.

May be outside of major.

** Choose from ESS 4000, 4076, 4377, 4392, 4395.

ENGL literature fulfills the Language, Philosophy, and Culture core curriculum requirement.

A minor of 18 minimum hours is required.

- 4358. Leadership and Management in Sport (3).** Prerequisite: C or better in ESS 1302 or ESS 3358. Fundamental concepts and theories for management in sport programs. (Writing Intensive)
- 4359. Sport Law and Governance (3).** Prerequisite: C or better in ESS 1302 or ESS 3358. Overview of relevant legal theories within various sectors of the sport industry and how these legal issues affect governance of sport organizations.
- 4363. Principles and Theories in Exercise Psychology (3).** Prerequisite: C or better in ESS 3318. Psychological principles and theories regarding antecedents and consequences of exercise behaviors that can be applied to healthy individuals and clinical populations. (Writing Intensive)
- 4368. Applied Exercise Physiology (3).** Prerequisite: C or better in ESS 3305. Examination of physiological adaptations to exercise training in health and disease along with physiological responses to environmental stress.
- 4372. Management in Exercise Science Programs (3).** Prerequisite: C or better in ESS 1301. Applied knowledge and roles of exercise science professionals in a variety of settings, emphasizing development, management, and marketing of these facilities and programs. (Writing Intensive)

- 4373. Sales and Fundraising in Sport (3).** Prerequisite: C or better in ESS 1302 or ESS 3358. Students learn about client-focused selling and fundraising in the sport industry and the importance of understanding client needs and motivations for buying and donating.
- 4374. International Sport Management (3).** Prerequisite: C or better in ESS 1302 or ESS 3358. An overview of the global sport industry from both cultural and economic perspectives and the globalization of American sports.
- 4375. Internship in Exercise Science (3).** Prerequisites: Senior standing; C or better in ESS 1301 and 4372. Provides work-related experiences in physical activity, exercise, health promotion, and related exercise science organizations, including commercial, corporate, and clinical settings.
- 4377. Sport for Development (3).** Prerequisite: C or better in ESS 1302 or ESS 3358. Students may complete a service learning experience working closely with a sport organization to serve as an integrative experience.
- 4392. Research Methods (3).** Prerequisite: Junior standing; C or better in ESS 1301 or ESS 1302, or departmental approval. Research methods, designs, and analysis and interpretation of data. (Writing Intensive)

4395. **Senior Research Project (3)**. Prerequisites: C or better in 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)**. 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)**. Prerequisite: C or better in ESS 2245. Theory, practice, and instructional methodologies appropriate for teaching physical education in school settings. (Writing Intensive)

Graduate Courses

5002. **Clinical Internship (V1-6)**. Prerequisites: Nine hours of graduate work in kinesiology. One credit hour is equal to 100 hours of on-site experience in a hospital setting specializing in exercise for rehabilitation.
5003. **Internship in Sports Administration (V1-6)**. Prerequisites: 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.
5031. **Independent Study (V1-6)**. A structured independent study under the guidance of a member of the graduate faculty. May be repeated for credit up to a maximum of 6 hours.
5302. **Motor Control (3)**. 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)**. Theory and practice of the major psychological dimensions underlying the behavior of the coach and athlete in the sport context.
5305. **Motor Learning (3)**. The study of the principles and concepts of human behavior related to and affected by human movement with emphasis on motor skill learning.
5307. **Motor Development (3)**. 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)**. The study of the physiological, psychological, and sociological variables that influence children's participation in sport.
5312. **Behavioral and Psychological Aspects of Exercise (3)**. Empirical investigations of the association between exercise and psychological/behavioral health. Moderation and mediation of the associations will also be discussed.
5313. **Applied Psychology of Sport (3)**. 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.
5315. **Research Methods in Exercise and Sport Sciences I (3)**. Basic concepts of research methods, research design, treatment and interpretation of data.
5316. **Research Methods in Exercise and Sport Sciences II (3)**. Prerequisite: C or better in ESS 5315. Advanced and applied concept of research methods, research design, treatment and interpretation of data.
5317. **Seminar in Exercise and Sport Sciences (3)**. Specific research topics in exercise and sport sciences will be studied. May be repeated for credit.
5320. **Sport Leadership (3)**. 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)**. Prerequisite: Sport management track only. 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)**. 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)**. Prerequisite: Sport management track only. 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)**. Ethical theory and professional ethics of sport managers. The principles of laws (constitutional, tort, contractual, labor, and antitrust laws, etc.) affecting sport management.
5327. **Sport Facility Planning and Management (3)**. Prerequisite: sport management track only. Principles, terminology, and standards for planning, construction, use, and maintenance of facilities.
5328. **Sport in American Culture (3)**. Prerequisite: Restricted to students in sport management track. Analysis of the place of sport in American society and the impact of sport on American culture.
5329. **Sport Event Management (3)**. Prerequisite: Restricted to students in sport management track. The study of management principles and procedures specific to the design, operation, and implementation of sporting events.
5330. **Health Issues for the Active Female (3)**. The Female Athlete Triad is targeted. The triad consists of: (1) energy deficiency with or without disordered eating; (2) menstrual disturbances/amenorrhea; and (3) bone loss/osteoporosis.
5332. **Applied Physiology of Exercise (3)**. Application of the principles of exercise physiology to assess health, fitness, muscle metabolism, and physiological adaptations with exercise training.
5334. **Clinical Exercise Testing and Prescription (3)**. Prerequisite: C or better in ESS 5337 or knowledge of EKG. Study of the pathophysiology of cardiovascular and pulmonary diseases with concentration on the recommendations for exercise in clinical populations.
5335. **Cardiopulmonary Exercise Physiology (3)**. Biophysical principles, cellular mechanics, fiber contraction, and feedback control systems in cardiovascular and pulmonary function is highlighted.
5336. **Skeletal Muscle Physiology (3)**. Structural and functional characteristics of skeletal muscle and the regulation of energy pathways that support muscle contraction.
5337. **Electrocardiography (3)**. The art and science of the interpretation of the 12-lead electrocardiogram and the underlying cardiovascular physiology is highlighted. ACLS emergency drugs are emphasized.
5339. **Laboratory Techniques in Exercise Physiology (3)**. Prerequisites: C or better in ESS 5336 or instructor consent. Laboratory-based course designed to provide students with basic analytical methods and procedures used in laboratories investigating questions related to biochemical and molecular exercise physiology.
5353. **Assessment of Muscular Performance (3)**. Details the techniques used to assess human performance with an emphasis on athletic performance testing and tools.
5355. **Program Design for Strength and Conditioning (3)**. Examines the outcomes associated with different strength training and conditioning regimens.
5357. **Applied Anatomy and Neuromuscular Performance (3)**. Examines the basic and applied principles of neuromuscular performance and the effects of exercise applications on the functioning of the neuromuscular system.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Health (HLTH)

Undergraduate Courses

1300. **[PHED 1304, 1305] Patterns of Healthful Living (3)**. A study of patterns of mental, physical, and social development of the individual including relationships of individual and community health.
1306. **Introduction to Public Health (3)**. Introductory principles of evidence-based public health and implementation tools, including health communications and informatics, applications of social and behavioral sciences, health policy, law, and ethics.
2302. **Environmental Health and Awareness (3)**. Examines critical issues and relationships affecting biospheric health including personal, community, and international ecology.
2307. **Understanding Death and Dying (3)**. Exploration of issues concerning the death and dying process, including death anxiety.

- ety, bereavement, grief, and mourning. Biological, psychological, social, and cultural aspects will be addressed.
2360. **Community Health (3)**. 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)**. Principles and methods in epidemiology about the incidence, distribution, cause and control of disease in populations with applied emphasis to public health issues and practices.
3311. **Communicable and Chronic Diseases (3)**. 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)**. A process-oriented course addressing health needs and/or problems of various ethnic, cultural, and socioeconomic groups.
3313. **Health for Preadolescents (3)**. 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)**. Prerequisite: Junior standing. Studies health factors that affect the adolescent; addresses social, emotional, and physical factors of health.
4300. **Individual Studies in Health (3)**. Prerequisite: Departmental approval. An independent study program allowing students to pursue an area of special interest under the guidance of a professor. May be repeated up to three times for credit. (Writing Intensive)
4307. **Health Program Planning and Evaluation (3)**. Principles and applications of planning and implementing health programs in a variety of school and community settings including monitoring techniques. (Writing Intensive)
4308. **Introduction to Biostatistics (3)**. Overview of various statistical methods used in public health practice and research with an emphasis on application of appropriate methods and interpretation of results.
4313. **Mental Health (3)**. Prerequisite: Junior standing. Overview of social, behavioral and contextual factors in well-being with an emphasis on mental health from a biopsychosocial framework.
4398. **Health Seminar (3)**. Prerequisite: Senior standing. Selected topics in health. May be repeated for credit with different seminar topics.
4344. **Managing Stress (3)**. Prerequisite: Junior standing. Provides a comprehensive and holistic approach to stress and stress management.
1127. **Bowling (1)**. Basic to advanced bowling skills will be taught, including stance, approach, delivery, rules, safety, bowling etiquette, and terminology. Class meets off campus. Extra fee required.
1130. **Basketball (1)**. Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility and conditioning for basketball.
1132. **Soccer (1)**. Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for soccer.
1133. **Softball (1)**. Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for softball.
1134. **Volleyball (1)**. 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)**. 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)**. 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)**. Swimming principles, basic stroke mechanics, breathing technique, and conditioning for beginning swimmers.
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)**. Prerequisite: PFW 1113 or previous varsity level experience. Improvement and refinement of stroke mechanisms. Seven full rounds of golf must be completed before the final. Class meets off campus. Extra fee required.
2143. **Swim Conditioning (1)**. Review and refinement of strokes. For students with the ability to complete multiple lengths of the pool while correctly performing the basic strokes. Techniques for stroke improvement through swimming will be addressed.
2144. **[PHED 2155, PHED 2255] Advanced Swimming (1)**. Refinement of strokes. For students with the ability to complete multiple lengths of the pool with sound stroke mechanics. Multiple training techniques will be used.

Personal Fitness and Wellness (PFW)

Undergraduate Courses

1111. **Aerobics (1)**. Physical exercise that combines rhythmic aerobic exercise with stretching and strength training routines with the goal of improving all elements of fitness.
1112. **[PHED 1338] Diet and Exercise (1)**. A concepts-based activity course in which the student learns to create and participate in an individualized lifetime physical activity program combined with healthy nutritional practices.
1113. **Golf (1)**. Basic golf rules, etiquette, and mechanics. Class meets off campus. Extra fee required.
1114. **Jogging (1)**. Principles and practice of recreational jogging for cardiovascular health. Includes flexibility training, individual progression instruction, complementary weight training, and nutritional practices.
1117. **Walking (1)**. Topics include walking technique, principles and practice of personal walking programming, interval, and circuit training, flexibility and muscular endurance training.
1118. **Weight Training (1)**. Basic principles and practice of weight training, developing and modifying an individual program. Includes flexibility and cardiovascular fitness.
1119. **Yoga (1)**. Basic poses, principles of movements and balance in yoga. Breathing techniques, stress reduction, relaxation, advanced poses, and twists will be covered.
1123. **Racquetball (1)**. Introduction to rules, shots, and strategies for singles, doubles, and cut-throat.
1125. **Tennis (1)**. Concepts of stroke mechanics, skill development, offensive and defensive strategies, rules, game play, singles and doubles, organization and communication, flexibility, and conditioning for tennis.

Department of Mathematics and Statistics

Horn Professor: L. Allen

Dick and Martha Brooks Regents Professor: Ghosh

Professors: E. Allen, Bennett, Dwyer, Gelca, D. Gilliam, Harris, Ibragimov, Jang, Lewis, Lindquist, Mansouri, Schovanec, Solynin, Surles, Toda, Trindade, Wang, Williams

Associate Professors: Aulisa, Byerly, Christensen, Drager, Hoang, Howle, Iyer, Juan, Ledet, Lee, Long, Monico, Roeger, Seaquist, Weinberg

Assistant Professors: Bornia, Ellingson, Ghosh, Hamilton, Higgins, McCarthy, Su

Instructor: X. Gilliam

CONTACT INFORMATION: 201 Mathematics and Statistics Bldg., Box 41042, Lubbock, TX 79409-1042, T 806.742.2566, F 806.742.1112, www.math.ttu.edu

About the Program

This department supervises the following degree and certificate 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
- Graduate Certificate in Mathematics

Dual Degree Program

- Bachelor of Science in Mathematics/Bachelor of Science in Computer Science

A Bachelor of Arts or Bachelor of Science in Mathematics with a minor in actuarial science has been offered since 2008. In addition, the department supervises programs leading to minors in mathematics and to teacher certification in mathematics at the middle and secondary school levels.

Undergraduate Program

The academic background of undergraduate students pursuing a degree in mathematics is extremely diverse. Because of this diversity, semester-by-semester schedules for undergraduate degree plans are formulated individually for each student on a case-by-case basis.

Specific listings of General Degree Requirements for each undergraduate program, based on disciplines and number of corresponding credit hours, can be found at:

www.math.ttu.edu/Undergraduate/undergrad_program.shtml

The mathematics curriculum is designed to allow flexibility in choosing elective courses so that students can prepare to enter the industrial job market, graduate 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.

Highly motivated students are strongly encouraged to pursue an accelerated bachelor's-to-master's program. The department offers honors-level courses in collaboration with the Honors College. The upper-division curriculum includes customized special topics classes and fosters individual undergraduate research projects under supervision of faculty members.

Bachelor of Arts in Mathematics

The 120-hour curriculum established for the B.A. degree is designed to provide the foundation for a liberal education through a well-rounded study of the humanities and fine arts; the physical, biological, and social sciences; and mathematics. It also provides the factual basis and insights requisite for specialized study and professional work in these fields.

Requirements. Twenty-five semester hours of upper-level math courses are required. These course requirements may be broadly divided into four components:

- Calculus: MATH 1451, 1452, 2450
- Foundation: MATH 2360, 3310, 3354, 3360, 4350
- Depth (take one of the four): MATH 4343, 4351, 4354, 4360
- Breadth (take minimum of 10 hours not used on above lists): MATH 3342, 3430, 4000, 4310, 4312, 4330, 4331, 4342, 4343, 4351, 4354, 4356, 4360, 4362, 4363

Total MATH hours must be at least 37, with at least half of the upper-division (3000- and 4000-level) courses taken at Texas Tech.

The Bachelor of Arts in Mathematics requires a minimum of 40 semester hours of junior and senior work. Not more than 42 semester hours in one subject may be counted nor more than 8 hours in applied music and/or music ensemble except for students offering music as a major or minor. Not more than 6 hours in personal fitness and wellness courses may be counted as electives nor more than 24 hours in the technical or professional subjects or agriculture, business administration, engineering, and/or human sciences.

Minor. A minimum of 9 semester hours above the level of Calculus III is required for a minor, 6 hours of which must be upper-division coursework. The minor is subject to the requirements of and must be approved by the department that supervises the minor.

Elective Courses. Additional courses sufficient to bring the total to 120 semester hours must be taken.

Bachelor of Science in Mathematics

The 120-hour B.S. degree permits a greater degree of specialization than that afforded by the B.A. degree.

Requirements. Twenty-seven semester hours of upper-level math courses are required. The mathematics requirements are similar to those for the B.A. degree, but two additional advanced math courses are required. These course requirements may be broadly divided into four components:

- Calculus: MATH 1451, 1452, 2450
- Foundation: MATH 2360, 3310, 3354, 3360, 4350
- Depth (take two of the four): MATH 4343, 4351, 4354, 4360
- Breadth (take a minimum of 9 hours not used in the above lists): MATH 3342, 3430, 4000, 4310, 4312, 4330, 4331, 4342, 4343, 4351, 4354, 4356, 4360, 4362, 4363

Total MATH hours must be at least 39, with at least half of the upper-division (3000- and 4000-level) courses taken at Texas Tech.

Minor. Candidates for the B.S. degree must choose their minor from the following: actuarial science, atmospheric science, biology, chemistry, chemical engineering, civil engineering, computer science, economics, electrical engineering, exercise and sport sciences, geology, geophysics, industrial engineering, mechanical engineering, microbiology, petroleum engineering, physics, or zoology. A minor must include 18 semester hours, 6 of which must be advanced. In particular, an engineering minor must consist of 18 semester hours in only one department. Courses counted for the minor must be approved by the department supervising the minor.

Electives. Additional courses must be taken which, together with the required courses, are sufficient to total 120 semester hours. The inventory of courses that can be used to fulfill various requirements changes every year as some courses are deleted and others added. Students should consult the department's *Director of Undergraduate*

Programs if they have any questions about a particular course and the general degree requirements. For the minor in actuarial sciences, refer to page 197 and www.math.ttu.edu/Undergraduate/Minors/actuary.shtml.

Graduate Program

For information on graduate programs offered by the Department of Mathematics and Statistics, visit the Graduate School section of the catalog on page 131.

Additional Requirements

Residency Requirement. 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. 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 middle school teaching are MATH 1320, 2370, 2371, 3370, 3371, 3372, 4370, and 4371.

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. Students planning to become high school teachers should minor in secondary education. They will be required to take EDSE 4000 for their student teaching experience. The university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for students beginning their teacher education program in spring 2013 or later. Students wishing to obtain teacher certification should consult with the department's undergraduate advisor and see a College of Education advisor to complete a certification plan.

The minimum requirements for the teaching field in mathematics at the secondary level are as follows:

- MATH 1451, 1452, 2450, 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). Students matriculating to the university in a fall semester are typically expected to take the online MPE prior to attending their summer new student orientation. Students matriculating to the university in a spring semester or a summer term are expected to take the placement examination during the open registration periods prior to the start of the semester or 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 1451) on the SATM or at least 26 (29 for 1451) 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, students are encouraged to take the MPE during an orientation session to provide them with a current assessment of their mathematics skills for advisement purposes.

NOTE: A satisfactory score on the placement exam or satisfactory completion of TSI requirements is required for entrance to all above courses. Texas Success Initiative (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.

Accelerated Bachelor's-to-Master's

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. The 150-hour accelerated bachelor's-to-master's degree 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 degrees in mathematics differ only in the final two years; the first three years are the same as the standard B.A. or B.S. in Mathematics program. See either the graduate or undergraduate advisor for details.

Semester-by-semester degree plans for accelerated degrees can be found at www.math.ttu.edu/Undergraduate/undergrad_program.shtml.

Undergraduate Dual Degree

The Department of Mathematics and Statistics participates with the Department of Computer Science to offer a 162-hour dual degree program in mathematics and computer science. This is a five-year program that culminates in a B.S. in Mathematics with a minor in computer science from the College of Arts and Sciences and a B.S. 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.

Course Descriptions

(To interpret course descriptions, see page 23.)

Mathematics (MATH)

Developmental Courses

- 0301. Essential Mathematics (3).** 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 Developmental Education Office in 78 Holden Hall.
- 0302. Intermediate Algebra (3).** 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 a grade of D or better in 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 Developmental Education Office in 78 Holden Hall.

Undergraduate Courses

- 1300. [MATH 1332] Contemporary Mathematics (3).** Prerequisites: A score of at least 500 on the SATM and composite score of 1070 or a score of at least 19 on the ACTM and composite score of 23 or a grade of C or better in MATH 0302 or a grade of C or better in TSI 0302. Quantitative literacy and problem solving with applications to finance, population dynamics, politics, and business. Partially fulfills core Mathematics requirement

1320. [MATH 1314] **College Algebra (3)**. Prerequisites: A score of at least 500 on the SATM and composite score of 1070 or a score of at least 19 on the ACTM and composite score of 23 or a grade of C or better in MATH 0302 or a grade of C or better in TSI 0302. Inequalities, determinants, theory of equations, binomial theorem, progressions, mathematical induction. Partially fulfills core Mathematics requirement. Cannot receive credit for both MATH 1320 and 1420.
1321. [MATH 1316] **Trigonometry (3)**. Prerequisite: A score of at least 500 on the SATM and composite score of 1070 or a score of at least 19 on the ACTM and composite score of 23 or a grade of C or better in MATH 0302 or a grade of C or better in TSI 0302. Trigonometric functions, radians, logarithms, solutions of triangles, identities, trigonometric equations, complex numbers, De Moivre's Theorem. Partially fulfills core Mathematics requirement.
1330. [MATH 1324] **Introductory Mathematical Analysis I (3)**. Prerequisites: A score of at least 500 on the SATM and composite score of 1070 or a score of at least 19 on the ACTM and composite score of 23 or a grade of C or better in MATH 0302 or a grade of C or better in TSI 0302. 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. Partially fulfills core Mathematics requirement.
1331. [MATH 1325, 1425] **Introductory Mathematical Analysis II (3)**. Prerequisite: a grade of C or better in MATH 1330 or MATH 1430 or a test score of at least 610 on SATM or 26 on ACTM or Code 4 or higher on MPE. 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. Partially fulfills core Mathematics requirement.
1350. [MATH 1348, 2312, 2412] **Analytical Geometry (3)**. 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. Partially fulfills core Mathematics requirement.
1420. [MATH 1414] **College Algebra With Review (4)**. Prerequisites: A score of at least 500 on the SATM and composite score of 1070 or a score of at least 19 on the ACTM and composite score of 23 or a grade of C or better in MATH 0302 or a grade of C or better in TSI 0302. Review of topics from high school algebra, inequalities, functions and graphs, linear systems, sequences, mathematics induction. Partially fulfills core Mathematics requirement. Cannot receive credit for both MATH 1320 and 1420.
1430. **Introductory Mathematical Analysis With Review (4)**. 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 a grade of D or better in 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. Partially fulfills core Mathematics requirement.
1451. [MATH 2413, 2417, 2513] **Calculus I With Applications (4)**. Prerequisite: MATH 1350 or 1550 with a grade of C or better, or MATH 1321 with a grade of C and Code 5 on MPE, or MATH 1321 with a grade of B or better, 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, or a score of at least 3 on AP AB Calculus and Code 5 on MPE. Differentiation of algebraic and transcendental functions, differentials, indefinite integrals, definite integrals. Applications and problem-solving are strongly emphasized. Partially fulfills core Mathematics requirement. (Honors section offered.)
1452. [MATH 2414, 2419] **Calculus II With Applications (4)**. Prerequisite: MATH 1451 or departmental consent. Methods of integration, parametric equations, polar coordinates, hyperbolic functions, infinite series. Applications and problem-solving are strongly emphasized. Partially fulfills core Mathematics requirement. (Honors section offered.)
1550. **Precalculus (5)**. 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 a grade of C or better in a college level mathematics course. Topics from college algebra, trigonometry, and analytical geometry that are necessary prerequisites for Calculus I. Partially fulfills core Mathematics requirement.
2300. [MATH 1342, 1442, 2342, 2442] **Statistical Methods (3)**. Prerequisite: A score of at least 500 on the SATM and composite score of 1070 or a score of at least 19 on the ACTM and composite score of 23 or a grade of C or better in MATH 0302 or a grade of C or better in TSI 0302. Methods of analyzing data, statistical concepts and models, estimation, tests of significance, introduction to analysis of variance, linear regression, and correlation. Partially fulfills core Mathematics requirement.
2345. **Introduction to Statistics With Application to Business. (3)**. 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 or 1430 with a grade of C or better. Statistics and probability for business. Data collection, description, interpretation, prediction, inference, and computer software. Partially fulfills core Mathematics requirement.
2356. **Quantitative Theory of Interest (3)**. Prerequisite: MATH 1331 or 1451. Mathematical theory of compound interest, annuities, yield rates, amortization, funds, bonds, and depreciation.
2360. [MATH 2318, 2418] **Linear Algebra (3)**. Prerequisite: MATH 2450 or consent of department. Finite-dimensional vector spaces, linear transformations and matrices, eigenvalues and eigenvectors.
2370. [MATH 1350] **Elementary Analysis I (3)**. 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. Partially fulfills core Mathematics requirement.
2371. **Elementary Analysis II (3)**. Prerequisites: 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. Partially fulfills core Mathematics requirement.
2450. [MATH 2415] **Calculus III With Applications (4)**. Prerequisite: MATH 1452 or departmental consent. Partial differentiation, functions of several variables, multiple integrals, line integrals, surface integrals, Stokes Theorem. Applications and problem-solving are strongly emphasized. (Honors section offered.)
3310. **Introduction to Mathematical Reasoning and Proof (3)**. Prerequisite: MATH 2450 or concurrent with 2450 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)**. Prerequisite: MATH 1452 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)**. Prerequisite: MATH 2450 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)**. Prerequisite: C or better in MATH 1452 (cannot be taken concurrently) 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. Mathematics majors should take MATH 3354 and have the consent of the department to take MATH 3350.
3351. **Higher Mathematics for Engineers and Scientists II (3)**. Prerequisites: C or better in MATH 2450 and in 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)**. Prerequisite: C or better in MATH 2450 and MATH 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)**. Prerequisite: MATH 2360 and 3310 or consent of department. Fundamental concepts of abstract algebra. Primarily group theory. (Writing Intensive)
3370. **Elementary Geometry (3)**. 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)**. Prerequisite: MATH 1550 or 2370 or consent of department. Combinatorics, prob-

Bachelor of Arts in Mathematics

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 1451, Calc. I With Applications	4	MATH 1452, Calc. II With Applications	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Life and Physical Sciences Elective	4	Life and Physical Sciences Elective	4
Language, Phil., & Culture Elective	3	Language, Phil., & Culture Elective	3
		Personal Fitness and Wellness	1
TOTAL	14	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 2450, Calc. III With Applications	4	MATH 3310, Intro. to Math Reason. & Proof	3
MATH 2360, Linear Algebra	3	English Literature	3
English Literature	3	Foreign Language*	3
Foreign Language*	3	Creative Arts Elective	3
Minor	3	Minor	3
TOTAL	16	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 3360, Foundations of Algebra I	3	MATH 4331, Advanced Geometry†	3
MATH 3354, Differential Equations	3	HIST 2301, History of U.S. Since 1877	3
HIST 2300, History of the U.S. to 1877	3	Creative Arts Elective	3
Social & Behavioral Sciences Elective	3	Social & Behavioral Sciences Elective	3
Minor	3	Minor	3
		MATH 4000, Selected Topics	1
TOTAL	15	TOTAL	16

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 4350, Advanced Calculus	3	MATH 4351, Advanced Calculus‡	3
MATH 3430, Computational Techniques†	4	POLS 2302, American Public Policy	3
POLS 1301, American Govt., Org.	3	Oral Communication Elective	3
Minor	3	Minor	3
Personal Fitness and Wellness	1	MATH 4362, Theory of Numbers‡	3
TOTAL	14	TOTAL	15

TOTAL HOURS: 120

* A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

† Can be exchanged within Breadth category.

‡ Can be exchanged within Depth category.

ability theory. Bayes' Theorem, Bernoulli Trials. Probability distributions and statistics. Not for engineering, science, or mathematics majors.

- 3372. Math Modeling for Teachers (3).** 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).** Prerequisite: MATH 2450 and MATH 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.
- 4000. Selected Topics (VI-3).** Prerequisite: Consent of undergraduate program director. Selected topics in upper-division mathematics. May be repeated for credit.
- 4101. Seminar in Mathematics, Statistics, and Mathematics Education (1).** Prerequisite: MATH 1451 or consent of instructor. Issues in mathematics, statistics, and mathematics education.
- 4202. Preparation for Mathematics Competitions (Putnam Competition) (2).** Prerequisite: Consent of instructor. Prepares students for the Putnam Competition. Only 2 hours of this course can be applied toward the major.
- 4310. Introduction to Numerical Analysis I (3).** Prerequisite: MATH 3350 or 3354, or consent of instructor. Interpolation, approximations, numerical integration, and differentiation.
- 4312. Introduction to Numerical Analysis II (3).** Prerequisite: MATH 2360 or consent of instructor. Numerical techniques in linear algebra.

Bachelor of Science in Mathematics

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 1451, Calc. I With Applications	4	MATH 1452, Calc. II With Applications	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Life and Physical Sciences Elective	4	Life and Physical Sciences Elective	4
Social & Behavioral Sciences Elective	3	Creative Arts Elective	3
		Personal Fitness and Wellness	1
TOTAL	14	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 2450, Calc. III With Applications	4	MATH 3310, Intro. to Math Reason. & Proof	3
MATH 2360, Linear Algebra	3	MATH 3354, Differential Equations	3
English Literature	3	English Literature	3
Foreign Language*	3	Foreign Language*	3
Minor	3	Minor	3
		Elective	1
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 3360, Foundations of Algebra I	3	MATH 4310, Intro. Numerical Analysis I*	3
MATH 4354, Differential Equations	3	MATH 4331, Advanced Geometry*	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
Minor	3	Minor	3
Language, Phil., & Culture Elective	3	Multicultural Elective	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 4350, Advanced Calculus	3	MATH 4351, Advanced Calculus‡	3
MATH 3430, Computational Techniques†	4	POLS 2302, American Public Policy	3
POLS 1301, American Govt., Org.	3	Oral Communication Elective	3
Minor	3	Minor	3
Personal Fitness and Wellness	1	Elective	3
TOTAL	14	TOTAL	15

TOTAL HOURS: 120

* A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

† Can be exchanged within Breadth category.

‡ Can be exchanged within Depth category.

- 4324. Introduction to Topology (3).** Prerequisite: MATH 3310. Euclidean spaces; metric, open, and closed sets; neighborhood; topology; Euler characteristic; triangulation; orientability classification of surfaces.
- 4330. Mathematical Computing (3).** Prerequisite: Consent of undergraduate program director. Topics from computational mathematics and programming.
- 4331. Advanced Geometry (3).** Prerequisite: MATH 2450 and MATH 3310 or consent of department. Euclidean and non-Euclidean geometries.
- 4342. Mathematical Statistics (3).** Prerequisite: MATH 2450 or consent of department. Frequency functions, moments, probability, correlation and regression, testing hypotheses, small sample distributions, analysis of variance, nonparametric methods, sequential analysis. MATH 3342 and 4342 cannot both be counted toward a mathematics major or minor.
- 4343. Mathematical Statistics (3).** Prerequisite: 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.
- 4350. Advanced Calculus (3).** Prerequisite: MATH 2450, 2360, and 3310 or consent of department. Sets, functions, vector fields, partial derivatives, power series, theory of integration, line, surface, and multiple integrals. (Writing Intensive)
- 4351. Advanced Calculus (3).** Prerequisite: MATH 4350 or consent of department. Sets, functions, vector fields, partial derivatives, power series, theory of integration, line, surface, and multiple integrals.
- 4354. Differential Equations II (3).** Prerequisite: MATH 3350 or 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)**. 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)**. Prerequisite: MATH 3360 or consent of department. Continuation of MATH 3360. Rings, fields, and applications.
4362. **Theory of Numbers (3)**. Prerequisite: MATH 3310 or consent of department. Prime numbers, congruences, theorems of Fermat, Euler, and Wilson, residues, reciprocity law, Diophantine Equations.
4363. **Introduction to Combinatorics (3)**. Prerequisite: MATH 3310. Basic counting techniques, pigeonhole principle, partitions, permutations, recurrence relations, coloring problems.
4370. **Elementary Problem Solving (3)**. Prerequisite: MATH 3370 or consent of department. Techniques of problem solving using elementary number theory.
4371. **Basic Computer Literacy and Programming (3)**. Prerequisite: MATH 3372 and 4370 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

5099. **Individual Study (V1-6)**. Prerequisite: Consent of instructor. A structural independent study course in mathematics or statistics under the guidance of a faculty member. May be repeated for credit.
5101. **Seminar in Mathematics (1)**. Discussion of current research and topics of interest in mathematics. Must be taken pass/fail. May be repeated for credit.
5104. **Seminar in Statistics (1)**. Discussion of current research and topics of interest in statistics. Must be taken pass/fail. May be repeated for credit.
5310. **Principles of Classical Applied Analysis I (3)**. 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.
5311. **Principles of Classical Applied Analysis II (3)**. 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)**. 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)**. 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)
5315. **Introduction to Set Theory (3)**. Zermelo-Fraenkel axioms set theory, axiom of choice and its equivalents, cardinal and ordinal numbers, cardinal and ordinal arithmetic.
5316. **Applied Linear Algebra (3)**. Prerequisite: Consent of instructor. Solution of linear systems, matrix inversion, vector spaces, projections, determinants, eigenvalues and eigenvectors, Jordan form, computational methods, and applications.
5317. **Introduction to Modern Algebra (3)**. Prerequisites: MATH 2360 and 3310, or similar courses on linear algebra and introduction to proof. Graduate-level introduction to the theory of groups and rings.
5318. **Intermediate Analysis I (3)**. The real number system, introduction to metric spaces, sequences, continuity, differentiation, Riemann integration, power series, functions of several variables, and differential forms.
5319. **Intermediate Analysis II (3)**. The real number system, introduction to metric spaces, sequences, continuity, differentiation, Riemann integration, power series, functions of several variables, and differential forms.
5320. **Functions of a Complex Variable I (3)**. 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.
5321. **Functions of a Complex Variable II (3)**. 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. **Functions of a Real Variable I (3)**. Prerequisite: MATH 5319 or equivalent. General measure and integration theory, L_p theory, differentiation theory, and basic functional analysis.
5323. **Functions of a Real Variable II (3)**. Prerequisite: MATH 5319 or equivalent. General measure and integration theory, L_p theory, differentiation theory, and basic functional analysis.
5324. **Topology I (3)**. Prerequisite: MATH 4350 or consent of instructor. Point set theory, introduction to combinatorial topology and homology theory.
5325. **Topology II (3)**. Prerequisite: MATH 4350 or consent of instructor. Point set theory, introduction to combinatorial topology and homology theory.
5326. **Modern Algebra I (3)**. Prerequisite: MATH 3360 or consent of instructor. Groups, rings, fields, linear algebra, Galois theory.
5327. **Modern Algebra II (3)**. Prerequisite: MATH 3360 or consent of instructor. Groups, rings, fields, linear algebra, Galois theory.
5330. **Theory of Ordinary Differential Equations I (3)**. 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)**. Prerequisite: MATH 5330 or consent of instructor. Advanced existence, uniqueness, continuation, and continuity results; symmetry and variance; center manifold theorem.
5332. **Partial Differential Equations I (3)**. 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.
5333. **Partial Differential Equations II (3)**. 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. **Numerical Analysis I (3)**. Prerequisite: MATH 5316 or equivalent. Computer arithmetic and error analysis, interpolation techniques, numerical differentiation and numerical quadrature, direct and iterative methods for solution of systems of linear equations.
5335. **Numerical Analysis II (3)**. Prerequisite: MATH 5316 or equivalent. Numerical solution of ordinary differential equations, solution of nonlinear systems of equations, calculation of eigenvalues and eigenvectors, special topics.
5340. **Functional Analysis I (3)**. 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.
5341. **Functional Analysis II (3)**. 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. **Advanced Topics in Analysis I (3)**. Prerequisite: Consent of instructor. Current topics in analysis. May be repeated for credit.
5343. **Advanced Topics in Analysis II (3)**. Prerequisite: Consent of instructor. Current topics in analysis. May be repeated for credit.
5344. **Topics in Numerical Analysis I (3)**. Prerequisite: MATH 5335. Current advanced topics in numerical analysis, research work using computers. May be repeated for credit.
5345. **Topics in Numerical Analysis II (3)**. Prerequisite: MATH 5335. Current advanced topics in numerical analysis, computational research. May be repeated for credit.
5346. **Advanced Topics in Applied Mathematics I (3)**. Prerequisite: Consent of instructor. Current topics in applied mathematics. May be repeated for credit.
5354. **Biomathematics I (3)**. Prerequisite: Differential equations and linear algebra or consent of instructor. Qualitative and

- quantitative behavior of deterministic biological models are studied.
5355. **Biomathematics II (3)**. 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)**. 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. **Advanced Mathematics for Teachers I (3)**. Prerequisite: Consent of instructor. Selected topics in mathematics. May be repeated for credit.
5361. **Advanced Mathematics for Teachers II (3)**. Prerequisite: Consent of instructor. Selected topics in mathematics. May be repeated for credit.
5362. **Theory of Numbers (3)**. Prerequisite: MATH 4362. Diophantine equations, binary quadratic forms, algebraic numbers, theory of number-theoretic functions, partitions, the prime number theorem.
5364. **Computer Literacy and Programming I (3)**. Development of computer literacy and programming ability, algorithms and data structures, and recursion.
5365. **Computer Literacy and Programming II (3)**. Development of computer literacy and programming ability, algorithms and data structures, and recursion.
5366. **Introduction to Analysis I (3)**. Introduction to logic, proofs, sets, functions, real numbers, and sequences. Not for M.S./Ph.D. in Math/Stat. Online.
5367. **Introduction to Analysis II (3)**. Prerequisite: MATH 5366. A formal introduction to differentiation and Riemann Integration. Not for M.S./Ph.D. in Math/Stat. Online.
5368. **Abstract Algebra Applied I (3)**. An example-intensive introduction to fields and vector spaces. Not for M.S./Ph.D. in Math/Stat. Online.
5369. **Abstract Algebra Applied II (3)**. Prerequisite: MATH 5368. An example-intensive introduction to Galois Theory and unsolvability of the general quintic. Not for M.S./Ph.D. in Math/Stat. Online.
5370. **History of Mathematics (3)**. A history of mathematics with an emphasis on the development of commercial arithmetic, geometry, algebra, and calculus. Not for M.S./Ph.D. in Math/Stat. Online.
5371. **Topology of the Real Line I (3)**. An introduction to topology via linearly ordered sets. Emphasis is on creating and criticizing proofs and counter examples. Not for M.S./Ph.D. in Math/Stat. Online.
5372. **Topology of the Real Line II (3)**. Prerequisite: MATH 5371. Covers concepts of connectedness, separability, and characterization of the real line. Not for M.S./Ph.D. in Math/Stat. Online.
5375. **Modern Geometry I (3)**. A modern introduction to Euclidean geometry using metric and synthetic approaches. Uses dynamic geometry software. Not for M.S./Ph.D. in Math/Stat. Online.
5376. **Modern Geometry II (3)**. Prerequisite: MATH 5375. Advanced topics in Euclidean geometry and an introduction to hyperbolic geometry. Uses dynamic geometry software. Not for M.S./Ph.D. in Math/Stat. Online.
5377. **Applied Mathematics I (3)**. An introduction to mathematical applications. Explores handling of data, voting, golden ratio, modular arithmetic, and encryption. Not for M.S./Ph.D. in Math/Stat. Online.
5378. **Applied Mathematics II (3)**. Explores mathematical ideas and applications, including infinity, surfaces, modeling of populations, and fractals and chaos. Not for M.S./Ph.D. in Math/Stat. Online.
5382. **Advanced Probability I (3)**. 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.
5383. **Advanced Probability II (3)**. 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)**.
6320. **Representation Theory (3)**. Prerequisites: MATH 5326 and 5327. An introduction to basic methods and results of representation theory focusing on linear representations of finite groups.
6321. **Homological Algebra I: Introduction (3)**. Prerequisite: MATH 5326. Categories, functions, simplicial and singular homology, category of modules over a ring, resolutions, and derived categories.
6322. **Homological Algebra II: Applications (3)**. Prerequisite: MATH 6321. Homological dimensions, Koszul homology, local cohomology, duality theories, global dimension and regular rings, Cohen-Macaulay rings.
6323. **Algebraic Geometry I (3)**. Prerequisite: MATH 5326 or consent of instructor. Covers the basic theory of affine and projective varieties.
6324. **Algebraic Geometry II (3)**. Prerequisite: MATH 6323 or equivalent. Covers the theory of schemes and the scheme-theoretic concept of a variety.
6325. **Category Theory (3)**. Prerequisites: MATH 5326 and 5327 or consent of instructor. Covers the basic theory of categories and functors.
6330. **Manifold Theory (3)**. Prerequisites: MATH 5316 and 5318 or permission of instructor. Differentiable manifolds theory: smooth structures, tangent spaces, implicit mapping theorem, embeddings, immersions and submersions, vector fields, tensor analysis, Stokes' theorem.
6331. **Riemannian Geometry (3)**. Prerequisite: MATH 5330 or consent of instructor. Affine connections, Riemannian connections, geodesics and geodesic flow, curvatures (Ricci, sectional), spaces of constant curvature. Applications to computer modeling and visualization.
6332. **Geometric Mechanics (3)**. Prerequisite: MATH 5330 or consent of instructor. Geometric concepts in classical mechanics; Euler-Lagrange equations, Legendre transform and Hamilton's equations; symplectic manifolds; group actions; momentum maps; Hamiltonian and Lagrangian reduction.
6333. **Introduction to Lie Groups and Their Representation (3)**. Prerequisite: MATH 5330 or consent of instructor. Lie groups, Lie algebras, exponential map, Lie brackets, representation theory with examples, Peter-Weyl theorem, homogenous and symmetric spaces, applications to ODEs/PDEs arising in physics.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Statistics (STAT)

Graduate Courses

5302. **Applied Statistics I (3)**. Prerequisite: Consent of instructor. Graphical presentation of data, histograms, confidence intervals for binomial probabilities, one-sample and two-sample t-test, regression and correlation with two variables, hypothesis testing and confidence intervals, multivariate regression and correlation, partial correlation coefficients, analysis of variance and covariance, multiple comparison procedures. Emphasis on analysis of research data. Not for mathematics, statistics, engineering, or physical science majors; these students should take STAT 5384, 5385.
5303. **Applied Statistics II (3)**. Prerequisite: Consent of instructor. Graphical presentation of data, histograms, confidence intervals for binomial probabilities, one-sample and two-sample t-test, regression and correlation with two variables, hypothesis testing and confidence intervals, multivariate regression and correlation, partial correlation coefficients, analysis of variance and covariance, multiple comparison procedures. Emphasis on analysis of research data. Not for mathematics, statistics, engineering, or physical science majors; these students should take STAT 5384, 5385.
5326. **Biostatistics (3)**. Prerequisite: Consent of instructor for non-majors. One- and two-sample testing and estimation; sample size and power calculation; nonparametric tests for one, two, and multiple samples; correlation; design and analysis of epidemiologic studies.

5328. **Intermediate Mathematical Statistics I (3)**. Prerequisite: MATH 2450 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.
5329. **Intermediate Mathematical Statistics II (3)**. Prerequisite: MATH 2450 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)**. Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Game theory, statistical decision, Bayesian statistics.
5371. **Regression Analysis (3)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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. **Advanced Mathematical Statistics I (3)**. Prerequisite: STAT 5329. Theory of estimation and tests of statistical hypotheses, sequential analysis.
5381. **Advanced Mathematical Statistics II (3)**. Prerequisite: STAT 5329, 5380. Theory of estimation and tests of statistical hypotheses, sequential analysis.
5384. **Statistics for Engineers and Scientists I (3)**. Prerequisite: MATH 2450 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)**. 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)**. Prerequisite: Consent of instructor. Methods of approximating functions and probabilities, computational methods in linear algebra, introduction to theory and applications of random number generation, testing generators.
6000. **Master's Thesis (V1-6)**.
6310. **Master's Report (3)**.
7000. **Research (V1-12)**.

Department of Philosophy

Mark Owen Webb, Ph.D., Chairperson

Professors: Curzer, Webb

Associate Professors: Di Poppa, Hom, Nathan, Ribeiro, Schaller

Assistant Professors: Grzankowski, Schwartz, Velasco

CONTACT INFORMATION: 251 English/Philosophy Building, Box 43092, Lubbock, TX 79409-3092, T 806.742.3275, F 806.742.0730, www.depts.ttu.edu/philosophy

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 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). Additionally, philosophy majors have been more likely than almost any other major to gain admission to medical schools. No other undergraduate discipline can match such a record of achievement across the entire range of professional and graduate schools.

The Department of Philosophy 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.

Graduate Program

For information on graduate programs offered by the Department of Philosophy, visit the Graduate School section of the catalog on page 131.

Students majoring in philosophy must complete 30 hours in philosophy, including PHIL 2310, 2320, 3301, 3303, and one course from PHIL 3330, 3340, 4330, 4331, or 4340. Twenty-four hours must be at the 3000 or 4000 level. Majors 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 Concentration. Philosophy majors may pursue a concentration in ethics by completing six Philosophy courses that focus on ethics. PHIL 2320, which is required for the major, is one of the six. The remaining Philosophy courses may be drawn from 3320, Introduction to Political Philosophy; 3321, Philosophy of Law; 3322, Biomedical Ethics; 3323, Business Ethics; 3325, Environmental Ethics; 4320, Ethics (Advanced); 4321, Political Philosophy (Advanced); and any other Philosophy courses with topics that cover an aspect of ethics. The latter group of courses may be identified with the section number 061 or otherwise approved by the department chairperson.

Course Descriptions

(To interpret course descriptions, see page 23.)

Philosophy (PHIL)

Undergraduate Courses

- 1310. Critical Reasoning (3).** Study of good reasoning for use in both scholarly and everyday life. Topics will include principles of deductive and inductive reasoning and fallacies in reasoning.
- 2300. [PHIL 1301] Beginning Philosophy (3).** An introduction to philosophical thinkers, ideas, and methods. Fulfills core Language, Philosophy, and Culture requirement.
- 2310. [PHIL 2303] Logic (3).** Development of formal methods for evaluating deductive reasoning. Additional topics may include uses of language, definition, nondeductive inference. Partially fulfills core Mathematics requirement (in conjunction with a mathematics course).
- 2320. [PHIL 2306] Introduction to Ethics (3).** Discussion of moral problems and theories of morality. Includes the application of philosophical techniques to issues of contemporary moral concern. Fulfills core Language, Philosophy, and Culture requirement.
- 2350. [PHIL 1304] World Religions and Philosophy (3).** Philosophical study of the doctrines and practices of the major world religions, including Hinduism, Buddhism, Christianity, Judaism, and Islam. Fulfills multicultural and core Language, Philosophy, and Culture requirement.
- 3301. Classical Greek Philosophy (3).** Study of the major philosophical ideas as originally developed in the Western world by thinkers such as Socrates, Plato, Aristotle, and others. (Writing Intensive)
- 3302. Asian Philosophy (3).** Study of the major philosophical ideas originating in India and China, and developed generally in Asia.
- 3303. Modern European Philosophy (1600-1800) (3).** 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. F(Writing Intensive)
- 3304. Existentialism and Phenomenology (3).** Consideration of the meaning of human existence through study of thinkers such as Nietzsche, Heidegger, Husserl, Merleau-Ponty, Sartre, and others.
- 3320. Introduction to Political Philosophy (3).** 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.
- 3321. Philosophy of Law (3).** Discussion, based on study of philosophical writings, of various conceptions of law and their rela-

Bachelor of Arts in Philosophy: Sample Four-Year Curriculum

FIRST YEAR

Fall		Spring	
PHIL 2320, Introduction to Ethics*	3	PHIL 2310, Logic‡	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
POLS 1301, American Govt., Org.	3	American History†	3
Social & Behavioral Sciences†	3	Oral Communication†	3
Creative Arts†	3	Social & Behavioral Sciences†	3
TOTAL	15	TOTAL	15

SECOND YEAR

Fall		Spring	
PHIL Elective	3	PHIL Elective	3
ENGL 2000-Level Literature	3	ENGL 2000-Level or CLAS 1310	3
Foreign Language (2000 level)§	3	Foreign Language (2000 level)§	3
Life and Physical Sciences†	4	Life and Physical Sciences†	4
Multicultural Elective#	3	Elective	1
TOTAL	16	TOTAL	14

THIRD YEAR

Fall		Spring	
PHIL 3301, Classical Greek Philosophy	3	PHIL 3303, Modern Euro. Philosophy	3
PHIL Junior/Senior Elective	3	PHIL Junior/Senior Elective	3
Minor Elective	3	Minor Elective	3
American History†	3	POLS 2302, American Public Policy	3
Creative Arts†	3	Math†	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
PHIL 3330, 3340, 4330, 4331, or 4340	3	PHIL Junior/Senior Elective	3
Minor Elective	3	Minor Elective	3
Minor Elective	3	Minor Elective	3
Elective	3	Elective	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
Elective	3	Elective	1
TOTAL	16	TOTAL	14

TOTAL HOURS: 120

* Also fulfills 3 hours of the core curriculum Language, Philosophy, and Culture requirement.

† Choose from the university's core curriculum.

‡ Also fulfills 3 hours of the core curriculum Mathematics requirement.

§ A student must complete 6 hours at the sophomore level or above in a single language.

The prerequisite for all sophomore language courses is credit for the freshman level.

This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

Choose from the university's multicultural list.

- tion to morality. Includes philosophical problems about liberty, privacy, justice, and criminal punishment. (Writing Intensive)
- 3322. Biomedical Ethics (3).** Discussion of conceptual and moral problems surrounding such issues as abortion, euthanasia, genetic research, behavior control, allocation of medical resources, health, and disease.
- 3324. Philosophy of Religion (3).** An examination of general philosophical problems that arise in connection with religion. Topics may include the nature of religion, the existence of God, the problem of evil, the relation between faith and reason, and the relation between religion and morality.
- 3325. Environmental Ethics (3).** 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)**. Inquiry into the nature of science including the examination of basic scientific concepts and the forms of scientific reasoning.
3334. **Philosophy of Biology (3)**. 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)**. 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)**. Discusses philosophical questions raised by literature, including such topics as the nature of literature, theories of interpretation and evaluation of literary works, and an evaluation of whether literary works convey unique knowledge.
3342. **Philosophy and Film (3)**. Philosophical examination of issues raised by film, such as cinematic representation, realism, film genre, the power of cinema, and the interpretation of film. Required screenings.
4000. **Philosophical Problems (V1-3)**. Prerequisites: Previous philosophy coursework and instructor consent. Directed individual studies or conferences on selected advanced topics. May be repeated for a total of 9 hours. (Writing Intensive)
4125. **Introduction to Research Ethics (1)**. Introduction to research ethics for future researchers. Frameworks of moral reasoning and their application to moral problems through a discussion of case studies.
4301. **Seminar in Ancient Philosophy (3)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. Prerequisite: Previous coursework in philosophy or consent of instructor. General theory of significance, meaning, and interpretation.
4340. **Metaphysics (3)**. 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)**. Prerequisite: Previous coursework in philosophy or consent of instructor. In-depth study of the works of just one or two great philosophers.

Graduate Courses

5125. **Introduction to Research Ethics (1)**. Introduces future researchers to research ethics. Presents frameworks for moral reasoning and application of those frameworks to moral problems through a discussion of case studies.
5301. **Studies in Greek Philosophy (3)**. Studies in the Pre-Socratics, Plato, Aristotle, and Hellenistic philosophy. May be repeated as topic varies.
5302. **Studies in Modern Philosophy (1600-1800) (3)**. 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)**. Major philosophical theories and controversies of the 20th 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)**. Major philosophical theories of art and beauty from classical Greece to the present. May be repeated as topic varies.
5311. **Seminar in Epistemology (3)**. 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)**. 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.
5315. **Topics in Aesthetics (3)**. In-depth examination of a particular area of topic in aesthetics and the philosophy of art. May be repeated as topic varies.
5320. **Seminar in Ethics (3)**. 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)**. 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)**. 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.
5324. **Philosophy of Religion (3)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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

Roger Lichti, Ph.D., Chairperson

Horn Professor: Estreicher

Bucy Professor: Wigmans

Professors: Akchurin, Duncan, Huang, Lichti, Myles, Owen

Associate Professors: Gibson, Glab, Grave de Peralta, Kaye, Kunori, Lamp, Lee, Maccarone, Sanati, Thacker, Volobouev

Assistant Professors: Clark, Corsi, Gupta, Sand

Research Professor: Lodhi

Adjunct Faculty: Cheng, Holtz, Sill

Joint Faculty: Blawdziewicz, Hussain, Pal, Poirier, Quitevis

CONTACT INFORMATION: 101 Science Building, Box 41051, Lubbock, TX 79409-1051, T 806.742.3767, F 806.742.1182, www.phys.ttu.edu

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Physics
- Master of Science in Physics
- Master of Science in Physics–Applied Physics*
- Doctor of Philosophy in Physics

The department also supervises an applied physics option leading to the Ph.D. degree. This interdisciplinary option affords flexibility in coursework and area of research concentration. An M.S. degree involving industry internships is available.

* Program being phased out. No new students accepted.

Undergraduate Program

The Bachelor of Science in Physics degree can be taken in any of four areas of concentration and requires 120 hours of credit. These concentrations allow students to tailor their studies towards their particular career goals. Please refer to the sample course schedules in this section for details about each concentration. Physics majors should declare a concentration by the beginning of their junior year.

Majors in this department are required to maintain a minimum grade point average of 2.0 in physics courses and required adjunct courses and receive a C or better in each of these courses. Students also have a variety of university and College of Arts and Sciences requirements that must be met. Credit for any transferred physics hours will be handled on an individual basis with the department's undergraduate advisor.

Students are strongly encouraged to devote time to undergraduate research. Research areas in the department include atomic, molecular, and optical physics; condensed matter physics; nuclear physics; physics education; particle physics; astronomy; and biophysics.

The Bachelor of Science in Physics curricula are designed around the assumption that physics students will minor in mathematics. However, a variety of other minors complement a major in physics.

Professional Concentration. The professional concentration provides a traditional curriculum for students majoring in physics and is intended to prepare them for graduate study or employment

in the private or government sector as a physicist. A typical sequence of courses begins with PHYS 1408, 2401, 2402, and 2305 for a total of 15 hours at the introductory level. These are usually followed by the intermediate and advanced sequences, PHYS 3304, 3305, 3306, 3401, 4302, 4304, and 4307. Students desiring to pursue advanced degrees are recommended to take advanced topic courses.

The required mathematics courses for physics majors are MATH 1451, 1452, 2450, 3350 and 3351. MATH 3354 and 4354 may be substituted for 3350 and 3351. Students planning to pursue an advanced degree in physics should consult the physics undergraduate advisor about appropriate additional courses. Majors in this concentration are strongly encouraged to minor in mathematics.

Astrophysics Concentration. The astrophysics concentration is a variation of the professional concentration as is intended for students who have a particular interest in astronomy and astrophysics. In addition to preparing students for possible employment paths associated with the professional concentration, the astrophysics concentrations will prepare students to pursue graduate study in astronomy or astrophysics. This concentration has the same mathematics requirements as the professional option and very similar physics course requirements (with one less required upper-level PHYS course), but it also includes 14 hours of ASTR courses. Majors in this concentration are strongly encouraged to minor in mathematics and devote time to undergraduate research.

Applied Physics Concentration. The applied physics concentration is a variation of the professional concentration for students who wish to pursue more applied work, such as graduate study or employment in engineering fields. It requires the same coursework as the professional option, with an additional 9 required hours of an applied specialty. Majors in this concentration are strongly encouraged to minor in mathematics and to devote time to undergraduate research.

Secondary Education Concentration. The secondary education curriculum will prepare students for teaching physics and/or mathematics at the secondary education level. It provides a four-year path to certification for teaching at the middle school and high school levels. This concentration will enable a graduate to go directly from a college degree program into teaching math and/or physics at the secondary education level. Students selecting this option should expect to take additional hours of advanced physics coursework if they wish to be well prepared for graduate study in physics or employment as a physicist. Coursework for this concentration includes 12 hours of introductory physics courses, a one-hour field-work course, 12 hours of additional sophomore/junior/senior-level physics courses, 24 hours of mathematics courses, and 27 hours of education courses, all of which apply to the attainment of secondary teacher certification in the math/physics content area.

Minors for Physics Majors. A broad variety of minor subjects may be elected by a student majoring in physics. These include mathematics, biochemistry, physical chemistry, geophysics, computer science, business, and electrical engineering. A frequent minor choice for physics majors is mathematics because the requirements are automatically satisfied by the sequence of math courses required for a physics major. Students contemplating minors outside the College of Arts and Sciences should seek the advice of the physics undergraduate advisor before beginning that minor.

Minor in Physics. A minor in physics by majors outside of physics requires 18 semester hours, at least 6 of which must be at the 3000 level or higher and must be approved by the undergraduate advisor. The minor sequence is PHYS 1408, 2401, and 2402, plus 6 hours of approved 3000-level or above courses. Students must receive a grade of C or better in all courses applied toward a minor. Core astronomy courses (ASTR 1400 and 1401) may not be used to satisfy requirements for the physics major or minor.

Students are encouraged to participate in the Society of Physics Students, which sponsors several academic and social activities.

Graduate Program

For information on graduate programs offered by the Department of Physics, visit the Graduate School section of the catalog on page 131.

Minor in Astronomy. A minor in astronomy by students majoring in subjects other than physics requires 21 semester hours of physics and astronomy courses, at least 9 of which must be at the 3000 or higher level and which must be approved by the undergraduate advisor. The recommended sequence is PHYS 1408, PHYS 2401, PHYS 2402, with additional credits selected from among ASTR 2401, 4301, 4302; PHYS 3302; and undergraduate research (PHYS 3000) in astronomy. Under some circumstances, courses in engineering, geosciences or mathematics with significant astronomy content may be taken in place of the courses listed here.

Course Descriptions

(To interpret course descriptions, see page 23.)

Astronomy (ASTR)

Undergraduate Courses

1100. **Astronomy Laboratory Science (1).** Corequisite: Enrollment in a lab section of the appropriate astronomy course. For transfer students only. Provides lab credit for a transferred lecture-only. Natural sciences core course in astronomy.
1400. [PPHYS 1304+1104, 1403; ASTR 1304+1104, 1404] **Solar System Astronomy (4).** Covers the sun, planets, moons, asteroids, comets, gravitation, and formation. Partially fulfills core Life and Physical Sciences requirement. (Honors section offered)
1401. [PHYS 1303+1103, 1403; ASTR 1303+1103, 1403] **Stellar Astronomy (4).** Covers stars, star formation, galaxies, and cosmology models. Partially fulfills core Life and Physical Sciences requirement. (Honors section offered)
2401. **Observational Astronomy (4).** Prerequisite: ASTR 1400 or 1401 or consent of instructor. Designed for anyone interested in learning the use of an optical telescope, both visually and for imaging.
4301. **Astrophysics I (3).** Prerequisites: PHYS 2402. Introduction to the tools of astronomy, stellar properties, stellar structure, and stellar evolution.
4302. **Astrophysics II (3).** Prerequisite: ASTR 4301. Structure, formation and evolution of galaxies; cosmology.

Physics (PHYS)

Undergraduate Courses

1100. **Physics Laboratory Science (1).** Corequisite: Enrollment in a lab section of the appropriate physics course. For transfer students only. Provides lab credit for a transferred lecture-only. Natural sciences core course in physics.
1171. **Physics Fieldwork (1).** Interact with public school teachers and students to deliver a limited lesson for students. Texas Tech student will learn and implement a lesson.
1304. **Physics: Basic Ideas and Methods (3).** Intended to provide physics background to pre-engineering students. Examines basic concepts in physics. Problem-solving techniques, graphical representations, and pertinent mathematics.
1401. [PHYS 1305+1105, 1310+1110, 1405] **Physics for Non-Science Majors (4).** 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. Partially fulfills core Life and Physical Sciences requirement.
1402. **Physics of Living Matter (4).** Covers the physics principles found in living matter and techniques useful in biomedical sciences. Not for physics majors.
1403. [PHYS 1301+1101, 1401] **General Physics I (4).** Prerequisite: MATH 1320 or 1451 or 1550. Non-calculus introductory physics covering mechanics, heat, and sound, thus providing background for study in science-related areas. Partially fulfills core Life and Physical Sciences requirement.
1404. [PHYS 1302+1102, 1402] **General Physics II (4).** Prerequisite: PHYS 1403. Non-calculus introductory physics covering electricity, magnetism, light, and modern physics, thus providing background for study in science-related areas. Partially fulfills core Life and Physical Sciences requirement.
1406. **Physics of Sound and Music (4).** 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 labora-

tory sessions. Satisfies natural science requirement in Arts and Sciences. Partially fulfills core Life and Physical Sciences requirement.

1408. [PHYS 2325+2125, 2425] **Principles of Physics I (4).** Prerequisite MATH 1451 or 2323. Calculus-based introductory physics covering mechanics, kinematics, energy, momentum, and thermodynamics. Partially fulfills core Life and Physical Sciences requirement. (Honors section offered)
2305. **Computation for the Physical Sciences (3).** Prerequisite: PHYS 1408 and 2401. Introduces computational tools to solve science problems. Emphasizes interplay between technology application and practical learning. Includes applications for data analysis.
2401. [PHYS 2326+2126, 2426] **Principles of Physics II (4).** Prerequisites: PHYS 1408 and MATH 1452. Calculus-based introductory physics covering electric and magnetic fields, electromagnetic waves, and optics. Partially fulfills core Life and Physical Sciences requirement. (Honors section offered)
2402. [PHYS 2427] **Principles of Physics III (4).** 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).** Prerequisite: PHYS 2402. Deals with topics from astrophysics, cosmology, and cosmic ray physics of interest to all physicists.
3304. **Intermediate Physics Laboratory (3).** Prerequisite: PHYS 2402 and PHYS 2305. 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. (Writing Intensive)
3305. **Electricity and Magnetism (3).** Prerequisite: PHYS 2401 and either MATH 3350 or 3354. Electrostatics, dielectric materials, Maxwell's equations, currents, and magnetostatics.
3306. **Electricity and Magnetism (3).** Prerequisite: PHYS 3305 and either MATH 3351 or 4354. Magnetic properties of materials, electrodynamics, electromagnetic waves, waveguides and resonators, interaction with matter, AC circuits, radiation.
3400. **Fundamentals of Physics (4).** Prerequisites: Education majors only; preference given to EC or HDF5; instructor approval. Teaches the fundamentals of physics and strategies for teaching these fundamentals. Not open to engineering, science, or mathematics majors.
3401. **Optics (4).** Prerequisites: Physics majors only; PHYS 1408 and 2401. Covers geometrical and physical optics, waves, reflection, scattering, polarization, interference, diffraction, modern optics, and optical instrumentation. (Writing Intensive)
4000. **Independent Study (V1-4).** Prerequisite: Approval of advisor. Study of advanced topics of current interest under direct supervision of a faculty member.
4301. **Computational Physics (3).** Prerequisites: PHYS 1408, 2305, 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).** Prerequisites: 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).** 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).** Prerequisite: MATH 3351 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).** 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).** Prerequisites: PHYS 3305 and knowledge of elementary quantum mechanics. The structural,

**Bachelor of Science in Physics:
Astrophysics Concentration**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
Social and Behavioral Sciences*	3	PHYS 1408, Principles of Physics I	4
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
COMS 2300, Public Speaking	3	Creative Arts*	3
TOTAL	14	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
PHYS 2401, Principles of Physics II	4	PHYS 2402, Principles of Physics III	4
MATH 2450, Calculus III	4	MATH 3350, Math for Engr. & Sci. I [†]	3
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
Language, Philosophy, and Culture*	3	Foreign Language [†]	3
Foreign Language [†]	3	ASTR 1401, Stellar Astronomy	4
TOTAL	17	TOTAL	17

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
PHYS 2305, Comput. for Physical Sci. Elective	3	PHYS 4304, Mechanics	3
PHYS 3305, Electricity and Magnetism	3	PHYS 3302, Cosmophysics	3
MATH 3351, Math for Engr. & Sci. II [‡]	3	PHYS 3306, Electricity and Magnetism [§]	3
Multicultural [#]	3	ASTR 2401, Observational Astronomy	4
HIST 2300, History of the U.S. to 1877	3	PHYS 4302, Statistical and Thermal	3
TOTAL	17	TOTAL	16

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ASTR 4301, Astrophysics I	3	ASTR 4302, Astrophysics II	3
PHYS 4307, Quantum Mechanics I	3	PHYS 3304, Intermediate Physics Lab	3
HIST 2301, History of U.S. Since 1877	3	PHYS 4312, Nuclear & Particle Physics	3
2000-Level ENGL	3	2000-Level ENGL	3
TOTAL	12	TOTAL	12

TOTAL HOURS: 120

Astrophysics concentration students are strongly encouraged to minor in mathematics, as assumed in the curriculum above.

* Choose from the university's core curriculum.

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ MATH 3354 and 4354 may substitute for MATH 3350 and 3351.

§ PHYS 3401 (Optics) can be substituted for PHYS 3306.

Choose from the university's Multicultural Requirement list

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).** 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.
- 4371. **Physics as It Is Taught (3).** Discusses the teaching of introductory material. Extends topic coverage into advanced treatments and mathematics. Designed for students seeking teaching certification. (Writing Intensive)
- 4372. **Astronomy as It Is Taught (3).** Discusses solar system, stellar, and galactic astronomy and develops the use of activities in the process of instruction. Designed for students seeking teacher certification.
- 4373. **Math Modeling in Physics (3).** Motivates extensive use of mathematics in the practice of physics and teaching physics. Designed for students seeking teacher certification. (Writing Intensive)

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

**Bachelor of Science in Physics:
Professional Concentration**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
Social and Behavioral Sciences*	3	PHYS 1408, Principles of Physics I	4
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
COMS 2300, Public Speaking	3	Creative Arts*	3
TOTAL	14	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
PHYS 2401, Principles of Physics II	4	PHYS 2402, Principles of Physics III	4
MATH 2450, Calculus III	4	MATH 3350, Math for Engr. & Sci. I [§]	3
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
Foreign Language [†]	5	Foreign Language [†]	3
		Multicultural [‡]	3
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
PHYS 2305, Computation for Phys. Sci.	3	PHYS 4304, Mechanics	3
PHYS 3401, Optics	4	Elective	3
MATH 3351, Math for Engr. & Sci. II [§]	3	PHYS 4302, Statistical & Thermal Phys.	3
PHYS 3305, Electricity and Magnetism	3	PHYS 3306, Electricity and Magnetism	3
		2000-Level ENGL [#]	3
TOTAL	13	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
HIST 2300, History of the U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
PHYS 4307, Quantum Mechanics I	3	PHYS 3304, Intermediate Physics Lab	3
PHYS Elective**	3	PHYS Elective	3
Elective	3	Elective	4
2000-Level ENGL	3	Elective	3
TOTAL	15	TOTAL	16

TOTAL HOURS: 120

Professional concentration students are strongly encouraged to minor in mathematics, as assumed in the curriculum above.

* Choose from the university's core curriculum.

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ Choose from the university's Multicultural Requirement list.

§ May be substituted with MATH 3354 and MATH 4354.

Choose a course that fulfills the Language, Philosophy, and Culture core requirement.

** Physics electives are offered in alternate years. Consult the current *Physics Undergraduate Handbook* at www.phys.ttu.edu for current scheduling.

laboratory setting. Arranged through the department and directly related to degree program.

- 5101. **Seminar (1).** Must be taken by every graduate student for at least the first four semesters. Taken pass/fail.
- 5104. **Instructional Laboratory Techniques in Physics (1).** Laboratory organization and instructional techniques. Must be taken by all teaching assistants when on appointment.
- 5274. **Physics Pedagogy (2).** A course in teaching methods and pedagogy for physics laboratories and recitations.
- 5300. **Special Topics (3).** 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).** 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).** 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).** 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.

**Bachelor of Science in Physics:
Applied Physics Concentration****FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
Social and Behavioral Sciences*	3	PHYS 1408, Principles of Physics I	4
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
COMS 2300, Public Speaking	3	Creative Arts*	3
TOTAL	14	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
PHYS 2401, Principles of Physics II	4	PHYS 2402, Principles of Physics III	4
MATH 2450, Calculus III	4	MATH 3350, Math for Engr. & Sci. I [†]	3
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
Language, Philosophy, & Culture*	3	Foreign Language [†]	3
Foreign Language [†]	3	Multicultural [§]	3
TOTAL	17	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
PHYS 2305, Comput. for Physical Sci.	3	PHYS 4304, Mechanics	3
PHYS 3401, Optics	4	Engineering or Applied Physics Elective [#]	3
MATH 3351, Math for Engr. & Sci. II [‡]	3	PHYS 4302, Statistical and Thermal	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
		2000-Level ENGL	3
TOTAL	13	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
PHYS 3305, Electricity and Magnetism	3	PHYS 3306, Electricity and Magnetism	3
PHYS 4307, Quantum Mechanics I	3	PHYS 3304, Intermediate Physics Lab	3
PHYS Elective**	3	Engineering or Applied Physics Elective**	3
Engineering or Applied Physics Elective [#]	3	PHYS Elective**	3
2000-Level ENGL	3	Elective	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

Applied physics concentration students are strongly encouraged to minor in mathematics, as assumed in the curriculum above.

* Choose from the university's core curriculum.

[†] A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

[‡] MATH 3354 and MATH 4354 may substitute for MATH 3350 and 3351.

[§] Choose from the university's Multicultural Requirement list. Choose a course that also fulfills the core Social and Behavioral Sciences requirement.

[#] These courses should be selected in consultation with, and approved by, the physics undergraduate advisor.

** Physics electives are offered in alternate years. Consult the current *Physics Undergraduate Handbook* at www.phys.ttu.edu for current scheduling.

- 5304. Solid State Physics (3).** 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).** 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).** 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).** 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.

**Bachelor of Science in Physics:
Physics/Math Secondary
Education Concentration****FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
MATH 1451, Calculus I	4	PHYS 1408, Principles of Physics I	4
EDSE 2300, Schools, Society, & Diversity	3	MATH 1452, Calculus II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
POLS 1301, American Govt. Org.	3		
TOTAL	17	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
PHYS 2401, Principles of Physics II	4	PHYS 2402, Principles of Physics III	4
MATH 2450, Calculus III	4	MATH 3350, Math for Engr. & Sci. I	3
COMS 2300, Public Speaking	3	PHYS Elective [†]	3
Foreign Language*	3	Foreign Language*	3
PHYS 1171, Physics Fieldwork	1	MATH 4331, Advanced Geometry	3
TOTAL	15	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 3310, Intro. to Math. Reason & Proof	3	EDSE 4322, Diversity & the Classroom	3
2000-Level ENGL	3	MATH 3342, Math. Stats. for Engr. & Sci.	3
POLS 2302, American Public Policy	3	2000-Level ENGL	3
Social and Behavioral Sciences [†]	3	EDSE 4310, School & the Adolescent	3
Creative Arts [‡]	3	PHYS 4373, Math Modeling in Physics	3
		EDLL 4382, Reading & Writing in Second.	3
TOTAL	15	TOTAL	18

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
EDSE 4311, Curriculum Planning	3	EDSE 4330, Capstone for Second. Stud.	3
EDSE 4000, Student Teaching	6	EDSE 4000, Student Teaching	3
Language, Philosophy, & Culture [†]	3	PHYS 4371 or EDSE 4376	3
		PHYS Elective [†]	3
TOTAL	12	TOTAL	12

TOTAL HOURS: 120

* A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

[†] These electives can be any of a number of junior/senior-level physics courses. Students should consult with the physics undergraduate advisor when choosing these electives.

[‡] Choose from the university's core curriculum.

- 5308. Molecular Biophysics (3).** 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).** Study of experimental and computational methods in biophysics. Requires an individual research project. Mandatory for students in biophysics research.
- 5311. Nuclear Physics (3).** 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).** 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).** 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).** Survey of semiconductor materials deposition, characterization, and processing techniques with emphasis on the fundamental physical interactions underlying device processing steps.
- 5335. Physics of Semiconductors (3).** 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).** 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).** Inquiry-based course in elementary physical principles of mechanics, heat, electricity, and magnetism.
- 5372. Astronomy for Teachers (3).** Inquiry-based course in solar system, stellar, and galactic astronomy. Discusses history of human understanding of the universe.
- 5373. Mathematical Modeling of the Physical World (3).** Studies how and why mathematics is used to model physical situations and uses physical examples extensively.
- 5374. Research Experience in Physics (3).** Motivates physics/education research activities. Discusses scientific method, research plans, literature searches, data collection and analysis. Designed for math/science teachers; not allowed for physics majors.
- 6000. Master's Thesis (V1-6).**
- 6002. Master's Report (V1-6).**
- 6304. Condensed Matter Physics (3).** Prerequisite: PHYS 5304. Problems of current interest in condensed matter physics.
- Topics include transport properties in solids, superconductivity, magnetism, semiconductors, and related topics.
- 6305. Statistical Mechanics II: Critical Phenomena (3).** Equilibrium treatments of strongly interacting systems, phase transitions, and critical phenomena; mean field and Landau theories, scaling and critical exponents, renormalization approach, disorder and percolation.
- 6306. Advanced Electromagnetic Theory (3).** 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).** 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).** 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).**
- 8000. Doctor's Dissertation (V1-12).**

Department of Political Science

Dennis Patterson, Ph.D., Chairperson

Professors: Dometrius, Khan, Lee, Mayer, Patterson

Associate Professors: Barkdull, Hamilton, Hayhoe, Kwon, Lektzian, McKee, McKenzie, Murray, Nokken, Rider, Thames

Assistant Professors: Bak, Forbis, Gittner, Lewis (visiting), Meserve, Ostrander, Steele

CONTACT INFORMATION: 113 Holden Hall, Box 41015, Lubbock, TX 79409-1015, T 806.742.3121 F 806.742.0850, www.depts.ttu.edu/politicalscience

About the Program

This department supervises the following degree programs and certificate:

- Bachelor of Arts in Political Science
- Bachelor of Science in Global Studies*
- Master of Arts in Political Science
- Master of Public Administration
- Doctor of Philosophy in Political Science
- Graduate Certificate in Strategic Studies

Dual Degree Program

- Master of Public Administration/Doctor of Jurisprudence

The department also participates in the Bachelor of Arts in Languages and Cultures with a specialization in Russian Language and Area Studies; a minor in women's studies; Honors College programs; and Arts and Sciences minors in urban studies, international studies, ethnic studies, and Asian studies.

* See page 197 for a sample curriculum table.

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 to 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 31 hours of coursework within the department. Political science majors are required to take POLS 1301, 2302, 3410, 3361,

3371, and 15 hours of upper-level POLS courses (must include 6 hours of writing intensive 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.

Graduate Program

For information on graduate programs offered by the Department of Political Science, visit the Graduate School section of the catalog on page 132.

Minor. The requirement for a minor in political science is 18 hours, including POLS 1301 and 2302. Political science minors are also required to take either POLS 3361 or 3371 plus 9 hours of upper-level POLS courses.

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.

Writing Intensive Requirement. All majors are required to take 6 hours of writing intensive courses. Each semester the department designates two or more 3000-level courses as Writing Intensive under the university's policy of writing intensive requirements. The designation is not visible in the catalog course description because the courses change each semester, but the designation is visible in the Banner online schedule and course attributes. The department and the Dean of Arts and Sciences Student Division have a list of the writing intensive POLS courses for reference. For questions about the writing intensive requirements or courses in the department, contact a departmental advisor.

Selected Topics Courses. Multiple sections of POLS 3300 and 3301 are offered each semester with varying topics of contemporary interest. These courses are repeatable for credit up to four times each (totaling 12 hours). In order to apply to a student's major or minor, these courses must each cover different topics, as indicated by the course title found online each semester. Additionally, for students to grade replace either course, the topics must be the same.

Accelerated Bachelor's-to-Master's Degree Programs. The department offers the following two accelerated bachelor's-to-master's programs.

- For the B.A./M.A. in Political Science, undergraduate political science majors may apply for admission to the 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.
- The 153-hour B.A. in Political Science/M.P.A. is open only to seniors who have a GPA of 3.5 or higher in their major courses. Students must apply for this program in their junior year. They will then take 9 hours of graduate public administration courses in their senior year that will count for both the undergraduate and graduate M.P.A. requirements.

For more information about either accelerated program, contact the undergraduate advisor at pols.advising@ttu.edu or visit the department.

Internships in Political Science. Political science majors and minors may receive up to 9 hours of POLS credit toward their major or minor during a long semester (or during a full summer session) when they complete the congressional internship program offered through the Office of the President. Alternatively, students who secure internships individually are eligible to be awarded upper-level political science credit with permission from the undergraduate director. Students must complete the appropriate POLS internship coursework in conjunction with the approved internship. Approved internships vary but have historically included internships working in legislative offices, on political campaigns, in law offices, and with non-profit organizations.

Course Descriptions

(To interpret course descriptions, see page 23.)

Political Science (POLS)

For Writing Intensive courses in the Department of Political Science, please contact a departmental advisor.

Undergraduate Courses

- 1301. [GOVT 2305] American Government, Organization (3).** Constitutions and organization of the governments of the United States, the states in general, and Texas in particular. Partially fulfills core Government/Political Science requirement.
- 2107. Federal and Texas Constitutions (1).** Prerequisite: Consent of instructor. A study of the United States and state constitutions with emphasis on Texas. Ensures compliance with TEC 51.301.
- 2302. [GOVT 2306] American Public Policy (3).** 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. Partially fulfills core Government/Political Science requirement.
- 3300. Selected Topics in Political Science (3).** Prerequisite: POLS 1301. Topics of contemporary interest, varying from semester to semester. Consult the department for current topic. Repeatable up to 12 hours with different topics. Note that to grade replace this course, the topics must be the same.
- 3301. Selected Topics in International Relations (3).** Prerequisite: POLS 1301. Varying global and international topics of current interest. Consult department for current topic. Repeatable for

Bachelor of Arts in Political Science

FIRST YEAR

Fall		Spring	
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
PHIL 2310 or MATH*	3	PHIL 2310 or MATH*	3
IS 1100, Freshman Seminar	1	Language, Philosophy, & Culture*	3
TOTAL	13	TOTAL	15

SECOND YEAR

Fall		Spring	
POLS 3371, Comparative Politics	3	POLS 3361, International Politics	3
Foreign Language (2000 level)†	3	Foreign Language (2000 level)†	3
2000-Level ENGL Literature	3	2000-Level ENGL Literature	3
Creative Arts*	3	Life and Physical Sciences*	4
Personal Fitness and Wellness	1	Personal Fitness and Wellness	1
Elective	3		
TOTAL	16	TOTAL	14

THIRD YEAR

Fall		Spring	
POLS Writing Intensive Course	3	POLS Jr/Sr Course	3
Oral Communication*	3	POLS 3410, Intro. to Political Analysis	4
Life and Physical Sciences*	4	Elective	3
Social & Behavioral Sciences*	3	Minor‡	6
Minor‡	3		
TOTAL	16	TOTAL	16

FOURTH YEAR

Fall		Spring	
POLS Writing Intensive Course	3	POLS Jr/Sr Course	3
Minor‡	3	POLS Jr/Sr Course	3
Language, Philosophy, & Culture*	3	Minor‡	3
Creative Arts*	3	Minor‡	3
Elective or Minor (if needed)	3	Multicultural§	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

40 hours must be at the junior/senior level; 6 hours must be writing intensive in the major.

* Choose from the university's core curriculum.

† A student must complete 6 hours at the sophomore level or above in a single language.

The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ Minors can be 18-22 hours and may have prerequisites that change the order of this plan.

§ Choose from the university's multicultural list.

up to 12 hours with different topics. Note that to grade replace this course, the topics must be the same.

- 3312. Game Theory (3).** Prerequisite: POLS 1301. Introduces students to positive political theory through games of strategy so students can discuss the problems of contemporary democracy and international relation.
- 3317. Campaigns and Elections (3).** Prerequisite: POLS 1301. Examines what candidates and campaigns think and do to attract the support of voters.
- 3318. Public Opinion (3).** Prerequisite: POLS 1301. Examines the origins, stability, and meaning of public opinion.
- 3319. Political Behavior (3).** Prerequisite: POLS 1301. Examines the actions of political citizens as they interact with the political world through voting, joining political parties, and consuming mass media.
- 3323. Legislation (3).** Prerequisite: POLS 1301. Factors involved in the framing and enactment of statutory law with emphasis upon the work of the Congress of the United States.
- 3325. Political Parties (3).** Prerequisite: POLS 1301. Party history, functions, organization, finance, nominations, campaign methods, and elections.

- 3326. Women in Politics (3).** Prerequisite: POLS 1301. A study of female political participation in the United States, including voting, campaign activity, interest group activity, and office holding. (WS 3326)
- 3327. The American Presidency (3).** Prerequisite: POLS 1301. The presidency, its constitutional basis, structure, powers, functions, and responsibilities.
- 3339. Religion and Politics (3).** Prerequisite: POLS 1301. Exploration of various aspects of the relationship between major world religions and politics, including questions of church and state.
- 3341. The Administrative Process (3).** Prerequisite: POLS 1301. A survey of the field of public administration. Principles of administrative organization; distribution of administrative functions together with the structure of government charged with the carrying out of public policy.
- 3346. Public Policy Analysis (3).** Prerequisite: POLS 1301. The study of public policy formulation, implementation, and evaluation at various levels of government. Particular focus on health, social, and development policies. Attention to policy analysis skills and approaches used in government and consulting.
- 3351. The Judicial Process (3).** Prerequisite: POLS 1301. Analysis of the judicial process as part of the political process; judicial personnel and organization; sources and instruments of judicial power; judicial reasoning and behavior; and impact of judicial activity.
- 3352. Constitutional Law—Powers (3).** Prerequisite: POLS 1301. A case study of American constitutional law emphasizing constitutional bases of governmental power. Leading cases demonstrating the principles of separation of powers, judicial review, taxation, commerce, and implied powers.
- 3353. Constitutional Law—Limitations (3).** Prerequisite: POLS 1301. Primarily a case study of American constitutional law emphasizing the constitutional limitations on government, with particular emphasis on personal, civil, and political liberties. The administrative process with particular emphasis on public law relating to the powers and procedures of administrative agencies having powers of adjudication and rule making.
- 3360. United States Foreign Policy (3).** Prerequisite: POLS 1301. Examines the patterns and processes that shape U.S. foreign policy.
- 3361. International Politics (3).** Prerequisite: POLS 1301. Introduction to global issues, actions and processes: north-south relations, post-cold war issues, the role of the state, and leading theories of international relations.
- 3363. International Organization (3).** Prerequisite: POLS 1301. A comparative study of the major organizations of the League of Nations and the United Nations; approaches to peaceful settlement of disputes, collective security, disarmament, regional organizations, and the future of world order.
- 3364. Comparative Foreign Policy (3).** Prerequisite: POLS 1301. Prerequisite: POLS 1301. Surveys theories that connect domestic politics with foreign policy and applies them to a variety of countries.
- 3365. War and Security (3).** Prerequisite: POLS 1301. Considers the basic problem in international relations; how to survive. How do countries attempt to secure themselves against foreign threats?
- 3366. International Political Economy (3).** Explores interaction of politics and economics in trade, investment, finance, and development.
- 3368. Transnational Issues (3).** Prerequisite: POLS 1301. Survey of current politics of human rights, migration, environment, and technological change.
- 3371. Comparative Politics (3).** Prerequisite: POLS 1301. The primary institutions (e.g., parties, groups, executives, legislatures) and processes (e.g., voting, instability) of politics as well as relevant social structures are viewed in various national settings. Questions of how and why to compare also are considered.
- 3372. Post-Communist Politics (3).** Prerequisite: POLS 1301. Examination of the politics and governments of post-Communist states.
- 3373. Governments of Western Europe (3).** Prerequisite: POLS 1301. 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.
- 3375. South American Governments (3).** The government and politics of countries such as Argentina, Bolivia, Brazil, Chile, and Peru. Includes consideration of special problems such as land tenure and terrorism.
- 3376. Asian Governments and Politics (3).** Prerequisite: POLS 1301. Political culture, party systems, political structure, policy-making, and foreign policy in selected Asian countries. Primary attention focused on Japan, China, and South Korea.
- 3410. Introduction to Political Analysis (4).** Prerequisite: POLS 1301. 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.
- 4000. Active Learning in Political Science (VI-3).** Prerequisites: POLS 1301 and consent of instructor. Encompasses various forms of participatory learning, including internships and service learning. May be repeated for credit.
- 4001. Practicum in Politics: Public Service Systems and Policies (VI-3).** Supervised internship with government offices and agencies, including primarily congressional and legislative offices in Washington, D.C.; Austin, Texas; and Lubbock, Texas. Requires approval for participation in university program by the TTU Office of the President.
- 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).** Prerequisites: 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).** 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).** 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).** Advanced study in subjects relevant to an understanding of how the political process is affected by the environment of politics.
- 5324. The Executive (3).** Study of the executive branch of government in the United States, with particular emphasis on the presidency.
- 5325. The United States Congress (3).** 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).** Problems in American government and politics. Varying topics from semester to semester.
- 5356. Judicial Behavior (3).** Political analysis of actors in the judicial decision-making arena.
- 5360. Pro-Seminar in International Relations (3).** 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).** Survey of contending theories of world politics focusing on those that emphasize interdependence, democratization, transnationalism, nonstate actors, and the potential for system transformation.
- 5363. International Organization (3).** 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).** Intensive research on topics in international relations. Subjects vary.
- 5367. International Political Economy (3).** 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).** Examines how states maintain their security in a dangerous world.
- 5370. Pro-Seminar in Comparative Politics (3).** 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).** 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).** Studies in comparative politics, with topics varying from semester to semester.
5381. **Research Design (3).** Design and execution of political research.
5382. **Data Analysis (3).** Techniques of analyzing political data, including descriptive and inferential statistics and computer applications. (PUAD 5320)
5383. **Advanced Quantitative Research Methods in Political Science (3).** 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).** 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.
5395. **Practicum in Survey Research (3).** Prerequisites: POLS 5381, 5382, 5383, and consent of instructor. Introduces students to the operation and management of a survey research lab.
5396. **Research Practicum in International Relations (3).** 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).** 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)

Graduate Courses

5310. **Capstone: Practicum in Public Administration (3).** Prerequisite: To be taken during final semester unless an exception is granted. Applied research paper requiring students to use concepts from their M.P.A. courses to analyze, synthesize, and formulate recommendations that address a real-world public administration problem or policy issue. Requires oral presentation. (Graded on pass/fail basis)
5319. **Research Methods in Public Administration (3).** Issues and techniques in data collection, analysis, and management for evaluating programs. Focus on research design, measurement, and decision-making in public organizations.
5320. **Program Evaluation and Quantitative Analysis (3).** Introduction to techniques of analyzing public policies, including descriptive and inferential statistics and computer applications. (POLS 5382)
5322. **Planning and Management of Weather and Climate Risks (3).** Students learn about the hazards faced by human and natural systems that are caused by weather and climate-related risks and how to develop a risk-management plan.
5323. **The Science and Policy of Climate Change (3).** Discussion of the evidence for human-induced climate change, impacts of climate change on people and the planet, and possible solutions to this global problem.
5324. **Energy, Climate, and Sustainability (3).** Students learn the political and administrative dynamics of U.S. energy, climate, and sustainability law policy.
5325. **Analysis and Application of Climate Data (3).** Students learn to incorporate appropriate climate inputs into a wide range of quantitative applications. Fluency in advanced programming language (e.g., R, MatLab) required
5326. **Information Technology in Public Administration (3).** 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).** 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).** 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).** 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).** 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).** Introduction to competing theoretic explanations of U.S. public policy making. Explores interactions between institutional actors, logic of administrative structure and delegated authority, and bureaucratic discretion.
5342. **City Management (3).** The political implications and administrative functions of city government are examined. Contemporary issues of municipal management are emphasized.
5343. **Public Personnel Administration (3).** Description and analysis of the personnel function in public and nonprofit agencies.
5344. **Public Budgeting (3).** Political and economic aspects of the budgetary process as the central mechanism for public resource allocation and executive planning.
5345. **Administrative Ethics and Leadership (3).** Apply major frameworks to diagnose organizational problems and to exercise leadership when resolving ethical dilemmas and leading organizational change.
5346. **Public Financial Management (3).** 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).** 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).** Special studies on subjects in public administration. Topics will vary from semester to semester.
5352. **Public Policy Analysis (3).** Prerequisite: PUAD 5319, 5320 or instructor consent. 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.
5364. **Comparative Effectiveness and Quality Improvement of Healthcare Systems (3).** Prerequisite: PUAD 5319. An in-depth understanding of healthcare delivery systems through comparisons of U.S. and other country's healthcare delivery systems and QI and CER methods.

Modern Conflict, Diplomacy, and Reconciliation (MCDR)

Graduate Courses

5300. **Foundations of Strategic Studies (3).** 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).** Prerequisite: B or better in MCDR 5300. 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).** Prerequisite: B or better in MCDR 5300. 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.

Department of Psychological Sciences

Lee Cohen, Ph.D., Chairperson

John G. Skelton, Jr. Regents Endowed Professor: Morgan

Presidential Endowed Chair: Tang

Professors: Clopton, Cogan, Cohen, Delucia, Marshall, Richards, Taraban, Young

Associate Professors: Borrego, Cook, Cukrowicz, Epkins, Garos, Gorman, Jones, Klein, Mumma, Robitschek, Serra

Assistant Professors: Alquist, Brown, Davis, Hohman, Ireland, Littlefield, Parent, Piña-Watson, Talley, Van Allen

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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 General Experimental Psychology
- Master of Arts in Psychology
- Doctor of Philosophy in General Experimental Psychology
- Doctor of Philosophy in Clinical Psychology
- Doctor of Philosophy in Counseling 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 Psychology or the Ph.D. in 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 General 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, 2400, and 3401 (with 2400 as a prerequi-

site). All majors also must select at least one course from each of six groups:

GROUP 1, Learning and Cognition: PSY 3317, 4323, 4324, or 4327.

GROUP 2, Individual Differences, Personality, and Social Processes: PSY 3304, 3306, or 3398.

GROUP 3, Biological Bases of Behavior: PSY 3327, 4325, or 4332.

GROUP 4, Developmental Bases in Behavior: PSY 2301, 2305, 3318, or 4301.

GROUP 5, Applied Professional Psychology in Community and Practice Settings: PSY 3334, 4302, 4326, 4334, or 4384.

GROUP 6, Additional Courses in Psychology: PSY 3301, 3310, 3341, 4000, 4300, 4305, 4310, 4320, 4336, 4343, 4344 or 4380.

The required number of hours for the major is 35, including two writing intensive courses in psychology. Courses designated as writing intensive are PSY 3301, 3318, 3401, 4300, 4310, 4320, and 4336. Other courses are designated as writing intensive on a rotating basis. The writing intensive courses must be taken at Texas Tech

Bachelor of Arts in Psychology: Sample Curriculum

FIRST YEAR			
Fall		Spring	
PSY 1300, General Psychology	3	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Oral Communication†	3
MATH 1300 (or above)	3	HIST 2301, History of U.S. Since 1877	3
HIST 2300, History of the U.S. to 1877	3	POLS 2302, American Pub. Policy	3
POLS 1301, American Govt., Org.	3	PSY 2400, Statistical Methods	3
TOTAL	15	TOTAL	15
SECOND YEAR			
Fall		Spring	
Minor Elective	3	PSY 3401, Research Methods‡	4
English Literature†	3	Life and Physical Sciences Elective†	4
Language, Philosophy, & Culture*†	3	Minor Elective	3
Life and Physical Sciences Elective†	4	English Literature†	3
PSY-Group 2	3	Personal Fitness/Wellness§	1
TOTAL	16	TOTAL	15
THIRD YEAR			
Fall		Spring	
Personal Fitness/Wellness§	1	Foreign Language#	3
Foreign Language#	3	Language, Philosophy, & Culture*†	3
Minor Electives	6	Elective	1
Creative Arts*†	3	PSY-Group 3	3
PSY-Group 4	3	PSY-Group 1	3
TOTAL	16	TOTAL	13
FOURTH YEAR			
Fall		Spring	
PSY Group 6	3	PSY Elective	3
Creative Arts*†	3	PSY Elective	3
PSY-Group 5	3	Minor Elective	3
Minor Elective	3	General Elective	3
Multicultural*†	3	Social & Behavioral Sciences**	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 120 hours

* Some Language, Philosophy, & Culture, Individual and Group Behavior, and Creative Arts electives also fulfill the Multicultural requirement.

† Choose from Arts and Sciences General Degree Requirement list.

‡ PSY 3401 is always writing intensive. An additional 3-hour writing intensive PSY course is also required.

§ Choose from the Personal Fitness and Wellness section of the Arts and Sciences General Degree Requirements.

A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level.

This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

** The other three hours of this requirement are fulfilled by PSY 1300

Graduate Program

For information on graduate programs offered by the Department of Psychological Sciences, visit the Graduate School section of the catalog on page 133.

University. At least 21 hours of the total credits toward the major must be taken from 3000- or 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.

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.

Grades below C in psychology courses will not be acceptable for fulfilling major or minor 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. 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.

Course Descriptions

(To interpret course descriptions, see page 23.)

Psychology (PSY)

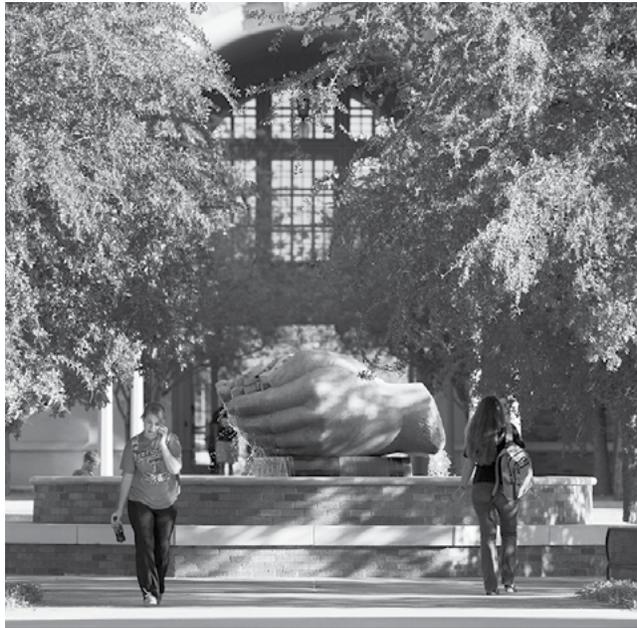
Undergraduate Courses

1300. [PSYC 2301] **General Psychology (3)**. Introduction to fundamental concepts in psychology. Emphasis on the physiological, social, emotional, and environmental determinants of behavior. Fulfills core Social and Behavioral Sciences requirement. (Honors section offered)
2301. [PSYC 2308] **Child Psychology (3)**. A study of the developmental processes and environmental factors that shape the personality and affect the achievement of the child.
2305. [PSYC 2307] **Adolescent Psychology (3)**. 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.
2400. **Statistical Methods (4)**. 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. Partially fulfills core Mathematics requirement (in conjunction with a mathematics course).
3301. **An Introduction to the Psychology of the Arts (3)**. An introduction to various psychological perspectives on artistic production and appreciation. (Writing Intensive – Specific Sections Only)
3304. **Introduction to Social Psychology (3)**. 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)**. Prerequisite: PSY 1300. Principles of normal personality structure.
3310. **Psychology and Religion (3)**. 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.
3318. **The Development of Children's Thinking and Emotion (3)**. Prerequisite: PSY 1300. Considers cognitive development from infancy to adulthood with attention to spatial cognition, concepts, problem solving, language, and emotion. (Writing Intensive)
3327. **Introduction to Physiological Psychology (3)**. 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 Clinical and Counseling Psychology (3)**. 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)**. 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.
3390. **Introduction to Positive Psychology (3)**. Provides an introduction to positive psychology constructs, topics, theories, contexts, and applications.
3398. **Ethnic Minority Psychology (3)**. Prerequisites: PSY 1300 and junior standing. Focus is on the psychosocial aspects that impact the four predominant ethnic minority populations in the United States. Fulfills multicultural requirement. (Writing Intensive)
3401. **Research Methods (4)**. Prerequisites: PSY 3400 and 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 (VI-6)**. Prerequisites: PSY 1300 and instructor consent. 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)**. Prerequisite: Junior standing. Study of human sexual behavior from a psychosocial viewpoint with emphasis on contemporary research methods and findings. (WS 4302) (Writing Intensive – Specific Sections Only)
4301. **Developmental Psychology (3)**. Prerequisite: PSY 1300. An advanced study of the process of development through consideration of data, theories, and contemporary research issues.
4302. **Undergraduate Internship in Psychology (3)**. Prerequisites: Senior standing, instructor consent. 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)**. Prerequisite: PSY 1300. Personality deviations and maladjustments; emphasis on clinical descriptions of abnormal behavior, etiological factors, manifestations, interpretations, and treatments.
4306. **Constructivist and Narrative Psychologies (3)**. Prerequisite: PSY 3401 or instructor consent. Introduction to theories, research, and applications of meaning-making psychologies, including constructivist, narrative, social constructionist, and feminist approaches. (Writing Intensive – Specific Sections Only)
4310. **Abnormal Child Psychology (3)**. Prerequisite: PSY 4305 or instructor consent; junior standing. Description, classification, assessment, treatment, and research methods pertaining to behavioral and emotional disorders of childhood and adolescence. (Writing Intensive)
4323. **Perception: Theories and Applications (3)**. 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)**. 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)**. Prerequisite: C or better in PSY 1300. Survey of psychological factors involved in drug use and an introduction to pharmacotherapy used in treatment of mental illness.
4326. **Human Factors Psychology (3)**. Prerequisite: PSY 3401. Introduction to methods and findings in human factors psychology. Applications of psychological research to designs of machines, environments, and tasks.
4327. **Cognitive Neuroscience (3)**. Prerequisite: PSY 1300. Introduction to functional neuroanatomy, cognitive neuroscience methods, and cognitive neuroscience theory in broad cognitive areas such as attention, perception, memory, language, and decision-making.
4331. **Social Psychology of Groups (3)**. 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)**. Introduces students to the contributions of psychology as a discipline to the understanding of health and illness.
4334. **Introduction to Counseling and Psychotherapy (3)**. 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. (Writing Intensive)
4336. **Research in Personality and Social Psychology (3)**. Prerequisite: Junior or senior standing. In-depth study of selected research areas in personality and social psychology, with special emphasis on scientific writing. (Writing Intensive – Specific Sections Only)
4380. **Intermediate Statistics for Psychologists (3)**. Prerequisite: PSY 3400 and 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)**. 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).
5303. **Developmental Psychopathology (3)**. Prerequisite: Instructor consent. An examination of psychopathology in children, with consideration of the developmental course of various psychological disorders through childhood and adolescence.
5306. **Seminar in Professional Ethics (3)**. A survey of the employment practices and prevailing legal and ethical standards in contemporary professional psychology.
5308. **Vocational Psychology (3)**. Prerequisite: Instructor consent. Review of theories, assessment tools, and interventions in vocational psychology including the integration of vocational issues into psychotherapy.
5311. **Introduction to Psychotherapeutic Intervention and Management (3)**. Prerequisites: C or better in PSY 5338 and instructor consent. Didactic introduction to psychotherapy procedures plus a practicum element.
5312. **Introduction to Child and Adolescent Psychological Treatment (3)**. Prerequisites: PSY 5303 and instructor consent. 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)**. Prerequisites: 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)**. Prerequisite: Admission to counseling psychology doctoral program or instructor consent. Professional identity, research themes and strategies, and ethical standards of counseling psychology. Exploration of theories and techniques of counseling.
5317. **Behavioral Assessment (3)**. Prerequisite: Instructor consent; 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)**. Prerequisite: Admission to clinical psychology doctoral program. Supervised experience in interviewing. A study of different approaches to psychotherapy with adults.
5320. **Research Methods in Social Psychology (3)**. Prerequisite: Graduate standing in psychology or instructor consent. Examines experimental, quasi-experimental and correlational methodologies in social psychology. Focuses on principles that guide research and development of skills to conduct and evaluate research.
5323. **Group Counseling and Psychotherapy (3)**. Prerequisites: PSY 5002, 5311, and instructor consent. Designed to provide theories of approaches to group work and a personal experience with group processes. Various points of view will be studied.
5327. **Social Psychology and Emotion (3)**. Prerequisite: Graduate standing in psychology and PSY 3304 or instructor consent. Coverage of current and classic studies in social psychology and emotion with attention to the role of emotion in social psychological processes.
5328. **Seminar in Social Psychology (3)**. 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)**. 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)**. Prerequisite: PSY 3304 or equivalent. Advanced study of the formation, organization, and change of social attitudes. Emphasis on current theory and research.
5332. **Constructivist and Narrative Therapies (3)**. 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)**. Prerequisites: 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)**. Prerequisite: PSY 5316. Consideration of theories of psychotherapy with

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)**. Prerequisites: 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)**. Prerequisites: 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)**. An overview of teaching methods as applied to the teaching of Psychology in the college classroom. Graded pass/fail.
5105. **Supervision and Consultation Seminar (1)**. Prerequisites: At least 10 hours of PSY 5002 or consent of the instructor. Provides an overview of theory and research relevant to clinical supervision and consultation.
5205. **Supervision Practicum (2)**. Prerequisite or corequisite: PSY 5105. Introduction to the process of clinical supervision and practice of the skills used in supervision. Provides an opportunity to supervise beginning-level therapists.
5301. **Biological Bases of Psychological Function (3)**. Current scientific knowledge of biological aspects of behavior and psychological function, including their history, research methods, and application to experimental and therapeutic research problems.
5302. **Lifespan Development (3)**. Prerequisite: Graduate standing in the department or instructor consent. Overview of norma-



- adults. Discussion of professional issues and problems related to the area of counseling psychology.
5335. **Group Processes and Intergroup Relations (3)**. Explores the processes that occur within and between groups, e.g., social identity, social exclusion, and prejudice. Emphasis is on current theory and research.
5338. **Seminar in Psychopathology (3)**. Prerequisite: Graduate standing in the department or instructor consent. A survey of theoretical perspectives and research findings concerning the causes, diagnosis, and treatment of psychopathology.
5340. **Automaticity and Control in Social Behavior (3)**. 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)**. Prerequisite: PSY 5347 (concurrent enrollment allowed) or instructor consent. Survey of methods and approaches to research in these areas.
5350. **History and Systems of Psychology (3)**. 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.
5354. **Seminar in Perception: Theories and Applications (3)**. 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 and Cognitive Neuroscience (3)**. Survey of research on human mental activities such as memory, concepts, language processing, problem solving, and decision making, with emphasis on cognitive and neural models.
5357. **Seminar in Psycholinguistics (3)**. 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.
5358. **Seminar in Metacognition (3)**. Overview of theories, concepts, empirical findings and philosophical writings about metacognition (“thinking about thinking”). Contexts include learning, memory, reading, social interactions, aging and animals.
5367. **Analysis of Repeated Measures and Intensive Longitudinal Designs (3)**. Prerequisites: B or better in PSY 5447 and 5480 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)**. 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)**. 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)**. 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)**. 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)**. 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.
5384. **Psychology and the Law (3)**. Survey of the interface between psychology and law including topics in forensic psychology, expert testimony, and psychologists’ influence in policy legislation.
5396. **Multicultural Counseling (3)**. 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)**. Course focuses on research and clinical issues related to mental health services for ethnic minority populations and establishing community prevention-intervention programs.
5404. **Practicum in Intelligence Testing (4)**. Prerequisite: Instructor consent. 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.
5409. **Clinical Neuropsychology (4)**. Prerequisites: PSY 5304, 5338, and doctoral standing in psychology. Foundational course in brain-behavior relationships, neuropathology for neuropsychologists, neuropsychological assessment, and other clinical applications.
5447. **Advanced Correlational Methods and Factor Analysis (4)**. Prerequisite: Instructor consent. Comprehensive survey of multivariate analysis including multiple correlation and factor analysis and other correlational techniques. Review of analysis of co-variance.
5448. **Advanced Multivariate Analysis for Psychologists (4)**. Prerequisite: PSY 5447. Covers topics in multivariate analysis, including canonical correlation, multiway frequency tables, MANOVA, profile analysis, discriminant analysis, logistic regression, and time series analysis.
5460. **Structural Equation Modeling for Psychologists (4)**. Prerequisites: PSY 5447 and 5480 or equivalent. Advanced statistics course focusing on structural equation modeling, confirmatory factor analysis, and path analysis.
5465. **Categorical Data Analysis (4)**. Prerequisites: PSY 5447 and 5480 (or equivalents). Analysis of categorical variables, including contingency table analysis, linear regression models, and repeated-measure designs.
5480. **Experimental Design (4)**. Prerequisite: Graduate majors and instructor consent. Logical principles governing sound experimentation: conventional designs using analysis of variance. Introduction to complex analysis of variance designs and trend tests.
5485. **Psychometric and Item Response Theory (4)**. Prerequisites: PSY 5447 and 5480 (or equivalents). Overview of psychometric theories and concepts in the field of psychology and related disciplines.
5490. **Computer Modeling: Applied Analysis and Simulation (4)**. Prerequisites: PSY 5447 and 5480 (or equivalents). Computational and simulation-based methods to develop principled solutions to novel data analytic problems.
5495. **Hierarchical Linear Modeling (4)**. Prerequisites: PSY 5447 and 5480 (or equivalents). Instruction in interpreting and conducting research in the field of psychological sciences using hierarchical linear modeling.
5496. **Qualitative Research Methods and Analysis (4)**. Prerequisites: PSY 5447 and 5480 (or equivalents). Introduces students to the ethical, philosophical, and methodological considerations for qualitative research in the field of psychology.
6000. **Master’s Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor’s Dissertation (V1-12)**.

Department of Sociology, Anthropology, and Social Work

Brett A. Houk, Ph.D., Chairperson

Professors: Dunn, Koch, Paine, Roberts, Williams

Associate Professors: Bradatan, Dunham, Elbow, Houk, Lowe, Morrow, Ramirez, Schneider, Smitley, Walter

Assistant Professors: Flores-Yeffal, Jordan, Maloney

Assistant Professors of Practice: Lindquist, Phelps

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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
- Master of Social Work

In addition, the department participates in the Women's Studies, Community and Urban Studies, Ethnic Studies, Environmental Studies, Family Life Studies, Religion Studies, and Asian 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

Sociology is the study of groups in society and individuals in those groups. Areas of specialization and faculty expertise include criminology and delinquency, intimate relationships and families, race and ethnicity, inequality, gender, aging, social psychology, medical sociology, 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, law enforcement, government, international development, medicine, and social services. The department also offers a criminology concentration for sociology majors who wish to specialize in this area. Courses in sociology fulfill core curriculum requirements in the social and behavioral sciences and multicultural core requirements in the College of Arts and Sciences and the university.

A student majoring in sociology must complete 30 hours in sociology, 24 of which must be upper-division courses (3000 or 4000). At least 6 hours of the College of Arts and Sciences general education requirements must be upper-division. A maximum of 9 hours of transfer credit may be accepted for the major. Core course requirements are as follows:

- SOC 1301, 3391, and 3392.
- Either SOC 3393 or 3394. Student expecting admission to graduate work in sociology should take both of these courses.

Criminology Concentration. Criminology is the sociological study of law-making, law-breaking, and social control. Sociology majors who wish to specialize in the study of criminology and receive the notation "Criminology Concentration" on their transcripts are required to complete the core course requirements for the sociology major plus the additional requirements as follows:

- Two core courses, both of which must be taken: SOC 3327 and 4325.

Graduate Program

For information on graduate programs offered by the Department of Sociology, Anthropology, and Social Work, visit the Graduate School section of the catalog on page 134.

- Four alternate upper-division courses to be chosen from SOC 2333, 2335, 3326, 3333, 3335, 3368, 3383, 4327; ANTH 2308, 3303, 4320, 4343; PSY 4384.
- Two upper-division SOC electives.

The sociology major with a concentration in criminology requires a total of 36 hours of sociology and/or approved courses in the above related areas.

Minor. Students minoring in sociology must complete 18 hours of sociology, including SOC 1301.

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 or corequisite that is recommended for all advanced courses is SOC 1301 or consent of instructor, unless otherwise indicated in the course description.

Anthropology Program

The anthropology program reflects the broad scope of the discipline, including the three areas of archaeology, ethnology, and physical anthropology. International and/or regional field schools in all three areas are highlights of the curriculum, and well-equipped laboratory facilities support faculty and student research in all three subfields.

A student majoring in anthropology must complete 34 semester hours in anthropology, including 10 hours of introductory-level coursework, 3 hours of theory, 9 hours of foundational courses, and 12 hours of electives. The introductory courses include ANTH 2100, 2300, 2301, and 2302. All majors are required to take ANTH 3316 as the theory course. Students are also required to take a foundational course in each subfield: ANTH 3310 or 3311 (physical anthropology); ANTH 3339 (ethnology); and ANTH 3343, 3344, 3347, 3348, or 3350 (archaeology). The remaining 12 hours are upper-division elective courses within the program. Students must complete two writing intensive courses within the discipline. A maximum of 9 hours of transfer credit may be accepted for the major. With prior departmental approval, 3 advanced hours in a related discipline may be counted toward the major. Anthropology majors must make a grade of C or better in each ANTH course. Up to 6 hours of individual studies and 6 hours of field courses may be credited to the major.

Forensic Anthropology Concentration. The department offers a concentration in forensic anthropology for students seeking the notation "Forensic Anthropology Concentration" on their transcripts. The concentration requires five 3-hour courses (15 hours) with a grade of C or better from the two following groups:

- ANTH 3303, 3314, 4343 (required core courses)
- One course chosen from ANTH 3350, 4320, 4341
- One course chosen from ANTH 2308, 3350, 4320, 4341; GIST 3300; GEOG 3301 (if you have not already taken the course)

The anthropology major with a concentration in forensic anthropology requires a total of at least 34 hours of anthropology courses. Students must receive a grade of C or better in each course that counts toward the forensic anthropology concentration. The minimum prerequisites recommended for all advanced courses are ANTH 2100 and 2300 or consent of instructor.

Minor. 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. Students seeking a minor in anthropology must make a grade of C or better in each ANTH course.

Anthropology courses provide distribution credit in three areas of the core curriculum (language, philosophy, and culture; social and behavioral sciences; and life and physical sciences) as well as the university's multicultural requirement. 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 is accredited by the Council on Social Work Education (CSWE). Graduates of this program are eligible to sit for the corresponding national exam with the Association of Social Work Boards, one requirement for licensing in Texas and many other states. The curriculum is based on the generalist social work model, which is intended to prepare graduates for entry-level work in a wide variety of social work settings with diverse populations. For those interested in pursuing their social work education at the master's level, the bachelor's in social work provides the advantage of making the student eligible for advanced standing in most graduate schools of social work.

Social Work Major. Social work majors are expected to complete the core curriculum requirements of the university, the General Degree Requirements of the College of Arts and Sciences, 30 hours of structured social work classes (SW 1300, 2301, 3311, 3312, 3331, 3332, 3333, 3339, 4311, 4340), the 6-hour social work field placement (SW 4611), an 18-hour minor, and the following adjunct requirements:

- Human Biology (before or with SW 3312) – Choose BIOL 1402 or ANTH 2300/2100 or a combination of both BIOL 1403 and 1404 or a combination of both ZOOL 2403 and 2404.
- Statistics or research methods (before SW 3339) – Choose SOC 3391, MATH 2300, or PSY 3400.

Freshmen can refer to the sample curriculum table for the Bachelor of Arts in Social Work for an example of course sequencing, while more advanced students interested in the degree should keep in mind that at least four long semesters are required to complete the social work curriculum.

Candidacy in the Social Work Program. A student must apply and be approved for candidacy to be able to take social work practice courses (SW 3332, 3333, 4340, and 4611). Applications for candidacy will be reviewed by the social work faculty to ensure that the student is in good standing (refer to the section below) and has completed SW 1300, 2301, 3311 and 3312 with a grade of C or better in each and at least a 2.5 GPA in SW classes.

Good Standing. Students may continue as social work majors as long as they remain in good standing. 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.
- Demonstrate a high level of engagement in social work classes. A highly engaged student misses class rarely, pays attention to the class lecture and activities, participates in discussion and group work, completes all readings, and spends an appropriate level of effort and length of time on assignments.
- Maintain a minimum 2.5 GPA in social work (SW) courses.

These behaviors demonstrate to the faculty (the profession's gatekeepers) the level of a student's interest and dedication to social work, as well as professionalism. Failure to remain in good standing

may prevent a student from progressing further in the program, as well as applying for scholarships or filling student positions within the program.

Social Work Field Placement. The field experience allows students to demonstrate their abilities to assess client systems and to apply generalist skills with populations at risk across micro, mezzo, and macro systems. It is a 400-hour, closely supervised individual experience in a social agency selected and certified by the social work program.

An Application for Field Experience must be completed prior to the field placement. Some field sites may have additional requirements, such as background checks or medical testing. Students should refer to the *Social Work Student Handbook* for additional details about the placement process. Professional liability insurance is required during the field placement and payment is the responsibility of the student.

Transfer Students and Transfer Credit. Under the Texas Common Course Numbering System, the College of Arts and Sciences and the social work program typically accept the equivalent of SW 2301, 3311, and 3312 for transfer, especially if from a CSWE-accredited program. However, transfer credit for SW 3331, 4311, 4340, and 4611 will not be accepted. Requests for transfer credit for all other social work courses will be considered on an individual basis. It is the intention of the social work program to avoid repetition of foundational courses taken through CSWE-approved programs. 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. The purpose of the social work minor is to provide an understanding of social work knowledge, values, and perspective. Minors are not eligible for social work licensing upon graduation nor are they given advanced standing status in social work graduate programs. The minor in social work consists of SW 1300, 2301, 3311, 3312, 3331, and either 3339 or 4311 (note that SW 3339 has a prerequisite).

For further information, contact Laura Lowe, Ph.D., LCSW, BASW Program Director, at laura.lowe@ttu.edu or refer to the program website (www.depts.ttu.edu/socialwork/).

Course Descriptions

(To interpret course descriptions, see page 23.)

Anthropology (ANTH)

Undergraduate Courses

- 1301. Understanding Multicultural America (3).** Cultural diversity in the U.S. as studied by anthropologists. Ethnographic descriptions of African-Americans, Hispanics, Native Americans and other groups. Fulfills the state standard requirement in multicultural education for education major and fulfills the university's multicultural requirement.
- 2100. [ANTH 2101, 2401] Physical Anthropology Laboratory (1).** 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 Life and Physical Sciences requirement.
- 2300. [ANTH 2301] Physical Anthropology (3).** Corequisite: ANTH 2100. Topics include human genetics, health, diet, and issues of human and nonhuman primate evolution. Partially fulfills core Life and Physical Sciences requirement.
- 2301. [ANTH 2302, 2401] Introduction to Archaeology (3).** 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 requirement.
- 2302. [ANTH 2346, 2351; HUMA 2323] Introduction to World Cultures and Ethnology (3).** The rich complexity of peoples and cultures in the world as studied by anthropologists. Discus-

**Bachelor of Arts in Sociology:
Sample Curriculum**

FIRST YEAR			
Fall		Spring	
SOC 1301, Introduction to Sociology	3	ENGL 1302, Advanced College Rhetoric	3
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
ENGL 1301, Essentials of Coll. Rhetoric	3	SOC Elective †	3
Life and Physical Sciences*	4	Life and Physical Sciences*	4
		Oral Communication*	3
TOTAL	13	TOTAL	16

SECOND YEAR			
Fall		Spring	
ENGL Literature*	3	ENGL Literature*	3
MATH Elective*	3	MATH Elective*	3
Sophomore Foreign Language‡	3	Sophomore Foreign Language‡	3
Elective	3	HIST 2300, History of the U.S. to 1877	3
SOC Elective	3	SOC Elective (Jr./Sr. Level)	3
Personal Fitness and Wellness*	1	Personal Fitness and Wellness*	1
TOTAL	16	TOTAL	16

THIRD YEAR			
Fall		Spring	
HIST 2301, Hist. of the U.S. Since 1877	3	SOC 3392, Intro. to Social Research II	3
SOC 3391, Intro. to Social Research I	3	Language, Philosophy, & Culture*	3
SOC 3393, Development of Soc. Theory	3	Creative Arts*	3
or SOC 3394, Contemp. Soc. Theory§		Minor	6
SOC Elective (Jr./Sr. Level)	3		
Minor	3		
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
SOC Elective	3	SOC Elective	3
Language, Philosophy, & Culture*	3	Creative Arts*	3
Minor	6	Minor	3
Elective	3	Elective	3
		Elective	2
TOTAL	15	TOTAL	14

TOTAL HOURS: 120

* Select from Arts and Sciences General Degree Requirements. At least 6 hours must be upper-division (3000 or 4000 level).

† Choose from the following lower-level courses (also satisfies core requirement for Social and Behavioral Sciences): SOC 1320, 2324.

‡ A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

§ Either SOC 3393 (fall only course) or SOC 3394 (spring only course)

**Bachelor of Arts in Sociology with a
Concentration in Criminology: Sample Curriculum**

FIRST YEAR			
Fall		Spring	
SOC 1301, Introduction to Sociology	3	ENGL 1302, Advanced College Rhetoric	3
POLS 1301, American Govt. Org.	3	POLS 2302, American Public Policy	3
ENGL 1301, Essentials of Coll. Rhetoric	3	SOC Elective	3
Life and Physical Sciences*	4	Life and Physical Sciences*	4
SOC Elective (Group A)	3	Oral Communication*	3
TOTAL	16	TOTAL	16

SECOND YEAR			
Fall		Spring	
ENGL Literature*	3	ENGL Literature*	3
MATH Elective*	3	MATH Elective*	3
Sophomore Foreign Language †	3	Sophomore Foreign Language †	3
Elective	3	HIST 2300, History of the U.S. to 1877	3
SOC 3327, Sociology of Law & Policing	3	SOC Elective (Group B)	3
Personal Fitness and Wellness*	1		
TOTAL	16	TOTAL	15

THIRD YEAR			
Fall		Spring	
HIST 2301, Hist. of the U.S. Since 1877	3	SOC 3392, Intro to Social Research II	3
SOC 3391, Intro to Social Research I	3	Language, Philosophy, & Culture †	3
SOC 3393, Development of Soc Theory	3	Creative Arts*	3
or SOC 3394, Contemp. Soc. Theory‡		Minor	3
SOC Elective (Group B)	3	SOC 4325, Criminology	3
Minor	3		
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
SOC Elective (Group B)	3	SOC Elective (Group B)	3
Language, Philosophy, & Culture*	3	Creative Arts*	3
Minor	9	Minor	3
		Elective	2
		Personal Fitness and Wellness*	1
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

* Select from Arts and Sciences General Degree Requirements. At least 6 hours must be upper-division (3000 or 4000 level).

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ Either SOC 3393 (fall only course) or SOC 3394 (spring only course)

GROUP A (3 hours)—Choose from the following lower-level courses (also satisfies core requirement for Social and Behavioral Sciences): SOC 1320, 2324.

GROUP B (9 hours)—Choose from the following courses: SOC 2335, 3326, 3335, 3368, 3383, 4327; PSY 4384; ANTH 2305, 3300 (Forensic Sciences), 4343.

- sion of basic concepts such as ethnography, linguistics, and social organization. Fulfills core Social and Behavioral Sciences and multicultural requirements.
- 2304. Global Forces and Local Peoples (3).** 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.
- 2306. Anthropology at the Movies (3).** Examines how anthropology, archaeology, and physical anthropology are portrayed in mainstream movies as a springboard for discussing important topics about culture and science. Fulfills core Language, Philosophy, and Culture requirement.
- 2308. Forensic Sciences (3).** An introductory course focusing on basic principles of criminalistics. Experts from academia and law enforcement will provide guest lectures on specific topics.
- 2315. Introduction to Language and Linguistics (3).** An introductory course in the scientific study of language, including grammatical description and analysis as well as the study of relationships between language and society.
- 3300. Special Topics in Anthropology (3).** Examines selected topics in the discipline of anthropology. Content varies. May be repeated for credit.

- 3303. Forensic Anthropology (3).** Examines the field of forensic anthropology, including osteological assessment of cases, ethics, and courtroom responsibilities.
- 3310. Human Evolution (3).** Prerequisites: 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).** Prerequisites: 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).** 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)
- 3313. Primate Evolution (3).** Introduces the field of primate evolution with attention to primate anatomy. Topics to be covered include non-human primate osteology, living primate anatomy, theories of primate origins, and the fossil record of primates.
- 3314. Human Osteology (3).** Prerequisites: ANTH 2100 and 2300. Detailed study of human bones and teeth to facilitate the field

**Bachelor of Arts in Anthropology:
Sample Curriculum**
FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
Language, Philosophy, & Culture*	3	ANTH 2301, Intro. to Archaeology	3
ANTH 2300, Physical Anthropology	3	ANTH 2302, Intro. to World Cultures	3
ANTH 2100, Physical Anth. Lab	1	ENGL 1302, Advanced College Rhetoric	3
POLS 1301, American Govt. Org.	3	Life and Physical Sciences*	4
ENGL 1301, Essentials of Coll. Rhetoric	3	HIST 2301, Hist. of the U.S. Since 1877	4
HIST 2300, History of the U.S. to 1877	3		
TOTAL	16	TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
POLS 2302, American Public Policy	3	ANTH 3343, Maya Archaeology [‡]	3
ANTH Elective 3000/4000 Level [†]	3	Language, Philosophy, & Culture*	3
MATH 1330, Intro. Math. Analysis I	3	MATH 2300 or 2345	3
COMS 2300, Public Speaking	3	ENGL Literature*	3
Foreign Language [†]	3	Foreign Language [†]	3
Personal Fitness and Wellness	1	Personal Fitness and Wellness	3
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ANTH 3316, Anthropological Theory	3	ANTH Elective 3000/4000 Level [†]	3
ANTH 3310, Human Evolution	3	ANTH 3339, Methods in Study of Culture	3
Creative Arts*	3	Elective	3
Minor	3	Minor	3
ANTH Elective 3000/4000 Level [†]	3	Minor	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ANTH Elective 3000/4000 Level*	3	Elective	1
Elective	3	Minor	6
Minor	3	Elective	3
Creative Arts*	3	ENGL Literature*	3
TOTAL	12	TOTAL	13

TOTAL HOURS: 120

* Select from Arts and Sciences General Degree Requirements. t least 6 hours must be upper-division (3000 or 4000 level).

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ Choose from ANTH 3300, 3304, 3312, 3313, 3320, 3331, 3335, 3341, 3342, 3343, 3347, 3348, 3350, 4310, 4320, or 4341. Anthropology majors are required to take 12 hours of upper-division (3000 or 4000m level) ANTH electives.

ANTH 2306 satisfies Language, Philosophy, and Culture requirement.

ANTH 2302 fulfills the Social and Behavioral Sciences and Multicultural requirements.

- identification of intact and fragmentary specimens. Includes basic identification of age and sex.
- 3316. Anthropological Theory: Understanding Language and Culture (3).** Prerequisite: C or better in ANTH 2302. Overview of history and development of anthropological theory. Explores theoretical debates within the fields of cultural anthropology, linguistics, and archaeology. (Writing Intensive).
- 3317. Food and Culture (3).** Explores cross-cultural variation in foodways, examining how groups utilize food to express their cultural identities. Topics include food taboos, feasting, and regional cuisines.
- 3320. Material Culture: People and Things (3).** Explores ways in which humans use food, clothing, monuments, and other material objects to construct and express their identity.
- 3331. Indians of North America (3).** The experience of Native American peoples from contact to the present. Incorporates historical and ethnographic approaches; selected case studies.
- 3335. Anthropology of the Plains Indians (3).** An introduction to Plains Indian cultures past and present. Explores a variety of topics, including world view, sacred sites, traditional arts, powwows, and language revitalization.
- 3339. Methods in the Study of Culture and Language (3).** Training in cross-cultural research methods employed by ethnographers

**Bachelor of Arts in Anthropology with a
Concentration in Forensic Anthropology:
Sample Curriculum**
FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
Language, Philosophy, & Culture*	3	ANTH 2301, Intro. to Archaeology	3
ANTH 2300, Physical Anthropology	3	ANTH 2302, Intro. to World Cultures	3
ANTH 2100, Physical Anthropology Lab	1	ENGL 1302, Advanced College Rhetoric	3
POLS 1301, American Govt. Org.	3	Life and Physical Sciences*	4
ENGL 1301, Essentials of Coll. Rhetoric	3	HIST 2301, Hist. of the U.S. Since 1877	3
HIST 2300, History of the U.S. to 1877	3		
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
POLS 2302, American Public Policy	3	ANTH 3343, Maya Archaeology	3
ANTH 3303, Forensic Anthropology	3	Language, Philosophy, & Culture*	3
MATH 1330, Intro. to Math. Analysis I	3	MATH 2300 or 2345	3
COMS 2300, Public Speaking	3	ENGL Literature*	3
Foreign Language [†]	3	Foreign Language [†]	3
Personal Fitness and Wellness*	1	Personal Fitness and Wellness*	1
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ANTH 3316, Anthropological Theory	3	ANTH 3314, Human Osteology	3
ANTH 3310, Human Evolution	3	ANTH 3339, Methods in Study of Culture	3
Creative Arts*	3	Elective	3
Minor	3	Minor	6
ANTH 4343, Human Skeletal Biology	3		
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Forensic ANTH Elective [‡]	3	Elective	2
Elective	3	Minor	6
Minor	3	Forensic ANTH Elective [§]	3
Creative Arts*	3	ENGL Literature*	3
TOTAL	12	TOTAL	14

TOTAL HOURS: 120

* Select from Arts and Sciences General Degree Requirements. At least 6 hours must be upper-division.

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

‡ Choose from ANTH 3350, 4320, 4341.

§ Choose from ANTH 2308, 3350, 4320, 4341; GIST 3300; GEOG 3301.

ANTH 2302 fulfills the Social and Behavioral Sciences and multicultural requirements.

ANTH 2306 fulfills the Language, Philosophy, and Culture requirement.

Anthropology majors are required to take 12 hours of upper-division (3000 or 4000 level) ANTH electives.

- and linguists. Topics include interviewing, participant observation, digital audio recording, transcription, and data analysis.
- 3341. Laboratory Archaeology (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).** 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).** A survey of ancient Maya prehistory and archaeology with emphasis on religion, world view, iconography, and hieroglyphic writing.
- 3344. South American Archaeology (3).** 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.

**Bachelor of Arts in Social Work:
Sample Curriculum**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
Creative Arts*	3	SW 1300, Why and How of Soc. Svcs.	3
Language, Philosophy, & Culture*	3	Mathematics*	3
POLS 1301, American Govt. Org.	3	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Oral Communication*	3
BIOL 1402, Biology of Animals†	4	Creative Arts*	3
		Personal Fitness and Wellness‡	1
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
SW 2301, Introduction to Social Work	3	SW 3311, Human Beh. & Soc. Env. Sys.	3
Life and Physical Sciences*	4	MATH 2300, Statistical Methods§	3
POLS 2302, American Public Policy	3	Freshman Foreign Language#	5
Language, Philosophy, & Culture*	3	Sophomore ENGL Literature‡	3
Sophomore ENGL Literature‡	3	Minor	3
Personal Fitness and Wellness‡	1		
TOTAL	17	TOTAL	17

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
SW 3312, Human Beh. & Soc. Env.: Life	3	SW 3332, Social Work Practice: Int. Skills	3
SW 3331, Social Work with Diverse Pop.	3	U.S. History*	3
U.S. History*	3	Sophomore Foreign Language#	3
Sophomore Foreign Language#	3	Minor	6
Minor	3		
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
SW 4311, Social Policy & Social Welfare	3	SW 3339, Social Work Res. & Eval.	3
SW 3333, Social Work Practice: Macro.	3	SW 4340, Social Work: Integr. Seminar	3
Minor	6	SW 4611, Social Work: Field Exper.	6
TOTAL	12	TOTAL	12

TOTAL HOURS: 120

* Select from the university's core curriculum.

† Must be taken with ANTH 2300/2301 and either BIOL 1403 and 1404 or ZOO 2403 and 2404. Any of these courses may be credited toward the 8-hour Life and Physical Sciences requirement for the College of Arts and Sciences.

‡ Select from Arts and Sciences General Degree Requirements.

§ MATH 2300 must be completed before SW 3339. Either PSY 3400 or SOC 3391 may be taken in lieu of MATH 2300; of these courses, only MATH 2300 also gets mathematics credit in the General Degree Requirements for the College of Arts and Sciences.

A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

- 3347. **Texas Prehistory (3).** 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).** 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).** Familiarizes 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.
- 3350. **Archaeology of Death (3).** Explores the archaeology of death. Topics include treatment of the dead, mortuary practices, and belief systems surrounding death.

- 3375. **Topics in Latin American Archaeology (3).** Examines the ancient civilization of Latin America through exploration of specific topics (e.g., cities, regions, cultures). May be repeated for credit when topics vary.
- 4000. **Individual Problems in Anthropology (V1-3).** Prerequisites: ANTH 2300, 2301, or 2302; advanced standing; and instructor consent. May be repeated for credit.
- 4310. **Cultural Resource Management (3).** Introduction to the practice of cultural resource management archaeology in the United States, including historical and legal background, methods, and employment opportunities. (Writing Intensive)
- 4320. **Forensic Archaeology (3).** Prerequisites: ANTH 2301 and 2305. Covers the history of forensic archaeology case studies and archaeological principles and methods as applied to forensic cases.
- 4343. **Human Skeletal Biology and Forensic Techniques (3).** Prerequisites: ANTH 2100 and 2300 or instructor consent. Intensive study of skeletal biology emphasizing subadult and adult morphological variation. Includes analysis of paleopathology, trauma, age, sex, and stature estimation. (Writing Intensive)
- 4640. **Field School in Cultural Anthropology (6).** A field school providing training in basic ethnographic methods, including interviewing, participant observation, the documentation of cultural performance events, and the analysis of material culture.
- 4642. **Field Archaeology (6).** A summer session field school providing instruction in basic archaeological field techniques, including site survey, test excavations, record keeping, mapping, and collection documentation.
- 4643. **Field Research in Skeletal Biology (6).** A field experience providing hands-on learning specific to human skeletal biology and forensic methods. May be repeated.

Graduate Courses

- 5305. **Method and Theory in Cultural Anthropology (3).** The history of research in cultural anthropology; development of methodological and theoretical approaches, and the exploration of ethnographic fieldwork and writing.
- 5310. **Seminar in Cultural Resource Management (3).** Seminar covering the practice of cultural resource management archaeology in the United States, including historical and legal background, business models, methods, and employment opportunities.
- 5311. **Human Origins (3).** A comprehensive examination of hominid evolution with emphasis on current discoveries, interpretations, and theories. Seminar on selected topics.
- 5312. **Human Diversity (3).** 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).** 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.
- 5315. **Advanced Human Osteology (3).** Rigorous study of human skeleton to facilitate the identification of intact and fragmentary bones. Includes ageing, sexing, measurement techniques, report writing, and some legal issues.
- 5319. **Topics in Physical Anthropology (3).** Selected topics or examination of a currently important topic in physical anthropology. May be repeated for a maximum of 9 hours credit.
- 5322. **Social Anthropology (3).** 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).** May be repeated for credit.
- 5341. **Method and Theory in Archeology (3).** An intensive survey of the development and present status of method and theory in archeology.
- 5343. **Topics in Anthropological Archeology (3).** 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.

5352. **Ethnolinguistics (3)**. Survey of the nature of the interrelationships between language and culture.
5642. **Advanced Field Archaeology (6)**. Field school providing instruction in crew supervision and advanced archaeological field techniques, including site survey, excavations, record keeping, TDS mapping, and photography.
5643. **Field Research in Skeletal Biology (6)**. A field experience providing hands-on learning specific to human skeletal biology and forensic methods.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Social Work (SW)

Undergraduate Courses

1300. **The Why and How of Social Services (3)**. Interaction of conditions and ideas that contribute to design and delivery of social services and their impact on diverse populations. Fulfills core Social and Behavioral Sciences requirement.
2301. **[SOCW 2361, 2362] Introduction to Social Work (3)**. Examination of society's responses to human needs and social problems through voluntary and governmental social policies and services.
3311. **Human Behavior and the Social Environment: Systems (3)**. Examination of interaction between person and environment, emphasizing mezzo and macro level systems, including small groups, organizations, and communities.
3312. **Human Behavior and the Social Environment: Lifespan (3)**. Examination of interaction between person and environment with emphasis on biological, social, emotional, and cultural systems across life-span.
3331. **Social Work with Diverse Populations (3)**. 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)**. Prerequisite: Acceptance into Social Work Candidacy. Prerequisite or corequisite: SW 3331. Foundational 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)**. Prerequisite: SW 3332. Knowledge base and skills of generalist social work practice with organizations and communities. Social work majors only.
3334. **Social Work Practice: Micro Systems (3)**. Prerequisites: 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)**. 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)
4000. **Independent Study in Social Work (V3-6)**. Prerequisite: Instructor consent. Independent study in social work theory, practice, policy, research, or policy evaluation. May be repeated for credit with instructor's approval.
4311. **Social Policy and Social Welfare Legislation (3)**. 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)**. Prerequisite: SW 3333; 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)**. 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.

Graduate Courses

5264. **Foundation Field Placement I (2)**. Prerequisite: Admission to Master of Social Work program. Pass/fail. Liability insurance

required. Supervised practicum using social work knowledge, skills, and ethics in a program-approved social agency.

5310. **The Social Work Profession and Social Welfare Policy (3)**. Foundation graduate course examining social welfare system. Emphasizes how policies impact systems. Topics include social welfare history, policy development, implementation, evaluation, and values.
5311. **Human Behavior and the Social Environment: Systems (3)**. Foundation course examining theories on and knowledge of interaction between person and environment. Emphasizes mezzo- and macro-level systems.
5312. **Human Behavior and the Social Environment: Lifespan (3)**. Foundation graduate course that examines theories on and knowledge of interaction between person and environment. Emphasizes biological, social, emotional, and cultural systems across lifespan.
5331. **Social Work with Diverse Populations (3)**. Foundation graduate course exploring integrated approach to theory, values, and skills of working with diverse populations. Emphasizes empowering vulnerable populations to fulfill potential.
5332. **Foundation Social Work Generalist Practice I (3)**. Prerequisite: Admission to Master of Social Work program. Introduces foundational theory principles and skills of professional relationships with systems of all sizes for generalist social workers.
5333. **Foundation Practice I (3)**. Prerequisite: Admission to Master of Social Work program. Introduces theory, principles, and skills of problem solving and evidence-based practice with systems of all sizes.
5339. **Foundations of Social Work Research (3)**. Introduces scientific approach to generation of social work knowledge, including how to read and interpret research with a critical eye and perform basic research activities.
5467. **Foundation Field Placement II (4)**. Prerequisite: Admission to Master of Social Work program. Pass/fail. Liability insurance required. Supervised practicum using social work knowledge, skills, and ethics in a program-approved social agency.
6374. **Social Work Practice with Veterans and Military Families(3)**. Prerequisite: M.S.W. student with second-year status. Introduces students to military culture and explores strengths, resources, stressors, and obstacles to well being.

Sociology (SOC)

Undergraduate Courses

1301. **[SOCI 1301] Introduction to Sociology (3)**. Human group behavior, influence on the individual, and relationships of individuals to each other as members of groups. Fulfills core Social and Behavioral Sciences and multicultural requirement.
1320. **[SOCI 1306] Current Social Problems (3)**. 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 requirement.
2333. **The U.S. Criminal Justice System (3)**. Surveys the structure and process of the U.S. criminal justice system, including policing and cross-national comparison.
2335. **Homicide (3)**. Analyzes homicide by strangers, family members, and acquaintances from a criminological perspective. Serial, mass, school shootings, and hate crime murder are also examined.
3300. **Special Topics in Sociology (3)**. Examines selected topics in sociology. May be repeated when topics vary.
3323. **Race and Ethnicity (3)**. Sociological and global analysis of racial and ethnic groups. Analysis of diversity and multiculturalism from a global perspective. Fulfills multicultural requirement.
3325. **Gendered Lives (3)**. Study of the gendered nature of society, emphasizing the experiences of women in such areas as family, health, and the economy. (WS 3325)
3326. **Women and Crime (3)**. Examines the nature and extent of female crime, contemporary debate in feminist criminology, and the construction of gender in criminal justice discourse.
3327. **Sociology of Law and Policing (3)**. Examines social forces affecting the development and current operation of criminal law and policing. Special attention given to contemporary issues concerning each.
3331. **Sociology of Family Life (3)**. Examines historical, global and cultural variations in intimate partnership and family life. (WS 3331)

Graduate Courses

3333. **White Collar Economic Crimes (3)**. Examines white collar and economic crimes in the United States as well as from a global perspective.
3335. **Family Violence (3)**. Surveys definitions, prevalence, and theories of family violence. Focuses on impact of variations in definitions of family violence and societal responses to family violence.
3336. **Sociology of Education (3)**. Examines the education system over time as well as the impacts of education on income, racial equality, and stratification in American society.
3337. **Inequality in America (3)**. Inequality as expressed in occupational, class, ethnic, and sexual hierarchies is examined from varying sociological perspectives. (WS 3337)
3352. **Technology and Society (3)**. Explores the interrelationships between technology and society, emphasizing the impacts of technology on society and social factors contributing to the development and diffusion of technology.
3368. **Sociology of Deviance (3)**. Study of different forms of deviant behavior in Western societies, emphasizing the social relativity of deviance and theories that attempt to explain it. Examples of topics include tattooing, drug abuse, topless dancing, pedophilia, and mental illness.
3383. **Alcohol, Drugs, and Society (3)**. Analysis of social factors related to the use and abuse of alcohol and other drugs.
3391. **Introduction to Social Statistics (3)**. Statistical analysis and interpretation of sociological research data.
3392. **Introduction to Social Research Methods (3)**. Nature of the sociological research process, including the scientific method, experimentation, participant observation and survey research. (Writing Intensive)
3393. **Development of Sociological Theory (3)**. Emergence of systematic sociological theory out of social philosophy; evolution of sociology as a discipline in the late nineteenth century. (Writing Intensive)
3394. **Contemporary Sociological Theories (3)**. 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. (Writing Intensive)
4307. **Individual Studies in Sociology (3)**. Prerequisite: Instructor consent and high scholastic achievement. Independent study. May be repeated for credit.
4311. **Sociology of the Person (3)**. Effects of group membership on individual attributes and behavior; focuses on the influence of experience in primary groups and positions in social structure.
4312. **Population and Environment (3)**. Focuses on the relationships between human population and the environment. Topics include demographic phenomena, policies, population, and environment degradation.
4316. **Aging and Society (3)**. Theory and research on aging: covering demographic, sociocultural, economic, individual, and social factors.
4325. **Criminology (3)**. Crime and deviant behavior as a social process and their regulation in a democratic society.
4327. **Juvenile Delinquency (3)**. 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)**. The sociological study of religious groups and beliefs. The reciprocal relationships between religious institutions and society.
4335. **Victims of Crime (3)**. A sociological analytical approach to social, scientific, and popular theories of criminal victimization, including its extent, nature, causes and effects, and lived experience of victims.
4381. **Sickness, Health, and Society (3)**. The sociological study of the medical institution and its interrelationship with other societal institutions. Differential definitions of health and illness.
4399. **Research (3)**. By invitation and under direction of a professor. Requires a completed research project and presentation at a formal conference for credit.
5101. **Professional Socialization (1)**. Practical issues in sociological research, scholarship, and teaching. Required of first-semester graduate students and teaching assistants through their appointment period. Pass-fail grading. May be repeated for a maximum of 4 hours credit.
5303. **Seminar in Contemporary Sociological Theory (3)**. Study of contemporary approaches to society, including conflict theory, functionalism, symbolic interaction, ethnomethodology, rational choice, emotions, feminist theory, globalization, and postmodern perspectives.
5308. **Seminar in the Origins of Social Theory (3)**. Development of sociological theory in the 19th and early 20th centuries. Topics may vary, but emphasis usually will be on the work of Marx, Durkheim, and Weber.
5311. **Seminar in Criminology (3)**. Critical review of theory and research on selected topics in criminology.
5312. **Seminar in Urban Problems (3)**. Extensive analysis of the process and consequences of urbanization, with emphasis upon causation and critiques of proposed solutions.
5313. **Seminar in Minority Relations (3)**. American and world patterns of interethnic relations are covered with emphasis on recent and current trends.
5315. **Seminar in Social Change (3)**. Linear and cyclical theories; analysis of the idea of progress, stage theories, dialectical materialism, and the lag hypothesis.
5316. **Seminar in Social Gerontology (3)**. Theory and research on aging, covering demographic, sociocultural, economic, individual, and societal factors. Interdisciplinary aspects are stressed.
5320. **Social Psychology: Symbolic Interactionism (3)**. Central ideas of social psychology are analyzed and integrated in a contemporary model of symbolic interactionism.
5325. **Seminar in Deviant Behavior (3)**. Critical review of current theory and research in deviance.
5327. **Seminar in Demography (3)**. Theory and skills of population analysis including use of large data-sets in 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)**. Participation in campus-based organized research project. Required at least once of research assistants; open to other students.
5334. **Quantitative Methods in Sociology (3)**. Decision making skills (from test selection to inferences from data) for quantitative analysis in sociology.
5335. **Seminar in Family Violence (3)**. 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)**. 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.
5360. **Sociology of Globalization (3)**. Examines the accelerated rise of globalization since the 1970s and its effects on individuals, families, communities, society, and the world.
5381. **Seminar in Medical Sociology (3)**. Theory and research on conceptions of health, illness, and medical care from the sociological perspective.
5383. **Substance Use and Abuse in America (3)**. Examines the social, political, and economic causes and consequences of substance use and abuse in America. Students engage in and conduct relevant research.
5384. **Seminar in the Sociology of Religion (3)**. 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)**. 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)**.

Jerry S. Rawls College of Business

Lance A. Nail, Ph.D., Dean

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About the College

The Jerry S. 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 in Accounting
- Bachelor of Business Administration in Energy Commerce
- Bachelor of Business Administration in Finance
- Bachelor of Business Administration in General Business
- Bachelor of Business Administration in International Business*
- Bachelor of Business Administration in Management
- Bachelor of Business Administration in Management Information Systems
- Bachelor of Business Administration in Marketing
- Master of Business Administration
- Master of Science in Business Administration
- Master of Science in Data Science†
- Master of Science in Accounting
- Doctor of Philosophy in Business Administration

Dual Degree Programs

- Bachelor of Business Administration/Bachelor of Science in Architecture
- Bachelor of Business Administration/Bachelor of Science in Agricultural and Applied Economics
- Master of Business Administration/Master of Architecture
- Master of Business Administration/Master of Arts in Languages and Cultures (German)
- Master of Business Administration/Master of Arts in Romance Languages (French or Spanish)
- Master of Business Administration/Master of Science in Biotechnology
- Master of Business Administration/Master of Science in Environmental Toxicology
- Master of Business Administration/Doctor of Medicine
- Master of Business Administration/Doctor of Jurisprudence
- Master of Business Administration/Doctor of Pharmacy
- Master of Business Administration/Doctor of Philosophy in Biomedical Sciences
- Master of Science in Accounting/Doctor of Jurisprudence

* Degree being phased out. No new students.

† Pending Texas Higher Education Coordinating Board approval.

Undergraduate Certificates

- Certificate in Energy
- ISQS Undergraduate Certificate in Management Information Systems (MIS)
- Joint Business/Engineering Undergraduate Certificate in Technology Entrepreneurship
- Undergraduate Certificate in Leadership
- Undergraduate Certificate in Finance

Graduate Certificates

- Authentic Leadership and Entrepreneurship for the Family Business
- Graduate Certificate in Business Analytics
- Graduate Certificate in Essentials of Business
- Graduate Certificate in Finance
- Graduate Certificate in Health Care Facilities Design
- Graduate Certificate in Leadership

Undergraduate Program

General Standards and Requirements

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.

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). Distance education 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 within one academic year. It may not be removed 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. Students should be aware that laptop computers are required. Minimum specifications are available at: <http://bacs.ba.ttu.edu/laptopRequirements/>

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.

Probation and Suspension. See the Undergraduate Academics catalog section concerning probation and suspension policies.

Mathematics Requirement. A mathematics course must be taken every semester until the requirement is fulfilled. 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.

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 Center for Global Engagement for specific program requirements.

Transfer Work. Coursework 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.

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 admission into a declared major in the Rawls College of Business.
- Completion of at least 40 hours of upper-division coursework.

Intent to Graduate. At least one year before the proposed graduation date, an intent to graduate must be filed 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.

Graduate Program

For information on graduate programs offered by the Rawls College of Business, visit the Graduate School section of the catalog on page 135.

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 72 hours can be accepted provided none of the courses are vocational, workforce education, career, or upper-division courses.

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: BCOM 3373, BLAW 3391, FIN 3320, ISQS 3344, MGT 3370, and MKT 3350. 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 3.0 GPA on a minimum of 18 hours from any college or university. 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 3.0 TTU GPA on a minimum of 18 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 unless approved at time of transfer.

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. 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 their designated major advisor in the Undergraduate Services Center concerning degree requirements along with faculty advisors for help in selecting courses to achieve career objectives.

Division of Curriculum

Lower Division. 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 majors until completion of the lower-division coursework 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.

Upper Division. Admission to the lower-division RCOBA 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. Students can only apply for majors in effect at the time the application is made. Students must meet the requirements in effect at the time of the application. Junior- and senior-level business and economics courses may be

Rawls College of Business				
Lower-Division Curriculum for All Majors				
FIRST YEAR				
	Fall		Spring	
BA 1101, Fund. Bus. Professionalism	1	MATH 1331, Intro. Math. Analysis II	3	
MATH 1330, Intro. Math. Analysis I	3	ENGL 1302, Advanced College Rhetoric	3	
ENGL 1301, Essentials of Coll. Rhetoric	3	HIST 2301, History of U.S. Since 1877*	3	
Life & Physical Sciences*†	4	Life & Physical Sciences*†	4	
(ENCO majors take GEOL 1303 & 1101)		Creative Arts*†	3	
HIST 2300, History of U.S. to 1877*	3			
TOTAL	14	TOTAL	16	
SECOND YEAR				
	Fall		Spring	
ACCT 2300, Financial Accounting‡	3	ACCT 2301, Managerial Accounting §	3	
ISQS 2340, Intro. Info. Systems in. Bus.	3	MATH 2345, Intro. to Statistics with Bus.	3	
Language, Philosophy, & Culture*†	3	ECO 2302, Principles of Economics II	3	
POLS 1301, American Govt., Org.*	3	POLS 2302, American Public Policy*	3	
Multicultural course*†	3	Oral Communication#	3	
TOTAL	15	TOTAL	15	

Students who will graduate under a catalog previous to 2012-2013 must meet the Technology and Applied Science requirement of the core.

* Does not require a grade of C or higher.
 † Choose from core curriculum requirements. Life and Physical Sciences must include both a lecture and a lab.
 ‡ Accounting and finance majors must achieve A or B.
 § Accounting majors must achieve A or B.
 # Choose either COMS 2358 or MCOM 2310.

Students transferring from any institution must have at least a 3.0 GPA on a minimum of 18 hours from any college or university. Transfer credit is not used in the calculation of a student's Texas Tech grade point average. The Rawls College of Business has the

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. All lower-division coursework must be completed prior to enrollment in any major course. This includes lower-division business core courses and university requirements. Upper-division requirements for each major are discussed in the following sections.

Undergraduate Dual Degrees

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.

Bachelor of Business Administration in General Business

The Bachelor of Business Administration with a major in General Business is strictly designed for a dual degree student. Only students whose primary major is outside of the Rawls College of Business can declare General Business as a secondary program of study. Note: This excludes students that declare General Business Construction Management concentration.

The lower-division requirements for this major should be completed during the freshman and sophomore years. Refer to the previous page for those requirements.

B.B.A. in General Business Concentration: Construction Management

Required courses:

21 hours of upper-division core (BLAW 3391; BCOM 3373; FIN 3320; ISQS 3344; MGT 3370, 4380; MKT 3350)

BECO 4310	Applied Business Economics
BA 2190	Perspectives on Entrepreneurship
EGR 1206	Engineering Graphics: Software A
FIN 3332	Real Estate Fundamentals
MKT 3356	Market Research and Analysis

Choose three of the following:

BLAW 3393	Real Estate Law
FIN 3334	Real Estate Finance and Investments
FIN 4333	Real Estate Appraisal
FIN 4382	Urban Land Development
CONE 2302	Surveying

With construction engineering minor:

CONE 2300	Construction Materials and Blueprint Reading
CONE 3302	MEP Systems and Design for Construction
CONE 4300	Construction Safety
CONE 4320	Construction Cost Estimating
CONE 4322	Construction Management
CONE 4324	Construction Contracts and Specifications

Minor in General Business for Non-Business Students

The college offers one minor for non-business students. The requirements are as follows:

- Must have a minimum 2.75 Texas Tech GPA and 12 earned hours 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 unless approved by minor advisor.

Course Requirements for 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; mechanical engineering majors can substitute IE 2311)
BA 3304	Operations Management (Prerequisite: min. 2.75 GPA)
BA 3305	Organization Management (Prerequisite: min. 2.75 GPA)

B.B.A. in General Business Recommended Upper-Division Curriculum

THIRD YEAR			
Fall		Spring	
BECO 4310, Applied Bus. Economics*	3	BLAW 3391, Business Law I	3
FIN 3320, Financial Management	3	BCOM 3373, Managerial Comm.	3
ISQS 3344, Intro. Production Oper. Mgt.	3	Major Courses†	9
MGT 3370, Organization & Management	3		
MKT 3350, Intro. to Marketing	3		
TOTAL	15	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

TOTAL HOURS: 120

* Or 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, FIN, ISQS, MGT, MKT. At least 9 hours must be senior-level courses. Be aware that some senior level courses will most likely have prerequisites. Please refer to course descriptions.

‡ These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

Course Descriptions

(To interpret course descriptions, see page 23.)

Business Administration (BA)

Undergraduate Courses

- 1101. Fundamentals of Business Professionalism (1).** For freshmen only. Integration of fundamental business principles from multiple disciplines and concepts of business professionalism and ethical behavior.
- 2190. Perspectives on Entrepreneurship (1).** Provides students with a basic understanding of the key concepts of entrepreneurship, the important role that entrepreneurship plays in economic

growth and job creation, and an understanding of the role of the entrepreneur.

- 3301. Fundamentals of Marketing (3).** Prerequisites: C or better in either ECO 2302, 2305, or AAEC 2305; minimum cumulative 2.75 Texas Tech 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).** Prerequisite: minimum cumulative 2.75 Texas Tech 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).** Prerequisites: minimum cumulative 2.75 Texas Tech 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).** Prerequisite: minimum cumulative 2.75 Texas Tech 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).** Prerequisite: minimum cumulative 2.75 Texas Tech 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.
- 3306. Fundamentals of Business Economics (3).** Prerequisite: Minimum 2.75 cumulative TTU GPA. Provides an understanding of how economic analysis is applied to business decisions and strategy.
- 4000. Directed Experience (V1-6).** Prerequisite: Instructor consent. Enhance the student's classroom knowledge through internships, projects in the workplace, mentoring experiences, and other approved experiences.
- 4101. Rawls Business Leaders Seminar I (1).** Prerequisite: Admission to Rawls Leadership Program. Focuses on guiding students to self-examine their leadership skills and identify their strengths and weaknesses.
- 4102. Rawls Business Leaders Seminar II (1).** Prerequisite: BA 4101 and Admission to Rawls Leadership Program. Guides students to formulate a personal development plan to enhance their leadership skills, particularly through the use of service learning projects and advanced leadership assessments.
- 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).** Prerequisites: Senior standing, 3.0 GPA in major, minimum cumulative 2.75 Texas Tech 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).** Prerequisites: 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. 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).** Prerequisite: Determined by area. May be repeated once for credit by faculty approval only with no duplication of topic.

- 4384. Volunteer Income Tax Assistance (3).** Prerequisite: ACCT 3307 or equivalent. Service learning course designed to teach students about income tax through hands-on training assisting others in the community with income tax return preparation.

Graduate Courses

- 5321. Negotiation and Business Law (3).** 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. Emphasizes negotiation skills and strategy development for managing organizational stakeholders.
- 5322. Technology Commercialization (3).** Focuses on how to recognize, screen, and develop technology opportunities to become commercial products and services.
- 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. 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 Communication (BCOM)

Undergraduate Course

- 3373. Business Communication (3).** Prerequisites: Sophomore standing, C or better in ENGL 1301 and 1302, minimum 2.75 Texas Tech GPA. Professional business communication focusing on audience, purpose, message, channels, and credibility. (Writing Intensive).

Health Organization Management (HOM)

Undergraduate Courses

- 4371. Health Organization Management (3).** Prerequisites: Junior/senior standing. 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).** Prerequisites: 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).** Prerequisites: HOM 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).** Prerequisite: Admitted to HOM or consent of instructor. Provides an introductory-level overview of the United States healthcare system in terms of historical, current, political, organizational, human resources, financial, access-related, and quality dimensions.
- 5307. Managing Healthcare Organizations (3).** Prerequisite: B or better in HOM 5306 or consent of instructor. Examines management of healthcare organizations, including issues pertaining to human resources, financing, organizational design, law, and the organization's role in a rapidly changing environment.

- 5308. Healthcare Operations Management and Quality (3).** Prerequisites: B or better in HOM 5306 and 5307 or consent of instructor. A study and application of healthcare operations management and quality tools emphasizing systems improvements through use of information technology and quantitative methods.
- 5309. HOM IV: Integrated Healthcare Operations (3).** Prerequisites: B or better in HOM 5306, 5307, 5308 or consent of instructor. Synthesizes components of prior courses and presents new knowledge through critical thinking skills and case studies.
- 5382. Field Experience in HOM (3).** Prerequisite: Consent of instructor. Exposes students to multiple levels of healthcare organizations while allowing them to develop skills in a defined project

International Business (IB)

Undergraduate Courses

- 3101. Global Learning Strategies (1).** Focuses on a student-centered learning approach and provides a series of exercises and reflections designed to help students recognize, develop, strengthen, and articulate their international experiences.

- 3105. Cross-Cultural Management Skills (1).** 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).** Prerequisites: MKT 3350 and 4358 with a C or better. Develops a basic understanding of international trade as well as importing and exporting and the associated government regulations.
- 4382. Internship in International Business (3).** 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).** 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.

School of Accounting

Robert Ricketts, Ph.D., Chairperson

Professors: Clancy, D. Collins, Mann, Pasewark, Ricketts, Viator

Associate Professors: Masselli, Oler, Fleischman, Sanchez

Assistant Professors: Cook, Buslepp, Hart, Romi, Wu

Associate Professor of Practice: A. Collins, Mohapatra (visiting)

Instructors: Allen, Bigbee, Kelley, Lynn, Pantoya

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have completed 102 hours toward the B.B.A. prior to beginning the fall semester of the fourth year. Students meeting that standard will then typically schedule the fourth year as follows:

FOURTH YEAR			
	Fall	Spring	
Undergraduate Courses	6	Internship	3
Graduate Courses	6	Graduate Courses	3-6

Note: Remaining undergraduate courses will be integrated into the schedule during the fifth year. Students will work with their graduate faculty accounting advisor to determine their fifth year schedule.

About the Program

The School of Accounting supervises the following degree programs:

- Bachelor of Business Administration in Accounting
- Master of Science in Accounting

Dual Degree Programs

- Master of Science in Accounting/Master of Science in Personal Financial Planning
- Master of Science in Accounting/Doctor of Jurisprudence

Undergraduate Program

The primary objective of the undergraduate accounting program is to prepare students for accounting positions at the entry level in industry, government, 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 in ACCT 2300 and 2301 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 during the fall of their junior year, prior to taking ACCT 3305. Students who plan to take the CPA exam are encouraged to apply to the 150-hour M.S.A. program.

Accelerated Bachelor's-to-Master's Program. The 150-hour program is designed to allow students to complete both the B.B.A. and M.S.A. degrees in five years. To meet this goal, students must

Course Descriptions

(To interpret course descriptions, see page 23.)

Accounting (ACCT)

Undergraduate Courses

- 2300. [ACCT 2301, 2401] Financial Accounting (3).** Prerequisites: minimum cumulative 2.75 Texas Tech GPA, and a C or better in any college-level mathematics course. Must make an A or B to declare Accounting major. Concepts and terminology of accounting and financial reporting for modern business enterprises and the relationships between accounting information and business activities.
- 2301. [ACCT 2302, 2402] Managerial Accounting (3).** Prerequisites: minimum cumulative 2.75 Texas Tech GPA and C or better in 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).** Structure of the accounting profession, requirements for certification, qualification for and preparation for professional practice in industry, government, and/or public accounting. Must complete before participating in "Meet the Firms." F
- 3304. Intermediate Accounting I (3).** Prerequisite: B or better in ACCT 2300. Net income concepts, corporations, current assets, and investments.
- 3305. Intermediate Accounting II (3).** Prerequisite: C or better in ACCT 3304. 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.

B.B.A. in Accounting Recommended Upper-Division Curriculum

THIRD YEAR

Fall		Spring		
ACCT 3304, Intermediate Acct. I	3	ACCT 3305, Intermediate Acct. II	3	
ACCT 3307, Income Tax Accounting	3	MKT 3350, Intro. to Marketing	3	
BECO 4310, Applied Bus. Economics*	3	ACCT 3315, Accounting Systems	3	
ISQS 3344, Intro. Prod. & Oper. Mgmt.	3	FIN 3320, Financial Management	3	
BCOM 3373, Managerial Communication	3	MGT 3370, Organization & Management	3	
ACCT 3101, Seminar in Prof. Practice	1			
TOTAL	16	TOTAL	15	

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 2358, Bus. & Pro. Comm.		Non BA / Non ECO Elective [†]	3	
ACCT 3306, Prin. Cost & Mgr. Acct.	3			
ACCT 4301, Principles of Auditing	3			
Non-accounting Electives ^{†‡§}	3			
TOTAL	15	TOTAL	14	

Minimum hours required for graduation: 120

* Or any upper-level economics course except ECO 3323 and 4332.

† This course does not require a grade of C or higher.

‡ 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.

- 3306. **Principles of Cost and Managerial Accounting (3)**. Prerequisite: B or better in ACCT 2301. A study of principles and techniques of accounting information systems for organizations.
- 3307. **Income Tax Accounting (3)**. Prerequisite: B or better in ACCT 2300. A study in detail of certain provisions of the Internal Revenue Code, combined with elementary tax planning in business and individual transactions.
- 3315. **Accounting Systems (3)**. Prerequisite: C or better in ACCT 3304. The theories, procedures, and techniques of accounting information systems for organizations.
- 4301. **Principles of Auditing (3)**. Prerequisite: B or better in ACCT 3304 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.
- 4310. **Petroleum Accounting (3)**. Prerequisite: B or better in ACCT 2300 and 2301. Accounting for the production, refining, and distribution of oil and gas with emphasis upon production.
- 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.

Graduate Courses

- 5301. **Financial and Managerial Accounting (3)**. 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)**. Prerequisites: 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. **Information Systems Auditing and Forensic Accounting (3)**. Prerequisites: Admission to M.S.A. program and ACCT 4301. Study of computer technology employed in auditing advanced information systems, including detection of financial fraud.
- 5305. **Accounting Research and Communication (3)**. 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)**. 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.

- 5307. **Income Tax Accounting for Managers (3)**. A detailed study of key provisions of the Internal Revenue Code combined with tax planning in common business and personal transactions.
- 5308. **Federal Income Tax Law for Partnerships (3)**. Prerequisites: 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. **Advanced Accounting (3)**. Prerequisites: Admission to M.S.A. program and ACCT 3305. A study of the accounting and reporting problems associated with partnerships, consolidated corporations, international corporations, not-for-profit organizations, and governmental entities.
- 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.
- 5315. **Estate and Gift Taxation (3)**. 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)**. 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. (Writing Intensive)
- 5319. **Auditing Theory and Practice (3)**. 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. **Analysis of Financial Accounting Information (3)**. Prerequisites: Admission to the M.S.A. program and ACCT 4301. Study of how financial accounting information is used by auditors, lenders, investors, regulatory compliance officers, management, and employees. Includes advanced analysis of financial reports, as well as economic trends and business valuation.
- 5324. **Issues in International Accounting (3)**. Prerequisite: ACCT 5401 or equivalent. Current issues in international accounting.
- 5327. **Advanced Income Taxation Accounting (3)**. Prerequisite: Admission to M.S.A. program. Study of advanced income tax affecting business and investment.
- 5332. **Ethics in Accounting (3)**. 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)**. Prerequisites: All requirements of the M.S.A. program must be met prior to enrollment, must be taken in last semester of study, and must have instructor consent. Prepares students for the accounting profession through intensive study, testing, and preparation for professional certification.
- 5382. **Internship in Accounting (3)**. Prerequisites: Admission to M.S.A. program and completion of ACCT 4301 for non-tax internships and ACCT 5318 for tax internships. 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. May be repeated for credit.
- 6301. **Archival Research in Accounting (3)**. 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)**. Prerequisite: Admission to doctoral program. This seminar explores how accounting research uses experimentation to investigate the ways in which accounting impacts judgments and decisions.

Area of Energy, Economics, and Law

Terry McInturff, J.D., Area Coordinator

Professor: Ewing

Assistant Professor: Cardella

Professors of Practice: T. McInturff

Associate Professors of Practice: Giberson, Schuetzeberg

Assistant Professors of Practice: R. McInturff, Reed

Instructors: Frisbie, Kantellis, Nieto

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About the Program

The Area of Energy, Economics, and Law supervises the following degree and certificate program:

- Bachelor of Business Administration in Energy Commerce
- Undergraduate Certificate in Energy

Undergraduate Program

The goal of the undergraduate program in energy commerce is to enhance leadership potential by providing a high-quality and thorough educational experience in preparation for a business career in the energy industry. The energy commerce curriculum reflects the current world energy mix, primarily hydrocarbons with some emphasis on alternatives and renewables. Energy commerce majors must take GEOL 1303 and 1101 to fulfill one of their lower-division laboratory science requirements. All lower-division business and university required courses must be completed prior to beginning the program. Due to sequencing of courses the energy commerce degree program will take two academic years to complete. Admission into the energy commerce major is competitive and based on a comprehensive review of the student's application, writing sample, resume, and interview with a panel of energy industry professionals. A minimum 3.25 GPA is needed for consideration in the energy commerce program. Acceptance for the fall semester will be made no later than April 1 of the preceding spring semester. For application information and deadlines, visit www.enco.ba.ttu.edu.

Undergraduate Certificate in Energy

The Certificate in Energy is designed to prepare undergraduate students in all non-energy commerce BA majors for careers in the energy industry. Students will take five courses related to the energy industry and upon graduation will receive a Certificate in Energy in addition to the B.B.A. degree in their major. Students will be required to complete all lower-division business core courses and have a minimum 3.25 GPA to enroll in ENCO 3301. Limited space is available in energy commerce courses for certificate students. Acceptance in the energy certificate program is subject to approval by the energy commerce area coordinator.

Required Courses: ENCO 3301 and 3350.

Elective: Please see advisor for elective course options.

Course Descriptions

(To interpret course descriptions, see page 23.)

Business Economics (BECO)

Undergraduate Course

4310. Applied Business Economics (3). Prerequisites: C or better in ECO 2302 or ECO 2305 or AAEC 2305. Economic analysis applied to business decisions and strategy. Topics may

include business valuation, pricing strategy, risk management, contracts, and organizational economics.

- 4345. Economics of Regulation (3).** Prerequisites: C or better in ECO 2302 or 2305. Study of the economic criteria of public regulation of private business with emphasis on public policy. Theories of regulation. Regulation of various markets.
- 4366. Global Business Economics and Policy (3).** Prerequisites: C or better in ECO 2302 or 2305. Examines business interaction with economic policy in a globalized world, the impact of international trade policy on businesses, and the role international businesses play in the process of economic development.
- 4376. Austrian Economics (3).** Prerequisites: C or better in ECO 2302 or 2305. Applied topics include entrepreneurship and competition theory, regulation and anti-trust, business cycles, comparative systems and economic development, and business management.

Graduate Courses

- 5310. Economic Analysis for Business (3).** Prerequisite: Admission to M.B.A. program. Studies markets in which firms compete within the context of a global supply chain, including markets for good and services, financial markets, and labor. Emphasizes how the interactions of these markets affect the formulation and implementation of business strategies.
- 5345. Economics of Regulation (3).** Study of the economic criteria of public regulation of private business with emphasis on public policy. Theories of regulation. **Regulation of various markets.**
- 5399. Global Energy Case Analysis (3).** Integrates and reviews prior course material in realistic case settings. Requires strategic assessment, communication, and use of (and balance between) quantitative and qualitative information.

Business Law (BLAW)

Undergraduate Courses

- 3391. Business Law I (3).** Prerequisite: C or higher in ENGL 1301 and 1302 and a minimum cumulative 2.75 Texas Tech GPA. Nature and source of law, courts and procedure, contracts, Texas law of separate and community property.
- 3393. Real Estate Law (3).** Prerequisite: Junior or senior standing. Rights in land, classification of estates, acquisition and creation of property rights, titles, and common conveyances. F.
- 4392. Business Law II (3).** Prerequisite: C or higher in BLAW 3391. Second course in business law. Law of negotiable instruments, business organizations, partnership and corporation sales.

Graduate Courses

- 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.
- 5390. Legal, Regulatory, and Ethical Environment of Business (3).** Examines legal, regulatory, and ethical issues related to business activities with emphasis on changing landscape based on ever-changing technology.
- 5392. Advanced Business Law (3).** Prerequisite: C or better in BLAW 3391. Second course in business law.

Energy Commerce (ENCO)

Undergraduate Courses

- 3301. Energy Industry Fundamentals (3).** Prerequisite: Admission to the energy commerce program. History and overview of the energy industry providing basics of oil and gas exploration, production, electricity generation and transmission and emerging alternative technologies. Emphasis on critical thinking and issue analysis. F.
- 3350. Basic Land Practices (3).** Prerequisites or corequisites: PETR 4303, 3302, and 3402. Petroleum engineering majors and

**B.B.A. in Energy Commerce
Recommended Upper-Division Curriculum
Petroleum Land Management Track**

THIRD YEAR			
Fall		Spring	
ENCO 3301, Energy Industry Fund.	3	ENCO 3376, Exploration & Prod. Tech.	3
ENCO 3385, Petroleum Land Mgmt.	3	ENCO 4395, Oil & Gas Law I	3
BLAW 3391, Business Law I	3	ENGL 3365, Prof. Report Writing	3
FIN 3320, Financial Management	3	ISQS 3344, Intro. to Prod. & Op. Mgmt.	3
BCOM 3373, Managerial Comm.	3	MKT 3350, Intro. to Marketing	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ENCO 4396, Oil & Gas Law II	3	ENCO 4386, Oil & Gas Agreements II	3
ENCO 3386, Oil & Gas Agreements I	3	ENCO 4330, Global Energy Transactions	3
PFP 3301, Intro. to Personal Finance	3	ENCO 4362, US Energy Policy & Reg.	3
MGT 3370, Intro. to Management	3	BECO 4310, Applied Business Econ.	3
Group A*	3	Group A*	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* GROUP A – Choose 2 courses from ENCO 4325, ENCO 4375, ENCO 4390, ACCT 4310

**B.B.A. in Energy Commerce
Recommended Upper-Division Curriculum
Energy Transaction Analysis Track**

THIRD YEAR			
Fall		Spring	
ENCO 3301, Energy Industry Fund.	3	ENCO 3365, Energy Markets	3
ENCO 3350, Basic Land Practices	3	ENCO 3376, Exploration & Prod. Tech.	3
BLAW 3391, Business Law I	3	ENGL 3365, Prof. Report Writing	3
FIN 3320, Financial Management	3	ISQS 3344, Intro. to Prod. & Op. Mgmt.	3
BCOM 3373, Managerial Comm.	3	MKT 3350, Intro. to Marketing	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
PETR 4310, Energy Accounting	3	PFP 3301, Personal Financial Planning	3
Group A*	3	BECO 4366, Economics of Regulation	3
Group A*	3	ENCO 4312, Energy Economics	3
MGT 3370, Intro. to Management	3	BECO 4330, Global Energy Transactions	3
BECO 4310, Applied Business Econ.	3	ENCO 4375, Energy Finance	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* GROUP A – Choose 2 courses from ENCO 4325, 4390, FIN 3321, or department-approved list.

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.

- 3365. **Energy Markets (3)**. Prerequisites: C or better in ENCO 3301; and either ENCO 3350 or 3385. Focuses on refining, processing, and transportation of hydrocarbons and electricity. Examines fuel on fuel competition, emerging energy markets, and commodity pricing.
- 3376. **Exploration and Production Techniques (3)**. Prerequisites: C or better in ENCO 3301, and either ENCO 3385 or 3350. Exposes students to exploration and production techniques in the energy industry and interfaces these areas with the land functions. S.
- 3385. **Petroleum Land Management (3)**. Prerequisite: Admission to the energy commerce program. Overview designed to provide a foundation knowledge negotiations, real property and contract law and regulations of the oil and gas industry. F.
- 3386. **Oil and Gas Agreements (3)**. Prerequisites: C or better in ENCO 3301, 3385 and 4395. Covers contracts utilized in petroleum exploration and production including farmouts and term assignments, state regulations, surface access and agreements, title opinions and curatives.
- 4312. **Energy and Environmental Economics (3)**. Prerequisites: C or better in ENCO 3301, and either 3385 or 3350. Focus on oil and gas project economics and capital formation. Emphasis on project cost, revenue forecasting, reserve analysis, and financial risk.
- 4325. **Global Energy Perspectives (3)**. Prerequisite: Instructor consent. Explores the challenges and resources available to developed nations in meeting the energy demands of the 21st century. Focuses on OECD countries primarily in Europe. Study abroad. SS.
- 4330. **Global Energy Transactions (3)**. Prerequisites: C or better in ENCO 3301, 3376, and either ENCO 3385 or 3350. Focus on geopolitical implications in transnational energy transactions. Emphasis on international contract terms, ethics, and leadership issues. S.
- 4344. **Energy Analytics and Strategy (3)**. Prerequisites: C or better in ENCO 3365 and FIN 3320. Various types of economic and business analysis used in the energy sector to make decisions and to develop strategies.
- 4354. **Oil and Gas Acquisitions and Divestitures (3)**. Prerequisites: C or better in ENCO 3301. Strategies, tactics, and agreements utilized in acquisition/disposition of producing properties.
- 4362. **U.S. Energy Policy and Regulation (3)**. Prerequisites: C or better in ENCO 3301, and either ENCO 3385 or 3350. Focuses on U.S. government policy and regulation and impact on the

energy business. Covers federal, state, and local issues. (Writing Intensive)

- 4373. **Energy and Developing Economies (3)**. Prerequisites: C or better in ENCO 3301 and 3385. Growth in global energy demand will be centered in emerging nations. Course focuses on availability and sustainability of energy resources to meet projected need.
- 4375. **Energy Finance (3)**. Prerequisites: C or better in ENCO 3301, FIN 3320, and either ENCO 3385 or 3350. Examines elements of finance unique to oil and gas, including reserve-based lending tied to commodity pricing, capital formation and risk management.
- 4386. **Oil and Gas Agreements II (3)**. Prerequisite: C or better in ENCO 3386. Covers contracts utilized in petroleum exploration and production, including joint operating agreements, federal onshore and offshore leases, and federal exploratory units.
- 4390. **World Energy Project (3)**. Prerequisites: Instructor consent. Industry sponsored project to provide basic energy needs in the developing world. Students spend summer session abroad. Designated service learning course.
- 4395. **Oil and Gas Law I (3)**. Prerequisites: ENCO majors only; C or better in ENCO 3301 and 3385. Case law based study of jurisprudence affecting the oil and gas industry. Emphasis is on concurrent ownership, split estates, and oil and gas leases. S.
- 4396. **Oil and Gas Law II (3)**. Prerequisite: ENCO majors only; C or better in ENCO 4395. Case law based on the study of jurisprudence affecting the oil and gas industry. Emphasis is on regulation of oil and gas industry and selected current issues in energy law. May not be taken concurrently with ENCO 3386.
- 4399. **Senior Seminar in Energy Commerce (3)**. Prerequisite: C or better in ENCO 3301, 3385, and 4395. Capstone course synthesizing with previous coursework advanced concepts in finance, mergers and acquisitions, and relevant negotiating and contract skills.

Graduate Courses

- 5315. **International Energy Policy and Law (3)**. Investigates the business environment of non-U.S. OECD economies (e.g., geopolitics and law) related to maintaining adequate energy supply necessary to maintain economic growth and political stability.
- 5373. **Energy and Developing Economies (3)**. Focuses on availability and sustainability of energy resources to meet global energy demand. Emphasizes opportunities and risks involved with investing in markets centered in emerging economies.

Area of Finance

Jeffrey Mercer, Ph.D., Area Coordinator

Professors: Goebel, Harrison, Hein, Mercer, Nail, Winters

Associate Professors: Cooney, Ritchey

Assistant Professors: Armstrong, L. Cardella, Eriksen, Myers

Associate Professor of Practice: M. Moore

Assistant Professor of Practice: Fairbanks

CONTACT INFORMATION: W309 Business Administration

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About the Program

The Area of Finance supervises the following degree and certificate programs:

- Bachelor of Business Administration in Finance
- Undergraduate Certificate in Finance
- Graduate Certificate in Finance

Undergraduate Program

The goal of the finance major is to prepare students for careers in banking, business finance, investment management, and real estate. To declare a finance major, students must make a B or better in ACCT 2300 and FIN 3320.

Prospective finance students are encouraged to enroll in FIN 3320 during the second semester of their sophomore year as opposed to the first semester of their junior year. This allows finance majors to spread their core finance coursework over two years. This structure enables finance students to legitimately apply for finance internships in both their sophomore and junior summers. Such opportunities will make them more competitive in the job market. Within this structure, ACCT 2300 and ECO 2302 remain as prerequisites for FIN 3320. However, ACCT 2301 and MATH 2345 will be corequisites for enrollment in FIN 3320 for students who have declared their intention of majoring in finance.

The Bachelor of Business Administration in Finance offers a concentration in real estate.

Certificate in Finance

The undergraduate Certificate in Finance is designed to provide undergraduates a strong foundation in the essential topics of finance. This certificate allows non-finance students to expand their knowledge of finance so that they are prepared to participate in business and personal financial decisions that enhance value. Students in this certificate take the four core finance major courses plus real estate finance. The required courses for the certificate are FIN 3321, 3322, 3323, 3324, 3332 or 3334.

General requirements for the certificate are as follows:

- Completion of the college's lower-division requirements.
- Completion of FIN 3320 with a B or better.
- All prerequisites must be met prior to taking each course.
- All courses must be taken in residence.

Course Descriptions

(To interpret course descriptions, see page 23.)

Finance (FIN)

Undergraduate Courses

- 3319. Personal Financial Management (3).** Broad coverage of personal financial management for business majors. Addresses issues in household finance, including saving, portfolio behavior, debt management, and analyzing financial choices.
- 3320. Financial Management (3).** Prerequisites: C or better in ACCT 2300, ECO 2302, and a minimum cumulative 2.75 Texas Tech GPA. Prerequisite or corequisite: C or better in ACCT 2301 and MATH 2345. To declare a FIN major, student must make a B or better. Survey course in finance introducing topics in corporate finance investments and financial institutions.
- 3321. Financial Statement Analysis (3).** Prerequisite: B or better in FIN 3320. 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. (Writing Intensive)
- 3322. Corporation Finance I (3).** Prerequisite: B or better in FIN 3320. Topics include financial analysis, capital budgeting and source of funds.
- 3323. Introduction to Financial Markets and Institutions (3).** Prerequisite: B or better in FIN 3320. Introduction to the US financial system covering various financial markets and institutions and key instruments.
- 3324. Investments (3).** Prerequisite: B or better in FIN 3320. 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).** Prerequisite: C or better in FIN 3320. 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).** Prerequisite: B or better in FIN 3320. Mechanisms of real estate financing, sources of funds and financial institutions, and government agencies. F
- 3336. Principles of Insurance (3).** Prerequisite: C or better in FIN 3320. 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. 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).** Prerequisites: C or better in FIN 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.
- 4326. Student-Managed Investment Fund (3).** Prerequisites: FIN 3321, 3324 and instructor consent. 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).** Prerequisites: C or better in FIN 3323 and 3324. 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).** Prerequisites: C or better in FIN 3322 and 3323. A study of the international monetary system in its theoretical and institutional setting. The position of an

B.B.A. in Finance
Recommended Upper-Division Curriculum

THIRD YEAR			
Fall		Spring	
FIN 3321, Financial Statement Analysis	3	FIN 3323, Intro. to Financial Markets	3
FIN 3322, Corporation Finance I	3	FIN 3324, Investments	3
ACCT 3304, Intermediate Acct. I	3	ACCT 3305, Intermediate Accounting II	3
ISQS 3344, Intro. to Prod. & Oper. Mgt.	3	MKT 3350, Intro. to Marketing	3
COMS 2358, Business & Prof. Comm. or MCOM 2310, Professional Comm.	3	FIN Elective*	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	BECO 4310, Applied Bus. Economics	3
MGT 3370, Organization & Management	3	FIN 4331, Financial Modeling	3
BCOM 3373, Managerial Comm.	3	FIN Elective*	9
FIN 4330, Global Business Finance	3		
FIN 3332, Real Estate Fundamentals	3		
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* Choose four courses from FIN 3319, 3334, 3336, 4326, or any 4000-level FIN course.
ENCO 3365 or 4375 may be used for students pursuing a certificate in Energy.

individual business firm in conducting international trade; procedures in financing international transactions.

- 4329. Fixed Income Analysis (3).** Prerequisites: C or better in FIN 3323 and 3324. Analysis of interest rates, fixed income valuation and fixed income risk management.
- 4330. Corporation Finance II (3).** Prerequisite: C or better in FIN 3322 and either FIN 3321 or ACCT 3305. Senior-level course in global business finance that provides students with the conceptual framework necessary to appreciate and understand business finance decisions.
- 4331. Finance Modeling (3).** Prerequisites: C or better in FIN 3322 and 3324. Exploration of Excel models for decision making in investments and financial management.
- 4333. Real Estate Appraisal (3).** Prerequisite or corequisite: C or better in FIN 3332 or 3334. Appraisal and valuation techniques applied to residential, commercial, and industrial property.
- 4335. Real Estate Investments (3).** Prerequisite: B or better in FIN 3320. Prerequisite or corequisite: C or better in FIN 3332. The framework for urban real estate investment decisions by individuals and institutions.
- 4336. Urban Land Development (3).** Prerequisite or corequisite: C or better in 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).** Prerequisites: Senior standing, minimum 3.0 TTU GPA, and instructor consent. Independent problem research under guidance of a faculty member.
- 4382. Internship in Finance (3).** Prerequisites: Faculty advisor approval and at least 6 hours of professional courses (excluding core courses) to be determined by the area faculty. 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).** 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).** Prerequisites: B or better in FIN 3320, senior standing, finance majors only. Must be taken in the last semester. Integrative experience that brings together the primary functional areas of finance: corporate, investments, institutions, and real estate.

B.B.A. in Finance
Concentration: Real Estate

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.

THIRD YEAR			
Fall		Spring	
FIN 3321, Financial Statement Analysis	3	FIN 3323, Intro. Fin. Mkts. & Institutions	3
FIN 3322, Corporation Finance I	3	FIN 3324, Investments	3
ACCT 3304, Intermediate Acct. I	3	ACCT 3305, Intermediate Accounting II	3
ISQS 3344, Intro. to Prod. & Oper. Mgt.	3	MKT 3350, Intro. to Marketing	3
COMS 2358, Business & Prof. Comm. or MCOM 2310, Professional Comm.	3	FIN 3332, Real Estate Fundamentals	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	BECO 4310, Applied Bus. Economics	3
MGT 3370, Organization & Mgmt.	3	FIN 4331, Financial Modeling	3
BCOM 3373, Managerial Comm.	3	FIN 4335, Real Estate Investment	3
FIN 3334, Real Estate Finance	3	FIN Elective *	6
FIN Elective*	3		
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* Choose three courses from BLAW 3393, or FIN 3319, 4323, 4326, 4333, 4336, and 4382.

Graduate Courses

- 5219. Financial Management Tools (2).** Prerequisites or corequisite: C or better in ACCT 5301 and ISQS 5345. Time value of money; evaluation of financial performance; risk and return; and basic valuation models.
- 5320. Financial Management Concepts (3).** Prerequisite: C or better in ACCT 5301 (concurrent enrollment allowed). 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).** Prerequisites: C or better in FIN 5320 or FIN 3322; admission to finance concentration in M.S./B.A. program, or consent of instructor. 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.
- 5324. Financial Statement Analysis and Equity Valuation (3).** Prerequisites: C or better in FIN 3320 or FIN 5320; admission to finance concentration in M.B.S.A. program, or consent of instructor. In-depth financial analysis leading to equity valuation.
- 5325. Seminar in Security Analysis and Investments (3).** Prerequisite: C or better in FIN 3320 or 5320; admission to finance concentration in M.S./B.A. program or instructor consent. 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).** Prerequisites: C or better in FIN 5325; admission to finance concentration in M.S./B.A. program or instructor consent. New developments in portfolio theory. Efficient markets and capital asset pricing model. Evaluation and management of portfolios.
- 5327. Student-Managed Fund (3).** Prerequisites: Instructor consent; C or better in either FIN 5324, 5325 or FIN 3324. 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).** Prerequisites: Admission to finance concentration in M.S./B.A. program or instructor consent; C or better in FIN 3323 and 3324, or 5320. 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).** Prerequisites: Admission to finance concentration in M.S./B.A. program or instructor consent; C or better in FIN 3323 and 3324, 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.
- 5331. Seminar in Management of Financial Institutions (3).** Prerequisites: Admission to finance concentration in M.S./B.A. program or instructor consent; C or better in FIN 3321 and 3323, or 5320. Management of financial institutions, especially commercial banks, investment banks, mutual funds, insurance companies, etc.
- 5332. Fundamentals of Real Estate (3).** 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).** Prerequisites: Admission to finance concentration in M.S./B.A. program or instructor consent. Corequisite: FIN 5320. 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).** Prerequisite: Admission to finance concentration in M.S./B.A. program; C or better in FIN 5320 or instructor consent. 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 for credit.
- 5338. Multinational Financial Management (3).** Prerequisites: Admission to finance concentration in M.S./B.A. program or instructor consent; C or better in FIN 5320. 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).** Prerequisite: C or better in FIN 5320 or instructor consent. 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: Instructor consent. Permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom.
- 6122. Research Seminar in Finance (1).** Seminar in current research topics and methodology in finance. Should be taken by doctoral students each semester of the program. May be repeated for credit.
- 6136. Seminar in Special Topics in Finance (1).** Prerequisite: C or better in FIN 6331. Doctoral seminar covering the major theoretical and empirical studies in the area of finance as determined by the instructor. May be repeated for credit up to four times.
- 6331. Seminar in Finance Foundations (3).** Prerequisite: Instructor consent. 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).** Prerequisite: C or better in FIN 6331. Doctoral seminar covering major theories and empirical studies that have been developed in the area of corporate finance.
- 6333. Seminar in Investments (3).** Prerequisite: C or better in FIN 6331. 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).** Prerequisite: C or better in FIN 6331. Doctoral seminar covering the major theoretical and empirical studies in the area of financial institutions.
- 6335. Seminar in Financial Markets (3).** Prerequisite: C or better in FIN 6331. Doctoral seminar covering the major theoretical and empirical studies that have been developed in the area of financial markets.



Area of Information Systems and Quantitative Sciences

Glenn Browne, Ph.D., Area Coordinator

Horn Professors: Conover, Westfall

Professors: Browne, Burns, Cao, Jones, J. Wetherbe, Yadav

Associate Professors: Durrett, Lin, Song, Walden

Associate Professor of Practice: Delgadillo

Instructors: Flamm, Giddens, Lay, B. Wetherbe

CONTACT INFORMATION: E310 Business Administration
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About the Program

The Area of Information Systems and Quantitative Sciences (ISQS) supervises the following degree and certificate programs:

- Bachelor of Business Administration in Management Information Systems
- Master of Science in Management Information Systems
- ISQS Undergraduate Certificate in Management Information Systems (MIS)
- Graduate Certificate in Business Analytics

Undergraduate Program

The Information Systems and Quantitative Sciences area has a major field called Management Information Systems (MIS). The MIS graduate is prepared to perform as a computer programmer, information systems analyst and designer, telecommunications and networking expert, information technology project manager, or business analyst depending upon the concentration(s) chosen for study. Graduates from all concentrations are in great demand by industries across the board. MIS majors may choose one or more of the three concentrations: web application design, telecommunications/networking, or business analysis.

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 enrolling in the course.

- ISQS 3345, Object Oriented Systems.
- ISQS 3346, Internet Programming.
- ISQS 3348, Database MGT Systems.
- ISQS 3349, Introduction to Data Communication Systems.
- ISQS 3351, Telecommunications Security Using Linux.
- ISQS 3358, Business Intelligence.
- ISQS 3360, Telecommunication Securities Theory.
- ISQS 4361, Web Application Design.
- ISQS 4385, Strategic IT and Telecommunications Management.

Course Descriptions

(To interpret course descriptions, see page 23.)

Information Systems and Quantitative Sciences (ISQS)

Undergraduate Courses

2340. [BCIS 1305, 1405] **Introduction to Information Systems in Business (3)**. Prerequisites: Minimum grade of C in any college-level math course and a minimum cumulative 2.75 Texas Tech GPA. Survey of computer principles, procedures, hardware systems.
3344. **Introduction to Production and Operations Management (3)**. Prerequisites: C or better in ISQS 2340; MATH 2300 or 2345; minimum cumulative 2.75 Texas Tech 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)**. Prerequisite: C or better in ISQS 3346 A basic course in the design and creation of object-oriented programs, currently in Java.
3346. **Internet Programming (3)**. Prerequisite: C or better in 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)**. Prerequisite: C or better 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)**. Prerequisite: C or better in ISQS 2340. Hands-on course introducing students to computer-to-computer communications technologies and the Linux operating systems.
3351. **Telecommunications Security Using Linux (3)**. Prerequisite: C or better in ISQS 3349. An advanced hands-on course in securing computer networks. F
3358. **Business Intelligence (3)**. Prerequisites: C or better in ISQS 3346 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)**. Prerequisite: C or better in ISQS 3349. A lecture/discussion course analyzing the basics of telecommunications theory. Best if taken concurrently with ISQS 3351. F
4345. **Android Development (3)**. Prerequisite: C or better in ISQS 3345. Focuses on the development of mobile Android applications.
4348. **Systems Analysis (3)**. Prerequisite: C or better in 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)**. Prerequisite: C or better in 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)**. Corequisite: ISQS 4348. Methods for management of software development projects; procurement and financial control; career and professional considerations. (Writing Intensive)
4361. **Web Application Design (3)**. Prerequisites: C or better in ISQS 3345 and 3348. The design and creation of web applications using a multi-tier internet technology such as Jakarta Struts and MySQL.
4375. **Business Analysis (3)**. Prerequisite: C or better in ISQS 4348 and 4350. Develops business analysts who facilitate communication between business areas, subject matter experts, project management, technical deployment teams, and customers to enable successful projects.

B.B.A. in Management Information Systems
Concentration: Telecommunications/Networking

THIRD YEAR			
Fall		Spring	
FIN 3320, Financial Management	3	BLAW 3391, Business Law I	3
ISQS 3349, Intro. Data Comm. Syst.	3	ISQS 3344, Intro. Prod. & Oper. Mgt.	3
ISQS 3348, Data Base Mgt. Systems	3	ISQS 4348, Telecom. Systems Analysis	3
ISQS 3346, Internet Programming	3	ISQS 4350, Info. Systems Project Mgt.	3
BCOM 3373, Managerial Commun.	3	MKT 3350, Intro. to Marketing	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
BECO 4310, Applied Bus. Economics*	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 & Management	3	ISQS 3358, Business Intelligence §	3
Elective (Non BA / Non Eco.) †	3	Elective (Non BA / Non Eco.) †	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* Or any upper-level economics course except ECO 3323 and 4332 or any department approved upper-level computer science course.

† These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

‡ ISQS 4382 or other with written approval.

§ or ISQS 4383 or as approved by an advisor. Topics include Joomla (community-based internet content management) and Mobile App Development (an introductory class in creating mobile applications for Android and/or iOS devices).

B.B.A. in Management Information Systems
Concentration: Web Application Design

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
BCOM 3373, Managerial Commun.	3	MKT 3350, Intro. to Marketing	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
BECO 4310, Applied Bus. Economics †	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 & Management	3	ISQS 4361, Web Application Design	3
Elective (Non-BA/Non-ECO) ‡	3		
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

* or ISQS 4383 or as approved by an advisor. Topics include Joomla (community-based internet content management) and Mobile App Development (an introductory class in creating mobile applications for Android and/or iOS devices).

† Or any upper-level economics course except ECO 3323 and 4332 or any department approved upper-level computer science course.

‡ These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

§ ISQS 4382 or other with written approval.

- 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. 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).** Prerequisite: Minimum cumulative 2.5 Texas Tech 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).** Prerequisite: Final semester or ISQS advisor approval. The design, management, and maintenance of information systems to provide strategic organizational advantage.

Graduate Courses

- 5330. Decision Theory and Business Analytics (3).** Provides an overview of business analytics and examines normative and behavioral theories that drive managerial decision-making.
- 5331. Information Technology and Operations Management (3).** Covers current topics in information technology and operations management and examines how to utilize them to gain competitive advantage.
- 5338. Information Technology for E-Business (3).** 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. Big Data Strategy (3).** Theory and practice of using data to create competitive advantage.
- 5343. Operations Management and Management Science (3).** Prerequisite: ISQS 5345. Fundamentals of the operations management function from a management perspective with an emphasis on the creation of value through the integrated production and distribution of goods and services.
- 5345. Statistical Concepts for Business and Management (3).** 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).** Discrete and continuous probability distributions, maximum likelihood, Bayesian meth-

B.B.A. in Management Information Systems
Concentration: Business Analysis

THIRD YEAR			
Fall		Spring	
MGT 3370, Organization & Management	3	BLAW 3391, Business Law I	3
ISQS 3344, Prod. & Operations Mgt.	3	BCOM 3373, Managerial Commun.	3
FIN 3320, Financial Management	3	MGT 4384, Conflict & Negotiations	3
ISQS 3348, Data Base Mgt. Systems	3	ISQS 4348, Telecom. Systems Analysis	3
BECO 4310, Applied Bus. Economics*	3	ISQS 4350, Info. Systems Project Mgt	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ISQS 3358, Business Intelligence	3	ISQS 4375, Business Analysis	3
MKT 3350, Intro. to Marketing	3	ISQS 4382, Internship in ISQS	3
MGT 4388, Change & Innov. Processes	3	ISQS 4385, Strategic IT/Telecom. Mgt.	3
ISQS 3389, Team Leadership	3	ISQS 4349, Information Systems Design	3
Elective (Non-BA/Non-ECO) †	3	Elective (Non-BA/Non-ECO) †	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

* Or any upper-level economics course except ECO 3323 and 4332 or any department approved upper-level computer science course.

† These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

ods, simulation, statistical methods for learning, prediction, and decision making. Uses calculus.

- 5348. Applied Distribution-Free Statistics in Business (3).** 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).** 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. Permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom.
- 6337. Scripting Languages (3).** Survey of current business analytics scripting languages.

- 6338. **Database Concepts (3).** Model organizational data and business rules; logical and physical designs of relational databases, data warehousing, data mining, and data administration.
- 6339. **Business Intelligence (3).** Prerequisite: ISQS 6338. Data warehousing, including extracting, transforming, loading, creating data warehouses, cubes, dimensional data modeling, techniques for managing large data sets, unstructured data sets, distributed data sets, and non-relational datasets.
- 6340. **Decision Support Systems (3).** 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).** Concepts and terminology of data communications, network design, client-server architecture, distributed information systems with focus on communications architecture, and management.
- 6347. **Data and Text Mining (3).** Prerequisites: C or better in ISQS 6339 and 6348. Classification modeling (decision trees, logistic regression), clustering (including the application to marketing), association analysis, machine learning (AI related methods), neural networks, text and web mining.
- 6348. **Applied Multivariate Analysis (3).** Prerequisite: ISQS 5347 or consent of instructor. Multivariate methods for business research, including classification, visualization, testing, clustering, and latent structure.
- 6349. **Predictive Analysis (3).** 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).** Prerequisite: ISQS 6338. Discusses various analysis and design methods and applies them to several case problems. Topics include requirement specification, design, and implementation architectures.
- 7339. **Prescriptive Analytics (3).** Prerequisites: ISQS 6339 and either ISQS 6348 or 6349. Methods for understanding why data behave as they do and developing prescriptions based on information behavior. Development of models of causality underlying data structures. Methods of communicating and implementing prescriptions for business action.
- 7341. **Seminar in MIS Research and Methods (3).** 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 for credit.
- 7346. **Seminar in Cognitive and Behavioral MIS Research (3).** Prerequisite: Doctoral standing or consent of instructor. Seminar covering cognitive and behavioral MIS research.
- 7347. **Seminar in Managerial and Organizational MIS Research (3).** Prerequisite: Doctoral standing or consent of instructor. Seminar covering managerial and organizational MIS research. May be repeated for credit.

Area of Management

Yitzhak Fried, Ph.D., Area Coordinator

Professors: Boal, Fried, Gardner, Mitchell, Payne

Associate Professors: Brigham, Cogliser, Hansen

Assistant Professors: Davison, Karam, Sears

Professor of Practice: Hoover

Associate Professor of Practice: M. Ryan

Assistant Professor of Practice: Chambers

Instructors: Duran, Fullerton, Miller, Rogers, S. Ryan, Stevens, Stull, Westney

CONTACT INFORMATION: E348 Business Administration
Box 42101 | Lubbock, TX 79409-2101 | T 806.742.3176

About the Program

The Area of Management supervises the following degree and certificate programs:

- Bachelor of Business Administration in Management
- Undergraduate Certificate in Leadership
- Joint Business/Engineering Certificate in Technology Entrepreneurship
- Graduate Certificate in Authentic Leadership and Entrepreneurship for the Family Business
- Graduate Certificate in Leadership

Undergraduate Program

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. The department offers concentrations in human resources management and strategic entrepreneurship and innovation.

Undergraduate Certificate in Leadership

The Undergraduate Certificate in Leadership is designed to prepare undergraduate business majors to build and reinforce the interpersonal skills that are essential to the management role. Leadership has always been recognized as a very desirable trait in many domains and critical to advancement in the business community. Adding a foundation of leadership skills will enhance prospects and abilities in any business-focused discipline. Students will take four courses related to leadership and upon graduation will receive an Undergraduate Certificate in Leadership in addition to the B.B.A. degree. Students will be required to have a minimum GPA of 3.0.

Take MGT 3370 and 4373; then take one of the following:

- MGT 3376 Organizational Behavior
- MGT 4375 International Management

Also select one of the following:

- MGT 4384 Managing Conflict and Negotiation
- MGT 4385 Recruitment, Selection and Retention
- MGT 4388 Change and Innovation Process
- MGT 4397 Management and the Business Environment.

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. The certificate requires 9 hours.

- 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.

Course Descriptions

(To interpret course descriptions, see page 23.)

Management (MGT)

Undergraduate Courses

- 3370. Organization and Management (3).** Prerequisite: Minimum cumulative 2.75 Texas Tech GPA. The management function; basic principles, concepts, and practices in the operation of organizations.
- 3374. Managing Human Resources (3).** Prerequisite: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Principles and methods in human resources management.
- 3375. Entrepreneurship: New Value Creation (3).** Prerequisite: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Introduces students to the knowledge and modes of thinking that are basic to new value creation.
- 3376. Organizational Behavior (3).** Prerequisite: B or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Focuses on managerial and employee attitudes and behavior. Topics include performance, job satisfaction, motivation groups, and task design.
- 3379. Advanced Organization and Management (3).** Prerequisite: B or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Study of the design and management of organizations in considerable depth beyond the basic course.
- 4370. Consulting to Entrepreneurial Organizations (3).** Prerequisite: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Field Project in the Lubbock Community. Not an in-classroom course.
- 4373. Leadership Ethics (3).** Prerequisite: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Alternative perspectives of leadership and ethics are explored and applied to emergent ethical issues facing organizations.
- 4374. International Entrepreneurship (3).** Prerequisites: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors); minimum cumulative 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).** Prerequisite: C or better in MGT 3370 and 3376 (business majors) or BA 3305 (non-business majors). Exploration of organization and management issues in international enterprise.
- 4376. Entrepreneurship: Discovering Entrepreneurial Opportunities (3).** Prerequisite: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors). 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).** Prerequisite: Previous experience in a family business or intent to establish a family business. Exploration of major issues and strategies for initiating, building and managing a family business.
- 4380. Strategic Management (3).** Prerequisite: Business students in their final semester with a C or better in BLAW 3391, ISQS 3344, FIN 3320, MKT 3350, MGT 3370, and MGT 3373 or BCOM 3373. 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. (Writing Intensive)
- 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. 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.

B.B.A. in Management Recommended Upper-Division Curriculum

THIRD YEAR			
Fall		Spring	
BECO 4310, Applied Bus. Economics*	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
BCOM 3373, Managerial Commun.	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	15	TOTAL	12

Minimum hours required for graduation: 120

* Or any upper-level economics course except ECO 3323 and 4332.

† Group A – Choose four courses from MGT 3374, 3375, 4370, 4373, 4374, 4375, 4376, 4377, 4384, 4385, 4386, 4388, 4389, 4397 or HOM 4371.

‡ Group B – Choose one additional junior- or senior-level business course, provided it is not used to fulfill another requirement.

§ These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120-hour requirement.

- 4483. Special Topics in Management (3).** Prerequisite: Consent of instructor. Examines specialized problems relating to management. May be repeated once for credit as topic varies.
- 4484. Managing Conflict and Negotiations (3).** Prerequisite: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Develop the skills necessary to manage organizational stakeholders effectively. Emphasizes negotiation skills.
- 4485. Recruitment, Selection, and Retention (3).** Prerequisite: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Introduces students to employee selection and placement issues, including job analysis, criterion development, development and use of employment tests, validation of selection techniques, recruitment strategies, and statistical methods for making fair employment decisions.
- 4486. Entrepreneurship: New Venture Creation (3).** Students learn and apply due diligence, business planning, and venture creation skills needed to implement new business concepts.
- 4487. History of Management Thought: Honors Seminar in Management (3).** Prerequisites: 3.0 Texas Tech GPA; MGT major or Honors College student. Offers interdisciplinary perspective on development of management knowledge.
- 4488. Change and Innovation Processes (3).** Prerequisite: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Focuses on understanding and managing innovation and change processes.
- 4489. Team Leadership (3).** Introduction to the dynamic nature of teams using an experiential approach. Explores various roles in the interactions among team members, team members and leader, and team leader and the organization.
- 4497. Management and the Business Environment (3).** Prerequisite: C or better in MGT 3370 (business majors) or BA 3305 (non-business majors). Study and cases in social responsibility, business ethics, and other problems in the external environment of the business organization.
- 4499. Human Resource Management Capstone (3).** Provides students with opportunities to demonstrate mastery of the human resource management concentration coursework through review strategies and intensive preparation for the SHRM Assurance of Learning Assessment®.

Graduate Courses

- 5199. M.B.A. Capstone (1).** 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

B.B.A. in Management
Concentration: Strategic
Entrepreneurship and Innovation

The entrepreneurship emphasis focuses on the creation of new value, wherever it can be found: new products, services, businesses, social enterprises, and corporate entrepreneurship. This emphasis prepares students for exciting careers in any organization that requires entrepreneurial thinking backed up by concrete skills.

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
BECO 4310, Applied Bus. Economics*	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 3375, New Value Creation	3
BCOM 3373, Managerial Commun.	3	MGT 3376, Organizational Behavior	3
MKT 3350, Intro. to Marketing	3	MGT 3379, Adv. Organization & Mgt.	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Group A †	6	MGT 4380, Strategic Management	3
Group B ‡	3	Group B ‡	3
Non BA / ECO Elective	3	Free Electives	6
MGT 4376, Discovering Entrep. Opps.	3		
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

- * Or any upper-level economics course except ECO 3323 and 4332.
- † Group A – Choose two courses from MGT 4370, 4374, 4377, 4383, 4386, 4388.
- ‡ Group B – Choose two courses from any junior- or senior-level business course provided it is not used to fulfill another requirement.

B.B.A. in Management
Concentration: Human Resources Management

The human resources management concentration offers students the opportunity to learn the principles of effectively planning, organizing, and leading organizations. Students develop distinctive competencies that enable them to effectively manage, lead, and compete in the global marketplace while modeling high standards of ethical conduct and social responsibility.

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MGT 3370, Organization & Mgt.	3	BLAW 3391, Business Law I	3
BCOM 3373, Managerial Commun.	3	ISQS 3344, Intro. Prod. Oper. Mgt.	3
FIN 3320, Financial Management	3	MGT 3374, Managing Human Res.	3
MKT 3350, Intro. to Marketing	3	MGT 3376, Organizational Behavior	3
BECO 4310, Applied Bus. Economics*	3	HRDV 3307, Employment Law in HR Dev.	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
HRDV 3310, Training & Dev. in HR Dev.	6	MGT 4399, HR Mgmt. Capstone	3
Group A †	3	MGT 4380, Strategic Management	3
MGT 4385, Rec. Selection & Ret.	3	Group A †	3
Free Elective	3	Group B ‡	3
		Free Elective	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 120

- * Or any upper-level economics course except ECO 3323 and 4332.
- † Choose 3 courses from MGT 3379, 4373, 4375, 4384, 4388, 4389, 4397
- ‡ Choose 1 course from HRDV 3305, 3308

and leadership skills; formulation of individual Career Development Plan; assessment of individual progress toward M.B.A. program goals.

- 5300. **Management in Special Contexts (3)**. Special management topics will vary by semester and faculty instructor.
- 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)**. Students apply alternative leadership and ethical perspectives through cognitive skill building and experiential learning to accelerate their development as authentic leaders.
- 5373. **Opportunity Creation and Discovery (3)**. 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)**. Emphasizes negotiation skills and strategy development for managing organizational stakeholders.
- 5376. **Strategic Business Communication (3)**. A strategic approach to professional business communication with diverse internal and external stakeholders. Focuses on credibility, persuasion, group facilitation, ethics, and case analysis.
- 5377. **Human Resource Management (3)**. Examination of the principles and methodology of personnel administration with emphasis on manpower planning, selection, development, and evaluation.
- 5378. **Leading and Managing the Effective Family Business (3)**. Focuses on the exploration of the unique aspects of entrepreneurship in a family business enterprise.
- 5379. **Applied Entrepreneurship (3)**. Develops entrepreneurial creation and discovery skills with a focus on applying those skills to real-world situations.
- 5381. **Managing Innovation and Change (3)**. 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. 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)**. Comparative analysis of domestic, international, and multinational business operations, and the significance for organization and management.
- 5391. **Strategic and Global Management (3)**. M.B.A. Capstone. Global and local strategy formulation and implementation of corporate, business, and functional strategies.
- 5476. **Executive Skills (4)**. 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)**. 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)**. 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)**. 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)**. 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.

Area of Marketing

Dennis B. Arnett, Ph.D., Area Coordinator

Horn Professor: Hunt

Professors: Arnett, Duhan, Howell, Laverie, McDonald

Associate Professors: Dass, Rinaldo, R. Thomas

Assistant Professors: Chaudhry, Frias, Popovich

Assistant Professor of Practice: S. Thomas

Instructors: Harper, Whitebread

CONTACT INFORMATION: 241 Business Administration
 Box 42101 | Lubbock, TX 79409-2101
 T 806.742.3162 | F 806.742.1572

About the Program

The Area of Marketing supervises the following degree program:

- Bachelor of Business Administration in Marketing

Undergraduate Program

The undergraduate program in marketing offers a solid curriculum and learning experiences that prepare students for success. The marketing major is designed to offer an understanding of marketing with cutting-edge ideas and practices that prepare students for their first position in marketing and also provide the foundation needed to advance. The degree offers two concentrations: supply chain management and sales.

A grade of B or better in MKT 3350 is required to progress as a marketing major.

Marketing (MKT)

Undergraduate Courses

- 3350. Introduction to Marketing (3).** Prerequisites: C or better in ECO 2302 or ECO 2305 or AAEC 2305; minimum cumulative 2.75 Texas Tech 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.
- 3351. Services Marketing (3).** Prerequisite: B or better in MKT 3350. 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).** Prerequisite: B or better 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).** Prerequisites: B or better in MKT 3350; 3.2 TTU GPA; completion of all undergraduate course work. An introduction to principles and practices used today in managing relationships among manufacturers, distributors, retailers, and consumers.
- 3356. Marketing Research and Analysis (3).** Prerequisites: B or better in MKT 3350 and C or better in MATH 2345 or 2300. Scientific marketing research methods; emphasis on collection, analysis, and interpretation of data as applied to the solution of marketing problems.
- 4350. Personal Selling (3).** Prerequisite: B or better in MKT 3350. Customer-focused selling, including socialization to a career in sales.
- 4354. Market Promotion (3).** Prerequisite: B or better in MKT 3350. Management of the promotional mix of advertising, personal selling, and sales promotion. Emphasizes the interaction and

B.B.A. in Marketing

Recommended Upper-Division Curriculum

THIRD YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	ISQS 3344, Intro. Prod. & Oper. Mgt.	3
FIN 3320, Financial Management	3	MKT 3356, Market. Research & Anal.	3
MGT 3370, Organization & Management	3	Group A*	6
BCOM 3373, Managerial Comm.	3	Group B†	3
MKT 3350, Intro. to Marketing	3		
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
BECO 4310, Applied Bus. Economics§	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

TOTAL HOURS: 120

* Group A – Choose five courses from MKT 3351, 3352, 3353, 4354, 4356, 4358, 4359, 4370, 4371, 4383; IB 4361.

† Group B – Choose two additional junior- or senior-level business courses provided they are not used to fulfill another requirement.

‡ These are the only courses not requiring a grade of C or higher.

§ Or any upper-level economics course except ECO 3323 and 4332.

coordination of these three elements and relates them to the other components of the firm's marketing strategy.

- 4356. Brand Management/New Product Development (3).** Prerequisite: B or better in MKT 3350. Overview of product/brand management and new product development. A mix of theory and actual business application of the theory.
- 4358. International Marketing (3).** Prerequisite: B or better in MKT 3350. A survey of international marketing principles, cultural differences, world markets, and political constraints.
- 4359. Sales Management (3).** Prerequisite: C or better in MKT 3350. Problems and methods of organization and administration of sales departments, sales operations, sales control, sales promotion, and sales policies.
- 4370. Forecasting and Inventory Management (3).** Prerequisites: B or better in MKT 3350 and 3353, ISQS 3344, and admission to the supply chain management concentration. Covers demand management, customer service, forecasting, and inventory management aspects of business logistics. Introduces select analytical techniques, strategies, and applied problem-solving approaches.
- 4371. Transportation and Distribution Management (3).** Prerequisites: B or better in MKT 4370 and admission to the supply chain management concentration. Covers transportation and distribution aspects of business logistics. Introduces select analytical techniques, strategies, and applied problem-solving approaches.
- 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).** Prerequisites: 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).** Prerequisite: B or better in MKT 3350 and consent of instructor. Examination of specialized problems in such topics as working capital management, capital budgeting, cost of capital, commodity and financial

B.B.A. in Marketing
Concentration: Sales

Most marketing majors begin their career with a sales position. The sales concentration is intended to prepare students for that first job. The courses included will help students to understand the role of sales in a marketing strategy, how to manage a sales force, and the sales process. Additionally, students will learn skills such as uncovering prospect needs, making sales presentations, and writing proposals.

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
BLAW 3391, Business Law I	3	ISQS 3344, Prod. & Operations Mgmt.	3
FIN 3320, Financial Management	3	MKT 3352, Consumer Behavior	3
MGT 3370, Organization & Mgmt.	3	MKT 4350, Personal Selling	3
BCOM 3373, Managerial Comm.	3	MKT 3356, Marketing Research & Anal.	3
MKT 3350, Intro. to Marketing	3	Restricted Elective*	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
BECO 4310, Applied Bus. Economics	3	MGT 4380, Strategic Management	3
GROUP A †	3	MKT 4354, Market Promotion	3
MKT 4359, Sales Management	3	Free Elective	6
Non BA/Non ECO elective	3	Group A †	3
Group B ‡	3		
TOTAL	15	TOTAL	15

* Restricted Electives: COMS 2358 or ENGL 3365

† Group A: Choose 2 from MKT 3351, 3353, 4356, 4358

‡ Group B: One additional junior- or senior-level business course provided it is not used to fulfill another requirement.

future investment, and small business finance. May be repeated once for credit as topic varies.

- 4385. Marketing Strategy (3).** Prerequisite: C or better in 9 hours of MKT 3000-4999 courses. Explores the field of marketing as it directs the organization's resources to satisfy customers' wants and needs through the exchange of process at a profit to the organization. (Writing Intensive)

Graduate Courses

- 5353. Global Supply Chain Management (3).** Focuses on managing the flow of goods, services, finances, and information from point of origin to point of consumption in global supply chains. Emphasis on the strategic role of supply chain management as a source of competitive advantage and value creation.
- 5355. Research Design (3).** An in-depth examination of measurement issues, including latent constructs and data-gathering procedures in marketing.
- 5358. Business-to-Business Marketing (3).** 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).** Prerequisite: Consent of instructor. Directed individual study of advanced marketing problems varying with the need of the particular student. May be repeated for credit if subject matter is different.
- 5360. Marketing Concepts and Strategies (3).** 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).** Prerequisite: MKT 5360. A study of marketing planning and strategic issues related to the marketing effort.
- 5364. Services Marketing (3).** Prerequisite: MKT 5360. Designed to provide an overview of the basic functions, theoretical concepts,

B.B.A. in Marketing
Concentration: Supply Chain Management

The concentration in supply chain management focuses on managing the flow of goods, services, finances, and information from point of origin to point of consumption in global supply chains. Supply chain management requires the analytical ability to make data-driven decisions and the interpersonal skills to manage essential business relationships. Supply chain managers must be able to communicate, collaborate, and coordinate with customers and suppliers. The concentration prepares students for challenging careers in supply chain management in areas such as transportation, inventory management, strategic sourcing, distribution, customer service, and demand management. Admission into the supply chain management concentration is competitive and based on a comprehensive review of a student's application materials.

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
BLAW 3391, Business Law I	3	FIN 3320, Financial Management.	3
ISQS 3344, Prod. & Operations Mgmt.	3	MKT 3353, Supply Chain Mgt	3
MGT 3370, Organization & Mgmt.	3	MKT 4358, International Mkt	3
BCOM 3373, Managerial Comm.	3	Free Elective	3
MKT 3350, Intro. to Marketing	3	Group B*	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
BECO 4310, Applied Bus. Economics	3	MGT 4380, Strategic Management	3
MKT 4370, Logistics Mgt	3	MKT 4371, Logistics Analytical Methods	3
IB 4361, International Commerce	3	Group A †	3
Non BA/Non ECO elective	3	Free elective	3
MKT 3356, Market. Research & Analys	3		
TOTAL	15	TOTAL	12

* Group B: One additional junior- or senior-level business course provided it is not used to fulfill another requirement

† Group A: Choose one from MKT 3351, 3352, 4350, 4354, 4356, 4359.

and terminology of the marketing of services to consumers and businesses.

- 5382. Internship in Marketing (3).** 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.
- 6300. Colloquium in Marketing (3).** Studies in selected areas of marketing. Topics vary by semester. May be repeated for credit.
- 6310. Advanced Topics in Marketing (3).** Seminar covering current issues in marketing. Topics vary by semester. May be repeated for credit.
- 6320. Advanced Topics in Marketing Research (3).** Seminar covering current issues in marketing research. Topics vary by semester. May be repeated for credit.
- 6350. Theory Building and Testing (3).** Prerequisite: Advanced graduate standing. Designed to provide an introduction to the research process as it applies to business disciplines.
- 6353. Marketing Theory (3).** 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.
- 6354. Marketing Strategy (3).** Prerequisite: Advanced graduate standing and consent of instructor. Designed to examine issues regarding marketing strategy, its formulation, and its implementation.
- 6355. Theory Testing (3).** Prerequisite: Consent of instructor. A survey of quantitative methods for and issues in the analysis of marketing data.
- 6356. Consumer Behavior Seminar (3).** Prerequisite: Advanced graduate standing. A survey of the major research being carried out in consumer behavior.

College of Education

Scott Ridley, Ph.D., Dean

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About the College

The College of Education has embarked on a reform agenda to increase the rigor and relevance of all its programs. Working closely with partners in public schools, community agencies, and institutions of higher learning, college faculty have developed innovative programs to prepare graduates for the educational demands of the 21st century.

The college 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 a global society.

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 secondary 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 Texas Education Agency, the State Board for Educator Certification, and the Council for Accreditation of Educator Preparation. 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 three departments. The Department of Teacher Education offers undergraduate programs leading to initial teaching certificates. The Department of Curriculum and Instruction offers 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 website 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 passing rate for all students taking their exams in 2013-2014 was 95 percent.

TechTeach

The college is implementing a new teacher education program, TechTeach. Students entering the program participate in a field-based, competency-based curriculum that features a full year of student teaching. The new TechTeach program has been developed by university faculty in partnership with public school personnel. Those who complete the new program will be highly capable teachers able to begin their teaching careers as skilled professionals.

Appropriate coursework accompanies student teaching. Student teachers follow the school district calendar for new teachers and participate in professional development opportunities with their cooperating teachers.

All students seeking initial teaching certification at Texas Tech must successfully complete a series of competency-based performance assessments.

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 website (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, Media and Communication, 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 includes the state-mandated Texas Examinations of Educator Standards (TExES) exams. Students must pass all appropriate TExES exams for teacher certification.

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 selected program. 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 any certification must have a 2.75 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.
4. Pass a content exam in the desired teaching field.
5. Meet the requirements of all other criteria that may be established for the teacher certification program.

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 any of the admission criteria 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. A full year of student teaching is required for students beginning their programs in spring 2013 or later. The following are prerequisites for admission to student teaching:

1. The applicant must have completed all appropriate coursework prior to student teaching. Additional courses will be taken during student teaching.
2. Each student—unless enrolled in agricultural science, family and consumer science, 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, art or music must consult their department chairperson regarding the proper time to file this application.
3. Students must pass the content TExES exam in their teaching field.
4. The student must have a grade point average of 2.75 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 2.75 or higher overall GPA. Students seeking middle-level, secondary, and all-level certificates must have a 2.75 or higher overall GPA.
5. The student must be able to speak and understand the English language sufficiently to use it easily and readily in conversation and teaching.
6. The student must possess and demonstrate such personal and social qualities and physical and mental health to indicate a fitness for the education profession.
7. The student must have met all other criteria that may be established for admission to student teaching.

Under some circumstances a student may be requested to leave a student teaching placement. Such a request can be initiated by the college, the student, or the school district. Due process will be observed in considering whether an alternate placement will be made or the student teaching experience will be terminated.

TExES 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 and a content specialization test in each area for which certification is sought. 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 exam information and access to the registration process at www.educ.ttu.edu/certification. Students should also consult the website for exam testing dates 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. Teacher candidates must demonstrate their competency through a series of performance assessments to be eligible for an initial teaching certificate recommendation. 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 completion of all requirements, including the appropriate TExES examinations, the College of Education will recommend the student for certification.

While completing the requirements, a student must maintain a 2.75 GPA in the professional education courses and a 2.75 GPA in the teaching field(s). Grades of D are not acceptable in the professional education courses or in the teaching field(s). An overall GPA of 2.75 is

required. Students must successfully complete coursework and clinical experiences to proceed from one semester to the next in the program.

Post-Baccalaureate Certification Programs. The post-baccalaureate program is under revision. Please consult www.educ.ttu.edu for program requirements.

Secondary Catalog Policy. Students pursuing a College of Education teacher concentration will use a primary catalog specific to their major. For the teacher education program, students will use a secondary catalog specific to the year they begin their College of Education teacher concentration.

This will be listed on the student's concentration record within Banner. The use of a secondary catalog year ensures that students will remain compliant with annually updated TEA rules and regulations.

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 website 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 certification 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 the programs are housed. For admission information and details about the programs, see the college website 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.tea.state.tx.us).

Department of Curriculum and Instruction

Margaret Price, Ph.D., Chairperson

Professors: Benavides, Lesley, Midobuche, Morgan-Fleming, Smith, Wang

Associate Professors: Agnello, Aguirre-Muñoz, Akrofi, Anderson, Janisch, Johnson, Matteson, McMillan, Muñoz, Pratt, Price, Walker

Assistant Professors: Carpenter, Fortney, Greenhalgh-Spencer, Han, Kenna, Patrick

CONTACT INFORMATION: 104 Education Building, Box 41071, Lubbock, TX 79409-1071, T 806.742.1958, F 806.742.2179, www.educ.ttu.edu/academic-programs/curriculum-and-instruction/default

About the Program

This department supervises the following degree programs and certificates:

- 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
- Graduate Certificate in Multidisciplinary Science
- Master Mentor Graduate Certificate

Master's Programs

M.Ed. in Bilingual Education. A master's degree in bilingual education 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.

M.Ed. in Curriculum and Instruction. The program area of curriculum and instruction offers a 36-hour master's degree that is designed to meet the diverse needs of professional educators in elementary, secondary, and post-secondary education. Thesis and non-thesis options are available. This degree is offered online with specializations in language and literacy and bilingual education. Further information and application forms are available on the website www.educ.ttu.edu/edci.

M.Ed. in Elementary Education. The 36-hour master's program in elementary education is designed for students interested in concentrating on the fundamentals of reflective practice with an emphasis in social studies, mathematics, and science education. Thesis and non-thesis options are available. Students enrolled in a post-baccalaureate certification program should meet with a faculty advisor to develop a master's degree plan that will include certification coursework. Information about the program and application forms can be found at www.educ.ttu.edu/eled

M.Ed. in 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 non-thesis options are available.

M.Ed. in Secondary Education. This 36-semester-hour degree 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. 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.

M.S. 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 has two tracks, one for secondary science teachers or K-8 teachers with a strong science background and another for middle-level science and math teachers. The program requires completion of a core of nine courses:

- BIOL 5311 Ecology for Teachers
- BIOL 5312 Cellular, Molecular Biology for Teachers
- CHEM 5360 Conceptual Chemistry for Teachers I
- CHEM 5361 Conceptual Chemistry for Teachers II
- EDSE 5377 Science Curriculum and Instruction
- IS 5301 The Nature of Science for Teachers
- MATH 5360 Advanced Mathematics for Teachers I
- MATH 5361 Advanced Mathematics for Teachers II
- PHYS 5371 Conceptual Physics for Teachers

Middle-level students are required to take ECE 5332, PHYS 5300, and EDCI 6306 in addition to the nine core courses.

Secondary-level students are required to take ATMO 5302, GEOL 5340, and PHYS 5372 in addition to the nine core courses.

Doctoral Program

Ph.D. in Curriculum and Instruction. The Doctor of Philosophy in curriculum and instruction may be completed with 93 credit hours beyond the baccalaureate. Students may choose a concentration in one of four areas: curriculum studies/teacher education; language, diversity, and literacy studies; physical education and sports science; or science, technology, engineering, and mathematics (STEM) education. Courses are taken in curriculum and instruction, the student's concentration, research methods, diversity, and technology. Contact the department (peggie.price@ttu.edu) for further information.

Online/Blended Ph.D. in Curriculum and Instruction. This degree is designed to emphasize studies in areas that are crucial to development of existing P-12 teachers, administrators, and curriculum specialists as well as college and university professors and administrators. The program prepares students to apply, synthesize, and evaluate curriculum and instruction theory. Coursework is completed primarily online, but students are required to attend an on-campus orientation and three consecutive annual, two-week intensive summer sessions. The concentration areas available are (1) curriculum studies and teacher education and (2) STEM education, and (3) language, diversity, and literacy studies. Contact the department (peggie.price@ttu.edu) for further information.

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, 806.834.1186, mellinee.lesley@ttu.edu

Master Mentor. The 12-hour Master Mentor Graduate Certificate is designed to prepare experienced teachers to mentor beginning professionals 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. Connie Anderson, connie.anderson@ttu.edu

Multidisciplinary Science. The 15-hour Graduate Certificate in Multidisciplinary Science supports on-going and professional development activities that are designed to improve classroom practice for English learners in science and mathematics instruction. **Contact:** Zenaida Aguirre-Muñoz, 806.834.4949, z.aguirre@ttu.edu

Post Baccalaureate Initial Teaching Certification

The post-baccalaureate program is under revision. Please consult www.educ.ttu.edu for further information.

Course Descriptions

(To interpret course descriptions, see page 23.)

Bilingual Education (EDBL)

Graduate Courses

- 5306. **Seminar in Bilingual/ESL Education in K-12 Contexts (3).** Recent research trends and issues in bilingual education or English-as-a-Second Language in K-12 contexts.
- 5310. **Advanced Spanish for Bilingual Teachers (3).** Prerequisite: Admission to the graduate program in bilingual education or consent of instructor. Advanced proficiency and instructional skills for bilingual classrooms. Emphasis on academic language.
- 5320. **Advanced Content Area Instruction in Spanish for Dual-Language Classrooms (3).** 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).** Overview of curriculum, assessment process, teaching strategies, research, and legislation related to bilingual education.
- 5333. **Teaching the Multicultural-Multilingual Student (3).** Strategies and techniques for teaching and working with the multicultural-multilingual student.
- 5334. **First and Second Language Acquisition (3).** 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).** 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).** 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).** 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.
- 5340. **Academic Writing Development for K-12 Second Language Learning Contexts (3).** Theory, research, and development of written school-based genres of bilingual students for K-12 curriculum and assessment design considerations.
- 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)

Graduate Courses

- 5306. **Seminar in Curriculum and Instruction (3).** Recent research, trends, and issues in curriculum and instruction. May be repeated for credit.
- 5308. **Improving Mentoring Practices (3).** Provides an instructional framework for teaching specific mentoring skills and for developing and nurturing the teaching of skillful and reflecting thinking.
- 5309. **Mentoring Models for New Professionals (3).** Selected mentoring models of well-conceived introduction programs that offer practitioners a valuable tour of the mentoring landscape. Emphasis is placed on professional support and development.
- 5310. **Instructional Theory and Design (3).** Applications of contemporary educational theory and design procedures to secondary

education, including models of teaching, enhancement of self-concept, and adolescent needs and interests.

5311. **Mentorship (3)**. Guides veteran professionals through a cycle of learning based on established professional development national standards. Required for Master Mentoring Certificate.
5312. **Collaborative Communities in Mentoring (3)**. Designed to assist those planning to teach or work in professional settings in acquiring a perspective dealing with the theory and practice of professional learning communities. Required for Master Mentoring Certificate.
5313. **Nature of Informal Science Education (3)**. Introduction to the nature of informal science education, the process of informal learning, and educating a wide range of audiences.
5315. **Learning Theories and Curriculum Models in Informal Science Education (3)**. Formal learning theories and curriculum methodologies are investigated and applied to learning in informal settings.
5316. **Assessing Learning in Informal Science Settings (3)**. Theoretical underpinnings of assessment in informal settings and the diversity and complexity of assessing science learning in informal contexts.
5320. **Curriculum Theory: Foundations (3)**. Fundamental bases for curriculum development.
5321. **Curriculum Theory: Design and Development (3)**. Principles of curriculum needs assessment, design, implementation, and evaluation.
5330. **Ethics and Education (3)**. A critical study of ethical theories and their implications for teaching and the teaching profession.
5333. **Improving the Teaching of Thinking (3)**. 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)**. Selected models of or approaches to teaching are described, demonstrated, and practiced. Emphasis is placed on expanding the repertoire of teaching skills.
5362. **Curriculum and the Media (3)**. Investigates popular media and its role in development of relevant curriculum. Educators gain knowledge and skills for communicating educational issues in public environments.
5371. **Curriculum and Instruction in Sciences and Math Education (3)**. 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)**. 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)**. Introduces interdisciplinary pedagogies, technological tools, instructional strategies, and appropriate assessments for designing and developing project-enhanced environments in science and mathematics classrooms.
5375. **Creativity in the Curriculum (3)**. A critical exploration of the trends, issues, and multiple perspectives related to creativity; its importance to individuals, groups, and society; and its place in cross-disciplinary curricula. Development of an informed position and curriculum recommendations.
5377. **Technology in Science/Math Education (3)**. Explores the use of technology to promote science, mathematics, and integrated learning with a focus on current research.
5380. **Action Research I (3)**. Fundamentals of quantitative and qualitative design. Students write a literature review and design an original action research project.
5386. **Constructivist Inquiry Methodologies in Curriculum and Instruction (3)**. 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)**. Critical analysis and design of research in selected curriculum areas. May be repeated for credit.
6320. **Curriculum Theory: Inquiry (3)**. 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)**. A critical analysis of John Dewey's theory of education, pedagogy, and curriculum.

6333. **Diversity Ideologies: Implications for Schooling (3)**. Examines the origin, purpose, disciplinary orientation, and ideological positions of diversity theoretical perspectives.
6382. **Advanced Field Methods in Constructivist Inquiry (3)**. Prerequisite: One of EPSY 5382, 6304; EDCI 5386; ANTH 4305 or 5305; SOC 5394; ART 5364; ENGL 5389; HIST 5303; AGED 5302; COMS 5301; FCSE 5304; HDFS 5351 or 6366; MFT 5351 or 6323; NURS 5391; WS 5320. Advanced course investigating methods used in constructivist inquiry. Students will complete three studies using observations, interviews, and documents culminating in a completed case study.
6392. **Advanced Practicum in Mentoring (3)**. A supervised lab or field experience in a mentoring curricular area. Includes assessment, planning, instruction, and evaluation.
6393. **Advanced Practicum in Curriculum and Instruction (3)**. A supervised laboratory or field experience in a curricular area; includes assessment, planning, instruction, and evaluation. May be repeated for credit.
6395. **Advanced Seminar: Best Practices in Mentoring (3)**. Critical analysis and design of research in selected curriculum areas of induction training and support.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Elementary Education (EDEL)

Graduate Courses

5360. **Developing Social Studies Programs in Elementary Education (3)**. Objectives, patterns, and principles of organization of social studies in the elementary schools.
5370. **Developing Mathematics Programs in Elementary Education (3)**. Development of arithmetic and its educative function in the elementary school curriculum.
5375. **Developing Science Programs in the Elementary School (3)**. Methods and materials for helping children develop an understanding of their natural and physical environments.
6306. **Studies in Elementary Education (3)**. Trends in modern elementary education.
6360. **Studies in Social Studies Education (3)**. Prerequisite: EDEL 4360 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)**. 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)**. 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)**.

Interdisciplinary Studies (IS)

Graduate Course

5301. **The Nature of Science for Teachers (3)**. Interdisciplinary course for teachers providing an overview of science and scientific inquiry. Special emphasis on research methods.

Language Literacy (EDLL)

Graduate Courses

5340. **Literacy Acquisition Process and Pedagogy (3)**. Prerequisite: EDLL 5351 or concurrent enrollment. Psychological and research bases of reading instruction. A foundations course.
5341. **Developing Academic Literacy in the Disciplines for Adolescents (3)**. Reading and writing to learn in content area disciplines intended for secondary students in grades 8-12.
5342. **Classroom-Based Literacy Assessment for Differentiated Instruction (3)**. 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 Literacy (3)**. 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 Methods for Primary and Elementary Literacy (3)**. 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. **Emergent and Early Literacy Development and Pedagogy (3)**. Theoretical bases, procedures, techniques, and materials for early literacy instruction.
5346. **Increasing Reading Proficiency for All Readers (3)**. 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)**. Prerequisite: Previous reading courses or consent of instructor. A study of reading as communication with applications of linguistics to the reading classroom.
5350. **Developing Traditional and New Literacies in Elementary Settings (3)**. Applications of research findings and modern theory to teaching and organizing the language arts in the elementary school.
5351. **Children's Literature in the School Curriculum (3)**. 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)**. Selection of materials and methods for understanding and developing reading requirements/strategies/skills of middle school/level students in grades 4-8.
5355. **Creating Writing-Centered Classrooms (3)**. Application of in-depth studies of research and instructional practices in the teaching of writing to guide development of effective writing programs.
5356. **Trends and Issues in Adolescent Literacy (3)**. Investigation of current problems, trends, and issues in the teaching adolescent readers in middle and secondary schools. May be repeated for credit.
5366. **Teaching Developmental Readers Adolescent to Adult (3)**. Examines current research and theories concerned with effective literacy instruction for developmental readers.
5393. **Internship in 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. **Trends and Issues in Literacy Pedagogy and Research (3)**. 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. **Content Area Literacy Policies and Research (3)**. 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. **Analyzing, Designing, and Conducting Literacy Research (3)**. In-depth analysis and synthesis of contemporary research in literacy development and instruction.
6349. **Adolescent Literature (3)**. 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)**. Prerequisite: EDLL 3352 or 5350. In-depth studies of research and instructional practices pertaining to elementary language arts. May be repeated for credit.
6351. **Critical Studies in Literature (3)**. Prerequisite: EDLL 3350 or 5351. In-depth studies of research and instructional practices pertaining to children's literature. May be repeated for credit.
6353. **Investigating Theoretical Models of Literacy (3)**. 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)**.

Education Middle Level (EDML)

Graduate Courses

5301. **Foundations of Middle-Level Education (3)**. Examines the history and philosophy of middle-level education reforms and the implication for the current educational climate.

Secondary Education (EDSE)

Graduate Courses

5305. **Issues and Reform in American Secondary Schooling (3)**. 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)**. Foundations, principles, and issues of curriculum in secondary level schools.
5331. **Improvement of Instruction in the Secondary School (3)**. A study of teaching behaviors, styles, and strategies. Instructional theories and various models of teaching are examined.
5377. **Science Curriculum and Instruction (3)**. A study of evolving science curriculum with emphasis on innovative practices, methodology, organization for instruction, and evaluation.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

STEM Education (ESTM)

Graduate Courses

6370. **Research in STEM Education (3)**. Survey of research in science, mathematics, engineering, and/or technology education.
6371. **Effective Policy Advocacy in STEM Education (3)**. A P1 conceptual development course that focuses on knowledge and understanding of effective advocacy avenues for STEM education issues and current progressive STEM education reform efforts at the local, regional, national, and international levels.
6372. **Applied Assessment in STEM Education (3)**. A P1 exploration of current issues related to assessment, multiple dimensions of assessment, and the processes of assessment in mathematics and science education.
6373. **Advanced Theory of Inquiry in STEM Education (3)**. Introduces interdisciplinary pedagogies, technological tools, instructional strategies, and appropriate assessments for designing and developing inquiry-based instructional and learning environments in science and mathematics classrooms.
6374. **International STEM Education Assessment, Policy and Practice (3)**. Prerequisites: EPSY 5381 and EDCI 6377 or consent of instructor. Analysis and policy implications of international assessments of STEM education.
6375. **Staff Development in STEM Education (3)**. Prerequisite: EDCI 6378 or consent of instructor. Principles of organizational change applied to STEM education.
6377. **Global STEM Education (3)**. Examines instructional methods to engage students in global STEM education.
6378. **Applications of Global Science Education (3)**. Prerequisite: EDCI 6377 or consent of instructor. A supervised practicum in global STEM education.
6379. **Applied Research in STEM Education (3)**. A P2 course that asks students to know, understand, evaluate, and apply through guided instructional framework the foundations and applications of qualitative and quantitative STEM education research methods.

Department of Educational Psychology and Leadership

Janet Froeschle-Hicks, Ph.D., LPC, Chairperson

Horn Professor: Bradley

Professors: Burley, Duemer, Froeschle-Hicks, Griffin-Shirley, Hartmeister, Hawley, Lan, Little, Lock, Marbley, Parr, Paton, Pogrud, Richman, Stevens

Associate Professors: Banda, Barnard-Brak, Carter, Cheon, Claudet, Crews, Davidson, Hendricks, Inan, Jones, Mendez-Morse, Siwatu, Taylor, Valle, Wang

Assistant Professors: Brendle, Donaldson, Dotson, Jackson, Korich, Louis, Jackson-Smith, Strickland-Cohen

Professor of Practice: Trlica

Assistant Professors of Practice: Atwoord, Brown, Hart, Jones,

Research Assistant Professor: Soto

Instructors: Blodgett, White, Williams

CONTACT INFORMATION: 103 Education Building, Box 41071, Lubbock, TX 79409-1071, T 806.742.2290, F 806.742.2179, www.educ.ttu.edu/academic-programs/psychology-and-leadership/default

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 Leadership
- Doctor of Philosophy in Educational Psychology
- Doctor of Philosophy in Higher Education-Higher Education Research
- Doctor of Philosophy in Special Education
- Graduate Certificate in Applied Behavior Analysis
- Graduate Certificate in Autism
- Graduate Certificate in College Student Counseling
- Graduate Certificate in Dual Sensory Impairment
- Graduate Certificate in Higher Education Administration
- Graduate Certificate in Mental Health Counseling
- Graduate Certificate in Sensor Impairment and Autism Spectrum Disorders
- Graduate Certificate in Special Education Transition
- Graduate Certificate in Teacher Leadership
- Graduate Certificate in Teacher Advancement Program (TAP) Connect Educational Leadership
- Graduate Certificate in Teacher Advancement Program (TAP) Connect Literacy
- Graduate Certificate in Teacher Advancement Program (TAP) Connect STEM

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

*Degree being phased out. No new students.

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 of Education and a Doctor of Philosophy in Counselor Education. The master's program with a track in school counseling requires 48 credit hours. The master's program with a track in clinical mental health counseling requires 60 credit hours. The doctoral program requires 93 hours beyond the bachelor's degree and 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 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 Certification. 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.), a Doctor of Education (Ed.D.), and a Doctor of Philosophy (Ph.D.) degree in educational leadership. The M.Ed. requires 36 hours of graduate coursework, and the doctorate degrees require 60 hours of coursework beyond the master's degree. Graduate preparation programs are also offered for principal and superintendent professional certification. Degree programs and certification programs have different requirements, but many courses will apply to both and are explained at www.cms.educ.ttu.edu/academic-programs.

Educational Psychology. Students enrolled in the educational psychology program earn a M.Ed. or a Ph.D. in Educational Psychology. Students have the option of selecting a specialization in school psychology; quantitative methods; or cognition, motivation, and development. Students are required to complete a minimum of 36 semester credit hours for the Master of Education degree; additional hours are required for licensure and/or certification as a licensed specialist in school psychology (LSSP). Students pursuing a master's degree can do so with or without a thesis. Students specializing in quantitative methods or cognition, motivation, and development require a minimum of 91 semester credit hours beyond the bachelor's degree for the Doctor of Philosophy degree; additional hours are required for licensure and/or certification as an LSSP. The Quantitative Methods specialization provides a unique doctoral training experience wherein students are trained as quantitative specialists who can interface quantitative methods with substantive issues across the educational, behavioral, and social sciences. Current methodological interests in quantitative methods include longitudinal structural equation modeling, multilevel modeling, mixture modeling, psychometrics, item response theory, nonparametric statistics, and many other topics on quantitative methods as applied across the educational, behavioral and social sciences.

Applicants to either the M.Ed. or Ph.D. 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. See www.educ.ttu.edu/academic-programs/psychology-and-leadership/educational-psychology for more information.

Higher Education. The Higher Education program is a competency-based program for those who wish to lead, change, and reform higher education settings. It is designed to develop scholarly and theoretical practitioners and researchers who understand the importance of equity and social justice. Graduates of the program are equipped to apply theories and practical research as tools to name, frame, and solve problems of practice, using empirical evidence to evaluate impact and develop innovative solutions for colleges and universities.

The Higher Education program is committed to excellence in preparing and supporting administrative and instructional leaders for higher education, generating and supporting research in the field of higher education, and delivering public service to the practice of higher education. The program delivers teaching, research, and professional services to students, institutions of higher education, and other academic disciplines.

Students working on a master's degree may pursue either non-thesis or thesis options. The master's program requires completion of 36 semester credit hours for non-thesis students. Students completing a thesis will complete 39 semester credit hours. During their second semester, students must declare a thesis or non-thesis option. Later, if desired, they may switch from the thesis to the non-thesis option (or vice versa) with the permission of their advisor. However, thesis credit hours they have earned will not count toward the non-thesis degree. Each option has a set of required core courses that are selected in consultation with the student's advisor.

The Doctor of Education (Ed.D.) is designed for advanced scholarly practitioners who wish to achieve a superior level of competency in their professional field with emphasis on practice and leadership. Under the direction of their advisor, students may select a focus in community college administration or general higher education administration. The Doctor of Philosophy (Ph.D.) is designed for advanced theoretical practitioners and researchers who want to acquire the ability to contribute to the knowledge base of research, 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; higher education administrators with an orientation towards research, sponsored programs, or grant proposal writing; program assessment-evaluation specialists; research associates; and faculty members.

The Ed.D. in Higher Education requires completion of 90 credit hours beyond the baccalaureate. The Ph.D. in Higher Education—Higher Education Research requires 96 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 website at www.cms.educ.ttu.edu/academic-programs/psychology-and-leadership/higher-education/default.

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 93 credit hours (including a dissertation) beyond a bachelor's degree. Doctoral program graduates often enter the field of higher education as professors, instructional designers, and technology specialists.

Two areas of emphasis are available: educational computing and distance education. The master's program with an emphasis in educational computing requires 39 credit hours, and the emphasis in distance education requires 36 hours. Graduates often accept positions as technology specialists in public education, consultants or developers of instructional materials in the private sector, or community college instructors or technology specialists. For more information, visit 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. Additional national certifications are available in orientation and mobility and applied behavior analysis. 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.

Specific areas of interest within the special education program include autism, applied behavior analysis, generic special education, orientation and mobility, visual impairment, deafblindness, deaf education, and special education transition.

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. A majority of the courses in the master's program in special education are available online.

The Doctor of Philosophy (Ph.D.) in Special Education requires 93 credit hours beyond the baccalaureate. Courses in the doctoral core are generally available throughout the year, including the summer sessions. These hours are typically traditional on-campus classes with options for distance participation. The remainder of the program can be completed on campus or through distance education with a residency requirement.

Special education program applicants for the post-baccalaureate, certification, master's, or doctoral program must complete an application found at www.educ.ttu.edu/future/admission/apply-now. Acceptance to the master's program does not guarantee later acceptance to the doctoral program. For additional information, visit www.educ.ttu.edu. For information about the undergraduate Bachelor of Science in Multidisciplinary Studies leading to a special education certificate, refer to the Department of Teacher Education section.

Graduate Certificate Programs

Applied Behavior Analysis. The 15-hour Graduate Certificate in Applied Behavior Analysis serves as a course of study for students who want to take the Board Certified Behavior Analyst coursework but may not want to complete the entire national certification process. **Contact:** Dr. Robin Lock, 806.742.1997, Ext. 288, robin.lock@ttu.edu; Dr. Stacy Carter, 806.742.1997, Ext. 303, stacy.carter@ttu.edu

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:** Dr. Devender Banda, 806.834.4827, devender.banda@ttu.edu

College Student Counseling. The 15-hour Graduate Certificate in College Student Counseling does not represent licensure or certification in mental health, but it will enhance professionals who work in student counseling, mentoring, advising, personnel, and student affairs perform their duties more effectively. **Contact:** Dr. L.J. Gould, 806.834.4224, lj.gould@ttu.edu.

Dual Sensory Impairment. The 15-hour Graduate Certificate in Dual-Sensory Impairment closely mirrors CEC standards 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:** Dr. Rona Poggrund, 512.206.9213, rona.poggrund@ttu.edu.

Higher Education Administration. The 15-hour Graduate Certificate in Higher Education Administration provides the opportunity for higher education professionals to hone their skills in current trends, methodologies, administration, strategic management, and leadership. **Contact:** Dr. David Jones, 806.834.0989, djones.jones@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, 806.834.4224, lj.gould@ttu.edu

Sensory Impairment and Autism Spectrum Disorders. The 15-hour Graduate Certificate in Sensory Impairment and Autism Spectrum Disorder provides graduate students with specialized knowledge and strategies to use with the growing population of students with autism who also have a sensory impairment (visual impairment, hearing impairment, or deafblindness). This certificate can be undertaken during a master's or postbaccalaureate certification program or as a stand-alone certificate. **Contact:** Dr. Nora Griffin-Shirley, 806.742.1997 Ext. 247, n.griffin-shirley@ttu.edu

Special Education Transition. The 15-hour Graduate Certificate in Special Education Transition provides specialized training for anyone working with individuals with disabilities in the transition from school to employment, postsecondary education, or independent living. It can be undertaken during a master's, doctorate, or post-baccalaureate certification program or as a stand-alone certificate. **Contact:** Dr. Donna Brown, 806.834.2490, donna.brown@ttu.edu

Teacher Leadership. The 15-hour Graduate Certificate in Teacher Leadership enhances leadership skills in data-driven decision making, instructional leadership, communication, and mentoring for teachers who aspire to perform teacher leadership duties more effectively. The certificate can be undertaken prior to joining the master's program or as part of the master's program. **Contact:** Dr. Fernando Valle, f.valle@ttu.edu, or David Jones, djones.jones@ttu.edu.

Teacher Advancement Program (TAP) Connect Educational Leadership. The 15-hour Graduate Certificate in Teacher Advancement Program (TAP) Connect Educational Leadership will prepare completers to radically reform educational practices in classrooms that have previously been low performing. The graduate certificate will focus on issues that administrators face in helping classroom teachers and other educational personnel to improve their instructional performance. **Contact:** Dr. Fernando Valle, f.valle@ttu.edu.

Teacher Advancement Program (TAP) Connect Literacy. The 15-hour Graduate Certificate in Teacher Advancement Program (TAP) Connect Literacy will improve teaching in high-need schools across the state. This graduate certificate will prepare completers to radically reform literacy educational practices in classrooms that have previously been low performing. **Contact:** Dr. Mellinee Lesley, mellinee.lesley@ttu.edu.

Teacher Advancement Program (TAP) Connect STEM. The 15-hour Graduate Certificate in Teacher Advancement Program (TAP) Connect STEM will improve teaching in high-need schools across the state. This graduate certificate will prepare completers to radically reform STEM educational practices in classrooms that have previously been low performing. **Contact:** Dr. Shirley Matteson, shirley.matteson@ttu.edu.

ments in counseling-related activities. A maximum of 6 hours of credit may be earned.

- 5094. Internship in Counseling (V1-3).** Prerequisites: EPCE 5360 and admission to the EPCE program. Students cannot enroll in more than 3 semester hours of EPCE 5094 each semester, including summer sessions.
- 5352. Child and Adolescent Counseling (3).** Philosophy, principles, and practices of counseling children and young adolescents in school and community settings.
- 5353. Introduction to Community Counseling (3).** 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).** Overview of the principles, practices, and approaches to group counseling in school and community settings.
- 5355. Introduction to Career Counseling (3).** 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).** Prerequisite: Admission to the EPCE program. Theory, simulation, and practice of counseling techniques used in school and community agency settings.
- 5358. Introduction to School Counseling (3).** Designed to equip students with skills and knowledge to develop, implement, manage, and assess components of a comprehensive developmental school counseling program.
- 5360. Practicum in Counseling (3).** Prerequisites: Admission to Graduate School, admission to the EPCE program, and completion of EPCE 5353 or 5358, 5352 or 5366, 5354, 5357, 5364. Two of the following may be taken concurrently if others are completed: EPCE 5367, 5370, 5371, and either 5376 or 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).** Overview of theories and paradigms of counseling.
- 5365. Dysfunctional Behavior of Children and Youth (3).** Overview and analysis of dysfunctional behavior, including substance abuse and disorders affecting children and youth in educational and counseling settings.
- 5366. Dysfunctional Behavior of Adults (3).** Prerequisites: EPCE 5364, 5365, and either EPCE 5353 or 5358. Advanced analysis of dysfunctional behavior, diagnosis criteria and tools, and mental and emotional disorders in educational and counseling settings.
- 5367. Marriage and Family Counseling for Professional Counselors (3).** Theory and practice of marriage and family counseling for licensed professional and school counselors.
- 5369. Seminar in Counseling (3).** Prerequisite: Consent of instructor. 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).** An investigation of legal and ethical issues in the counseling profession. Focus on schools and community agencies.
- 5371. Counseling Diverse Populations for Licensed Professional Counselors (3).** 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 Mental Health Counselors (3).** Overview of addictions theory, issues, and practice. The course's focus is on community and school counseling.
- 5373. Advanced Addictions Counseling (3).** Screening, assessment, diagnosis, and counseling techniques used in treatment of co-occurring mental health and substance use disorders for counselors in school and community agencies.
- 5374. Techniques of Counseling II (3).** Prerequisites: EPCE 5364, 5357, and either 5353 or 5358. An overview of advanced counseling techniques.
- 5375. Counselor Supervision (3).** Prerequisite: Counselor practicum or consent of instructor. Provides an overview of counselor supervision and coursework for the Licensed Professional Counselor-Supervisor.
- 5376. Assessment for Professional Counselors (3).** Assessment principles for professional counselors in both clinical and school settings.
- 5377. Crisis Intervention Counseling (3).** Prerequisites: EPCE 5364 and 5357. Analysis and application of short-term counseling intervention strategies in trauma and crisis situations, with special attention to emergency preparedness.
- 6001. Advanced Study of Special Topics in Counselor Education (V1-6).** Prerequisites: Consent of instructor and admission to doctoral program in counselor education. An organized course

Course Descriptions

(To interpret course descriptions, see page 23.)

Counselor Education (EPCE)

Graduate Courses

- 5001. Advanced Workshop in Counseling (V1-6).** Prerequisite: Consent of instructor. Workshop and field experience assign-

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 (VI-3)**. Prerequisites: EPCE 6360 and 6366. 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)**. Prerequisites: 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)**. 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)**. Prerequisite: EPCE 5354, 5364, or 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)**. Prerequisites: Admission to Graduate School, admission to the Ph.D. counseling program, completion of all EPCE 5000-level practica. 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)**. Prerequisites: Admission to the Graduate School, admission to the Ph.D. counseling program, completion of all EPCE 5000-level practica, EPCE 6335, or consent of instructor. Emphasis on supervision theory, training, and experience in the supervision of counselors.
7000. **Research (VI-12)**.
8000. **Doctor's Dissertation (VI-12)**.

Educational Leadership (EDLD)

Graduate Courses

5001. **Advanced Education Workshops in Teaching and Administration (VI-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)**. Examines the major theories, concepts, and empirical findings related to school-based leadership.
5310. **Instructional Supervision (3)**. Principles, planning, organizations, and processes of supervision in both elementary and secondary schools, including TAP
5320. **Data-Driven Communication and Decision Making (3)**. An in-depth exploration of the use of data and data communication strategies for decision making by principals.
5325. **Decision Making in Educational Leadership (3)**. An in-depth exploration of decision making within the context of school leadership. Explores the irrationality of decision making, the role of emotion, heuristics and biases, and decision making under uncertainty, which includes bounded rationality.
5330. **Staff Development (3)**. Principles and procedures of organizing programs of school improvement through comprehensive and ongoing staff development.
5340. **Educational Law (3)**. 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)**. Introduction to the concepts of fiscal and human resource management with an emphasis on site-based decision making.
5351. **Communication for School Leaders (3)**. 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)**. A study of the knowledge base of change management in education. Application of the cognitive understandings to national change models and local settings.
5370. **Implementation Challenges in Educational Leadership (3)**. Involves students in implementation challenges in their internship school. Working with host ISD administration, students focus on how to implement change and overcome implementation challenges through instructional leadership, data-driven leadership, communications, etc.
5380. **The School Superintendent and Educational Governance (3)**. 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)**. 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)**. 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.
5385. **Teams in Educational Leadership (3)**. An in-depth application of how principals form teams, work as team members, lead teams that result in building relationships that achieve results, and manage people/processes and climate.
5391. **School and Community (3)**. 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 (VI-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)**. 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)**. 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)**. 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)**. Exploration of democratic principles, philosophy, and past and present cultural influences on our democracy and schools.
6340. **Educational Policy and the Law (3)**. 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)**. 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)**. 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)**. 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.
6385. **Research in Educational Administration (3)**. 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)**. Prerequisite: Admission to doctoral program and consent of instructor.

The application of reflective practice to problems of leadership in a school setting. Expert practitioners and University professors coach students through a process of thinking about the definition and solution of problems as they develop and test plans for action.

7000. **Research (V1-12).**

8000. **Doctor's Dissertation (V1-12).**

Early Childhood Education (EDEC)

Undergraduate Course

4000. **Student Teaching EC-4 Certification (V1-12).** Prerequisite: Attainment of admission standards to student teaching. Supervised teaching involving a period of major responsibility for instruction and learning in an early childhood classroom of an accredited school. Course graded credit (CR) or no credit (NC).

Graduate Courses

5310. **Application of Studies in Maturation and Learning to Early Childhood Education (3).** Study of the influence of environmental factors on the physical, emotional, social, and intellectual growth of young children.

Educational Psychology (EPSY)

Undergraduate Courses

2301. **iGeneration: Living and Learning on the Internet (3).** Examines how the Internet transforms our social behavior and how we learn. Fulfills core Social and Behavioral Sciences requirement

3331. **Adolescent Development: Applications for Middle-Level Classrooms (3).** Study of physical, intellectual, social, and emotional development of and environmental influences on the development of young adolescents.

3380. **Introduction to Educational Statistics (3).** Emphasizes descriptive and basic inferential statistics on univariate measures for analyzing educational data and how certain variables lead to and are related to changes in others.

4000. **Quantitative Methods (V1-9).** Enhances skills in research methodology, data analysis, and statistical inference and prepares students for graduate school.

4381. **Intermediate Educational Statistics (3).** Methods of educational research. Methods of obtaining, processing, interpreting, and using significant educational data.

4383. **Data Management and Processing in R (3).** Introduces students to the R programming language. Covers data management, data structures, programming, graphics and basic statistical analysis.

Graduate Courses

5093. **Internship in Education (V1-6).** Supervised internships in applied educational settings.

5310. **Philosophy of Education (3).** Major western social philosophies and their application to the field of education in the United States.

5312. **Philosophy of Qualitative Research (3).** Study in philosophical perspectives informing qualitative research and their applications in educational research.

5314. **History of Education (3).** A study of the development of Western education with emphasis on pedagogical leaders and reformers.

5323. **Cultural Foundations of Education (3).** 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).** 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).** Interrelationships of social and psychological development through the life cycle and implications for teaching and learning.

5332. **Educational Psychology and Learning (3).** Emphasis on the application of educational psychological principles to learning at all levels.

5333. **Adolescent Learners (3).** Environmental, social, developmental, and cognitive factors influencing learning in adolescence;

application of learning theory to classroom environment and instructional design for adolescent learners.

5340. **History and Systems in Educational Psychology (3).** Study of the history and philosophies undergirding educational psychology. Includes examinations of emergent problems as they apply to school and educational psychology.

5349. **Seminar in Educational Psychology (3).** Research analysis and synthesis in the field of educational psychology. May be repeated for credit.

5356. **Educational and Psychological Assessment and Decision Making (3).** Analysis and administration of techniques and measures used in the practice of school psychology.

5360. **Practical Educational Program Evaluation (3).** Emphasis on providing knowledge and skills related to understanding and evaluating the effectiveness of educational programs.

5370. **Seminar in Institutional Research and Institutional Effectiveness (3).** Seminar exploring the foundations of institutional research and institutional effectiveness using case studies and educational psychology theories.

5379. **Introduction to Educational Research (3).** 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).** An introductory course in statistics with major emphasis on univariate measures for analyzing educational data.

5381. **Intermediate Educational Statistics (3).** 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).** Study in theoretical perspectives informing qualitative research in education including relevant issues and methodological criteria.

5383. **Data Analysis With Statistical Software (3).** Hands-on analysis of quantitative educational data using statistical software.

5385. **Foundations of Educational Research (3).** Methods of educational research; methods of obtaining, processing, interpreting, and using significant educational data.

5389. **Individual Intelligence Testing (3).** Use of individual appraisal instruments and techniques (WJ III, WISC IV) in educational evaluation of children, youth, and adults.

5390. **Ethics, Standards, and Best Practices in School Psychology (3).** Analysis of ethics, APA and NASP standards, and legislations, including IDEA, Section 504, and case law relevant for practice in settings in which school psychologists work.

5391. **Assessment and Intervention in Schools (3).** Assessment, evidence-based intervention development and implementation, and progress monitoring to promote social-emotional functioning, mental health, academic skills, and learning in schools.

5392. **Practicum in School Psychology (3).** Field-based integrative experience for school psychology students. Includes opportunities to learn and practice skills in assessment, intervention, consultation, and counseling. May be repeated.

5395. **Consultation in Schools (3).** Practical application of consultation theory, models, and interventions to school-based issues to promote positive social and academic development and good mental health.

6000. **Master's Thesis (V1-6).**

6100. **Professional Seminar in Educational Psychology (1).** Orients EPSY Ph.D. students to the field of educational psychology, scholarly bodies of work, and program faculty and their research agendas.

6301. **Structural Equation Modeling (3).** 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).** 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).** Prerequisites: 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).** Prerequisite: EPSY 5382. Study of qualitative methods used in educational research. Includes application and problems.

6305. **Qualitative Data Analysis in Education (3).** 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.

- 6306. **Longitudinal Data Analysis (3)**. Prerequisite: EPSY 6301 or consent of instructor. Study of techniques for analyzing longitudinal data, including panel designs and growth curve designs. Analyses may include longitudinal structural equation modeling, latent growth curve modeling, and advanced longitudinal techniques
- 6307. **Case Study Research in Education (3)**. Study in design methods, issues and applications of case study research in education.
- 6332. **Advanced Educational Psychology (3)**. Emphasis on the research and theories of educational psychology and the evaluation and synthesis of psychology theories.
- 6349. **Doctoral Seminar in Educational Psychology (3)**. Prerequisite: Admission to doctoral program. Several topics in research and analysis in educational psychology. May be repeated for credit.
- 6385. **Causal Inference in Research (3)**. Prerequisite: EPSY 5381 or consent of instructor. Threats to causal inference and how experimental and quasi-experimental research designs and analytic strategies address these threats.
- 7000. **Research (V1-12)**.
- 8000. **Doctor's Dissertation (V1-12)**.

Higher Education (EDHE)

Undergraduate Courses

- 4001. **Higher Education Practicum (V1-6)**. Supervised practice in the profession of student affairs with an emphasis on real-world settings in higher education. May be repeated for credit.

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)**. An examination of the development of the American system of higher education, its origin, major characteristics, trends, and distinctive features.
- 5301. **Critical Issues in Higher Education (3)**. A comprehensive evaluation of the current and future critical issues impacting American higher education.
- 5302. **Comparative Higher Education (3)**. A comparative study of systems of higher education throughout the world and their counterparts in the United States.
- 5303. **Access and Equity in American Higher Education (3)**. An examination of perspectives on equity and access, excellence, and efficiency concerns in higher education.
- 5305. **Leadership, Entrepreneurship, and Change (3)**. An examination of leadership perspectives and theory and their application in the four-year college and university environment. Addresses organization culture and behavior, management and leadership studies, and entrepreneurial and change leadership.
- 5313. **The Comprehensive Community College (3)**. An introductory course to acquaint students with the purposes, programs, people, organization, control, and resources of these colleges.
- 5315. **Community College Leadership (3)**. A study of different leadership styles, strategies, and theories applicable to the community college sector.
- 5321. **The Administration of Higher Education (3)**. Examines administration of higher education at institution and unit level. Addresses organizational culture and behavior, as well as management and leadership studies.
- 5322. **Strategic Planning and Institutional Effectiveness (3)**. An examination of the principles of institutional effectiveness focused on the processes and implications for accreditation, strategic planning, and evaluation of programs and services that result in continuous improvement
- 5323. **Funding Higher Education (3)**. 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)**. 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)**. Focuses on the theoretical bases of the profession, roles and models for practice and competencies, and techniques of student services.

- 5334. **College Student Development (3)**. Provides 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)**. Examines the changing demographics and characteristics of college students. Research on college students will be reviewed to determine the impact of college on students.
- 5341. **Program Assessment and Evaluation in Higher Education (3)**. An examination of the philosophy and practice of assessment and evaluation in higher education with particular emphasis on assessment of programs/services and/or students.
- 5342. **College Teaching (3)**. 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)**. Issues, problems, and basic considerations in curriculum development. The structure of knowledge. Developments and trends in liberal education, the disciplines, and professional education.
- 5393. **Internship in Higher Education (3)**.
- 6000. **Master's Thesis (V1-6)**. Prerequisite: Instructor permission. Involves completing the master's thesis in higher education under the supervision of a thesis advisor from the higher education program.
- 6310. **Higher Education Research Seminar (3)**. 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 Doctoral Seminar (3)**. 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)**. 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. **Dissertation Proposal Seminar (3)**. 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)**. Use of computers as productivity tools, societal and ethical implications, and applications and related technology in society.
- 3118. **Technology in Educational Settings (1)**. Students will have the opportunity to utilize technology applications that enhance the teaching/learning process. Course includes using technology to assess and monitor student learning.
- 3218. **Introduction to Applications of Technology in Education (2)**. Introduces students to technology as an educational tool. Students will learn applications of technology to enhance learning in school settings.
- 3318. **Applications of Technology in Education (3)**. 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.

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)**. Overview of the field of instructional technology including the design, development, utilization, management, and evaluation of instructional systems.
- 5317. **Instructional Design Foundations (3)**. Examines the systematic approach to designing instructional materials. Emphasizes solving real-world learning problems through the application of contemporary instructional design principles and models.
- 5318. **Introduction to Small Computers in Education (3)**. 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).** Provides fundamental concepts of computer networking and knowledge of server-based applications for instructional settings. Emphasizes hands-on activities pertaining to installing and setting up server operating systems, content management systems, learning management systems and other related tools.
5321. **Computer Programming for Educators (3).** Emphasizes understanding and skills pertaining to computer authoring programs through the development of interactive multimedia and hypermedia applications.
5322. **Authoring Systems for Educational Software (3).** Covers visual design for learning and data visualization. Students acquire extensive knowledge of graphic design guidelines and create instructional visuals based on various principles and visual representation of massive data.
5325. **Planning and Developing Instructional Media (3).** Production and use of visual instructional media. Includes visual design, photographic techniques, video production, and computer graphic presentations.
5326. **Instructional Software Design (3).** An in-depth study of instructional software and e-learning application development. Focuses on principles and procedures for designing sound instructional software and online learning tools.
5330. **Computers, Critical Thinking, and Problem Solving in the Content Areas (3).** 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).** Examines the theory and practice of teaching online courses in diverse educational settings. Emphasizes the design of instructional activities using online communication, collaboration, and assessment tools.
5342. **Authoring Tools for Internet Instruction (3).** Explores web authoring tools with emphasis on using effective principles of instructional design to develop personal, professional, and educational websites.
5370. **Foundations of Distance Education (3).** 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).** Explores emerging online learning technologies and video-based learning systems with emphasis on how these tools can be used to promote performance and learning.
5390. **Online Distance Learning (3).** Covers the design and development of online courses and e-learning applications in K-12, adult, and higher education. Also covers instructional management and related issues.
5395. **Administration of the Educational Technology Program (3).** Overview of the procedures in planning, administering, and evaluating instructional technology programs in both educational and corporate settings. Major topics include organization improvement plans, software evaluation, and project management.
5397. **Practicum in Educational Technology (3).** Students receive a supervised practicum experience in an educational setting requiring the application of competencies related to the design, development, implementation, management, and evaluation of instructional technologies.
6317. **Advanced Instructional Design: Theory and Practice (3).** Prerequisite: EDIT 5317 or EDCI 5310. 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).** Prerequisites: Minimum of 6 hrs in EDIT and B or better in 6 hrs of EPSY or instructor consent. 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).** Explores a systematic procedure (analysis, design, development, and evaluation) for producing an online instructional unit based on an instructional design model. Emphasizes advanced development skills and in-depth understanding of instructional design models.
6380. **Distance Education: Trends, Issues, Research (3).** Students will identify and evaluate relevant literature to synthesize theories, trends, issues, and concerns related to the field of instructional design and technology.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Special Education (EDSP)

Undergraduate Courses

3000. **Autism Teaching and Research Practicum (V1-3).** Students will receive experience in conducting autism intervention and research through practicum experience in the Burkhardt Center for Autism Education and Research.
3100. **Special Education Inclusion Methods I (1).** Introduces the teacher candidate to skills needed to communicate about individual student progress in class and on the Individualized Education Program (IEP).
3135. **Exceptional Children and Youth in Middle Level I (1).** Prepares teacher candidates for collaboration, differentiation, and instructional planning for diverse learners in middle-level general education inclusion classrooms. Requires field-based experience.
3200. **Special Education Inclusion Methods II (2).** Prepares the teacher candidate to communicate, collaborate, and co-teach using differentiated instructional methods.
3205. **Learning and Special Populations (2).** Examines the psychological, sociological, and educational implications of both high and low incidence populations of exceptionality for middle level classrooms. Field-based experience required.
3235. **Exceptional Children and Youth in Middle Level II (2).** Enhances candidate skills for collaboration, differentiation, and instructional planning for diverse learners in middle-level general education inclusion classrooms. Accompanies student teaching and includes classroom applications.
3300. **Exceptional Children and Youth (3).** Prepares teacher candidates for collaboration, differentiation, and instructional planning for diverse learners in general education inclusion classrooms. Field-based experience is required.
3301. **Introduction to Teaching Exceptional Children and Youth (3).** Introduces special education teacher candidates to the fundamentals of teaching, including instructional principles and lesson planning.
3302. **Assessment and Program Planning for Exceptional Children (3).** Appraisal instruments and techniques employed by relevant disciplines in determining appropriate educational placement and programming for exceptional children. Field-based experience required.
3303. **Methods for Teaching Students With Mild Disabilities (3).** Gives preservice teachers a foundation in best practice methodology for teaching basic academic skills, social skills, and content area subjects for students with mild disabilities in inclusion classrooms. Field-based experience required.
4304. **Methods for Teaching Students With Severe Disabilities (3).** Best practice methodology for teaching basic daily living, communication, behavioral, vocational, community living skills and content to students with low incidence disabilities. Field-based experiences required.
4305. **Behavior Management for Students With Disabilities (3).** Focuses on research-based strategies for effective behavior management for children in the classroom. The strategies for effective management will involve curriculum, instruction, organization of time, and assessment to minimize and/or prevent problem behaviors. 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: B or higher in EDSP 5093 and 5301, EPSY 5389. The arranged internship gives students practical experience in an area of specialization.
5300. **Exceptional Children and Youth (3).** Major categories of exceptional children and youth; psychological, sociological, and educational implications of exceptionality.
5301. **Educational Appraisal of Exceptional Children (3).** 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).** 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).** 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).** 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).** Current problems and future trends in the field of special education.
5308. **Authentic Assessment for Students with Exceptionalities (3).** 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).** Psychological, sociological, and educational implications of higher level intelligence and intellectual ability as well as various talents.
5320. **Children and Youth With Low Incidence Disabilities (3).** 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).** The characteristics and psychological, sociological, and educational implications of mild disabilities including learning disabilities, behavior disorders, and mild mental retardation.
5344. **Augmentative and Alternate Communication (3).** Prepares graduate students to address issues associated with augmentative and alternative communication systems for use by individuals who do not have or are limited in spoken language.
5345. **ABA II: Data Collection Methods and Single-Subject Designs (3).** 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).** 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).** 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).** 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.
5349. **ABA VI: Ethical and Professional Conduct (3).** Prerequisite: B or better in EDSP 5303 and 5345. Based on the BACB Professional Disciplinary and Ethical Standards, the course addresses the behavior analyst code of ethics and focuses on practical, cultural, and social issues related to ethics in behavior analysis.
5350. **Foundations and Psychosocial Aspects of Students Who Are Deaf or Hard of Hearing (3).** 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).** 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).** 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).** 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. **Accessing the General Education Curriculum for Students Who Are Deaf or Hard of Hearing (3).** 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).** 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).** Strategies for teaching and adapting instruction in content areas, independent living, career-vocational, P.E., and leisure. Includes a theoretical framework, assessment strategies, and research applications.
5382. **Braille Code for Teaching Individuals With Visual Impairments (3).** Knowledge and skills in reading and writing the literary Braille code, Nemeth mathematics code, and formatting rules for Braille transcription.
5383. **Anatomy and Functions of the Visual System (3).** 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).** 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 Individuals Who Are Blind/Visually Impaired (3).** Development of orientation and mobility skills for individuals who are blind or visually impaired.
5387. **Advanced Orientation and Mobility Training for Individuals Who Are Blind/Visually Impaired (3).** Development of advanced orientation and mobility skills for individuals who are blind or visually impaired.
5388. **Programs and Services for Students With Dual Sensory Impairments (3).** Psychological, sociological, and educational implications of dual sensory impairments in children and youth, including appropriate community, educational, and social services.
5389. **Strategies for Students with Multiple Disabilities and Visual Impairments or Deafblindness (3).** Curricular adaptations, assessment, and intervention for students with multiple disabilities and visual impairments or deafblindness.
5390. **Seminar in Special Education (3).** Research practices and problem areas in special education. May be repeated for credit.
5391. **Intermediate Seminar in Orientation and Mobility (3).** 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).** Focuses on research practices and problem areas in advanced orientation and mobility services for students with visual impairments and additional disabilities.
5393. **Sensory Impairments and Autism Spectrum Disorders (3).** Studies the characteristics and psychological, sociological, and educational implications for students with sensory impairments and autism spectrum disorder. Addresses intervention strategies and curricula adaptations.
6000. **Master's Thesis (V1-6).**
6093. **Doctoral Internship in Special Education (V1-3).** Individualized, field-based, sustained professional practice experience in research, teacher education, and/or program evaluation to match the student's career goal.
6301. **Grant Writing for Special Education (3).** Strategies and procedures specific to the field of special education for identifying sources of external funding and applying for externally funded grants.
6302. **Program Evaluation in Special Education (3).** Prepares doctoral students to develop, implement, and evaluate education and rehabilitation programs for individuals with disabilities.
6303. **Contemporary Issues in Special Education (3).** Prepares students to identify, understand, articulate, and manage contemporary issues for individuals with disabilities. May be repeated once for credit.
6304. **Preparing Leadership Personnel for Special Populations (3).** Prepares doctoral-level students to develop a leadership and managerial style and to address effectively the role of the professor in an academic setting.
6305. **Advanced Issues in the Experimental Analysis of Behavior (3).** Three units that correspond to Parts I-III of the Catania textbooks and one unit that consists of a selection of readings that challenge and extend students' understanding of the concepts covered in the first three units.
6308. **The Nature and Practice of ABA (3).** Prerequisite: A or B in EDSP 4357 or equivalent. Covers one or more topics in each of the content areas of applied behavior analysis. Students should be familiar with the basic principles of operant conditioning and at least some of their applications
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Department of Teacher Education

Douglas Hamman, Ph.D., Chairperson

Helen DeVitt Jones Endowed Chair in Teacher Education: Wang
Professors: Hamman

Associate Professors: Button, Coward, Saldaña

Assistant Professors: Flores

Assistant Professors of Practice: Fox, Ortiz

Instructors: Anderson, Baptista, Briggs, Bullard, Carruth, Cashman, Cowart, Dennis, Drake, Duke, Halsey, Heider, Howard, Lay, Lindsey, Matthews, McLaren, Mitchell, Morales, Muñoz, Nelson, Pollart, Santiago, Scott, Sierra, Soto, Sowder, Spears, Stocks, Tamayo-Hoeve, Torres, Valles

CONTACT INFORMATION: 104 Education Building, Box 41071, Lubbock, TX 79409-1071, T 806.742.1958, F 806.742.2179, www.educ.ttu.edu/academic-programs/curriculum-and-instruction/default

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Multidisciplinary Studies
- Bachelor of Science in Multidisciplinary Science

Undergraduate Program

B.S. in Multidisciplinary Studies

Middle-Level Education. This specialization within the B.S. in Multidisciplinary Studies is designed primarily for individuals seeking teacher certification in grades four to eight. Students may choose certification in English language arts/social studies or 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 two student teaching semesters). All courses include field experiences scheduled outside of class time.

Bilingual Education. This specialization within the B.S. in Multidisciplinary Studies is designed to prepare those who wish to be certified as an elementary generalist and as a bilingual generalist teacher. The specialization includes coursework in Spanish and certification requires passing the Texas Oral Proficiency Test in Spanish as well as TExES exams. Students will 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 B.S. in Multidisciplinary Studies with a specialization in special education. Students will 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 B.S. in Multidisciplinary Studies with a specialization in ESL. Students will complete four semesters of professional education work with field experience in elementary and ESL classrooms.

Elementary Math/Science Emphasis. This specialization within the B.S. in Multidisciplinary Studies is designed to prepare those who wish to emphasize math and science courses as they prepare to be certified as an elementary generalist.

B.S. in Multidisciplinary Science

Secondary Science Education. Individuals completing the B.S. in Multidisciplinary Science—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. Students should consult advisors so that prerequisites and other requirements may be met in a timely manner. Two semesters of a single foreign language are considered leveling work for this program, but may be waived if the student had 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. See “Educator Certification” on page 294 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 obser-

**Bachelor of Science in Multidisciplinary Studies
with Elementary EC-6 Certification:
Sample Curriculum for a Specialization
in Special Education**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1320, College Algebra	3	MATH 2370, Elementary Analysis I	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. since 1877	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
COMS 2300, Public Speaking	3	Earth/Space Science	4
TOTAL	15	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 2000 Level*	3	Physical Science	4
MATH 3370, Elementary Geometry	3	MUSI 2301, Essential Elements of Music	3
Life Science	4	HIST 3310, History of Texas	3
EDEL 2300, Schools, Society, & Diversity	3	Child Development Course	3
ESS 3335 or 3345 or HLTH 3313	3	GEOG 2351, Reg. Geog. of the World	3
TOTAL	16	TOTAL	16

SUMMER

EDLL 3350, Children's Literature	3	ART 3372, Rethinking Art Education	3
TOTAL	3	TOTAL	3

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
EDEL 3300, Introduction to Teaching	3	EDEL 4370, Teaching Mathematics	3
EDLL 3351, Found. in Reading Instr.	3	EDEL 4375, Teaching Science	3
EDLL 3352, Lang. Literacy Acquisition	3	EDEL 4360, Teaching Social Studies	3
EDSP 3300, Exceptional Child. & Youth	3	EDSP 4305, Behavior Management	3
TOTAL	12	TOTAL	12

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
EDBL 3335, Teach. Ling. & Cultural Div.	3	EDIT 3318, Applications of Tech. in Edu.	3
EDEL 4000, Student Teach. Elementary	3	EDEL 4000, Student Teach. Elementary	6
EDSP 3303, Meth. for Teach. Mild Disabil.	3	EDLL 4380, Literacy in the Content Areas	3
EDSP 3302, Assessment, Except. Child.	3	EDSP 4304, Meth. Teach. Severe Disabil.	3
TOTAL	12	TOTAL	15

TOTAL HOURS: 120

* Not ENGL 2311

**Bachelor of Science in Multidisciplinary Studies
with Elementary EC-6 Certification: Sample
Curriculum for a Specialization in Math/Science**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
COMS 2300, Public Speaking	3	MATH 1320, College Algebra	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
BIOL 1401, Biology of Plants	4	BIOL 1402, Biology of Animals	4
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 2000 Level (not 2311)	3	GEOG 1101/1303, Physical Geology	4
MATH 2370, Elementary Analysis I	3	ART 3372, Rethinking Art Education	3
CHEM 1105/1305, Exp. Chemical Basics	4	GEOG 2351, Reg. Geog. of the World	3
EDEL 2300, Schools, Society, & Diversity	3	HIST 3310, History of Texas	3
ESS 3335, Health & PE for Children	3	MATH 3370, Elementary Geometry	3
TOTAL	16	TOTAL	16

SUMMER

MUSI 2301, Essential Elements of Music	3	Child Development Course	3
TOTAL	3	TOTAL	3

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
EDEL 3300, Introduction to Teaching	3	EDLL 3351, Found. of Reading Instr.	3
EDSP 3300, Exceptional Children & Youth	3	EDLL 3352, Lang. Literacy Acquisition	3
MATH 3371, Elements of Finite Math	3	EDEL 4370, Teaching Mathematics	3
EDLL 3350, Children's Literature	3	MATH 4370, Elementary Problem Solv.	3
EDSP 4305, Behavior Management	3		
TOTAL	15	TOTAL	12

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
EDBL 3335, Teaching Ling. & Cultural Div.	3	EDIT 3318, Applications of Tech. in Edu.	3
EDEL 4000, Student Teach. Elementary	4	EDEL 4000, Student Teach. Elementary	6
EDEL 4360, Teaching Social Studies	3	EDLL 4380, Literacy in the Content Areas	3
EDEL 4375, Teaching Science	3		
TOTAL	13	TOTAL	12

TOTAL HOURS: 122

variations and activities in public school settings. These field experiences may require time in addition to class time to complete.

Full-Year Student Teaching. Teacher candidates will be assigned to a classroom for a full year of student teaching. Appropriate coursework will accompany both semesters of student teaching. All students seeking initial certification at Texas Tech must successfully complete a series of competency-based performance assessments to be recommended by the university for a teaching certificate.

Clinical Experiences. TechTeach is a field-based teacher education program. In the semesters prior to student teaching, teacher candidates will spend one day each week in a public school setting. For candidates in secondary education, this will be their first block of the teacher education program; for elementary and middle-level candidates, it will be the first and second blocks. Assignment to apply and evaluate what candidates have learned in the courses will be completed in the school settings.

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 without written approval from the department chair or associate dean. During the student teaching semester, the maximum load is 12-15 semester hours. Requests to take more than 15 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 127-128 hours. A student may be required to attend summer term 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), 4312, 4313, 4315, 4316, 4322; 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.

**B.S. in Multidisciplinary Studies: Sample Curriculum
for a Specialization in Middle-Level Math/Science**

FIRST YEAR			
Fall		Spring	
MATH 1320, College Algebra	3	MATH 2370, Elementary Analysis I	3
CHEM 1105/1305, Exp. Chem. Basics	4	GEOL 1101/1303, Physical Geology	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ANTH 1301, Understand. Multi. America	3
COMS 2300 or CFAS 2300	3	ENGL 1302, Advanced College Rhetoric	3
TOTAL	13	TOTAL	13
SUMMER			
POLS 1301, American Govt., Org.	3	HIST 2300, History of U.S. to 1877	3
TOTAL	3	TOTAL	3
SECOND YEAR			
Fall		Spring	
MATH 2371, Elementary Analysis II	3	MATH 3370, Elementary Geometry	3
BIOL 1401, Biology of Plants	4	MATH 3372, Math Modeling for Teachers	3
EDEL 2300, or EDEL 2300	3	BIOL 1402, Biology of Animals	4
HIST 2301, History of U.S. Since 1877	3	PHYS 1401, Phys. for Non-Sci. Majors	4
Creative Arts Elective	3		
TOTAL	16	TOTAL	14
SUMMER			
ASTR 1400, Solar System Astronomy	4	ATMO 1100/1300, Intro. to Atmo. Sci.	4
TOTAL	4	TOTAL	4
THIRD YEAR			
Fall		Spring	
EDSP 3300, Exceptional Children & Youth	3	EDML 4325, Classroom Organization	3
EDML 3320, Middle-Level Curric. & Phil.	3	EDML 3370, Teach. Math Middle Sch.	3
EDLL 4381, Literacy in Content Areas	3	EDML 3375, Teach. Science Middle Sch.	3
MATH 3371, Elements of Finite Math.	3	EDML 3252, Assessment Middle Level	2
ENGL 2000 Level	3	MATH 4370, Elementary Problem Solving	3
		POLS 2302, American Public Policy	3
TOTAL	15	TOTAL	17
FOURTH YEAR			
Fall		Spring	
EDML 4375, Integrated Math & Science	3	EDML 4000, Student Teach. Middle Level	6
EDBL 3335, Teaching Ling. & Cultural Div.	3	EDIT 3318, Applications of Tech. in Edu.	3
EDML 4000, Student Teach. Middle Level	3	EDML 4381, Middle Level Capstone	3
MATH 4371, Basic Computer Literacy	3		
TOTAL	12	TOTAL	12
TOTAL HOURS: 126*			

* Pending Texas Higher Education Coordinating Board approval.

**B.S. in Multidisciplinary Studies: Sample Curriculum
for a Specialization in Middle-Level
English Language Arts, Social Studies**

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of U.S. to 1877	3	GEOG 1300 or 2351	3
Lab Science	4	COMS 2300 or CFAS 2300	3
Creative Arts Elective	3	HIST 2301, History of U.S. Since 1877	3
		MATH 1320, College Algebra	3
TOTAL	13	TOTAL	15
SUMMER			
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
TOTAL	3	TOTAL	3
SECOND YEAR			
Fall		Spring	
ENGL 2351, Intro. to Creative Writing	3	ENGL 2000 Level	3
HIST 2322 or 2323	3	HIST 1300, Western Civilization I	3
EDEL 2300, or EDEL 2300	3	MATH 3370, Elementary Geometry	3
ECO 2305, Principles of Economics	3	ANTH 1301, Understand. Multi. America	3
MATH 2370, Elementary Analysis I	3		
TOTAL	15	TOTAL	12
SUMMER			
Lab Science	4		
HIST 3310, History of Texas	3		
TOTAL	7		
THIRD YEAR			
Fall		Spring	
EDSP 3300, Exceptional Children & Youth	3	EDML 4325, Classroom Organization	3
EDML 3320, Middle-Level Curric. & Phil.	3	EDML 3361, Teaching Social Studies	3
EDLL 4381, Literacy in Content Areas	3	EDLL 3354, Reading Processes & Prac.	3
ENGL 3351, Creative Writing	3	EDML 3252, Assessment Middle Level	2
EDLL 4349, Adolescent Literature	3	SOC 3000 Level	3
TOTAL	15	TOTAL	14
FOURTH YEAR			
Fall		Spring	
EDML 4362, Interdis. Lang. Arts & Soc. Stu.	3	EDML 4381, Middle Level Capstone	3
EDBL 3335, Teaching Ling. & Cultural Div.	3	EDML 4000, Student Teach. Middle Level	6
EDML 4000, Student Teach. Middle Level	3	EDIT 3318, Applications of Tech. in Edu.	3
ENGL 3371 or 3373	3		
TOTAL	12	TOTAL	12
TOTAL HOURS: 121			

Course Descriptions

(To interpret course descriptions, see page 23.)

Bilingual Education (EDBL)**Undergraduate Courses**

- 3135. Teaching Linguistically and Culturally Diverse Students in the EC-6 Classroom I (1).** Application of knowledge and skills concerning culture, linguistics, and instructional practices for teachers of linguistically and culturally diverse students.
- 3205. Bilingual Programs and Language Issues at the Middle Level (2).** Corequisite: EDSP 3205. Overview of bilingual programs, issues, and second language research related to middle level students. Field experience required.
- 3235. Teaching Linguistically and Culturally Diverse Students in the EC-6 Classroom II (2).** Application of knowledge and skills concerning culture, linguistics, and instructional practices for teachers of linguistically and culturally diverse students in classroom settings during student teaching.
- 3300. Introduction to Teaching in a Bilingual/ESL Classroom (3).** Introduces bilingual/ESL teacher education candidates to the fundamentals of teaching, including instructional principles and lesson planning.
- 3310. Spanish for Bilingual Teachers (3).** 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).** 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).** Overview of history, philosophy, assessment processes, research, and legal aspects related to bilingual education.
- 3334. Dual Language and Cognitive Development in Bilingual Programs (3).** Skills, attitudes, psycholinguistic knowledge related to first and second language acquisition. Field experience required.
- 3335. Teaching Linguistically and Culturally Diverse Students in EC-6 Mainstream Classrooms (3).** Skills, attitudes, cultural, and psycholinguistic knowledge relevant for second language acquisition and development in relation to teaching practices for linguistically and culturally diverse students.
- 3336. Instruction and Management in Bilingual and Multilingual Settings (3).** Developing instruction and management skills in bilingual and multilingual classrooms.
- 3337. Content Area Development for English as a Second Language Populations (3).** 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).** Rationale, theories, and goals of a comprehensive curriculum program for English language learners.
- 4321. Teaching Literacy/Biliteracy in Elementary Dual Language Programs (3).** 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.

**Bachelor of Science in Multidisciplinary Studies
with Elementary EC-6 Certification: Sample
Curriculum for a Specialization in ESL**

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1320, College Algebra	3	MATH 2370, Elementary Analysis I	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
COMS 2300, Public Speaking	3	Earth/Space Science	4
TOTAL	15	TOTAL	16
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
ENGL 2000 Level*	3	Physical Science	4
MATH 3370, Elementary Geometry	3	MUSI 2301, Essent. Elements of Music	3
Life Science	4	GEOG 2351, Reg. Geog. of the World	3
EDEL 2300, Schools, Society, & Diversity	3	HIST 3310, History of Texas	3
ESS 3335 or 3345 or HLTH 3313	3	Child Development Course	3
TOTAL	16	TOTAL	16
SUMMER			
EDLL 3350, Children's Literature	3		
ART 3372, Rethinking Art Education	3		
TOTAL	6		
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
EDEL 3300, Introduction to Teaching	3	EDSP 4305, Behavior Management	3
EDLL 3351, Found. in Reading Instr.	3	EDEL 4370, Teaching Mathematics	3
EDLL 3352, Lang. Literacy Acquisition	3	EDEL 4375, Teaching Science	3
EDSP 3300, Exceptional Children & Youth	3	EDEL 4360, Teaching Social Studies	3
EDEL 3332, Found. of Bilingual Studies	3	EDEL 3338, Meth. for Teach. Eng. Lang.	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
EDEL 3334, Dual Lang. & Cognitive Dev.	3	EDIT 3318, Applications of Tech. in Edu.	3
EDEL 4000, Student Teach. Elementary	3	EDEL 4000, Student Teach. Elementary	6
EDEL 3337, Content Area Develop. for ESL	3	EDLL 4380, Literacy in Content Areas	3
EDLL 4351, Found. in Read. for ESL	3		
TOTAL	12	TOTAL	12
TOTAL HOURS: 123			
* Not ENGL 2311.			

**Bachelor of Science in Multidisciplinary Studies
with Elementary EC-6 Certification: Sample
Curriculum for a Specialization in Bilingual
Education**

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1320, College Algebra	3	MATH 2370, Elementary Analysis I	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
COMS 2300, Public Speaking	3	Earth/Space Science	4
TOTAL	15	TOTAL	16
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
ENGL 2000 Level*	3	Physical Science	4
MATH 3370, Elementary Geometry	3	MUSI 2301, Essent. Elements of Music	3
Life Science	4	GEOG 2351, Reg. Geog. of the World	3
EDEL 2300, Schools, Society, & Diversity	3	HIST 3310, History of Texas	3
ESS 3335 or 3345 or HLTH 3313	3	Child Development Course	3
TOTAL	16	TOTAL	16
SUMMER			
EDLL 3350, Children's Literature	3		
ART 3372, Rethinking Art Education	3		
TOTAL	6		
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
EDEL 3300, Introduction to Teaching	3	EDSP 4305, Behavior Management	3
EDLL 3351, Found. in Reading Instr.	3	EDEL 4370, Teaching Mathematics	3
EDLL 3352, Lang. Literacy Acquisition	3	EDEL 4375, Teaching Science	3
EDSP 3300, Exceptional Children & Youth	3	EDEL 4360, Teaching Social Studies	3
EDEL 3332, Found. of Bilingual Studies	3	EDEL 3338, Meth. for Teach. Eng. Lang.	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
EDEL 3334, Dual Lang. & Cognitive Dev.	3	EDIT 3318, Applications of Tech. in Edu.	3
EDEL 4000, Student Teach. Elementary	3	EDEL 4000, Student Teach. Elementary	6
EDEL 3337, Content Area Develop. for ESL	3	EDEL 3320, Content Area Instr. in Span.	3
EDEL 3310, Spanish for Bilingual Teach.	3	EDEL 4321, Teaching Literacy/Biliteracy	3
TOTAL	12	TOTAL	15
TOTAL HOURS: 126†			
* Not ENGL 2311.			
† Pending Texas Higher Education Coordinating Board approval.			

Educational Curriculum and Instruction (EDCI)

Undergraduate Courses

- 2301. **The Education Effect: Why American K-12 Education Really Matters (3).** Considers costs and benefits of American education and exposes students to issues in education at a deeper level by tutoring in public schools. Fulfills core Social and Behavioral Sciences requirement
- 3325. **Honors Seminar: Trends and Issues in Educational Policy and Practice (3).** A seminar course that involves the analysis and synthesis of current trends in educational policy and practices.

Elementary Education (EDEL)

Undergraduate Courses

- 2300. **[EDUC 1301, 1325] Schools, Society, and Diversity (3).** 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.
- 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.
- 3100. **Introduction to Teaching I (1).** Introduces teacher education students to fundamentals of teaching, including teaching ethics and principles and state and national standards for student learning.

- 3200. **Introduction to Teaching II (2).** Introduces teacher education students to fundamentals of teaching, including instructional planning and assessment.
- 3300. **Introduction to Teaching (3).** Provides new teacher candidates information, access, and skills needed to successfully complete the teacher education program.
- 4000. **Student Teaching Elementary Level (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).** Emphasizes diagnostic teaching and learning, philosophies of education, current issues, classroom organization, professional portfolios, and teacher assessment. (Writing Intensive)
- 4360. **Teaching Social Studies (3).** Design and organization of content, materials, and instructional strategies for social studies programs in elementary schools. Field-based course.
- 4370. **Teaching Mathematics (3).** Application of content, materials, and instructional strategies in teaching elementary school mathematics. Field-based course.
- 4375. **Teaching Science (3).** Methodology of teaching appropriate science learning experiences to elementary school children. Field-based course.
- 4393. **Internship in Elementary Education I (3).** Prerequisite: Admission to teacher education. Directed experiences in various roles at the elementary level.
- 4394. **Internship in Elementary Education II (3).** Prerequisites: EDEL 4393 and admission to teacher education. Directed experiences in various roles at the elementary school level.

Bachelor of Science in Multidisciplinary Studies with Specialization in Bilingual Education Dallas/Fort Worth/San Antonio Program

The College of Education has established a partnership with community colleges in the Dallas, Fort Worth, and San Antonio areas to enable students to earn an Associate of Arts in Teaching degree and complete a B.S. from Texas Tech University through the College of Education. Agreements with area school districts place teacher candidates in area schools for extensive clinical experiences. Students enter the program in Summer II and complete the program by the following Summer I.

SUMMER II		FALL	
EDBL 3300, Introduction to Teaching	3	EDLL 3351, Found. in Reading Instr.	3
EDEL 4360, Teaching Social Studies	3	EDEL 4370, Teaching Mathematics	3
		EDBL 3334, Dual Lang. & Cognitive Dev.	3
		EDEL 4375, Teaching Science	3
		EDBL 3332, Found. of Bilingual Studies	3
		EDBL 3338, Meth. for Teach. Eng. Lang.	3
TOTAL	6	TOTAL	18
WINTERMESTER		SPRING	
EDBL 3336, Intro. to Mgmt. in Bilingual	3	EDBL 3337, Content Area Develop. for ESL	3
		EDBL 4321, Teaching Literacy/Biliteracy	3
		EDLL 3352, Lang. Literacy Acquisition	3
		EDLL 3350, Children's Literature	3
		EDEL 4000, Student Teach. Elementary	6
TOTAL	3	TOTAL	18
MAYMESTER		SUMMER II	
EDIT 3318, Applications of Tech. in Edu.	3	EDEL 4000, Student Teach. Elementary	6
TOTAL	3	TOTAL	6

Language Literacy (EDLL)

Undergraduate Courses

- 2300. Literacy Learning in the Preschool Setting (3).** Focuses on understanding and implementing instructional practices for preschool children's early literacy development with classrooms and community agencies as the contexts for service-learning. Fulfills multicultural requirement.
- 3350. Children's Literature (3).** Texts appropriate for children under 15, including standards of evaluation and criteria for selection. Includes field experiences.
- 3351. Foundations of Reading Instruction (3).** 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).** 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).** 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).** Overview of reading development, methods of reading instruction, and sequence of instruction for the middle-level classroom.
- 4349. Adolescent Literature (3).** 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).** Students will explore language development from a linguistic perspective that recognizes implications for professional teaching practice.
- 4351. Foundations in Reading for English Language Learners (3).** Evaluation and reflections of second-language literacy by examining its philosophy, theory, and examples of classroom-based practices.

B.S. in Multidisciplinary Science: Sample Curriculum for a Specialization in Biology*

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
GEOL 1101/1303, Physical Geology	4	GEOL 1102/1304, Historical Geology	4
CHEM 1107/1307, Exp. Prin. of Chem. I	4	CHEM 1108/1308, Exp. Prin. of Chem. II	4
MATH 1321, Trigonometry	3	MATH 2300, Statistical Methods	3
TOTAL	17	TOTAL	17
SECOND YEAR			
Fall		Spring	
ENGL 2000 Level	3	Creative Arts Elective	3
BIOL 1403, Biology I	4	BIOL 1404, Biology II	4
EDEL 2300, Schools, Society, and Divers.	3	POLS 2302, American Public Policy	3
POLS 1301, American Govt. Org.	3	PHYS 1404, General Physics II	4
PHYS 1403, General Physics I	4		
TOTAL	17	TOTAL	14
THIRD YEAR			
Fall		Spring	
COMS 2300 or CFAS 2300	3	EDSE 3100, Intro. to Teach. Secondary	1
ASTR 1400, Solar System Astronomy	4	EDSE 4316, Content Planning	3
ZOOL 2403, Human Anatomy	4	EDSE 4312, Classroom Management	3
MBIO 3400, Microbiology	4	EDLL 4382, Adolescents Content Area	3
		BIOL 3416, Genetics	4
		BOT 3401 or 3403	4
TOTAL	15	TOTAL	18
FOURTH YEAR			
Fall		Spring	
EDSE 4315, Learning and Technology	3	EDSE 4323, Teaching Diverse Students	3
EDSE 4000, Student Teach. Secondary	3	EDSE 4313, Contribute to Student Success	3
ATMO 1300, Intro. to Atmospheric Sci.	3	EDSE 4000, Student Teach. Secondary	6
BIOL 3309, Principles of Ecology	3		
EDLL 4382, Adolescents, Multiliteracies	3		
TOTAL	15	TOTAL	12
TOTAL HOURS: 125			
* Specializations in chemistry, geosciences, life and earth science, and physics are also available.			

- 4380. Literacy in the Content Areas (3).** 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).** Understanding literacy in the content areas and planning instruction to promote learning of students in grades 4-8. (Writing Intensive)
- 4382. Adolescents, Multiliteracies, and Content Area Learning (3).** Developing literacy practices to learn in content area disciplines aimed at grades 8-12. (Writing Intensive)

Education Middle Level (EDML)

Undergraduate Courses

- 3252. Assessment for Middle-Level Educators (2).** Focuses on understanding the purposes and practices of assessment in the middle-level classroom. Teacher candidates examine ways to assess learning formatively and summatively. They collect, manage, and analyze data to guide instructional decisions.
- 3320. Middle Level Curriculum and Philosophy (3).** 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.
- 3361. Teaching Social Studies at the Middle Level (3).** 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).** 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).** Prerequisite: Junior standing. A field-based course emphasizing teaching methods and techniques, lesson organization, assessment, and classroom management. Field experience required.
- 4000. Student Teaching Middle Level (V1-12).** Prerequisite: Attainment of admission standards to student teaching. Supervised



teaching involving a period of major responsibility for instruction and learning in a middle level classroom of an accredited school. Courses graded credit (CR) or no credit (NC).

4230. **Capstone for Middle-Level Teachers (2)**. Focuses on teacher effectiveness in instruction, skills in classroom management, reflective practices from real-life situations in student teaching, and becoming a professional educator.
4325. **Classroom Organization and Management for the Middle Level (3)**. Emphasizes theories of teaching and learning with a focus on classroom organization and management techniques for grades 4-8. Accompanies student teaching. (Writing Intensive)
4362. **Interdisciplinary Language Arts and Social Studies Methods at the Middle Level (3)**. Content, instructional strategies, and technologies for middle school English language arts and social studies with emphasis on integration through interdisciplinary projects. Field experience required.
4375. **Integrated Mathematics and Science Methods (3)**. Prerequisite: Junior standing. A field-based course emphasizing teaching methods and techniques, lesson organization, assessment, and classroom management. Field experience required.
4381. **Middle Level Capstone (3)**. Contributes to the overall competency of teacher candidates by focusing on aspects of teaching and learning that have the greatest impact on middle-level students' achievement. Accompanies student teaching.

Secondary Education (EDSE)

Undergraduate Courses

2300. **Schools, Society, and Diversity (3)**. 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.
3100. **Introduction to Teaching in Secondary Schools (1)**. Introduces teacher education students to fundamentals of teaching, including teaching ethics and principles as well as state and national standards for student learning.
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)**. 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)**. Foundations and principles of curriculum planning, development, implementation, and evaluation in secondary schools; issues in curriculum development. Field-based course.
4312. **Secondary Classroom Management and Learners with Disabilities (3)**. Prepares teacher candidates for effective classroom management as well as for working with students who have learning disabilities. Teaches collaboration and differentiated instruction and organization of social and academic systems in the classroom.
4313. **Contributing to Student Success in Professional Learning Communities (3)**. Supports participation in a professional learning community and provides opportunities to acquire skills in data analysis and instructional planning aimed at improving student achievement.
4315. **Learning and Technology (3)**. Introduces teacher candidates to current instructional technology and the use of technology integration strategies based on learning theories.
4316. **Content Planning and Strategies in the Inclusive Secondary Classroom (3)**. Principles of curricular planning and development in the secondary classroom. Methods, techniques, and evaluation procedures appropriate to the core content areas and technologies that support those procedures.
4320. **Instructional Methods (3)**. Strategies for teaching evaluation and classroom management. Field-based course.
4322. **Diversity and the Classroom Learning Environment (3)**. 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.
4323. **Teaching Diverse Students in the Secondary Classroom (3)**. 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.
4330. **Capstone for Secondary Students (3)**. Taught with student teaching. Focuses on instructional management, organization for teaching, student assessment, and political and ethical dimensions. (Writing Intensive)
4351. **Teaching Grammar, Composition, Spelling, and Listening (3)**. 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)**. 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)**. Focus on the curriculum, methods, and materials related to science instruction in the secondary schools. Field-based course.
4393. **Internship in Secondary Education (3)**. Prerequisite: Admission to teacher education. Directed experiences in various roles at the secondary level.
4394. **Internship in Secondary Education (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.

Edward E. Whitacre Jr. College of Engineering

Al Sacco, Jr., Ph.D., Dean

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About the College

The Edward E. Whitacre Jr. College of Engineering (WCOE) is an internationally recognized research institution ranked among the best in the nation. Award-winning faculty, interactive classes, and hands-on internships combine to empower students with the knowledge and experience they will need for a future in engineering.

By blending math, science, and creative thinking, engineers design solutions that improve society and transform the world. Each academic program includes not only an education in the basic sciences, mathematics, humanities, and social sciences, but also the technical knowledge needed to help solve the technological problems confronting society.

WCOE historically produces quality graduates. One component of this emphasis on excellence is the requirement of a grade of C or better in all courses that are part of the degree plan. The college also monitors student retention on a regular basis and has developed programs and tools to improve student retention and help students learn.

WCOE 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, and students will experience assessment and advisement based on outcomes as they complete their education. The capstone senior design course or sequence of courses offered by each department is a measure of the integrated knowledge and ability of students. By their senior year, students not only have developed technical knowledge, but they also have learned to work as part of a professional team, value ethics, and advance to a pattern of life-long learning.

The Bachelor of Science degree programs in chemical engineering, civil engineering, computer engineering, construction engineering, electrical engineering, 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, www.abet.org.

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, Environmental and Construction Engineering. The option of a non-ABET accredited Bachelor of Science in Environmental Engineering is available to Master of Environmental Engineering students.

Academic Programs

Degree Programs

Undergraduate Degrees. Whitacre College of Engineering offers the following professional engineering curricula, each leading to a Bachelor of Science degree in the respective engineering fields: chemical, civil, computer, construction, electrical, industrial, mechanical, and petroleum. 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. Engineering technology curriculum with specializations in construction 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 dual degrees from both colleges: a B.S. in Architecture and a B.S. in Civil Engineering. The Department of Civil, Environmental and Construction Engineering coordinates the program for WCOE.

WCOE is divided into instructional departments that offer coursework and supervise degree programs. These departments are presented 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 in the summer or during a long session. Before registration for each semester, a student should check course prerequisites carefully to include courses that are prerequisite to those needed the next semester.

Accelerated Bachelor's-to-Master's Program. The college provides an accelerated bachelor's-to-master's program 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. Application should be made during the first semester of the junior year following procedures available from graduate program coordinators in the department. Students interested in this program must apply to the Graduate School prior to taking graduate courses. Early planning and contact with the department advisors are essential because in some cases students may be able to connect undergraduate research experience to their thesis work in graduate school.

Second Degree. A student who has completed the requirements for a first bachelor's degree with a 3.0 GPA or greater from WCOE may acquire a second degree by completing the second program 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.

Advanced Degrees in Engineering. Programs are available through WCOE 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. These programs are discussed within the catalog section of each department. The Master of Environmental Engineering is a 154-hour freshman-to-master's degree described on page 141. In addition, the college offers a Master of Science in Bioengineering degree and also a Master of Engineering degree designed especially for practicing engineers desiring to continue their professional education. For more information on these two degrees, see page 140. Admission to the Graduate School is based upon an above average undergraduate record and satisfactory standing on the Graduate Record Examination.

International Experience Requirement. Effective fall 2013, all incoming students must complete an international experience as a component of their graduation requirements. The international experience requirement may be satisfied by any of the following:

- Receiving course credit (minimum 3 hours) during a study abroad experience (Faculty Led Programs, traditional reciprocal exchange agreements, or third-party programs).
- Participating in an international experience during a co-op or summer internship.
- Participating in international service activities (such as but not limited to Engineers Without Borders).

- Completing an international ROTC experience.
- Completing an international experience at a junior or community college.
- Completing another experience approved by the Associate Dean for Undergraduate Studies.

Students may qualify for an exemption from the international experience requirement; however, they must obtain approval from the Associate Dean for Undergraduate Studies. Students seeking the exemption must provide documentation to justify their exemption.

WCOE Distance Learning Program. The Edward E. Whitacre Jr. College of Engineering (WCOE) Distance Learning Program offers educational opportunities to students, engineers, and science professionals interested in pursuing graduate coursework in engineering, but cannot come to campus. The WCOE Distance Learning Program is designed to meet the needs of both practicing engineers and industry. The graduate degrees and graduate certificate offered are:

- Doctor of Philosophy in Systems and Engineering Management
- Master of Science in Systems and Engineering Management
- Master of Science in Software Engineering
- Master of Engineering (Interdisciplinary or Healthcare Option)
- Cyber Security for Critical Infrastructure Certificate

The goal in the WCOE Distance Learning program is to offer a high quality education. There is no distinction between on-campus and off-campus students. Both are concurrently enrolled in the same course. Students enrolled in the program participate in classes through the use of an Internet connection. This approach allows students to manage career and family commitments while earning graduate credentials and upgrading their engineering skills. Location changes do not pose a problem for students because the program is offered via distance learning. Students who move, or are transferred, can continue work toward completion of their degrees or certificate.

Minors and Certificates

Departmental Minors. Students from other colleges within the university must have a 2.5 or higher Texas Tech GPA (as specified by

Graduate Program

For information on graduate programs offered by the Whitacre College of Engineering, visit the Graduate School section of the catalog on page 140.

the department) to minor in a WCOE academic program. Each department will specify the required courses and number of hours that constitute a minor. Information on approved minors, if offered, is available from each department chair. WCOE foundational students are not allowed to declare a minor.

Engineering Minor. WCOE offers an engineering minor for students who have a 2.5 or higher Texas Tech GPA and are enrolled in academic programs outside 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) and taken at WCOE. Because each degree program may have different requirements for upper-level courses, students should verify the requirements with either the WCOE department advisor or chair. The WCOE academic dean must approve all programs of study for this minor.

International Engineering Minor. A minor in international engineering requires a minimum of 18 hours of coursework and is restricted to WCOE engineering majors. Three of those hours must be a foreign language, but only 6 hours of foreign language can be applied to the minor. Study abroad is also required. Students who wish to pursue this minor should contact the Engineering Opportunities Center, 806.742.3451.

Nuclear Engineering Minor. A minor in nuclear engineering

is available through the Big 12 Engineering Consortium and is restricted to WCOE engineering majors. A small group of Big 12 universities offers nuclear engineering courses by distance education to students enrolled at any of the Big 12 institutions. For more information on the program, visit the Big 12 Engineering Consortium website at www.big12engg.org. Students who wish to pursue this minor should see their advisor or academic dean.

Undergraduate Certificate in Technology Entrepreneurship (coupled with a B.S. in Engineering or a Bachelor of Business Administration) – 9 total hours required

Engineering students must take the following courses:

- BA 3302, Financial and Managerial Accounting (3 hours)
- MGT 4376, Entrepreneurship II: Discovering Entrepreneurial Opportunity (3 hours)
- Select one from the following: ECE 4331, Technology Startup Laboratory; CHE 4376, Entrepreneurship for Chemical Engineers; IE 4331, Individual Studies in Industrial Engineering; Engineering Entrepreneurship; ME 4337, Innovation, Discovery and Commercialization; or others as approved (3 hours)

Admissions to Foundational Curriculum and Degree Programs

The engineering degree programs consist of a freshman foundational curriculum followed by an upper-division program that includes courses taken in the sophomore, junior, and senior years. Effective January 2013, the criterion for admission to the Whitacre College Foundational Curriculum requires that a first-time freshman or transfer student with fewer than 12 hours of transfer credit must be accepted to the university with assured admission status. Admissions for transfer students and second-degree students are described below.

The criteria used to determine assured admission status are SAT/ACT scores and class rank as shown in the undergraduate admission section of this catalog. Students who do not meet the assured admissions requirements may enter the Pre-Engineering Program and then work to qualify as a Foundational Engineering Student. Students who are assured admit and not TSI compliant will be admitted to Texas Tech as a pre-engineering student. Upon completion of the foundational curriculum, a student must apply and be successfully admitted to a WCOE upper-division degree program. Students who are not successfully admitted to an upper-division degree program must transfer out of the college.

Freshman Admission to WCOE Foundational Curriculum. The criterion for admission to WCOE Foundational Curriculum requires that a first-time freshman or transfer student with fewer than 12 hours of transfer credit must be accepted to the university with assured admission status. The college recommends prospective students enroll in math each year in high school, including trigonometry, pre-calculus or calculus, and at least one year of physics with another science course. The criteria used to determine assured admission status are SAT/ACT scores and class rank as shown in the undergraduate admission section of this catalog.

External Transfer Admission to WCOE Foundational Curriculum. A transfer student with fewer than 12 hours of transferable coursework must meet first-time freshmen assured admission standards. For admission to the foundational curriculum with an engineering degree program concentration, transfer students must have 24 or more hours of transferable coursework and have a minimum cumulative GPA of 3.0 that includes the work at all previous institutions. External transfer students must complete a minimum of 12 hours of Texas Tech engineering degree program coursework before application to the upper division. Eligibility for admission to the upper division is based exclusively on the cumulative GPA earned at Texas Tech (2.5 or higher).

Second Degree Transfer Admission. Students holding a bachelor's degree from another institution must have a 3.0 cumulative GPA from that institution to be admitted to the WCOE foundational curriculum.

Internal Transfer Admission to WCOE Foundational Curriculum. Students entering Texas Tech and transferring to WCOE from other colleges within the university must have a minimum Texas Tech cumulative GPA of 3.0 on at least 12 hours of Texas Tech coursework that is included in the foundational curriculum.

Pre-Engineering. Students who do not meet the WCOE admission requirements are admitted initially to the Texas Tech Pre-Engineering Program and may apply for admission to the WCOE foundational curriculum upon satisfaction of the college internal transfer admission standards.

WCOE has partnered with Texas Tech University Advising to create the Pre-Engineering Program. This student retention and success initiative provides intense academic advising and support as students build the requisite math and science skills to be successful in an engineering degree program. While in Pre-Engineering, students will enroll in typical university core curriculum and foundational curriculum courses.

Engineering presents an extremely challenging course of study. For students who determine that engineering is not an appropriate choice, the advisors in University Advising have the specialized training and tools necessary to assist students in finding a course of study that is best suited to their unique talents and interests. The ultimate priority is for every student to graduate successfully from a best-fit major.

Admission to a WCOE Degree Program. All newly admitted students work to complete a foundational curriculum consisting of English I, English II, Calculus I, Calculus II, Physics I (calculus-based) plus another science course and a first engineering course that vary among the engineering degree programs. The foundational curriculum is supplemented with courses from the university core curriculum and general engineering courses (statics, thermodynamics, circuits, and materials science) to provide the opportunity for full course loads and scheduling flexibility.

When the foundational curriculum has been completed, students apply for admission to the upper division of their degree program. The acceptance criterion is based exclusively on a Texas Tech cumulative GPA that includes a minimum of 12 hours of coursework from the foundational curriculum. The specific GPA standard varies among the degree programs and may change from one academic year to the next as necessary to align enrollments with educational resources.

Students must be prepared to make an alternate choice of major if their foundational curriculum GPA does not qualify them for their preferred major. Students must make progress appropriate to their classification in their alternate choice of major as determined by each department for their degree programs. Students who are not admitted successfully to an upper-division degree program are not allowed to enroll in engineering courses and must transfer out of WCOE.

Refer to the program descriptions in this catalog for the specific foundational curriculum and upper-division GPA admission standards.

WCOE Academic Standards and Requirements

Progress Towards a Degree. WCOE students are expected to maintain good engineering academic standing (cumulative Texas Tech GPA of 2.5 or higher). Engineering students are expected to maintain continuous progress toward completion of their degree program regardless of catalog year. Specifically, a full-time student must achieve a C or better in 18 hours of coursework included in the degree program each year (two long semesters). Students are required to complete the foundation curriculum within four long semesters. Continued acceptance within WCOE for students who do not maintain this level of progress is subject to the discretion of the dean of the college.

Students not compliant with the 18 hours of coursework in two long semesters and completion of the foundation curriculum (see Admission to a WCOE Degree Program) will follow the guidelines specified in WCOE Expulsion.

Dean's List. Students who maintain a semester GPA greater or equal to 3.5 are placed on the Dean's List. The student will be notified and a certificate may be picked up in the Engineering Opportunities Center.

WCOE Probation. Students whose cumulative GPA falls below 2.5 are placed on "WCOE academic probation." The student may not enroll for more than 14 hours without prior approval from their advisor or the academic dean. A student on WCOE probation (below 2.5 GPA) will be allowed to take no more than two engineering courses per semester (up to 6 hours of engineering course work), and those courses should be eligible for grade replacement (attempted previously and resulting in grades of D or F). In addition, the student must complete an academic recovery plan* before the start of the next long semester. While on WCOE academic probation, a student with less than a 2.0 cumulative GPA will be required to complete PADR 0091, Strategies for Academic Achievement for the Engineering Major.

WCOE Continued Academic Probation. A probationary student whose current GPA is 2.5 or higher but whose cumulative GPA is below 2.5 will be placed on "WCOE continued academic probation" until the cumulative GPA is 2.5 or higher. The student may not enroll for more than 14 hours without prior approval from an advisor or academic dean. Students will not be allowed to be on WCOE academic probation for more than one long semester (summer not included). Failure to meet the conditions established will result in WCOE Expulsion.

WCOE Expulsion. A student on WCOE probation who has a current or cumulative GPA below 2.5 at the end of a two consecutive semesters will be on WCOE Expulsion unless grade replacements for courses completed at that time raise the cumulative GPA above 2.5. A student on WCOE Expulsion is not permitted to take engineering courses.

Students may return to WCOE after a WCOE Expulsion with a 3.0 TTU cumulative GPA. Students are not eligible to enroll in engineering classes due to their GPA. Students should make an appointment with University Advising (advising@ttu.edu) to seek guidance on other degree programs offered by Texas Tech.

Texas Tech Probation and Suspension. WCOE students whose Texas Tech GPA falls below a 2.0 also will follow the rules for Texas Tech probation and suspension depending on the student's academic status as indicated in the Undergraduate Academics section of this catalog. Students will need to seek immediate counseling/advising to transfer to a non-engineering major.

When students meet the criteria for WCOE Expulsion, WCOE suspension, WCOE probation, Texas Tech probation, or Texas Tech suspension, the WCOE Dean's Office will place an engineering hold on the student's account.

Transfer Students. If a transfer student needs to complete the foundational curriculum upon arrival at Texas Tech, the student will follow the process outlined in the "Admission to a WCOE Degree Program" section and must comply with processes outlined in the "WCOE Academic Standards" section of this catalog. For students who have completed the foundational curriculum prior to transferring and have a Texas Tech cumulative GPA less than 2.5 their first semester at Texas Tech, they will be placed on WCOE probation and will follow the guidelines specified in the "WCOE Academic Standards" section of this catalog.

Academic Integrity and Misconduct. WCOE will not tolerate academic dishonesty and behavior incongruent with behaviors acceptable for professional engineers and computer scientists. Please refer to the "Academic Integrity" section of this catalog on page 67; the Code of Student Conduct, Part X, B3 of the Student Handbook; and Operating Policy 34.12 regarding academic integrity, cheating, and plagiarism. Also, please refer to the National Society of Professional Engineers Code of Ethics (www.nspe.org/resources/ethics/)

* Students will review their past performance to develop goals/tasks and take the Strong Interest Career Inventory Survey to accomplish the Academic Recovery Plan with Learning Contract. A calendar of mentoring/tutoring with study hall will complete a process of recovery. Before the start of a long semester, students will be required to attend a one-day workshop to understand the process of academic recovery.

code-ethics) for ethical behavior expected of professional engineers and computer scientists. Ignorance provides no protection from the consequences and all students are expected to review and understand the academic integrity standards and professional ethical code behavior expected of professional engineers. WCOE has adopted the following policy:

Instances of academic dishonesty will be submitted to the Office of Student Conduct. The student will, at minimum, receive a grade of F for the assignment or exam, and/or may receive an F for the course. Also, students will be subject to the disciplinary sanctions as prescribed by the Office of Student Conduct. For students found responsible of an Academic Integrity violation or behavior not consistent with the professional code of ethical behavior and the disciplinary action is suspension from the university, the student may be expelled from their degree program and the WCOE.

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 advisors or chairperson regarding specific requirements. These requirements are incorporated into the curriculum of each major or specialization in the college. Students are required 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.

Engineering Science Courses. All designated engineering science courses in a degree program should be taken as early as possible. The designated engineering science courses are CE 2101, 2301, 3302, 3303, 3305; CHE 2421, 3330; ECE 3302; IE 2301; ME 2301, 2302, 2311, 2322, 3403, and 3370.

Chemistry and Math Placement Exams. Students enrolling in the college must take placement exams in chemistry and math unless they pass MATH 1451, CHEM 1307 and CHEM 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, ACT-M, or SAT-M 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 Civil, Environmental and Construction Engineering. 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.

Prerequisites. In scheduling courses, students must be aware that prerequisites and corequisites are mandatory.

Repeated Courses. Students will only be allowed to attempt any engineering course twice to obtain a grade of C or better. The grades of D, E, and DG require a second attempt. Additionally, if a student earns a grade of D or F in a prerequisite to a required course, the student must retake the prerequisite course before enrolling in the required course. If the student's second attempt at an engineering course does not result in a passing grade, the student will not be permitted to continue studies in an engineering program. The engineering dean hold will not be released until the student has successfully transferred to a new college to pursue a new program of study. The student should make an appointment with University Advising (advising@ttu.edu) to seek guidance on other degree programs offered by Texas Tech.

Students may repeat up to three engineering courses during their program of study. Upon the need to repeat their fourth course, students will not be permitted to continue studies in an engineering

program. The engineering dean hold will not be released until the student has transferred to a new college to pursue a new program of study. Students will follow the guidelines specified in WCOE Expulsion. The student should make an appointment with University Advising (advising@ttu.edu) to seek guidance on other degree programs offered by Texas Tech.

Maximum Course Load. A normal course load is 15 to 19 credit hours. Students must have a Texas Tech GPA of 2.5 or higher to obtain approval from their academic advisors and the dean's office to take more than 19 hours during a long semester or more than 8 hours during a summer term. Students on university academic probation or WCOE probation are not allowed to take more than 14 hours during a long semester. Students who work should adjust their course load accordingly. Check with the academic advisor or the dean's office for recommendations.

Computer Requirements. All students in the college are expected to have access to a personal computer, which should be a laptop at a minimum. Many instructors require students to transfer homework using email. Some instructors transfer information to students using the Internet. While computer facilities are available on campus, students do best when they have a personal computer and monitor their Texas Tech email address for official notifications. Students should check with their respective department for hardware and software recommendations.

Course Credit

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.

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 Engineering Opportunity Center. 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 more 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 Cooperative Education Program at Texas Tech. Students must be registered for and meet the requirements of a qualifying cooperative education course during the semesters they are on tour in industry.

Transfer Course Evaluation. Students from community colleges generally transfer courses in English, history, political science, mathematics, and science. Community colleges that adequately prepare students to study engineering have designated faculty who function as liaisons between their schools and WCOE. Such cooperative arrangements provide students an opportunity to choose courses at the community college that are required by a specific engineering major. Problems in transferring are minimized by the student's early awareness of the WCOE curriculum and early commitment to transferring to Texas Tech. 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 that 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.

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, if applicable.

Course Substitutions. 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 WCOE. 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.

Multicultural Credit. The WCOE encourages students to seek multicultural credit using the international experience required of all students entering in Fall 2013 or later. To obtain multicultural credit, students must complete the Global Scholars Certificate Program, which is available through <http://globalscholar.us/>. The Global Scholar submissions will be reviewed by the Study Abroad Office.

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

Students must meet the scholarship requirements to maintain the scholarship. The deadline to apply for a WCOE scholarship is February 1. For college scholarships, students must enroll as a full-time student (a minimum of 12 semester credit hours per semester) in accordance with their engineering degree plan, achieve a cumulative TTU GPA of 3.25 or higher each semester, and provide a letter of appreciation to the sponsor. Failure of the recipient to submit the letter of appreciation to the sponsor by 95 percent payment of mandatory tuition and fees or enrollment in a payment plan date will result in forfeiture of the scholarship. College scholarships are awarded for one-year only and students must reapply each year. The award may not be deferred to future semesters. For departmental scholarships, students must be full-time students and meet the department's scholarship requirements.

Students must make satisfactory academic progress towards their degree to remain eligible for college-level scholarships. Credit hours attempted by undergraduate students may not exceed 150 percent of the educational program to remain eligible for the awarded scholarship. At least 75 percent of all credit hours attempted must have passing grades of C or higher. Failure to complete coursework successfully with passing grades by the end of each period of enrollment may put both current and future financial aid eligibility at risk.

A satisfactory pace is calculated by dividing the cumulative hours the student successfully completed by the cumulative hours the student has attempted. Scholarship evaluation is conducted during the renewal process. Incomplete grades (grades of "I") do not affect a student's cumulative GPA for satisfactory academic progress but count as credit hours attempted towards both pace and maximum hours. Students with grades of incomplete which become new letter grades prior to or during a subsequent period of enrollment and that may affect financial aid eligibility for that period of enrollment are encouraged to contact Student Financial Aid for further evaluation.

Graduation

Graduation Requirements. To fulfill graduation requirements, a student must complete each course specified in the degree program with grade of C or higher. Course substitutions may be used to fulfill degree program requirements and course substitutions must be completed as described previously.

Application for Degree. Students must file an "Application for Degree" with the office of the dean of the WCOE at least one year before the anticipated date of graduation. Subsequently, students 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 WCOE, 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

(To interpret course descriptions, see page 23.)

Course descriptions for the college's various engineering specializations can be found within the catalog information for each department. Courses with an ENGR prefix are common to many disciplines within the college and can be viewed below.

Bioengineering (BIOE)

Undergraduate Courses

- 3101. **Bioengineering Laboratory(1).** Covers laboratory topics strongly related to chemical and biological engineering background, including tissue engineering, microscopy, industrial biotechnology, and drug design. (Writing Intensive)
- 3202. **Bioinstrumentation and Bioinformatics Laboratory (2).** Covers laboratory topics strongly related to chemical and biological engineering background, including tissue engineering, microscopy, industrial biotechnology, and drug design. (Writing Intensive)
- 4301. **Bioengineering System Design (3).** Covers systematic design processes, engineering economics, FDA requirements, safety engineering ethics, design failures, and sustainability through the design of biomedical and biotechnological devices. (Writing Intensive)

Engineering (ENGR)

Undergraduate Courses

- 1105. **Strategies for Success in Engineering (1).** 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.
- 1106. **Math Fundamentals for Engineering Students (1).** Prerequisites: MPE score of 4-6 and department approval.
- 1107. **Engineering Seminar (1).** Topics in engineering.
- 1108. **General Chemistry Bridge Course for Engineers (1).** Prerequisite: 43% or higher on Chemistry Placement Exam. Review/preview of high school/college chemistry designed to increase preparedness for CHEM 1307 while allowing co-registration in the ConocoPhillips Academic Success Bridge Program. (CHEM 1101)
- 1301. **Engineering Design for Sustainability (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. **[ENGR 1201] Introduction to Engineering (3).** Prerequisite: MATH 1451 (may be taken concurrently). Introduction to the engineering profession, including the distinction between different majors, engineering problem solving, MatLab programming, Excel basics, professionalism and ethics, and experiences in team design projects.
- 2331. **Professional Communication for Engineers (3).** 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.
- 2392. **Engineering Ethics and Its Impact on Society (3).** Development of ethical reasoning and enhancing critical thinking skills using theory and case studies with applications to engineering practice, including international issues. Available in classroom and by online distance learning. Fulfills core Language, Philosophy, and Culture requirement.
- 2393. **Environmental Literacy and Ethics (3).** Familiarizes students with some of the contemporary challenges they are likely to face as professionals as the concepts and practices of environ-

mental literacy and sustainability become more prevalent in their industries.

- 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).** 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).** Prerequisites: MATH 2450, PHYS 1408. Introduction to the principles of mechanics, including statistics, dynamics, and mechanics of solids.
- 3321. Fundamentals of Thermal Science (3).** Prerequisites: MATH 2450, PHYS 1408. Introduction to the principles of the thermal sciences, including thermodynamics, fluid mechanics, and heat transfer.
- 4001. Special Topics in Engineering (V1-6).** Prerequisite: Departmental approval. Special topics in engineering. May be repeated for credit.

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.
- 5360. Fundamentals of Engineering Science (3).** An overview of physical, mathematical, and engineering concepts; including electronics, materials, statistics, C programming, digital logic, microprocessors, and project management.
- 5392. Ethics in Engineering Research (3).** 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

Sindee L. Simon, Ph.D., Chairperson

Horn Professors: McKenna, Simon

Professors: Chen, Sacco, Weeks

Associate Professors: Gill, Hedden, Khare, Nuraje, Vanapalli, Vaughn, Wiesner

Assistant Professors: Khatib, Lacerda, Li, Marston, Nura

Assistant Professor of Practice: Hu

CONTACT INFORMATION: 204 Chemical Engineering Building, Box 43121, Lubbock, TX 79409-3121, T 806.742.3553, F 806.742.3552, www.depts.ttu.edu/che/index.php

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

Vision. The Department of Chemical Engineering will be the undergraduate Chemical Engineering department of choice in Texas and will be recognized as one of the top research and graduate Chemical Engineering departments in the nation.

Mission. The Department of Chemical Engineering educates, conducts research, and disseminates chemical engineering knowledge through internationally recognized programs for the benefit of society.

Program Educational Objectives. The undergraduate program educational objectives embody the expected accomplishments of graduates during their first few years following graduation. The program educational objectives of the Department of Chemical Engineering (CHE) as adopted by the CHE faculty, with advice from students, alumni, and the CHE External Advisory Board are as follows:

- Graduates will be successful in chemical engineering-related careers and other diverse career paths.
- Graduates will continue professional development and will pursue continuing education opportunities relevant to their careers.
- Some graduates will pursue advanced degrees.

These objectives are published in the university's catalog and on the Department of Chemical Engineering website.

Student Outcomes. Student outcomes are statements of the expectations for the knowledge and skills that students should possess when they graduate with a Bachelor of Science in Chemical Engineering from Texas Tech University.

Graduates of the program must demonstrate 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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- 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, economic, environmental, 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 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 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 the 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 Micro-

Bachelor of Science in Chemical Engineering**FIRST YEAR**

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1451, Calculus I*	4	MATH 1452, Calculus II	4
CHEM 1307 & 1107, Princ. of Chem. I†	4	CHEM 1308 & 1108, Princ. of Chem. II	4
CHE 1121, Chemical Engineering Sem.	1	CHE 1305, Engineering Analysis	3
		PHYS 1408, Principles of Physics I‡	4
TOTAL	12	TOTAL	18

SECOND YEAR

Fall		Spring	
MATH 2450, Calculus III	4	MATH 3350, Math. for Engr. & Sci. I	3
CHEM 3305 & 3105, Organic Chem. I	4	CHE 3315, Fluid Mechanics	3
CHE 2410, Intro. to Chemical Process	4	CHE 2421, Chemical Engr. Thermo. I	4
PHYS 2401, Principles of Physics II	4	ENGR 2392, Engineering Ethics	3
TOTAL	16	TOTAL	13

THIRD YEAR

Fall		Spring	
CHE 2306, Exposition of Technical Info.	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	CHE 3323, Chem. Reaction Engr.	3
IE 2311, Engineering Econ. Analysis	3	CHE 3341, Mass-Transfer Operations	3
		CHE 3330, Engineering Materials Sci.	3
TOTAL	12	TOTAL	15

FOURTH YEAR

Fall		Spring	
CHE 4232, Unit Operations Laboratory	2	CHE 4555, Chem. Proc. Design Simul.	5
CHE 4353, Process Control	3	Chemical Engineering Elective	3
CHE 4122, Chemical Engineering Rev.	1	CHE 4356, Process Safety	3
Chemical Engineering Elective§	3		
TOTAL	9	TOTAL	11

Critical-Path Hours: 106

Additional Requirements:

American Government	6	U.S. History	6
Chemistry Electives#	8	Creative Arts§	3

TOTAL HOURS: 129

* Students who are not adequately prepared for calculus must take appropriate courses (MATH 0301, 0302, 1320, 1321, 1350) before enrolling in MATH 1451.

† 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.

§ Select a course that is simultaneously listed in the Creative Arts 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.

soft 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

General Standards and Requirements. Admission requirements and academic standards for the Department of Chemical Engineering are consistent with the plan for the Edward E. Whitacre Jr. College of Engineering. Refer to the introduction to the Whitacre College of Engineering section of this catalog (page 315) for a description of the criteria for initial admission to the Whitacre College of Engineering and the lower-division foundational curriculum. The recommended foundational curriculum for chemical engineering consists of ENGL 1301, 1302; MATH 1451, 1452; CHEM 1307/1107; PHYS 1408; and CHE 1305.

A student may apply for admission to the upper division of a degree program upon completion of the foundational curriculum and a minimum of 12 credit hours of Texas Tech coursework. The accep-

ance criterion is based exclusively on a cumulative GPA for coursework completed at Texas Tech. The specific GPA standard varies among the degree programs and may change from one academic year to the next as necessary to align enrollments with the educational resources. For students who entered Texas Tech prior to June 1, 2012, a minimum 2.0 GPA is required for admission to the chemical engineering upper-division degree program. Students entering Texas Tech after June 1, 2012, must have a minimum 2.5 GPA.

The academic standards required by the Whitacre College of Engineering and the Department of Chemical Engineering are given in the introduction to the Whitacre College section of the catalog and summarized below. Exceptions to these standards are at the discretion of the dean of the Whitacre College of Engineering.

- A grade of C or better is required for all courses in an engineering degree plan.
- A grade of C or better must be achieved in all prerequisites before the subsequent course may be attempted.
- A minimum 2.5 GPA is required to maintain academic good standing and continued membership in the Whitacre College of Engineering.
- A full-time student must achieve a C or better in 18 credit hours of coursework in the degree plan in each year (fall and spring).
- An engineering course may be repeated only one time after a course drop, withdrawal, or failure to achieve a C or higher. A maximum of three engineering courses may be repeated.

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.

Scholarships. In addition to scholarships offered through the university's Financial Aid Office and the Whitacre College of Engineering, the Department of Chemical Engineering 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 2306, 3232, 4232, and 4555.

The department also offers a combined Bachelor of Science and Master of Science curriculum in which completion of degree requirements leads to the awarding 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. Minors in bioengineering and polymers and materials are offered by the department. 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.

A minor in bioengineering requires a minimum of 21 hours in biology, chemistry, and bioengineering courses. Required courses include BIOL 1403; CHEM 1308/1108; CHEM 3306/3106 or BIOL 1404 or MBIO 3400; CHE 4363 or ECE 5356. Two courses from the approved list of bioengineering electives must also be completed.

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 or ME 3311). The remaining four courses should be selected from the following list:

Graduate Program

For information on graduate programs offered by the Department of Chemical Engineering, visit the Graduate School section of the catalog on page 141.

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
ECE 4381	VLSI Processing
ME 3228	Materials and Mechanics Laboratory
ME 4338	Polymer Composite Materials

Course Descriptions

(To interpret course descriptions, see page 23.)

Chemical Engineering (CHE)

Undergraduate Courses

- 1121. Chemical Engineering Seminar (1).** Prerequisite: For chemical engineering majors only. Readings and discussion of the chemical engineering profession; history, ethics, career paths, and research opportunities.
- 1305. Engineering Analysis I (3).** Prerequisite: CHE 1121 or departmental approval. Prerequisite or corequisite: MATH 1451. Synthesis and analysis of typical engineering problems emphasizing the use of computing tools, spreadsheet and compiler programming.
- 2306. Exposition of Technical Information (3).** 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 (pending THECB approval). (Writing Intensive)
- 2410. Introduction to Chemical Process (4).** Prerequisites: CHE 1305, CHEM 1307, ENGL 1301, MATH 1451, and CHE 1121. Prerequisite or corequisite: PHYS 1408. Units and conversions, process variables, material and energy balances, process flow sheet analysis, phase equilibrium, elementary transient balances.
- 2421. Chemical Engineering Thermodynamics I (4).** Prerequisite: CHE 2410; prerequisite or corequisite: MATH 2450. Properties of pure substances, ideal gas behavior, heat effects in industrial reactions, first and second law analyses, energy conversion and power cycles.
- 3232. Chemical Engineering Transport Laboratory (2).** Prerequisites: CHE 2306, 3315 and 3326; prerequisite or corequisite: CHE 3341. Experiments in mass, momentum, and heat transport; statistical analysis of data. (Writing Intensive)
- 3315. Fluid Mechanics (3).** Prerequisites: 2.5 TTU GPA; C or better in MATH 3350 (concurrent enrollment allowed) and CHE 2410. Principles of momentum transport. Application to laminar and turbulent flow, metering, porous media, and settling.
- 3322. Chemical Engineering Thermodynamics II (3).** Prerequisite: CHE 2421. Solution thermodynamics, phase and chemical equilibria, analysis of processes.
- 3323. Chemical Reaction Engineering (3).** Prerequisites: CHE 3322 and 3326. An introduction to the kinetics of chemical conversion processes and the design of chemical reactors.
- 3326. Heat Transfer (3).** Prerequisites: CHE 2421 and MATH 3350. Principles of energy transport. Application to heat conduction, convection, and radiation. Design and performance of heat exchangers and furnaces.
- 3330. Engineering Materials Science (3).** Prerequisites: CHE 2421, CHEM 1308, and MATH 1452. Engineering properties of metals, ceramics, and polymers; molecular, crystal, and microstructure configurations; selection of materials for applications.
- 3341. Mass-Transfer Operations (3).** Prerequisite: CHE 3322. Theory and practice of mass transfer. Particular emphasis on the operations of distillation, absorption, and extraction.
- 4000. Special Problems in Chemical Engineering (VI-6).** Prerequisite: Departmental approval. Individual studies in chemical engineering areas of special interest. May be repeated for credit.
- 4121. Chemical Engineering Research Seminar (1).** Prerequisite: Senior standing in chemical engineering. External speakers focus on their current research in chemical engineering and related fields.
- 4122. Chemical Engineering Review (1).** Prerequisite: 2.5 TTU GPA; senior standing in chemical engineering, C or better in IE 2311. Corequisite: CHE 4353. Review of chemical engineering science and engineering courses. Preparation for the chemical engineering portion of the FE exam and the chemical engineering capstone design project.

Combined Bachelor of Science and Master of Science in Chemical Engineering

FIRST YEAR			
Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1451, Calculus I*	4	MATH 1452, Calculus II	4
CHEM 1307 & 1107, Prin. of Chem. I†	4	CHEM 1308 & 1108, Prin. of Chem. II	4
CHE 1121, Chemical Engr. Seminar	1	CHE 1305, Engineering Analysis	3
		PHYS 1408, Principles of Physics I‡	4
TOTAL	12	TOTAL	18
SECOND YEAR			
Fall		Spring	
MATH 2450, Calculus III	4	MATH 3350, Math. for Engr. & Sci. I	3
CHEM 3305 & 3105, Organic Chem. I	4	CHE 3315, Fluid Mechanics	3
CHE 2410, Intro. to Chemical Process	4	CHE 2421, Chem. Engr. Thermodyn. I	4
PHYS 2401, Principles of Physics II	4	ENGR 2392, Engineering Ethics	3
TOTAL	16	TOTAL	13
THIRD YEAR			
Fall		Spring	
CHE 2306, Exposition of Tech. Info.	3	CHEM 3308 & 3108, Physical Chem. II	4
CHE 3326, Heat Transfer	3	CHE 3232, Transport Lab.	2
CHE 3322, Chem. Engr. Thermodyn. II	3	CHE 3323, Chem. Reaction Engineering	3
IE 2311, Engineering Econ. Analysis	3	CHE 3341, Mass-Transfer Operations	3
		CHE 3330, Engineering Materials Sci.	3
TOTAL	12	TOTAL	15
FOURTH YEAR			
Fall		Spring	
CHE 4232, Unit Operations Laboratory	2	CHE 4555, Chem. Process Design & Simu.	5
CHE 4353, Process Control	3	Graduate Core Course§	3
CHE 4122, Chemical Engineering Rev.	1	Graduate Core Course§	3
Graduate Core Course§	3	CHE 4356, Process Safety	3
Graduate Core Course§	3		
TOTAL	12	TOTAL	14
FIFTH YEAR			
Fall		Spring	
CHE 7121, Graduate Seminar	1	CHE 7121, Graduate Seminar	1
Graduate Core Course§	3	Graduate Elective Course#	3
Graduate Elective Course#	3	Graduate Elective Course#	3
CHE 6000, Master's Thesis**	3	CHE 6000, Master's Thesis**	3
TOTAL	10	TOTAL	10
Critical-Path Hours: 132			
Additional Requirements:			
American Government	6	U.S. History	6
Creative Arts††	3	Chemistry Electives‡‡	8
TOTAL HOURS: 155			
* Students who are not adequately prepared for calculus must take appropriate courses (MATH 0301, 0302, 1320, 1321, 1350) before enrolling in MATH 1451.			
† 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 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.			
** CHE 5000 for non-thesis option, plus one additional graduate elective and one more CHE 7121 credit.			
†† Select a course that is simultaneously listed in the Creative Arts 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.			

- 4153. Process Control Laboratory (1).** Prerequisite: CHE 4353. Experiments with control equipment and the minicomputer. Professional practice course.
- 4232. Unit Operations Laboratory (2).** Prerequisites: CHE 3232 and senior standing in chemical engineering. Laboratory experiments illustrating the basic principles of unit operations. Includes instruction on experimental methods, equipment scale up, and technical communication. (Writing Intensive)
- 4315. Experimental Techniques in Fluid Dynamics (3).** Prerequisite: CHE 3315. Prerequisite or corequisite: CHE 3232. Experimental techniques for fluid dynamics, including flow visualization, fluid characterization, image processing and analysis. Analytical modeling and statistical treatment of experimental data. Significant laboratory component.
- 4340. Polymer Processing (3).** Prerequisite: CHE 3315. Structure, processing, and properties for industrial plastics processing operations, including extrusion, mixing, calendaring, blow molding, thermoforming, fiber spinning, compression molding, injection molding, and recycling.
- 4341. Polymerization Engineering (3).** Prerequisites: CHEM 3305 and MATH 2450. 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)**. 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)**. Prerequisite or corequisite: CHE 3330 or ME 3311. Synthesis and properties of materials including polymers, polymerization, transitions, phase separation, mechanical properties, and processing.
4346. **Polymer Viscoelasticity (3)**. Prerequisites: MATH 3350 and CHE 3330 or consent of instructor. Linear viscoelasticity, Boltzmann superposition, experimental methods, molecular theory, and mechanical properties of solid polymers.
4353. **Process Control (3)**. Prerequisites: CHE 3315, 3341, 3323; MATH 3350 or 3354. Study of the principles of process dynamics and control and their applications to feedback control.
4356. **Process Safety (3)**. Prerequisites: CHE 3315 and 3341 or consent of instructor. Introduction to hazards associated with chemical, physical, and biological processes. Prepares students for future industrial employment.
4363. **Biochemical Engineering (3)**. Prerequisite: CHE 3323 (may be taken concurrently), CHEM 3305, MATH 2450, PHYS 1408. Introduction to biochemical engineering, including design of processes that involve biological organisms; cellular, molecular and tissue engineering; biomaterials and biotransport.
4364. **Chemical Engineering Applications in Biological Systems (3)**. Prerequisite: MATH 3350 or 3354. Transport phenomena and chemical reactions at the molecular and cellular level in biological systems.
4365. **Biotransport (3)**. Prerequisites: CHE 3315, MATH 3350 or 3354, or consent of instructor. Mass and momentum transport in living systems.
4366. **Biomicrofluidics (3)**. Prerequisite: CHE 3315. Fluid phenomena at small scales. Science and engineering of miniaturized lab-on-chip devices for applications in chemical, biomolecular, and cellular analysis.
4372. **Engineering Experimentation (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. **Entrepreneurship for Chemical Engineers (3)**. Business plan preparation, types of enterprises and initial steps including key permits necessary to start a chemical engineering enterprise.
4381. **Numerical Techniques for Chemical Engineering Problems (3)**. Prerequisite: MATH 3350. Numerical methods for integration, solution of systems of algebraic equations, initial- and boundary-value problems, and optimization.
4385. **Bioprocess Control (3)**. Prerequisites: MATH 3350 or 3354 and CHE 4353 or consent of instructor. Problems and solutions associated with optimization and control of bioprocesses.
4555. **Chemical Process Design and Simulation (5)**. Prerequisites: CHE 3323, 3341, 4353, 4122; IE 2311. Design of chemical processes and equipment using computer simulation, flow sheeting, optimization, and process synthesis techniques. (Writing Intensive)

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.
- 5310.* **Advanced Chemical Engineering Techniques (3)**. 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)**. Fundamental relations governing mass, momentum, and energy transfer within fluids, with special emphasis on simultaneous transport, process applications, and numerical methods of analysis.
5315. **Experimental Techniques in Fluid Dynamics (3)**. Experimental techniques for fluid dynamics, including flow visualization, fluid characterization, image processing and analysis. Analytical modeling and statistical treatment of experimental data. Significant laboratory component.
- 5321.* **Advanced Chemical Engineering Thermodynamics (3)**. 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)**. 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.
5340. **Polymer Processing (3)**. Polymer processing and fabrication technology for thermoplastic and thermoset polymers. The science and art of manufacturing with plastic materials.
5341. **Polymer Chemistry and Processing (3)**. Polymerization reactions, mechanisms, and kinetics, large-scale synthesis, scope of polymer processing, and fabrication technology.
5342. **Polymer Physics and Engineering (3)**. 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)**. 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)**. Synthesis and properties of materials, including polymers, polymerization, transitions, phase separation, mechanical properties, and processing.
5346. **Polymer Viscoelasticity (3)**. Linear viscoelasticity, Boltzmann superposition, experimental methods, molecular theory, and mechanical properties of solid polymers.
5348. **Materials Applications for Scanning Probe Microscopy (3)**. 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)**. 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)**. Prerequisite: MATH 3350 or 3354. Transport phenomena and chemical reactions at the molecular and cellular level in biological systems.
5365. **Biotransport (3)**. Mass and momentum transport in living systems.
5366. **Biomicrofluidics (3)**. Fluid phenomena at small scales. Science and engineering of miniaturized lab-on-chip devices for applications in chemical, biomolecular, and cellular analysis.
5372. **Engineering Experimentation (3)**. Course emphasizes strategy in experimentation, planning efficient experiments, analyzing and interpreting data, presenting results, and Six Sigma methodology.
5376. **Entrepreneurship for Chemical Engineers (3)**. Business plan preparation, types of enterprises and initial steps including key permits necessary to start a chemical engineering enterprise.
5381. **Molecular Thermodynamics for Chemical Engineering (3)**. 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)**. 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)**. Problems and solutions associated with optimization and control of bioprocesses.
5635. **Advanced Topics in Transport Phenomena (6)**. Current research topics in transport phenomena, including turbulent flow characterization, atmospheric chemistry and transport, and rheology, with an emphasis on computational modeling.
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)**. Discussion and presentation of current research.
7123. **Bioengineering Seminar (1)**. Discussion and presentation of current research in bioengineering.
8000. **Doctor's Dissertation (V1-12)**

* The master's program is a structured program requiring the five core courses denoted by asterisks.

Department of Civil, Environmental and Construction Engineering

David Ernst, M.E., Interim Chairperson

Horn Professor: Mehta

Professors: Chen, Fedler, Jackson, Liu, A. Morse, Norville, Rainwater, Reible, Song, V. Uddameri, Won

Associate Professors: Cleveland, Darwish, Ernst, Green, Hernandez, Jayawickrama, Lawson, Liang, Na, Senadheera, Smith, Zuo

Assistant Professors: Bae, Ghebrab, Millerick, Morse, Nejat, Seo, Yan

Instructors: Gurley, Leaverton, Shturman, Spears

CONTACT INFORMATION: 150 Civil and Environmental Engineering Building, Box 41023, Lubbock, TX 79409-1023, T 806.742.3523, F 806.742.3488, www.depts.ttu.edu/ceweb

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Civil Engineering
- Bachelor of Science in Construction Engineering
- Bachelor of Science in Environmental Engineering
- Master of Science in Civil Engineering
- Master of Environmental Engineering
- Doctor of Philosophy in Civil Engineering
- Graduate Certificate in Construction Engineering and Management

Dual Degree Program

- Bachelor of Science in Civil Engineering/Bachelor of Science in Architecture (see the College of Architecture section in this catalog for a curriculum plan)

Vision. The vision of the Department of Civil, Environmental and Construction Engineering is to be nationally and internationally recognized for producing well-prepared graduates, developing visible research programs, and advancing knowledge through public outreach and professional service.

Mission. The mission of the department has four elements:

- To provide excellent instruction and design experiences essential for graduates to enter the practice of civil, environmental and construction 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 provide graduates who are well-educated in both the technical disciplines and the humanities and are prepared to contribute to society and excel in a diverse and highly competitive global workforce.
- To foster a spirit of service and leadership among students and faculty and assist the public in addressing issues concerning the use of resources, protection of the environment, an development of infrastructure.

Program Educational Objectives. The undergraduate program educational objectives embody the expected accomplishments of graduates during their first few years following graduation. The program educational objectives of the Department of Civil, Environmental and Construction Engineering as adopted by the faculty, Advisory Council and the Student Advisory Council are as follows:

Bachelor of Science in Civil Engineering Program

- Graduates will meet the expectations of employers of civil engineers.
- Graduates will continue their professional development through graduate study if qualified and continuing education.

Bachelor of Science in Construction Engineering Program

- Have a strong personal sense of professionalism and pride in their chosen career field.
- Engage in professional service, such as participation in a professional society and community service.
- Advance to higher levels of professional responsibility.
- Be committed to professional development via obtaining professional registration, certification, or other credentials appropriate to their career, professional training, or via post-baccalaureate course work.

Master of Environmental Engineering Program

- Graduates will meet the expectations of employers of environmental engineers.
- Graduates will continue their professional development through continuing education.

These objectives are published in the university's catalog and on the Department of Civil, Environmental and Construction Engineering website.

Student Outcomes. Student outcomes are statements of the expectations for the knowledge and skills that students should possess when they graduate with a B.S. in Civil Engineering, B.S. in Construction Engineering, or the Master of Environmental Engineering degree from Texas Tech University.

Graduates of the program must demonstrate 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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- 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.
- A broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

By the time of graduation, civil engineering students should also demonstrate the following civil engineering program specific outcomes:

- Apply knowledge of mathematics, calculus-based physics, chemistry and one additional area of science.
- Apply knowledge of four technical areas appropriate to civil engineering.
- Conduct experiments and analyze and interpret data.
- Design a system, component, or process in more than one civil engineering context.
- Explain basic professional practice concepts.
- Explain the importance of professional licensure.

By the time of graduation, environmental engineering students should also demonstrate the following environmental engineering program specific outcomes:

- Proficiency in mathematics, probability and statistics, calculus-based physics, general chemistry earth science, biological science and fluid mechanics.
- Knowledge of environmental issues associated with air, land, and water systems and associated environmental health impacts.

- An ability to conduct laboratory experiments and critically analyze and interpret data.
- Performed engineering design by means of integrated design experiences.
- Proficiency in advanced principles and practice relevant to the program objectives.
- Understanding of professional practice concepts.

Undergraduate Program

General Standards and Requirements. Admission requirements and academic standards for the Department of Civil, Environmental and Construction Engineering are consistent with the dynamic enrollment plan for the Edward E. Whitacre Jr. College of Engineering. Refer to the introduction to the Whitacre College of Engineering section of this catalog (page 315) for a description of the criteria for initial admission to the Whitacre College of Engineering and the lower-division foundational curriculum. The recommended foundational curriculum for civil, environmental and construction engineering consists of ENGL 1301, 1302; MATH 1451, 1452; CHEM 1307/1107; PHYS 1408; and ENGR 1315.

A student may apply for admission to the upper division of a degree program upon completion of the foundational curriculum and a minimum of 12 credit hours of Texas Tech coursework. The acceptance criterion is based exclusively on a cumulative GPA for coursework completed at Texas Tech. The specific GPA standard varies among the degree programs and may change from one academic year to the next as necessary to align enrollments with the educational resources. For students who entered Texas Tech prior to June 1, 2012, a minimum 2.0 GPA is required for admission to the civil or environmental engineering upper-division degree programs. Students entering Texas Tech after June 1, 2012, must have a minimum 2.5 GPA.

The academic standards required by the Whitacre College of Engineering and the Department of Civil, Environmental and Construction Engineering are given in the introduction to the Whitacre College section of the catalog and summarized below. Exceptions to these academic standards are at the discretion of the dean of the Whitacre College of Engineering.

- A grade of C or better is required for all courses in an engineering degree plan.
- A grade of C or better must be achieved in all prerequisites before the subsequent course may be attempted.
- A minimum 2.5 GPA is required to maintain academic good standing and continued membership in the Whitacre College of Engineering.
- A full-time student must achieve a C or better in 18 credit hours of coursework in the degree plan in each 12-month period.
- An engineering course may be repeated only one time after a course drop, withdrawal, or failure to achieve a C or higher.
- A maximum of three engineering courses may be repeated.

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, which should be a laptop at a minimum, and should check with the department to obtain recommended specifications.

The required undergraduate programs for civil, environmental and construction engineering are contained in the curriculum tables shown in this section.

The broad Bachelor of Science in Civil Engineering curriculum includes structural, geotechnical, environmental, water resources, and transportation topics to prepare the graduate for multiple career options. The undergraduate courses in the combined Bachelor of Science and Master in Environmental Engineering provide strong preparation in biology, chemistry, and environmental engineering.

The curriculum in construction engineering consists of a basic core of about 63 semester hours of specified courses. These courses in basic

science, humanities, social studies, mathematics, and applied science give a foundation in engineering, technology and general education.

All students who complete the ABET-accredited five-year curriculum receive both the B.S.Env.E. and the M.Env.E. degrees concurrently. M.Env.E. graduates are prepared to move toward professional licensure in any state with the proper combination of examinations (FE, PE) and experience required by that state. Students who only complete the undergraduate courses in the curriculum (1000-4000 level) receive the non-ABET-accredited BS.Env.E. degree only. Graduates who have only a B.S.Env.E. degree and desire licensure must consult the engineering licensure regulations for graduates with non-accredited degrees in their states of interest.

The department requires students in their junior year to conduct a degree audit. Following this audit, they must meet with their academic advisors to discuss all courses remaining for completion of their degree. To graduate, the student must 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, Environmental and Construction Engineering. Forms and information pertaining to departmental regulations are available in the Department of Civil, Environmental and Construction 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.

Minors

Civil, environmental, and construction engineering majors may pursue a minor in any field of study at Texas Tech. A minor consists of 18 hours coursework, with at least 6 hours at the junior or senior level. A minor in mathematics normally can be obtained with the completion of a few additional hours.

The basic core courses for a civil or environmental engineering minor are CE 2301, 3303, and 3305. The last 9 hours should consist of courses from geotechnical, transportation, structures, water resources, or environmental engineering topics.

A minor in construction engineering is available by completing 18 hours of selected construction engineering courses. See the departmental website for more information.

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 construction engineering** 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 CONE 4100 to obtain internship credit.

Credit by Examination

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 pm the first Wednesday after classes begin for the fall term. Students should have a background in beginning drawing and descriptive geometry.

Bachelor of Science in Civil Engineering Curriculum

FIRST YEAR

Fall		Spring	
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
HIST 2300, U.S. History to 1877	3	ENGR 1315, Intro. to Engineering	3
CE 1130, Civil Engineering Seminar I	1	PHYS 1408, Principles of Physics I	4
EGR 1207, Engr. Graphics: Software B	2	CHEM 1308, Principles of Chemistry II	3
CHEM 1307, Principles of Chemistry I	3	CHEM 1108, Exp. Principles of Chem. II	1
CHEM 1107, Exp. Principles of Chem.	1		
TOTAL	17	TOTAL	18

SECOND YEAR

Fall		Spring	
MATH 2450, Calculus III	4	MATH 3350, Math. for Engr. & Sci. I	3
ECE 3301, Gen. Electrical Engineering*	3	IE 2311, Engr. Economic Analysis	3
CE 2301, Statics	3	CE 3303, Mechanics of Solids	3
CONE 2302, Surveying	3	CE 3305, Mechanics of Fluids	3
POLS 1301, American Govt., Org.	3	Statistics†	3
CE 2101, Construction Materials Lab.	1		
TOTAL	17	TOTAL	15

THIRD YEAR

Fall		Spring	
CE 3440, Structural Analysis I	4	CE 3372, Water Systems Design	3
CE 3354, Intro. to Hydrology	3	CE 3341, Prin. of Structural Design	3
CE 3309, Environmental Eng. I	3	CE 3302, Dynamics	3
CE 3171, Environmental Eng. Lab.	1	CE 3321, Intro. to Geotechnical Eng.	3
CE 3105, Mechanics of Fluids Lab.	1	CE 3121, Geotechnical Engineering 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 Engineering Syst.	3
Creative Arts‡	3	Basic Science Elective**	3
Elective (Design)§	3	ENGR 2392, Engr. Ethics & Its Impact	3
CE 4361, Transport. Engineering	3	Elective (Design)§	3
Oral Communication#	3	CE 4101, Fund. of Engr. Exam Review	1
CE 4200, Prof. Engineering Practice Iss.	2		
TOTAL	17	TOTAL	13

TOTAL HOURS: 129

* PHYS 2401 may be substituted.

† Select from IE 3341 or MATH 3342.

‡ Creative Arts elective should satisfy both multicultural and Creative Arts requirements of the core curriculum. Obtain departmental approval before enrolling in courses to satisfy Creative Arts elective.

§ Electives shall be selected as follows (f=fall, s=spring, r=rotating): Design—choose from CE 4311(f), 4312(s), 4321(f), 4331(r), 4333(r), 4340(s), 4342(s), 4351(s), 4353(f), 4371(f); ENVE 4307(f), 4391(s), 4399(s).

Oral Communication: Core Curriculum A

** Basic Science Elective—GIST 3300; GEOL 1303, 3428; ATMO 1300; PSS 2330; BIOL 1305, 1401, 1402, 1403.

Bachelor of Science in Construction Engineering Curriculum

FIRST YEAR

Fall		Spring	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
CHEM 1307, Principles of Chemistry I	3	PHYS 1408, Principles of Physics I	4
CHEM 1107, Exp. Prin. of Chemistry I	1	EGR 1207, Engr. Graphics: Software B	2
ENGR 1315, Intro. to Engineering	3	POLS 1301, American Gov. Org.	3
CONE 1100, Intro. to Construction	1		
TOTAL	15	TOTAL	16

SECOND YEAR

Fall		Spring	
MATH 2450, Calculus III	4	MATH 3350, Math for Engr. & Sci.	3
GEOL 1303/1101 or BIOL 1305/1113	4	CE 3303, Mechanics of Solids	3
CE 2301, Statics	3	CONE 2300, Constr. Mat. & Blueprint	3
CONE 2302, Surveying	3	CE 3305, Mechanics of Fluids	3
HIST 2300, History of U.S. to 1877	3	CE 2101, Construction Materials Lab.	1
		Oral Communication*	3
TOTAL	17	TOTAL	16

THIRD YEAR

Fall		Spring	
CONE 3312, Consts. Found. & Earthwork	3	CONE 3300, Construction Equipment	3
CE 3121, Geotechnical Eng. Lab.	1	MATH 3342, Math. Stats. for Engineers	3
ECE 3301, General Electrical Eng.	3	CONE 3302, MEP Systems & Design	3
CONE 3310, Constr. Struct. Anal. & Des.	3	CONE 4300, Construction Safety	3
CONE 4320, Construction Cost Est.	3	CONE 4322, Construction Management	3
IE 2311, Engineering Econ. Analysis†	3		
TOTAL	16	TOTAL	15

FOURTH YEAR

Fall		Spring	
CONE 4100, Construction Internship	1	CONE 4220, Construction Capstone	2
CONE 4310, Constr. Steel Structures	3	CONE 4312, Constr. Concrete Structures	3
HIST 2301, History of U.S. Since 1877	3	CONE 4324, Constr. Contracts & Specif.	3
ENGR 2392, Engineering Ethics‡	3	IE 3325, Management Systems Control	3
Engineer/Business Elective (Jr./Sr.)§	3	Creative Arts*	3
POLS 2302, American Public Policy	3	Math/Science Elective§	3
TOTAL	16	TOTAL	17

TOTAL HOURS: 128

* Choose from the university's core curriculum.

† Fulfills core Social and Behavioral Sciences requirement.

‡ Fulfills Language, Philosophy, and Culture core requirement

§ Advisor approval required.

NOTE: When choosing a Creative Arts elective, choose a course that also fulfills the university's multicultural requirement.

Course Descriptions

(To interpret course descriptions, see page 23.)

Civil Engineering (CE)

Undergraduate Courses

- 1130. Civil Engineering Seminar I (1).** Introduction to the practice of civil engineering.
- 2101. Construction Materials Laboratory (1).** Laboratory determination and interpretation of engineering properties of construction materials including steel, concrete, aluminum, wood, and masonry.
- 2301. [ENGR 2301, ENGR 2401] Statics (3).** Prerequisites: MATH 1452, PHYS 1408 (may be taken concurrently). Equilibrium of particles and rigid bodies, friction, centroids, and moments of inertia.

- 3103. Mechanics of Solids Laboratory (1).** Prerequisite: CE 3303. Laboratory measurements and observation of behavior of solid materials.
- 3105. Mechanics of Fluids Laboratory (1).** Prerequisite: CE 3305. Experimental studies of fluid behavior.
- 3121. Geotechnical Engineering Laboratory (1).** Corequisite: CE 3321. Laboratory determination and engineering evaluation of the physical properties of soils.
- 3171. Environmental Engineering Laboratory I (1).** 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).** Prerequisites: MATH 2450 (may be taken concurrently) and either CE 2301 or ME 2301. A study of motions of particles and rigid bodies.
- 3303. Mechanics of Solids (3).** Prerequisite: CE 2301 or ME 2301. Theory of stress and strain in elastic and inelastic bodies subject to various conditions of loading.

Graduate Program

For information on graduate programs offered by the Department of Civil, Environmental and Construction Engineering, visit the Graduate School section of the catalog on page 141.

Combined Bachelor of Science and Master of Environmental Engineering

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
EGR 1207, Engr. Graphics	2	ENGR 1315, Intro. to Engineering	3
CHEM 1307, Principles of Chemistry I	3	CHEM 1308, Principles of Chemistry II	3
CHEM 1107, Exp. Principles of Chem. I	1	CHEM 1108, Exp. Principles of Chem. II	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	18

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 2450, Calculus III	4	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	18	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
Statistics †	3	MATH 3350, Math. for Engr. & Sci. I	3
CE 3309, Environmental Engineering	3	IE 2311, Engineering Econ. Analysis	3
CE 3303, Mechanics of Solids	3	CE 3372, Water Systems Design	3
CE 3354, Engineering Hydrology	3	Creative Arts §	3
Oral Communication ‡	3	CE 3321, Intro. to Geotech. Engr.	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
CE 4353, Design of Hydraulic Systems	3	ENVE 4399, Bio. Mun. Wastewater Treat.	3
CE 3105, Mechanics of Fluids Lab.	1	Multicultural #	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 Pollution Ctrl. Syst.	3
ENVE 4385, Microbial Appl. in Env. Engr.	3	CE 5363, Groundwater Hydrology	3
ENGR 2392, Engr. Ethics & Impact on Soc.	3	ENVE 4191, Adv. Water Treatment Lab	1
ENVE 4185, Microb. App. in Env. Engr.	1		
TOTAL	15	TOTAL	16

FIFTH YEAR

<i>Fall</i>		<i>Spring</i>	
CE 5364, Groundwater Transp.	3	ENVE 5306, Env. Systems Design II	3
ENVE 5305, Env. Systems Design I	3	CE 4101, Fund. of Engr. Exam Review	1
ENVE 5315, Env. Chem. for Pollution Mgmt.	3	CE 5395, Solid and Hazardous Waste	3
Technical Elective**	3	Technical Electives**	6
TOTAL	12	TOTAL	13

TOTAL HOURS: 154

* Select environmental science elective such as GEOL 1303 or ATMO 1300 or others with advisor approval.

† Select IE 3341 or MATH 3342.

‡ Core Curriculum A.

§ Core Curriculum E can be used to meet the multicultural requirement.

If Core Curriculum E was not used to meet multicultural requirement.

** Choose at least one from CE 5331, 5361, 5366, 5383; CHE 5363; GEOG 5300; IE 5302, 5306, 5307, IE 5329; or ENTX 6445. or approval from advisor.

- 3305. Mechanics of Fluids (3).** Prerequisite: CE 2301 or ME 2301. Hydrostatics; dynamics of viscous and nonviscous fluids; resistance to flow; flow in pipes and open channels.
- 3309. Environmental Engineering (3).** Prerequisites: 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).** 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).** 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).** 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)

- 3372. Water Systems Design (3).** Prerequisites: 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).** 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. Fundamentals of Engineering Exam Review (1).** Prerequisites: CE 4200 and consent of instructor. Review for NCEES Fundamentals of Engineering Exam.
- 4200. Professional Engineering Practice Issues (2).** Prerequisite: Must be within two long semesters of graduation. Review engineering courses in preparation for NCEES FE exam. A study of engineering bodies of knowledge. May be repeated.
- 4315. Experimental Techniques in Fluid Dynamics (3).** Experimental techniques for fluid dynamics, including flow visualization, fluid characterization, image processing and analysis. Analytical modeling and statistical treatment of experimental data. Significant laboratory component.
- 4321. Geotechnical Engineering Design (3).** 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)
- 4330. Design of Engineering Systems (3).** Prerequisites: 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).** Prerequisite: CE 3440 or consent of instructor. Analysis of structures by matrix methods.
- 4342. Design of Steel Structures (3).** Prerequisites: CE 2101 and 3341. Design of structural steel systems by the LFRD method.
- 4343. Design of Concrete Structures (3).** Prerequisites: CE 2101 and 3341. A course in design of reinforced concrete systems by strength design methods.
- 4351. Pavement Materials and Design (3).** Prerequisites: CE 2101, 3303, 3321. Pavement system, material properties and selection, analysis of layered structures, pavement design, life-cycle cost, pavement performance evaluation, management of pavement systems. S.
- 4353. Design of Hydraulic Systems (3).** Prerequisites: CE 3305 and 3354. Design of open channel and closed conduit conveyance systems for water; includes introduction to HEC-RAS.
- 4361. Transportation Engineering (3).** 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).** 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).** Prerequisite: CE 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

- 5185. Microbial Applications in Environmental Engineering Lab (1).** Prerequisite: Consent of instructor. Determine concentration of coliforms, nutrients, and organic pollutants in water. Analyze water quality data.
- 5191. Advanced Water Treatment Lab (1).** Prerequisite: Consent of instructor. Design and conduct flocculation, coagulant dose, sedimentation, and disinfection studies and assess impact on water quality.
- 5310. Numerical Methods in Engineering (3).** 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).** 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).** 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).** Stress analysis of plates and shells of various shapes; small and large deflection theory of plates; membrane analysis of shells; general theory of shells.
- 5318. Finite Element Methods in Continuum Mechanics (3).** 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).** 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.
- 5322. Geotechnical Site Characterization (3).** Prerequisite: CE 3321 or equivalent. Modern methods for subsurface site characterization, investigation design, soil strength, groundwater monitoring, data presentation, risk/uncertainty issues.
- 5323. Advanced Foundation Engineering (3).** Prerequisites: 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.
- 5324. Geotechnical Practice for Expansive Soils (3).** Prerequisite: CE 3321 or equivalent. Expansive soil characterization, shrink/swell movement prediction methods, design applications, including foundations, pavements, and earth structures.
- 5326. Stability Analysis and Design of Slopes and Embankments (3).** Prerequisite: CE 3321 or equivalent. Principles of stability analysis and design as applied to earth dams, embankments, fills, cuts, and natural slopes; short-term and long-term stability; slope remediation.
- 5328. Design and Analysis of Earth Retaining Structures (3).** Prerequisite: CE 3321 or equivalent. Types of earth retaining structures; wall selection; lateral earth pressure theories; design of conventional, MSE, soil nail, tied-back, and drilled shaft walls.
- 5329. Advanced Design of Bridge Structures (3).** 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).** 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).** 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).** Prerequisite: CE 4342 or consent of instructor. Advanced design of structures, utilizing LRFD design concepts.
- 5343. Advanced Reinforced Concrete Design (3).** Prerequisite: CE 4343 or consent of instructor. Understanding advanced concrete design concepts and discussion of new concrete material technology.
- 5346. Structural Dynamics I (3).** Dynamic response of single and multidegree of freedom systems; modal analysis of lumped and continuous mass systems.
- 5347. Structural Dynamics II (3).** 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).** 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).** Materials science, microstructure, engineering properties, life-cycle, constitutive models, tests, constructability and performance of soils, aggregates, granular materials, stabilized materials, bituminous binders and asphalt concrete, mix design, sustainability.
- 5352. Advanced Pavement Design (3).** 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).** 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).** Channel geometry and parameters. Uniform and varied flow.
- 5361. Surface Water Hydrology (3).** 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).** 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).** 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).** Prerequisite: Consent of instructor. Study of sources and fates of contamination in groundwater. Mathematical modeling of reactive and nonreactive pollutant movement. Aquifer restoration strategies.
- 5366. Water Resources Management (3).** 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).** 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).** 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).** 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)**. 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)**. 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)**. 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)**. Water chemistry and microbiology; design procedures for municipal water treatment; advanced methods for quality control, renovation, and reuse.
5393. **Unit Processes Laboratory (3)**. 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)**. 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)**. 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)**.

Construction Engineering (CONE)

Undergraduate Courses

1100. **Introduction to Construction (1)**. Seminar designed to provide an introduction to the construction industry. Contains a general overview of the industry and the various career paths that are available within the industry as a whole.
2300. **Construction Materials and Blueprint Reading (3)**. Introduction to construction methods, materials, processes, and working drawings and specifications. Class blueprint exercises will be assigned and utilized to develop critical blueprint and specification reading skills.
2302. **Surveying (3)**. Prerequisite: MATH 1321 or 1451 or 1452 or 2450 with a C or better. Care and use of modern surveying equipment, differential leveling, area calculations, horizontal and vertical curves, and effects of observation errors.
3300. **Construction Equipment (3)**. Prerequisite: IE 2311. Introduction to construction equipment including types of equipment, ownership and operational costs, estimating equipment costs, equipment scheduling and selection, and fleet management.
3302. **MEP Systems and Design for Construction (3)**. Prerequisite: At least junior standing in construction engineering or consent of instructor. Introduces students to mechanical, electrical, and plumbing systems in buildings. Includes basic design principles, conservation measures, and green building practices.
3304. **Sustainable Building Design and Construction (3)**. Techniques and methods of sustainable construction and design. Addresses the importance of team effort among owners, developers, architects, engineers, and contractors. USGBC and LEED process will be studied.
3310. **Construction Structural Analysis and Design (3)**. Prerequisite: CE 3303. Covers the fundamental concepts of structure analysis and design associated with statically determinate and indeterminate structures for common members, systems, and materials.
3312. **Construction Foundations and Earthwork (3)**. Prerequisite: CE 3303. Identifies fundamentals of soil properties and addresses principles of soil mechanics and the design of foundations for structures.
3341. **Electric Power and Codes in Buildings (3)**. Prerequisites: MATH 1451 and PHYS 1408. Provides a working knowledge of the electrical power distribution system and equipment installed in buildings and applicable power codes.
4031. **Special Topic in Construction Engineering (V1-3)**. Prerequisite: Departmental approval. Elaborates on a special topic of current interest in construction engineering. May be repeated for credit.
4100. **Construction Internship (1)**. Prerequisite: At least junior status in the construction engineering program or consent of the department chairperson. Practical work experience in the construction or engineering industry. The practicum includes a written report and an oral presentation addressing work experience. Requires a minimum work commitment of 3 months.
4143. **Power, Lighting, and Controls Laboratory (1)**. Prerequisite or corequisite: CONE 3341 or 4342. Provides hands-on experience in constructing and analyzing power, lighting, and control systems.
4220. **Construction Capstone (2)**. Prerequisites: CONE 4300, 4320, and 4322. Design and development of real world construction projects. Projects require cost estimate, project schedule, site safety plan, and onsite-preconstruction planning. Written proposals and oral presentations required.
4300. **Construction Safety (3)**. Prerequisite: At least junior status in the construction engineering program or consent of the instructor. Management of safety and health programs for the construction company, including OSHA regulatory requirements. Students earn a 30-hour OSHA card upon successful completion of OSHA requirements. (Writing Intensive)
4306. **Mechanical System Applications and Codes (3)**. Prerequisite: ME 2322. Introduces the basics of heating and cooling load calculations and the appropriate energy, plumbing, and mechanical codes that apply to buildings.
4310. **Construction Steel Structures (3)**. Prerequisite: CONE 3310. Common practices and terminology of construction and design of steel structures. AISC-LRFD method is used to emphasize design, fabrication, and installation of steel elements and connections.
4312. **Construction Concrete Structures (3)**. Prerequisite: CONE 3310. Common practices and terminology of construction and design of concrete structures. ACI 318-Strength method emphasizes design, fabrication, and installation of concrete elements. Formwork design is also emphasized.
4314. **Masonry Construction (3)**. Prerequisite: CE 3303. A study of material properties and common practices of design and construction of masonry structures. Use of MSJC code (ACI 530/ASCE 5/TMS 402).
4320. **Construction Cost Estimating (3)**. Prerequisite: At least junior status in the construction engineering program or consent of the department chairperson. Construction drawings and specs used to quantify material, labor, overhead, and equipment for bid preparation. Computer software used to develop construction bid in project simulation and case study.
4322. **Construction Management (3)**. Prerequisite: At least junior status in the construction engineering program or consent of the department chairperson. Addresses modern methods for managing construction projects including CPM scheduling, resource allocation, and funds flow. Practical application made through project simulations.
4324. **Construction Contracts and Specifications (3)**. Prerequisite: At least junior status in the construction engineering program or consent of the department chairperson. Principles and analysis of construction contracts and project specifications as well as contract law, negotiations, and ethics. (Writing Intensive)
4342. **Power, Lighting, Communication, and Control Systems (3)**. Prerequisites: MATH 1451 and PHYS 1408. Provides a working knowledge of the power, lighting, communications, and control systems in buildings.

Graduate Courses

5031. **Independent Study in Construction (V1-3)**. Prerequisite: Graduate student standing in engineering. Explores advanced construction engineering topics not covered by current curriculum.
5302. **Construction Safety and Risk Management (3)**. Prerequisite: Graduate standing or consent of instructor. A study of risk assessment and management techniques, methods, and models used in the construction industry to minimize and control various risk.
5304. **Sustainable Building Design and Construction (3)**. Prerequisite: Graduate standing or consent of instructor. Design and construction of high-performance buildings with the basis on which sustainability can be evaluated.
5314. **Masonry Design and Construction (3)**. Prerequisite: Graduate standing or consent of instructor. Design and construction of masonry structures per current Joint Standards Masonry Committee Building Code Requirements and Specifications. Focus is on clay and concrete block masonry.
5320. **Construction Cost Estimating and Control (3)**. Prerequisite: Graduate standing or consent of instructor. Study of advanced topics in cost estimating and control, including methods, knowledge, and computer tools for project bidding, budgeting, financing, and accounting.
5322. **Construction Management (3)**. Prerequisite: Graduate standing or consent of instructor. Study of advanced topics in construction management, including methods, knowledge, and computer tools for project planning and administration.
5331. **Special Topics in Construction Engineering (3)**. Prerequisite: Departmental approval. Elaborates on a special topic of current interest to graduate students with an interest in construction engineering. May be repeated for credit.
5332. **BIM and 4D Modeling (3)**. Prerequisite: Graduate standing or consent of instructor. Introduction to building information modeling and its applications in the construction industry.
6000. **Master's Thesis (V1-6)**.
6330. **Master's Report (3)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Engineering Graphics (EGR)

Undergraduate Courses

1206. [ENGR 1204] **Engineering Graphics: Software A (2)**. Prerequisite: Must be accepted to the Whitacre College of Engineering. For students majoring in mechanical and industrial engineering and mechanical and electrical/electronics engineering technology. 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)**. Prerequisite: Must be accepted to the Whitacre College of Engineering. For students majoring in civil engineering, construction engineering, and construction engineering technology. Provides a background in orthographic projection, selected topics of descriptive geometry, engineering drawing techniques, and computer-aided design and drafting software.

Environmental Engineering (ENVE)

Undergraduate Courses

1100. **Environmental Engineering Seminar (1)**. Introduction of first year and transfer students to the practice of environmental engineering.
4107. **Advanced Physical and Chemical Municipal Water Treatment Lab (1)**. 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.
4185. **Microbial Applications in Environmental Engineering Lab (1)**. Prerequisite: Consent of instructor. Determine concentra-

tion of coliforms, nutrients, and organic pollutants in water; analyze water quality data.

4191. **Advanced Water Treatment Lab (1)**. Prerequisite: Consent of instructor. Design and conduct flocculation, coagulant doses, sedimentation, and disinfection studies; assess impact on water quality.
4307. **Physical and Chemical Municipal Wastewater Treatment (3)**. Prerequisites: CE 3309 and consent of instructor. Characterization of municipal wastewaters and the application of physical and chemical design procedures to remove and dispose of criteria pollutants in wastewater.
4314. **Membrane Treatment Processes (3)**. Prerequisite: CE 3309 or consent of instructor. Introduces the fundamental principles and applications of various membrane processes (MF, UF, NF, and RO) in water and wastewater treatment and quality control.
4315. **Environmental Chemistry for Pollution Management (3)**. Prerequisite: CE 3309 or consent of instructor. Introduces the fundamental knowledge of reaction kinetics and chemical equilibriums relevant to water quality in natural and engineered processes.
4385. **Microbial Applications in Environmental Engineering (3)**. 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)**. 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)**. 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)**. Prerequisite: Consent of instructor. Characterization of alkalinity, pH, BOD, and solids concentrations. Students will conduct column tests and filtration studies. Analyze water quality data.
5303. **Design of Air Pollution Control Systems (3)**. Engineering analysis procedures techniques for the selection, application, and operation of air pollution control methods in various operational situations.
5305. **Environmental Systems Design I (3)**. 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. (Writing Intensive)
5306. **Environmental Systems Design II (3)**. 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. (Writing Intensive)
5307. **Advanced Physical and Chemical Municipal Wastewater Treatment (3)**. Characterization of municipal wastewaters and the application of physical and chemical design procedures to remove and dispose of criteria pollutants in wastewater.
5314. **Membrane Treatment Processes (3)**. Prerequisite: CE 3309 or consent of instructor. Introduces the fundamental principles and applications of various membrane processes (MF, UF, NF and RO) in water and wastewater treatment and quality control.
5315. **Environmental Chemistry for Pollution Management (3)**. Prerequisite: CE 3309 (or equivalent) or consent of instructor. Introduces the fundamental knowledge of reaction kinetics and chemical equilibriums relevant to water quality in natural and engineered processes.
5399. **Biological Municipal Wastewater Treatment (3)**. 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

Rattikorn Hewett, Ph.D., Chairperson

Professors: M. Gelfond, Hewett

Associate Professors: Lopez-Benitez, Mengel, Rushton, Shin, Siami Namin, Watson, Zhang, Zhuang

Assistant Professors: Chen, Lim, Rahnamay Naeini

Instructors: Colmenares, G. Gelfond

CONTACT INFORMATION: CS211 Engineering Center, Box 43104, Lubbock, TX 79409-3104, T 806.742.3527, F 806.742.3519, www.cs.ttu.edu

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

Dual Degree Program

- Bachelor of Science in Computer Science/Bachelor of Science in Mathematics

The computer science program will provide students a broad-based understanding of the computing discipline and prepare them for a productive professional career and/or pursuit of advanced degrees in the field. The computer science curriculum places a strong emphasis on writing, communications, professional skills and ethical concerns.

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.

Mission Statement. The Department of Computer Science engages in the research, education, and service activities required to create and disseminate the knowledge of problem solving using computers.

Program Educational Objectives. Within a few years of graduation, Bachelor of Science in Computer Science graduates are expected to:

1. Practice in a computing-related profession and/or pursue advanced studies in computing or a related discipline
2. Exhibit communication, teamwork and leadership skills
3. Function ethically as responsible professionals with the ability to progress within their organizations
4. Pursue professional development through continuing education and/or participation in computing oriented events and organizations.

Student Outcomes. Bachelor of Science in Computer Science graduates of Texas Tech University should attain the Criterion 3 Student Outcomes a-k as the following.

- (a) An ability to apply knowledge of computing and mathematics appropriate to the discipline.
- (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- (d) An ability to function effectively on teams to accomplish a common goal.

- (e) An understanding of professional, ethical, legal, security and social issues and responsibilities.
- (f) An ability to communicate effectively with a range of audiences.
- (g) An ability to analyze the local and global impact of computing on individuals, organizations, and society.
- (h) Recognition of the need for and an ability to engage in continuing professional development.
- (i) An ability to use current techniques, skills, and tools necessary for computing practice.
- (j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
- (k) An ability to apply design and development principles in the construction of software systems of varying complexity.

Undergraduate Program

General Standards and Requirements. Admission requirements and academic standards for the Department of Computer Science are consistent with the dynamic enrollment plan for the Edward E. Whitacre Jr. College of Engineering. Refer to the introduction to the Whitacre College of Engineering section of this catalog (page 315) for a description of the criteria for initial admission to the Whitacre College of Engineering and the lower-division foundational curriculum. The recommended foundational curriculum for computer science consists of ENGL 1301, 1302; MATH 1451, 1452; CS 1411; PHYS 1408; and either PHYS 2401 or the required science elective.

A student may apply for admission to the upper division of a degree program upon completion of the foundational curriculum and a minimum of 12 credit hours of Texas Tech coursework. The acceptance criterion is based exclusively on a cumulative GPA for coursework completed at Texas Tech. The specific GPA standard varies among the degree programs and may change from one academic year to the next as necessary to align enrollments with the educational resources. For students who entered Texas Tech prior to June 1, 2012, a minimum 2.0 GPA is required for admission to the computer science upper-division degree program. Students entering Texas Tech after June 1, 2012, must have a minimum 2.5 GPA.

The academic standards required by the Whitacre College of Engineering and the Department of Computer Science are given in the introduction to the Whitacre College section of the catalog and summarized below. Exceptions to these standards are at the discretion of the dean of the Whitacre College of Engineering.

- A grade of C or better is required for all courses in an engineering degree plan.
- A grade of C or better must be achieved in all prerequisites before the subsequent course may be attempted.
- A minimum 2.5 GPA is required to maintain academic good standing and continued membership in the Whitacre College of Engineering.
- A full-time student must achieve a C or better in 18 credit hours of coursework in the degree plan in each 12-month period.
- An engineering course may be repeated only one time after a course drop, withdrawal, or failure to achieve a C or higher. A maximum of three engineering courses may be repeated.

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.

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.

Graduate Program

For information on graduate programs offered by the Department of Computer Science, visit the Graduate School section of the catalog on page 142.

Minor in Computer Science. A minor in computer science consists of a minimum of 18 hours, with at least six of those hours at the 3000 or 4000 level. CS 1300, 1303, 1305, 4311, and 4366 may not be part of a minor. Minor courses require the approval of the undergraduate advisor.

Dual Degree. Computer science is part of a dual-degree program in which students can earn a B.S. in Computer Science from the Whitacre College of Engineering and a B.S. in Mathematics with a minor in Computer Science from the College of Arts and Sciences. This degree program follows all requirements mandated for the Bachelor of Science degrees for both the Whitacre College of Engineering and the College of Arts and Sciences. Students are advised by an academic advisor in each college and may declare either college as their primary college. The five-year dual-degree curriculum table is listed in this section.

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 admitted initially 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.

Course Descriptions

(To interpret course descriptions, see page 23.)

Computer Science (CS)

Undergraduate Courses

- 1300. **Computers and Modern Society (3).** Survey of computers, their uses, and their impact on society. Brief introduction to computer programming and the use of word processor, spreadsheet, and data base application software. Credit may not be applied toward a computer science major or minor.
- 1303. **Programming Language Proficiency in C/C++ (3).** Prerequisites: 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 1315, 1330; ENGR 2304] Introduction to Computer Science (3).** 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

Bachelor of Science in Computer Science

FIRST YEAR

Fall		Spring	
CS 1411, Programming Principles I*	4	CS 1412, Programming Principles II	4
MATH 1451, Calculus I*	4	MATH 1452, Calculus II*	4
ENGL 1301, Essentials of Coll. Rhetoric†	3	PHYS 1408, Principles of Physics I*	4
Life and Physical Sciences*§	4	ENGL 1302, Advanced College Rhetoric*	3
TOTAL	15	TOTAL	15

SECOND YEAR

Fall		Spring	
CS 2413, Data Structures	4	CS 2350, Comp. Org. & Assembly Lang.	3
CS 1382, Discrete Computation Struct.	3	CS 2365, Object-Oriented Programming	3
ECE 2372, Modern Digital Syst. Design	3	ENGR 2392, Engineering Ethics	3
MATH 2450, Calculus III	4	POLS 1301, American Gov., Org.	3
PHYS 2401, Principles of Physics II	4	MATH 2360, Linear Algebra	3
		ENGL 2311, Technical Writing	3
TOTAL	18	TOTAL	18

THIRD YEAR

Fall		Spring	
CS 3361, Concepts. of Program. Lang.	3	CS 3365, Software Engineering I	3
CS 3364, Des. & Analysis of Algorithms	3	CS 3375, Computer Architecture	3
MATH 3342, Math Stat. for Engr. & Sci.	3	CS 3383, Theory of Automata	3
Elective (Core Curriculum)#	3	Elective (CS)†	3
POLS 2302, American Public Policy	3	Elective (Core Curriculum)‡	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
CS 4365, Software Engineering II	3	CS 4366, Sr. Capstone Project	3
CS 4352, Operating Systems	3	Elective (CS)†	6
CS 4354, Con. Database Systems	3	Elective (Core Curriculum)‡	6
Elective (CS)†	3		
Elective (Core Curriculum)‡	3		
TOTAL	15	TOTAL	15

TOTAL HOURS: 126

* Foundational curriculum course.

† Computer science electives: Choose from any 3000- or 4000-level computer science courses that are not required for the CS major.

‡ Courses needed to fulfill the university core curriculum requirements, including 6 hours of U.S. History, 3 hours of Creative Arts, and 3 hours of Social and Behavioral Sciences electives. The 3-hour multicultural requirement must also be satisfied. This can be done by either completing an approved study abroad program, including assessment by the Study Abroad Office, or by taking a course from the multicultural list. If taking a multicultural course, it is recommended that the course also meet either the Creative Arts or Social and Behavioral Sciences requirement, thus fulfilling two requirements. For details, consult the core curriculum requirements on page 59 of this catalog.

§ Any core curriculum 4-hour Life and Physical Sciences lab and lecture except Physics (see www.depts.ttu.edu/officialpublications/catalog/_AcademicsCore2014.php).

Oral Communication elective.

computer programming with an emphasis on problem solving, critical thinking, logical reasoning, design and implementation techniques.

- 1382. **Discrete Computational Structures (3).** Prerequisite: CS 1411 or ECE 1304. Sets, functions, counting principles, basic probability, logic, proof methods, and graphs.
- 1411. **[COSC 1320, 1336, 1415, 1436] Programming Principles I (4).** 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).** Prerequisite: CS 1411 or ECE 1304. Advanced procedural programming. Topics include recursive functions, parameter passing, structures, records, memory allocation, exception handling, and abstract data types.
- 2350. **[COSC 1319, 1419, 2319, 2325, 2419, 2425] Computer Organization and Assembly Language Programming (3).** Prerequisites: CS 1412, ECE 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.
- 2365. **Object-Oriented Programming (3).** Prerequisite: CS 2413. Introduction to object-oriented programming. Topics include object-oriented design and analysis, classes, inheritance, polymorph data abstraction, and user interface design principles.

**Bachelor of Science in Computer Science and
Master of Science in Software Engineering**

FIRST YEAR			
Fall		Spring	
CS 1411, Programming Principles I*	4	CS 1412, Programming Principles II	4
MATH 1451, Calculus I*	4	MATH 1452, Calculus II*	4
ENGL 1301, Essentials of Coll. Rhetoric†	3	PHYS 1408, Principles of Physics I*	4
Life and Physical Sciences*†	4	ENGL 1302, Advanced College Rhetoric*	3
TOTAL	15	TOTAL	15
SECOND YEAR			
Fall		Spring	
CS 2413, Data Structures	4	CS 2350, Comp. Org. & Assembly Lang.	3
CS 1382, Discrete Compu. Structures	4	CS 2365, Object-Oriented Programming	3
ECE 2372, Modern Digital Syst. Design	3	MATH 2360, Linear Algebra	3
MATH 2450, Calculus III	4	ENGL 2311, Technical Writing	3
PHYS 2401, Principles of Physics II	3	POLS 1301, American Gov., Org.	3
		ENGR 2392, Engineering Ethics	3
TOTAL	18	TOTAL	18
THIRD YEAR			
Fall		Spring	
CS 3361, Concepts of Program. Lang.	3	CS 3365, Software Engineering I	3
CS 3364, Des. & Analysis of Algorithms	3	CS 3375, Computer Architecture	3
MATH 3342, Math Stat. for Engr. & Sci.	3	CS 3383, Theory of Automata	3
Elective (Core Curriculum)‡‡	3	Elective (CS)‡	3
Elective (CS)‡	3	Elective (Core Curriculum)*	6
POLS 2302, American Public Policy	3		
TOTAL	18	TOTAL	18
FOURTH YEAR			
Fall		Spring	
CS 4365, Software Engineering II	3	CS 4366, Sr. Capstone Project	3
CS 4352, Operating Systems	3	CS 5373, Software Modeling & Arch	3
CS 4354, Concepts of Database Syst.	3	Graduate Elective (CS)#	3
CS 5374, Software Verification & Valid.	3	Elective (Core Curriculum)†	6
Graduate Elective (CS)#	3		
TOTAL	15	TOTAL	15
FIFTH YEAR			
Fall		Spring	
Graduate Elective (SE)**	6	Graduate Elective (SE)**	6
CS 6000, Master's Thesis ††	3	CS 6000, Master's Thesis ††	3
TOTAL	9	TOTAL	9

TOTAL HOURS: 150

NOTE: 6 hours of graduate work are dually counted in place of 6 hours of CS undergraduate electives for the B.S. degree.

* Foundational curriculum course.

† Any core curriculum 4-hour Life and Physical Sciences lab and lecture except Physics (see www.depts.ttu.edu/officialpublications/catalog/_AcademicsCore2014.php#Science).

‡ Computer Science electives: choose from any 3000- or 4000-level computer science courses that are not required for the CS major.

§ Courses needed to fulfill the university core curriculum requirements, including 6 hours of U.S. History, 3 hours of Creative Arts, and 3 hours of Social and Behavioral Sciences electives. The 3-hour multicultural requirement must also be satisfied. This can be done by either completing an approved study abroad program, including assessment by the Study Abroad Office, or by taking a course from the multicultural list. If taking a multicultural course, it is recommended that the course also meet either the Creative Arts or Social and Behavioral Sciences requirement, thus fulfilling two requirements. For details, consult the core curriculum requirements on page 59 of this catalog.

Graduate CS Elective Courses: to be determined in consultation with a thesis or departmental graduate advisor.

** Graduate Software Engineering Elective Course: To be determined in consultation with departmental graduate advisor.

†† Master's Thesis: The 6 hours for CS 6000 shown here are only a minimum number. Due to their nature, some thesis projects may require an earlier start and/or take longer to complete. Also, if pursuing the project option, substitute 3 hours of CS 6001, 3 hours of graduate Software Engineering electives, and 6 hours of graduate CS electives for the 6 hours of CS 6000. Elective courses are determined in consultation with a computer science graduate advisor. Thesis and non-thesis students must also pass the Final Comprehensive Examination as required by the university.

‡‡ Oral Communication elective.

**Combined Bachelor of Science and
Master of Science in Computer Science**

FIRST YEAR			
Fall		Spring	
CS 1411, Programming Principles I*	4	CS 1412, Programming Princ. II	4
ENGL 1301, Essentials of Coll. Rhetoric*	3	MATH 1452, Calculus II*	4
MATH 1451, Calculus I*	4	PHYS 1408, Principles of Physics I*	4
Life and Physical Sciences*†	4	ENGL 1302, Advanced College Rhetoric*	3
TOTAL	15	TOTAL	15
SECOND YEAR			
Fall		Spring	
CS 2413, Data Structures	4	CS 2350, Computer Org. Assem. Lang.	3
CS 1382, Discrete Compu. Structures	3	CS 2365, Object-Oriented Programming	3
MATH 2450, Calculus III	4	MATH 2360, Linear Algebra	3
ECE 2372, Modern Digital Syst. Design	3	ENGL 2311, Technical Writing	3
PHYS 2401, Principles of Physics II	4	ENGR 2392, Engineering Ethics	3
		POLS 1301, American Gov., Org.	3
TOTAL	18	TOTAL	18
THIRD YEAR			
Fall		Spring	
CS 3361, Concepts of Programming Lang.	3	CS 3365, Software Engineering I	3
CS 3364, Des. & Analysis of Algorithms	3	CS 3375, Computer Architecture	3
MATH 3342, Math. Stat. for Eng. & Sci.	3	CS 3383, Theory of Automata	3
Elective (Core Curriculum)‡‡	3	Elective (Core Curriculum)*	6
Elective (CS)‡	3	Elective (CS)‡	3
POLS 2302, American Public Policy	3		
TOTAL	18	TOTAL	18
FOURTH YEAR			
Fall		Spring	
CS 4365, Software Engineering II	3	CS 4366, Senior Capstone Project	3
CS 4352, Operating Systems	3	Elective (Core Curriculum)§	6
CS 4354, Concepts of Database Syst.	3	Graduate Core (CS)#	6
Graduate Core (CS)#	6		
TOTAL	15	TOTAL	15
FIFTH YEAR			
Fall		Spring	
Graduate Elective (CS)**	6	Graduate Elective (CS)**	6
CS 6000, Master's Thesis ††	3	CS 6000, Master's Thesis ††	3
TOTAL	9	TOTAL	9

TOTAL HOURS: 150

NOTE: 6 hours of graduate work are dually counted in place of 6 hours of CS undergraduate electives for the B.S. degree.

* Foundational curriculum course.

† Any core curriculum 4-hour Life and Physical Sciences lab and lecture except Physics (see www.depts.ttu.edu/officialpublications/catalog/_AcademicsCore2014.php#Science).

‡ Computer Science electives: choose from any 3000- or 4000-level computer science courses that are not required for the CS major.

§ Courses needed to fulfill the university core curriculum requirements, including 6 hours of U.S. History, 3 hours of Creative Arts, and 3 hours of Social and Behavioral Sciences electives. The Multicultural requirement must also be satisfied. This can be done by either completing an approved study abroad program, including assessment by the Study Abroad Office, or by taking a course from the multicultural list. If taking a multicultural course, it is recommended that the course also meet either the Creative Arts or Social and Behavioral Sciences requirement, thus fulfilling two requirements. For details, consult the core curriculum requirements on page 59 of this catalog.

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. Due to their nature some thesis projects may require an earlier start and/or take longer to complete. Also, if pursuing the project option, substitute 3 hours of CS 6001/6002 and 9 hours of graduate CS electives for the 6 hours of CS 6000. If pursuing the non-thesis exam option, substitute 12 hours of graduate CS elective courses for the 6 hours of CS 6000. Elective courses are determined in consultation with a computer science graduate advisor. Thesis and non-thesis students must pass the Final Comprehensive Examination as required by the university.

‡‡ Oral Communication elective.

- 2413. [COSC 2315, 2336, 2415, 2436] Data Structures (4).** 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).** Prerequisites: CS 2350 or ECE 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).** Prerequisite: CS 2413. Study of programming language design. The investigation and comparison of different programming language paradigms.
- 3364. Design and Analysis of Algorithms (3).** Prerequisite: CS 1382, 2413, and MATH 2360. A theoretical course focusing on the design and analysis of computer algorithms.
- 3365. Software Engineering I (3).** Prerequisite: CS 2365 or 2413, MATH 3342 or equivalent. Introduces theory and practice for software engineering. Topics include software life cycle,

Dual Bachelor of Science Degrees in Computer Science and Mathematics

FIRST YEAR

Fall		Spring	
CS 1411, Programming Princ. I*	4	CS 1412, Programming Princ. II	4
ENGL 1301, Essentials of Coll. Rhetoric*	3	MATH 1452, Calculus II*	4
MATH 1451, Calculus I*	4	PHYS 1408, Principles of Physics I*	4
Life and Physical Sciences*†	4	ENGL 1302, Advanced College Rhetoric*	3
TOTAL	15	TOTAL	15

SECOND YEAR

Fall		Spring	
CS 2413, Data Structures	4	CS 2350, Computer Org. Assem. Lang.	3
CS 1382, Discrete Comput. Structures	3	CS 2365, Object-Oriented Programming	3
ECE 2372, Modern Digital Syst. Design	3	MATH 2360, Linear Algebra	3
MATH 2450, Calculus III	4	MATH 3310, Intro to Math. Reason & Proof	3
PHYS 2401, Principles of Physics II	4	ENGR 2392, Engineering Ethics	3
TOTAL	18	TOTAL	15

THIRD YEAR

Fall		Spring	
CS 3364, Des. & Analysis of Algorithms	3	CS 3365, Software Engineering I	3
MATH 3342, Statistics for Eng. & Sci.	3	CS 3375, Computer Architecture	3
MATH 3354, Differential Equations I	3	MATH 3360, Foundations of Algebra I	3
Elective (Core Curriculum)††	3	POLS 1301, American Govt., Org.	3
English Literature	3	ENGL 2311, Technical Writing	3
		English Literature	3
TOTAL	15	TOTAL	18

FOURTH YEAR

Fall		Spring	
CS 3361, Concepts of Program. Lang.	3	CS 3383, Theory of Automata	3
CS 4352, Operating Systems	3	Foreign Language Elective‡	3
Foreign Language Elective‡	3	Elective (CS)#	3
MATH Breadth Course§	3	MATH Depth Course**	3
POLS 2302, American Public Policy	3	Elective (Core Curriculum)††	3
TOTAL	15	TOTAL	15

FIFTH YEAR

Fall		Spring	
CS 4365, Software Engineering II	3	CS 4366, Senior Capstone Project	3
CS 4354, Concepts of Database Syst.	3	MATH Depth Course§	3
MATH 4350, Advanced Calculus	3	Elective (CS)#	3
MATH Breadth Course§	3	Elective (Core Curriculum)††	6
Elective (Core Curriculum)††	3	Personal Fitness and Wellness	1
Personal Fitness and Wellness	1		
TOTAL	16	TOTAL	16

TOTAL HOURS: 158

* Foundational curriculum course.

† Any core curriculum 4-hour Life and Physical Sciences lab and lecture except Physics (see www.depts.ttu.edu/officialpublications/catalog/_AcademicsCore2014.php#Science).

‡ A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through a credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or the first or second semester of a beginning (first-year) language course. See Arts and Sciences General Degree Requirements for further explanation.

§ MATH breadth course: choose one from MATH 3430 4000, 4310, 4312, 4330, 4331, 4342, 4343, 4351, 4354, 4356, 4360, 4362, and 4363 with advisor approval.

Computer Science electives: Choose from any 3000- or 4000-level computer science courses that are not required for the CS major.

** MATH depth course: choose one from MATH 4343, 4351, 4354, and 4360 with advisor approval.

†† Courses needed to fulfill the university core curriculum requirements, including 6 hours, of U.S. History, 3 hours of Creative Arts, and 3 hours of Social and Behavioral Sciences electives. The Multicultural requirement must also be satisfied. This can be done by either completing an approved study abroad program, including assessment by the Study Abroad Office, or by taking a course from the multicultural list. If taking a multicultural course, it is recommended that the course also meet either the Creative Arts or Social and Behavioral Sciences requirement, thus fulfilling both core requirements. For details, consult the core curriculum requirements on page 59 of this catalog.

‡‡ Oral Communication elective.

requirements, specification and analysis, software architecture and detailed design, and testing. (Writing Intensive)

- 3366. Human Computer Interaction (3).** Prerequisite: CS 2413. Focuses on design, development, and evaluation of computer systems that interact with people. Topics include interaction design models, interface components, and usability testing.
- 3368. Introduction to Artificial Intelligence (3).** Prerequisite: CS 1382. This course provides introduction to theory, design, and implementation of intelligent systems.
- 3375. Computer Architecture (3).** Prerequisite: CS 2350 or ECE 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).** Prerequisite: CS 1382. The relationship between language, grammars, and automata. Deterministic and nondeterministic machines. Pushdown automata and Turing machines. Limits of computability.
- 4000. Individual Studies 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).** Prerequisites: CS majors only; CS 3365, 3364, and COMS 3358 or ENGR 2331; 12 additional hours of upper-division computer science coursework; senior standing. 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)
- 4328. Scientific Computing (3).** Prerequisites: CS 2413 and MATH 1452. Numerical techniques for interpolation, integration, and the solution of systems of algebraic and differential equations with special emphasis on hardware limitations.
- 4331. Special Topics in Computer Science (3).** Prerequisite: Advanced standing and CS 3375. Advanced study in computer science topics.
- 4352. Operating Systems (3).** Prerequisites: CS 3364 and 3375. 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).** Prerequisite: CS 3364. Overview of a database system and its components; physical organization of data; data models; relational databases; and query processing.
- 4365. Software Engineering II (3).** Prerequisite: CS 3365. Advanced theory and practice for software engineering. Topics include project management, configuration management, process improvement, software security, software reuse, and quality management.
- 4366. Senior Capstone Project (3).** Prerequisite: CS 4365. Project-oriented overview of software engineering concepts emphasizing teamwork and communication skills. Projects are formulated, formally proposed, designed, implemented, tested, documented, and demonstrated. (Writing Intensive)
- 4379. Parallel and Concurrent Programming (3).** Prerequisites: CS 3364 and 3375. Introduction to multi-threaded programming, data parallelisms, and message passing techniques. Topics include concurrent and parallel execution environments, user-programmed parallelism, and compiler-based parallelism. Applications addressed involve numerical algorithms familiar to senior-level students.
- 4380. Embedded Systems (3).** Introduction of special purpose embedded processor-based systems and their applications.
- 4391. Special Topics in AI (3).** 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).** Prerequisite: CS 2413. Digital transmission fundamentals, local area networks, network protocols, and common Internet applications.
- 4395. Introduction to Computer Graphics (3).** 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).** Prerequisite: CS 3364. Underlying science, technology, and art of computer games. Specific topics include design planning, interactive graphics, autonomous agents, multi-user interaction, and game engine construction.
- 4398. Theory and Practice of Logic Programming (3).** Formal syntax and semantics of logics of programming languages, practical application of such languages, and linking GUI interfaces written in imperative languages.

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. Foundations of Computer Science I (3).** Prerequisite: Programming proficiency. An accelerated survey of computer science. Computer organization, high level and assembler languages, job control, software design, data structures, file organization, machines, and formal languages. These courses are for leveling purposes and cannot be applied towards course requirements of any CS graduate degree.
- 5302. Foundations of Computer Science II (3).** Prerequisite: Programming proficiency. An accelerated survey of computer science. Computer organization, high level and assembler languages, job control, software design, data structures, file organization, machines, and formal languages. These courses are for leveling purposes and cannot be applied towards course requirements of any CS graduate degree.
- 5303. Foundations of Computer Engineering (3).** 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).** Techniques and methods for creating realistic images using graphic programming languages. Topics include visible surface determination rendering, surface modeling, and particle systems.
- 5328. Scientific Computing (3).** 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).** Prerequisite: Consent of instructor. Studies in advanced software engineering.
- 5341. Pattern Recognition (3).** 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).** 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).** 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.
- 5356. Advanced Database Management Systems (3).** 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).** 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).** Capstone design and implementation experience of a major software project applying comprehensive software engineering techniques.
- 5361. Theory of Computing Languages (3).** 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).** 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).** Comprehensive introduction to the field of parallel and distributed computing systems. Algorithms, architectures, networks, systems. Theory and applications.
- 5368. Intelligent Systems (3).** Comprehensive introduction to the field of artificially intelligent computer based systems. Theory and applications in artificial intelligence.
- 5373. Software Modeling and Architecture (3).** Introduces the theory and practice for software development and covers software requirements, analysis, software architecture and detailed design.
- 5374. Software Verification and Validation (3).** 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).** 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).** 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).** 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).** 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).** 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).** 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).** 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).** 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.
- 5386. Wireless Networking and Mobile Computing (3).** Wireless networks and mobile computing at the level of the link, network, and transport layers. Focus on the special topics in each layer.
- 5388. Neural Networks (3).** Neural network theory, models, and implementation. Applications to real-time systems, robotics, pattern recognition, computer vision, and event driven systems.
- 5391. AI Robotics (3).** Programming of artificially intelligent robots. Topics include sensing, navigation, path planning, and navigating with uncertainty.
- 5392. Reinforcement Learning (3).** Introduction to reinforcement learning and Markov decision processes and their applications for making optimal decisions.
- 5393. Bioinformatics (3).** Computational analysis of biological sequences gene expression and protein structures. Topics include sequence alignment, gene expression data analysis, and geometric analysis of protein structure.
- 5398. Theory and Practice of Logic Programming (3).** Formal syntax and semantics of logics of programming languages, practical application of such languages, and linking GUI interfaces written in imperative languages.
- 6000. Master's Thesis (V1-12).**
- 6001. Master's Project (V1-6).**
- 6002. Master's Report (V1-6).**
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12)**

Department of Electrical and Computer Engineering

Michael Giesselmann, Dr.-Ing., Chairperson

Horn Professors: Jiang, Lin, Mitra, Neuber

AT&T Distinguished Professor: Neuber

Edward E. Whitacre Jr. Endowed Chair: Jiang

Linda F. Whitacre Endowed Chair: Lin

Keh-Shew Lu Regents Chair: Lie

Thornton Professor: J. Dickens

Professors: Baker, Bayne, Dallas, Gale, Giesselmann, Joshi, Nikishin, Rao, Sari-Sarraf

Associate Professors: Bernussi, Fan, Karp, Li, Mankowski, Nutter, Pal, Saed

Assistant Professors: He

Instructors: Cox, M. Dickens, Helm, Storrs

CONTACT INFORMATION: 224 Electrical Engineering Building, Box 43102, Lubbock, TX 79409-3102, T 806.742.3533, F 806.742.1245, www.depts.ttu.edu/ece

About the Programs

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

Vision. The Department of Electrical and Computer Engineering will be the undergraduate electrical and computer engineering department of choice in Texas and will be recognized as one of the top research and graduate engineering departments in the nation.

Mission. The Department of Electrical and Computer Engineering educates, conducts research, and disseminates knowledge through nationally recognized programs in electrical engineering and computer engineering for the benefit of society.

Electrical Engineering Program Educational Objectives:

- Graduates will have careers in electrical engineering and related fields as productive engineers with potential for professional growth.
- Some graduates will pursue advanced degrees.
- Graduates will engage in professional activities to adapt to evolving challenges and career opportunities.

Computer Engineering Program Educational Objectives:

- Graduates will be prepared to have careers as computer engineers in the diverse fields that computer engineering transcends.
- Graduates will have the foundation to pursue advanced degrees and make important contributions to the field of computer engineering.
- Graduates will engage in professional development activities to adapt to evolving challenges and opportunities in an evermore networked society.

Student Outcomes for Both Electrical and Computer Engineering:

- 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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- 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, economic, environmental, 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.

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 – ECE 4310, 4314, 4321
- MEMS – ECE 4381, 4385, 4386
- Power Systems – ECE 4316, 4343, 4345, 4391
- Signal Processing – ECE 4363, 4364, 4367
- Communication Systems – ECE 4323, 4325, 4344, 4383, 4384
- Digital Systems – ECE 4375, 4380, 4382
- Control Systems – ECE 4324, 4368
- Electromagnetics – ECE 4341, 4342, 4344

An important contribution to accomplish these objectives is the five-course sequence of stand-alone project laboratory courses. In each of the project laboratory courses, students are given a brief description of a complex, open-ended project. The students, usually working in teams, are required to design, develop, construct, and evaluate a system to satisfy the requirements for the project. Faculty advisors evaluate the project on the basis of finished products, required written reports, and oral presentations. By its very structure the project laboratory sequence gives 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 into 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 life-long 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

General Standards and Requirements. Admission requirements and academic standards for the Department of Electrical and Computer Engineering are consistent with the dynamic enrollment plan for the Edward E. Whitacre Jr. College of Engineering. Refer to the introduction to the Whitacre College of Engineering section of this catalog (page 315) for a description of the criteria for initial admission to the Whitacre College of Engineering and the lower-division foundational curriculum. The recommended foundational

curriculum for electrical engineering consists of ENGL 1301, 1302; MATH 1451, 1452; PHYS 1408; ECE 1304; and CHEM 1307/1107. The recommended foundational curriculum for computer engineering consists of ENGL 1301, 1302; MATH 1451, 1452; PHYS 1408, 2401; and ECE 1304.

A student may apply for admission to the upper division of a degree program upon completion of the foundational curriculum and a minimum of 12 credit hours of Texas Tech coursework. The acceptance criterion is based exclusively on a cumulative GPA for coursework completed at Texas Tech. The specific GPA standard varies among the degree programs and may change from one academic year to the next as necessary to align enrollments with the educational resources. For students who entered Texas Tech prior to June 1, 2012, a minimum 2.0 GPA is required for admission to the electrical or computer engineering upper-division degree programs. Students entering Texas Tech after June 1, 2012, must have a minimum 2.5 GPA.

The academic standards required by the Whitacre College of Engineering and the Department of Electrical and Computer Engineering are given in the introduction to the Whitacre College section of the catalog and are summarized below. Exceptions to these standards are at the discretion of the dean of the Whitacre College of Engineering.

- A grade of C or better is required for all courses in an engineering degree plan.
- A grade of C or better must be achieved in all prerequisites before the subsequent course may be attempted.
- A minimum 2.5 GPA is required to maintain academic good standing and continued membership in the Whitacre College of Engineering.
- A full-time student must achieve a C or better in 18 credit hours of coursework in the degree plan in each 12-month period.
- An engineering course may be repeated only one time after a course drop, withdrawal, or failure to achieve a C or higher. A maximum of three engineering courses may be repeated.

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 systems, signal processing, communication systems, electromagnetics, control systems, and digital systems.

Licensing as a Professional Engineer (PE) allows an engineer to perform engineering services for the public and to supervise the design and construction of public works. Students who wish to eventually earn a PE license should take IE 2311 and ENGR 2392 for core credit and pass the Fundamentals of Engineering (FE) exam while seniors. The accreditation of the department's degree programs by the Accreditation Board for Engineering and Technology (ABET) accelerates the additional exam and experience requirements that must be met later in the engineer's career. Further information can be found at www.tbpe.state.tx.us and www.ncees.org.

The B.S. in Electrical Engineering offers interested students the opportunity to take up to four elective courses from other engineering departments that teach material tested by the FE. A list of these courses is maintained by the ECE department. The B.S. in Computer Engineering is not a recommended path to PE licensing. Passing the FE exam offers one means that satisfies the final comprehensive evaluation for students seeking a Master of Science in Electrical Engineering. Passing results on the FE exam are required for admission to candidacy for Ph.D. students.

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 1451, 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 seeking an electrical engineering or computer engineering degree must take a minimum 18 hours at the 3000 level or above in the Department of Electrical and Computer Engineering at Texas Tech.

Graduate Program

For information on graduate programs offered by the Department of Electrical and Computer Engineering, visit the Graduate School section of the catalog on page 142.

Minor. A minor in electrical engineering consists of 18 hours of coursework that includes ECE 2372, 3302 (or 3301), 3303, 3311, 3331, and 3362. Minor courses require approval of the undergraduate advisor. A minimum of 9 hours of ECE coursework must be taken at the 3000 level or above and must be taken in the Department of Electrical and Computer Engineering at Texas Tech for the minor.

Combined Bachelor's and Master's Programs. Two accelerated programs are available for outstanding students wanting to earn both a B.S. and an M.S. degree. The degrees awarded would include (1) the B.S. in Computer Engineering and the M.S. in Electrical Engineering (thesis and non-thesis options), or (2) the B.S. and M.S. in Electrical Engineering (thesis and non-thesis options). Students interested in these programs should inform their academic advisor during the first semester of the junior year and apply when they are within 30 hours of completing their undergraduate degree. Students admitted to a combined B.S./M.S. program may apply up to 12 graduate credit hours toward the B.S. degree requirements.

Course Descriptions

(To interpret course descriptions, see page 23.)

Electrical and Computer Engineering (ECE)

Undergraduate Courses

- 1304. Introduction to Electrical and Computer Engineering (3).** Prerequisite: MATH 1451 (may be taken concurrently), 2.0 GPA. 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).** Prerequisite: MATH 1451 (may be taken concurrently), 2.0 GPA. An introduction to the fundamentals of computing and structured programming for electrical engineering.
- 2372. Modern Digital System Design (3).** Prerequisite: MATH 1451 (may be taken concurrently), 2.0 GPA. An introduction to combinational and sequential digital systems.
- 3301. General Electrical Engineering (3).** Prerequisite: MATH 1452. Analysis of electric circuits. Introduction to electronic instrumentation and electromechanics. For non-majors only.
- 3302. Fundamentals of Electrical Engineering (3).** Prerequisites: MATH 1452, majors only, 2.5 GPA. Principles of electric circuits. DC, transient, and sinusoidal steady-state analysis.
- 3303. Linear System Analysis (3).** Prerequisites: ECE 1304, 3302; 2.5 GPA. Corequisite: MATH 3350. Concepts of signal and

Bachelor of Science in Computer Engineering

FIRST YEAR

Fall		Spring	
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
ECE 1304, Intro. Electrical & Comp. Engr.	3	CS 1412 or ECE 1305	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ECE 2372, Modern Digital Syst. Design	3
POLS 1301, American Gov., Org.	3	ENGL 1302, Advanced College Rhetoric	3
Oral Communications Elective*	3	PHYS 1408, Principles of Physics I	3
TOTAL	16	TOTAL	17

SECOND YEAR

Fall		Spring	
MATH 2450, Calculus III	4	MATH 3350, Math for Engr. & Scientists I	3
CS 2413, Data Structures	4	MATH 3342 or IE 3341, Statistics	3
ECE 3302, Fund. of Electrical Engr.	3	ECE 3331, Project Laboratory I	3
ECE 3362, Microcontrollers	3	ECE 3311, Electronics I	3
PHYS 2401, Principles of Physics II	4	ECE 3303, Linear System Analysis	3
TOTAL	18	TOTAL	15

THIRD YEAR

Fall		Spring	
ECE 3332, Project Laboratory II	3	ECE 3334, Computer Eng. Proj. Lab	3
ECE 3304, Discrete-Time Signals & Sys.	3	ECE 3341, Electromag. Theory I	3
ECE/CS 3000 or 4000 Elective (any)	3	ECE/CS 3000 or 4000 Elective (any)	6
CS 1382, Discrete Compu. Structure	3	Language, Philosophy, & Culture* †	3
CS 2365, Object-Oriented Programming	3	POLS 2302, American Public Policy	3
TOTAL	15	TOTAL	18

FOURTH YEAR

Fall		Spring	
ECE 4333, Project Lab. IV	3	ECE 4334, Project Lab. V	3
ECE/CS 3000 or 4000 Elective ‡	3	or ECE 4000-Level Elective	
ECE 4325 or CS 3365	3	ECE 4375, Microprocessor Architecture	3
HIST 2300, History of the U.S. to 1877	3	ECE/CS 3000 or 4000 Elective (any)	3
Social & Behavioral Sciences* †	3	HIST 2301, History of U.S. Since 1877	3
		Creative Arts* †	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 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.

† When choosing a Social & Behavioral Sciences, Creative Arts, or Language, Philosophy, & Culture elective, choose a course that also fulfills the university's multicultural requirement.

‡ Choose one course from ECE 4325, 4363, 4364, 4367, 4380, 4382; CS 3361, 3364, 3365, 3368, 3383, 4352, 4354, 4395.

Bachelor of Science in Electrical Engineering

FIRST YEAR

Fall		Spring	
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
ECE 1304, Intro. Electrical & Comp. Engr.	3	ECE 1305, Intro. to Engr. & Comp. Pr.	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ECE 2372, Modern Digital Syst. Design	3
POLS 1301, American Gov., Org.	3	CHEM 1307, Principles of Chemistry I	3
HIST 2300, History of the U.S. to 1877	3	CHEM 1107, Exp. Princ. of Chemistry I	1
		ENGL 1302, Advanced College Rhetoric	3
TOTAL	16	TOTAL	17

SECOND YEAR

Fall		Spring	
MATH 2450, Calculus III	4	MATH 3350, Math for Engr. I	3
ECE 3302, Fund. of Electrical Engr.	3	MATH 3342 or IE 3341, Statistics*	3
ECE 3362, Microcontrollers	3	ECE 3311, Electronics I	3
PHYS 1408, Principles of Physics I	4	ECE 3331, Project Laboratory I	3
POLS 2302, American Public Policy	3	ECE 3303, Linear System Analysis	3
		ECE 3306, Electric Circuits II	3
TOTAL	17	TOTAL	18

THIRD YEAR

Fall		Spring	
ECE 3332, Project Laboratory II	3	ECE 3333, Project Laboratory III	3
ECE 3312, Electronics II	3	ECE 3341, Electromagnetic Theory I	3
ECE 3323, Prin. of Comm. Systems	3	ECE 3353, Feedback Control Systems	3
PHYS 2401, Principles of Physics II	4	MATH 3351, Math for Engr. & Sci. II	3
Oral Communication †	3	HIST 2301, History of U.S. Since 1877	3
		Language, Philosophy, & Culture † ‡	3
TOTAL	16	TOTAL	18

FOURTH YEAR

Fall		Spring	
ECE 4333, Project Laboratory IV	3	ECE 4334, Project Laboratory V	3
ECE 3342, Electromagnetic Theory II	3	or ECE 4000-Level Elective	
ECE Jr./Sr. Elective §	3	ECE Jr./Sr. Elective §	3
ECE Jr./Sr. Elective §	3	ECE Jr./Sr. Elective §	3
Social & Behavioral Sciences † ‡	3	ECE Jr./Sr. Elective	3
		Creative Arts † ‡	3
TOTAL	15	TOTAL	15

TOTAL HOURS: 132

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.

* Taking MATH 3342 will complete a math minor.

† Choose from core curriculum list.

‡ When choosing a Social & Behavioral Sciences, Creative Arts, or Language, Philosophy, & Culture elective, choose a course that also fulfills the university's multicultural requirement.

§ Students pursuing PE license may take up to four Other Engineering electives. Select from departmentally approved list.

system analysis in time and frequency domains as applied to electric circuits. Laplace transform, Fourier series, and Fourier transform techniques are stressed.

- 3304. Discrete-Time Signals and Systems (3).** Prerequisite or corequisite: ECE 3303, 2.5 GPA. For majors only or departmental consent. Discrete-time signal processing, sampling, z-transform, discrete and fast Fourier transforms, infinite and finite impulse response digital filter design and implementation.
- 3306. Electric Circuits II (3).** Prerequisite: ECE 3302, 2.5 GPA. For majors only or departmental consent. Includes concepts of inductively coupled circuits, three phase circuits, frequency dependent circuits, active and passive filters, Laplace methods of circuits, transfer functions for linear circuits, and two port networks.
- 3311. Electronics I (3).** Prerequisite: ECE 3302, 2.5 GPA. Introduction to electronic devices, amplifiers, and electronic systems. Principles of electronic circuit design and analysis.
- 3312. Electronics II (3).** Prerequisites: ECE 3311, 3303, 2.5 GPA. For majors only or departmental consent. Analysis and design of special-purpose amplifiers and oscillators.
- 3323. Principles of Communication Systems (3).** Prerequisites: ECE 3303, MATH 3342 or IE 3341, 2.5 GPA. For majors only or departmental consent. Random processes and spectral densities. Fourier Transforms and linear systems concepts. Amplitude, phase angle, and pulse modulation communication systems.
- 3331. Project Laboratory I (3).** Prerequisites: ENGL 1302; ECE 2372, 3302; 2.5 GPA. A laboratory course to accompany second-year basic courses in electrical or computer engineering. (Writing Intensive)

- 3332. Project Laboratory II (3).** Prerequisites: ECE 3303, 3311, 3331, 3362; 2.5 GPA. For majors only or departmental consent. A laboratory course to accompany third-year basic courses in electrical or computer engineering. (Writing Intensive)
- 3333. Project Laboratory III (3).** Prerequisites: ECE 3312, 3323, 3332; 2.5 GPA; EE majors only or departmental consent. A laboratory course to accompany third-year basic courses in electrical engineering. (Writing Intensive)
- 3334. Computer Engineering Project Laboratory (3).** Prerequisites: C or better in ECE 3303, 3311, 3332, and 3362. For ECE majors only or departmental consent. A laboratory course to accompany third-year basic courses in electrical engineering. (Writing Intensive)
- 3341. Electromagnetic Theory I (3).** Prerequisites: ECE 3303 and PHYS 2401, 2.5 GPA. For majors only or departmental consent. Vector analysis. Partial differential equations. General treatment of static, electric, and magnetic fields from the vector viewpoint.
- 3342. Electromagnetic Theory II (3).** Prerequisites: ECE 3341 and MATH 3351. For majors only or departmental consent. General solutions for Maxwell's equations. Traveling waves in scalar media. Boundary conditions and constraints imposed by bounding surfaces.
- 3353. Feedback Control Systems (3).** Prerequisite: ECE 3303, 2.5 GPA. For majors only or departmental consent. An introduction to the analysis and design of automatic control systems. Control system concepts. Controller design and digital control.
- 3362. Microcontrollers (3).** Prerequisite: ECE 1305 or CS 1411, 2.5 GPA. Corequisite: ECE 2372. Advanced digital systems

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	
ECE 4333, Project Lab. IV	3	ECE 4334, Project Lab. V [‡]	3
ECE 3342, Electromagnetic Theory II	3	ECE 5000-Level Elective	3
5000-Level Elective	3	ECE 5000-Level Elective	3
ECE 5000-Level Elective	3	ECE Jr./Sr. Elective [§]	3
Social & Behavioral Sciences* [†]	3	Creative Arts* [†]	3
TOTAL	15	TOTAL	15

FIFTH YEAR

Fall		Spring	
ECE 5000-Level Elective	3	ECE 5000-Level Elective	3
ECE 5000-Level Elective	3	ECE 5000-Level Elective	3
ECE 5120, Graduate Seminar	1	ECE 5000-Level Elective	3
ECE 6000, Master's Thesis	6	ECE 5120, Graduate Seminar	1
TOTAL	13	TOTAL	10

* Choose from core curriculum list.

[†] When choosing a Social & Behavioral Sciences or Creative Arts elective, choose a course that also fulfills the university's multicultural requirement.

[‡] Students pursuing non-thesis option may substitute ECE 4000-level elective for ECE 4334.

[§] Students pursuing PE license may take up to four other engineering electives. Select from departmentally approved list.

Combined B.S. in Computer Engineering, M.S. 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	
ECE 4333, Project Lab. IV	3	ECE 4334, Project Lab. V [‡]	3
ECE 5325, Telecommunication Networks or CS 3365, Software Engineering	3	ECE/CS 5000-Level Elective	3
ECE/CS 5000-Level Elective	3	ECE 5375, Computer Architecture	3
HIST 2300, History of the U.S. to 1877	3	HIST 2301, History of U.S. Since 1877*	3
Social & Behavioral Sciences Elective* [†]	3	Creative Arts* [†]	3
TOTAL	15	TOTAL	15

FIFTH YEAR

Fall		Spring	
ECE 5000-Level Elective	3	ECE 5000-Level Elective	3
ECE 5000-Level Elective	3	ECE 5000-Level Elective	3
ECE 5120, Graduate Seminar	1	ECE 5000-Level Elective	3
ECE 6000, Master's Thesis	6	ECE 5120, Graduate Seminar	1
TOTAL	13	TOTAL	10

* Choose from core curriculum list.

[†] When choosing a Social & Behavioral Sciences or Creative Arts elective, choose a course that also fulfills the university's multicultural requirement.

[‡] Students pursuing non-thesis option may substitute ECE 4000-level elective for ECE 4334.

design. Assembly language programming, interfacing, and applications of microcontrollers.

4120. **ECE Seminar (1).** Readings and discussion of the electrical and computer engineering professions, history, ethics, career paths, and research opportunities.
4310. **Introduction to VLSI Design (3).** Prerequisite: ECE 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).** Prerequisites: ECE 3312, 3341; CHEM 1307. 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).** Prerequisites: ECE 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).** Prerequisites: ECE 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).** Prerequisites: ECE 3312, 3323. For majors only or departmental consent. Analysis and design techniques for modern communication circuits.
4324. **Computer-Aided Circuit Analysis (3).** Prerequisites: ECE 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).** Prerequisite: ECE 3304 or 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: Instructor approval. For majors only or departmental consent. 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.

4332. **Topics in Electrical Engineering (3).** For majors only or departmental consent. Elaboration on a special topic of current interest in electrical engineering. May be repeated for credit.
4333. **Project Laboratory IV (3).** Prerequisite: C or better in ECE 3333 or ECE 3334. 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).** Prerequisite: C or better in ECE 3333 or 3334. For majors only or departmental consent. A laboratory course to accompany fourth-year courses in electrical or computer engineering. (Writing Intensive)
4341. **Microwave Engineering (3).** Prerequisite: ECE 3342. For majors only or departmental consent. Analysis and design of microwave passive components, including transmission lines, waveguides, resonators, hybrids, couplers, attenuators, filters, circulators, switches, and phase shifters.
4342. **Microwave Solid-State Circuits (3).** Prerequisite: ECE 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).** Prerequisite: ECE 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).** Prerequisite: ECE 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).** Prerequisite: ECE 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).** Prerequisite: ECE 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.
4354. **Power Semiconductor Devices (3).** Prerequisite: ECE 4314 or 5314. For majors only or departmental consent. An introduction to the design and simulation of power semiconductor devices. Covers the operation of power diodes, power MOSFETS, and

Graduate Courses

- IGBTs. Power devices will be modeled using a physic-based simulator.
4360. **Fiber Optic Systems (3)**. Prerequisites: ECE 3312, 3323, 3341; CHEM 1307. For majors only or departmental consent. Optical fibers, couplers, sources, and detectors; applications to communications and sensing.
4361. **Advanced Communication Systems (3)**. Prerequisite: ECE 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)**. Prerequisites: ECE 3323, 3342. For majors only or departmental consent. Modern concepts in optics related to engineering applications. Geometrical optics; matrix methods in optics; polarization, interference, coherence, and lasers; Fourier optics; Fresnel and Fraunhofer diffraction.
4363. **Pattern Recognition (3)**. Prerequisite: MATH 3342. For majors only or departmental consent. Foundational topics in pattern recognition, linear discriminant functions, support vector machines, generalized decision functions, Bayes classifier, and various clustering techniques.
4364. **Digital Signal Processing (3)**. Prerequisite: ECE 3304. 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)**. Prerequisite: ECE 3304 or 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)**. Prerequisite: ECE 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)**. Prerequisite: ECE 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.
4377. **Technology Startup Laboratory (3)**. Provides a working knowledge of technology commercialization through a systematic concept refinement process. Prototypes are developed and evaluated by potential customers.
4378. **Solar Energy (3)**. Provides an overview of photovoltaic materials, devices, and systems. Students learn to analyze performance based on available solar light. Design projects provide practical experience.
4380. **Embedded Systems (3)**. Prerequisites: 2.5 GPA; C or better in ECE 3362 or CS 2350. For majors only or departmental consent. Control of peripherals. Streaming data. Implementation of discrete convolution. Real-time operating systems.
4381. **VLSI Processing (3)**. Prerequisites: 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)**. Prerequisites: ECE 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)**. Prerequisites: ECE 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)**. Prerequisite: ECE 4385 or 5385. For majors only or departmental consent. Application of microfabrication to create microsensor systems. Integration of optics, optoelectronics, and microfluids. Includes other MEMS projects.
4391. **Electric Machines and Drives (3)**. Prerequisite: ECE 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.
5120. **Electrical Engineering Graduate Seminar (1)**. Discussion will concern present research conducted in electrical engineering and other topics of interest to electrical engineers.
5310. **Introduction to VLSI Design (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)**. 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)**. 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)**. Switch mode power conversion, converters and inverters, power supplies and regulators, and power semiconductor circuits.
5320. **DC-DC Converter Design and Test (3)**. Focuses on the design and testing of low-power DC converters, including Buck, Boost, Buck-boost, and LDOs. Covers steady state and transient performance and includes a lab component.
5321. **Design and Analysis of Analog Integrated Circuits (3)**. Principles involved in designing analog integrated circuits. Device physics, small signal, and large signal models. Biasing and basic circuit building blocks. Applications.
5322. **Random Signals and Systems (3)**. Modeling and analysis of uncertainty or randomness; applying probability, random variables, and random processes to a variety of applications.
5323. **Modern Communication Circuits (3)**. Analysis and design techniques for modern communication circuits.
5324. **Computer-Aided Circuit Analysis (3)**. 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)**. 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)**. Prerequisites: 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)**. Elaborates on a special topic of current interest in electrical engineering. May be repeated for credit.
5341. **Microwave Engineering: Passive Components (3)**. Analysis and design of microwave passive components, including transmission lines, waveguides, resonators, hybrids, couplers, attenuators, filters, circulators, switches, and phase shifters.
5342. **Microwave Solid State Circuits (3)**. 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)**. Electrical power transmission and distribution systems; power generation systems; system modeling, planning, management and protection.
5344. **Antennas and Radiating Systems (3)**. Antenna fundamentals, uniformly spaced arrays, wire antennas of various types, aperture radiation, antennas for special applications.
5345. **Pulsed Power (3)**. Fundamentals of pulsed power circuits, components, and systems. Pulse forming lines, energy storage, voltage multipliers, switching, materials, grounding and shielding, measurements, and applications.
5346. **Plasma Engineering: An Introductory Course in Plasma Physics and Technology (3)**. Prerequisite: Consent of instructor. Fundamentals of plasma physics and technology, including gas discharge processes, plasma surface treatment, role of non-thermal plasmas, material processing, and biomedical treatment.
5347. **Laser Diagnostic Techniques (3)**. Prerequisite: Consent of instructor. Fundamentals of basic problems in laser physics and laser diagnostic techniques, specifically non-linear laser spectroscopy methods and applications, including environmental sensing and plasma diagnostics.
5348. **Computational Electromagnetics (3)**. Computational electromagnetics in guided-wave structures, wave scattering,

- and radiation. Emphasizes finite difference time domain and frequency domain methods and moment methods.
5350. **Introduction to Medical Instrumentation (3)**. Biomedical instrumentation, transducers, signals, circuits and filters, utilization of biopotential techniques in respiration, cardiac, and audiology.
5351. **Biomedical Signal Processing (3)**. 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)**. Medical imaging techniques including radiography and ionizing radiation, computer aided tomography, PET, MRI, and image reconstruction and processing techniques.
5353. **Gaseous Electronics (3)**. Kinetic theory of gases, collisions, emission processes, self sustained discharge, paschen law, glow discharge, arc discharge, streamers, spark discharge, corona discharge, gas lasers.
5354. **Power Semiconductor Devices (3)**. Prerequisite: ECE 5314. Introduction to the design and simulation of power semiconductors. Topics include high voltage breakdown, high current density, and temperature effects.
5355. **Genomic Signal Processing and Control (3)**. 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)**. Biosensors and semiconductor devices, cells, and other biomaterials. Bio-Micro-Electro-Mechanical Systems (Bio-MEMS) and low-power wearable/implantable medical devices.
5358. **Semiconductor Material and Device Characterization (3)**. Prerequisite: Consent of instructor. Introduction to the physical principles and techniques involved with the semiconductor processing of different electronic and optoelectronic devices.
5360. **Fiber Optic Systems (3)**. Optical fibers, couplers, sources, and detectors; applications to communications and sensing. Integrated optics.
5361. **Advanced Communication Systems (3)**. Information transmission in electronic systems. Random variables and stochastic processes, noise in analog and digital modulation systems, and optimal receivers.
5362. **Modern Optics (3)**. Modern concepts in optics related to engineering applications. Geometrical, physical, and quantum optics; Fourier optics, holography, and image processing.
5363. **Pattern Recognition (3)**. Foundational topics in pattern recognition. Linear discriminant functions, support vector machines, generalized decision functions, Bayes classifier, and various clustering techniques.
5364. **Digital Signal Processing (3)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. 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)**. Mixed-signal system specification, behavioral modeling and analysis, functional modeling and analysis, mixed-signal system design, and evaluation.
5377. **Technology Startup Laboratory (3)**. Provides a working knowledge of technology commercialization through a systematic concept refinement process. Prototypes are developed and evaluated by potential customers.
5378. **Solar Energy (3)**. Provides an overview of photovoltaic materials, devices, and systems. Students learn to analyze performance based on available solar light. Design projects provide practical experience.
5380. **Embedded Systems (3)**. Control of peripherals, streaming of data, implementation of discrete convolution, real-time operating systems.
5381. **Introduction to Semiconductor Processing (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)**. Advanced VLSI design. Computer arithmetic. High speed computation. Digital hardware design. CAD tools for VLSI design.
5383. **Communication Integrated Circuits Design I (3)**. Covers the fundamentals of RF-SoC (Radio-Frequency System-on-a-Chip) design. For students interested in RF/analog IC and SoC design, semiconductor products testing, and device/process engineering.
5384. **Communication Integrated Circuits Design II (3)**. Prerequisite: ECE 5383. Theory and design of RF/analog block-level IC and RF-SoC architectural design. Hands-on design projects for students to gain IC and SoC experience.
5385. **Introduction to Microsystems I (3)**. 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)**. Prerequisite: ECE 5385. Application of microfabrication to create microsensor systems. Integration of optics, optoelectronics and microfluids. Includes other MEMS projects.
5387. **Advanced Semiconductor Processing and Process Characterization (3)**. Prerequisite: ECE 5381. Stresses process flow; yield management; specific device processing steps; and process control, packaging and back-end processing.
5388. **Solid-State Energy Devices I (3)**. Prerequisite: ECE 5314 or 5381. Introduction to fundamentals of solar cells, including thin film, tandem, and nanostructured solar cell materials and devices.
5389. **Solid-State Energy Devices II (3)**. Prerequisite: ECE 5314 or 5381. Introduction to fundamentals of solid-state energy devices beyond solar cells, including materials and devices for thermoelectrics for converting heat to electricity, betavoltaics and alphavoltaics as long-life batteries, fuel cells and super-capacitors for energy storage, and hydrogen generation and storage.
5390. **Functional Materials (3)**. Prerequisite: ECE 5314 or 5381. Introduction to functional materials and their applications, including sustainability, bio-inspired materials, and nanostructured materials.
5391. **Electric Machines and Drives (3)**. Analysis and control of DC machines and induction machines. Space vector theory. Field oriented control. Modeling of machine and controller dynamics.
5392. **Nanophotonics (3)**. Prerequisites: ECE 5314, 5381, or consent of instructor. Introduction to light-matter interaction in nanostructures, quantum wells, wire and dots, photonics crystals, negative index and meta materials, nano-emitters and detectors, nano-plasmonics and biophotonics.
5393. **Detectors and Sensors I (3)**. Fundamentals of solid-state photo detectors and sensors for THz through EVU, including principles, performances, and applications.
5394. **Detectors and Sensors II (3)**. Fundamentals of solid-state radiation detectors and sensors, including principles, performances, and applications.
6000. **Master's Thesis (V1-6)**.
6351. **Physical Electronics (3)**. Prerequisite: 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)**. Theories of image formation and reconstruction. Reconstruction problems in tomography, magnetic resonance imaging, synthetic aperture radar, and other modalities of imaging.
6363. **Advanced Pattern Recognition (3)**. Prerequisite: ECE 5363. 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)**. Applications of detection and estimation theory in the design of optimum communication systems.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Industrial Engineering

Hong-Chao Zhang, Ph.D., Interim Chairperson

AT&T Professor: Beruvides

E.L. Derr Professor: Zhang

Professors: Hsiang, Patterson, J. Smith, M. Smith, J. Urban, S. Urban

Associate Professors: Cross, de Farias, Matis

Assistant Professor: Cong

CONTACT INFORMATION: 201 Industrial Engineering Building,
Box 43061, Lubbock, TX 79409-3061, T 806.742.3543,
F 806.742.3411, www.depts.ttu.edu/ieweb

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
- Doctor of Philosophy in Industrial Engineering
- Doctor of Philosophy in Systems and Engineering Management
- Undergraduate Certificate in Cybersecurity for Critical Infrastructure
- Graduate Certificate in Cybersecurity for Critical Infrastructure

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 undergraduate program educational objectives embody the expected accomplishments of graduates during their first few years following graduation. The program educational objectives of the Department of Industrial Engineering (IE) as adopted by the IE faculty, IE Industrial Advisory Board and the IE Student Leadership are as follows:

- Graduates are successful in their industrial engineering and related careers.
- Graduates are active in engineering professions.
- Graduates are engaged in lifelong learning through participation in continuing or graduate education.

These objectives are published in the university's catalog and on the Department of Industrial Engineering website.

Student Outcomes. Student outcomes are statements of the expectations for the knowledge and skills that students should possess when they graduate with a Bachelor of Science in Industrial Engineering from Texas Tech University.

Graduates of the program must demonstrate 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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- 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, economic, environmental, 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.

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 customers. A variety of assessment tools are utilized in the evaluation process. Program changes are implemented on an ongoing basis.

Minor. A minor in industrial engineering consists of 18 hours of IE courses and normally includes the following: IE 2311, 3311 or 4316, 3341, 3361; and two additional courses from IE 3346, 3351, 3328, 4316, 4361, 4362, 4363. Some deviations from these lists of courses may be permitted depending on students interests and academic background. Students should consult with an academic advisor in the department for development of a minor program if they request deviations from the prescribed minor courses.

Undergraduate Program

General Standards and Requirements. Admission requirements and academic standards for the Department of Industrial Engineering are consistent with the dynamic enrollment plan for the Edward E. Whitacre Jr. College of Engineering. Refer to the introduction to the Whitacre College of Engineering section of this catalog (page 315) for a description of the criteria for initial admission to the Whitacre College of Engineering and the lower-division foundational curriculum. The recommended foundational curriculum for industrial engineering consists of ENGL 1301, 1302; MATH 1451, 1452; CHEM 1307/1107; PHYS 1408; ENGR 1315; or IE 1385.

A student may apply for admission to the upper division of a degree program upon completion of the foundational curriculum and a minimum of 12 credit hours of Texas Tech coursework. The acceptance criterion is based exclusively on a cumulative GPA for coursework completed at Texas Tech. The specific GPA standard varies among the degree programs and may change from one academic year to the next as necessary to align enrollments with the educational resources. For students who entered Texas Tech prior to June 1, 2012, a minimum 2.0 GPA is required for admission to the industrial engineering upper-division degree program. Students entering Texas Tech after June 1, 2012, must have a minimum 2.5 GPA.

The academic standards required by the Whitacre College of Engineering and the Department of Industrial Engineering are given in the introduction to the Whitacre College section of the catalog and summarized below. Exceptions to these standards are at the discretion of the dean of the Whitacre College of Engineering.

- A grade of C or better is required for all courses in an engineering degree plan.
- A grade of C or better must be achieved in all prerequisites before the subsequent course may be attempted.
- A minimum 2.5 GPA is required to maintain academic good standing and continued membership in the Whitacre College of Engineering.
- A full-time student must achieve a C or better in 18 credit hours of coursework in the degree plan in each 12-month period.
- An engineering course may be repeated only one time after a course drop, withdrawal, or failure to achieve a C or higher. A maximum of three engineering courses may be repeated.

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. The curriculum is designed to provide a comprehensive education in industrial engineering and to develop effective engineers by balancing the breadth and depth of instruction.

A minimum of 130 hours is required for graduation. 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.

An accelerated program is available for outstanding students wanting to earn both a B.S. and an M.S. degree. Both thesis and non-thesis M.S. degree programs are available in this accelerated program. Students interested in these programs should inform their academic advisor during the first semester of the junior year and apply when they are within 30 hours of completing their undergraduate degree. If accepted, they will begin taking graduate courses during their senior year, and up to 9 hours of the coursework will apply to both their undergraduate and graduate degree requirements.

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

For information on graduate programs offered by the Department of Industrial Engineering, visit the Graduate School section of the catalog on page 143.

Undergraduate Certificate in Cybersecurity for Critical Infrastructure

The curriculum for the Undergraduate Certificate in Cybersecurity for Critical Infrastructure brings together the relevant computing, engineering, and legal aspects of critical infrastructure with a focus on security for cyberphysical systems. There is an interdisciplinary core that provides foundational coverage of cybersecurity for information systems, critical infrastructure issues, and the fundamentals of computer networking and industrial control systems. These courses are designed for a general engineering audience. Different tracks are defined for students in industrial engineering, computer science, mechanical engineering, and electrical and computer engineering through security-specific courses or through courses that are enhanced with security modules. Security-related course topics are contributed from the interdisciplinary team. The program is struc-

Bachelor of Science in Industrial Engineering

FIRST YEAR			
Fall		Spring	
IE 1385 or ENGR 1315	3	MATH 1452, Calculus II	4
MATH 1451, Calculus I	4	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	EGR 1206, Engineering Graphics	2
CHEM 1307, Principles of Chemistry I	3	PHYS 1408, Principles of Physics I	4
CHEM 1107, Exp. Prin. of Chemistry I	1	HIST 2301, Hist. of the U. S. Since 1877	3
HIST 2300, History of the U. S. to 1877	3		
TOTAL	17	TOTAL	16
SECOND YEAR			
Fall		Spring	
Oral Communication*	3	IE 2311, Engineering Econ. Analysis	3
MATH 2450, Calculus III	4	ME 3311, Materials	3
ME 2301 or CE 2301, Statics	3	MATH 3350, Higher Math	3
PHYS 2401 or CHEM 1308/1108	4	POLS 1301, American Gov., Org.	3
IE 2301, Engr. Design in Prod. Ops.	3	MATH 2360, Linear Algebra	3
TOTAL	17	TOTAL	15
THIRD YEAR			
Fall		Spring	
IE 3351, Manufacturing Engineering	3	IE 3311, Deterministic Ops. Research	3
IE 3341, Engineering Statistics	3	IE 3346, Quality Assurance & Engr. Stat.	3
IE 3361, Work Analysis & Design	3	IE 3328, Manufacturing Syst. Control	3
ME 2322, Engineering Thermodyn. I	3	IE 3325, Management Syst. Control	3
POLS 2302, American Public Policy	3	ECE 3301, General Electrical Eng.	3
Creative Arts*	3	IE 3244, Engineering Data Analysis	2
TOTAL	18	TOTAL	17
FOURTH YEAR			
Fall		Spring	
IE 4316, Simulation Systems Modeling	3	IE 4333, Senior Design Project	3
IE 4361, Engineering Design for People	3	IE Electives [†]	6
IE Elective [†]	3	Engineering Elective [‡]	3
IE 4351, Facilities Planning	3	Language, Philosophy, & Culture* [§]	3
Engineering Elective [‡]	3		
TOTAL	15	TOTAL	15
TOTAL HOURS: 130			
* Choose from the university's core curriculum.			
† IE electives from the following courses: IE 4320, 4331, 4352, 4362, 4363, 4380, 4381, 4382, 4384, 4385, 4386; ENGR 3301.			
‡ Engineering elective from the following courses: CE 3302 or ME 2302; CE 3303 or ME 3403; CE 3305, ME 3370, or CHE 3315; CHE 3326 or ME 3371; ECE 3306; ME 3322.			
§ Choose a course that also fulfills the university's multicultural requirement.			

tured to reach a wide range of undergraduate students. Undergraduate students can obtain this certificate as part of their B.S. degree program. The certificate requires completing 15 hours of undergraduate credit, some of which can be applied to the B.S. degree depending on the degree program. Texas Tech also provides a 150-hour accelerated B.S./M.S. degree program. Courses within the cybersecurity program can be used to form a cybersecurity concentration for students seeking the combined B.S./M.S. option. **Contact:** Dr. Joseph Urban, 806.834.5831, joseph.urban@ttu.edu

Course Descriptions

(To interpret course descriptions, see page 23.)

Industrial Engineering (IE)

Undergraduate Courses

- 1385. Computing Principles for Industrial and Systems Engineers (3).** Computational problem solving, abstraction, algorithm design, global impact of computing, professionalism and ethics, team design.
- 2301. Engineering Design in Production Operations (3).** The engineering design process applied to development management objectives, resource planning, product design, production operations, and engineering design team operations. (Writing Intensive)
- 2324. Engineering Economic Analysis (3).** Prerequisite: MATH 1451. Evaluation of economics of engineering proposals for cost

- and profitability. Fulfills Core Social and Behavioral Sciences requirement.
- 3244. Engineering Data Analysis (2).** Prerequisite: IE 3341. Techniques for data collection from engineering systems, analysis of data for modeling and system description. Data graphing and presentation.
- 3311. Deterministic Operations Research (3).** Prerequisite: MATH 2360. Introduction to operations research, linear programming, dynamic programming, integer programming, traveling salesman problem, transportation, and assignment problems.
- 3325. Management Systems Control (3).** 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.
- 3328. Manufacturing Systems Control(3).** 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.
- 3341. Engineering Statistics (3).** Prerequisite: MATH 1452. 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.
- 3346. Quality Assurance and Engineering Statistics (3).** 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).** Prerequisite: ME 3311, EGR 1206, or consent of instructor. Properties of materials as related to manufacturing. Processing methods for metals, plastics, ceramics, semiconductors, and composites. Process selection, planning, and economics.
- 3361. Work Analysis and Design (3).** 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.
- 4120. Innovation and Intellectual Property (1).** Prerequisite: Senior standing. Innovation and creativity for engineering design. Protection strategies for intellectual property.
- 4316. Simulation Systems Modeling (3).** Prerequisite: IE 3341. Fundamentals of Monte Carlo methods. Systematic development, programming, and analysis of computer simulation models using a high-level simulation language such as Arena.
- 4320. Fundamentals of Systems (3).** 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).** Prerequisites: 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).** Prerequisite: IE 3351. 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).** 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).** 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).** 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).** 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.
- 4380. Information Systems Engineering (3).** Information systems design for decision support, data modeling, database design and access, internet data, data security, data mining and warehousing, social and ethical issues.
- 4381. Introduction to Critical Infrastructure (3).** Introduction to the analysis and implementation of critical infrastructure and analysis of their security and resilience.
- 4382. Cybersecurity for Information Systems (3).** Countermeasures for combating risks, threats, and vulnerabilities of information technology, access control, security policy, audits, testing, monitoring, cryptography, networking principles and defenses, compliance laws/standards.
- 4383. Industrial and Networked Control Systems (3).** Introduction to the analysis and implementation of networked control systems, including applications in critical infrastructure.
- 4384. Security for Systems and Software (3).** Provides a comprehensive understanding of a secure systems and software development process.
- 4385. Cyber Attacks (3).** Provides a comprehensive understanding of cyber attacks that include systems engineering and software/hardware/network environments for national infrastructure.
- 4386. Requirement Engineering for Systems and Software (3).** Introduces the definition of and rationale for systems and software requirements engineering processes. Includes the fundamentals, principles, and techniques for requirements engineering.

Graduate Courses

- 5301. Ergonomics and Design (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.
- 5302. Bayesian Analysis for Human Decision (3).** Emphasizes the human decision making process under uncertainty. Topics include subjective probability, satisficing principle, signal detection theory, cross-entropy, discriminant analysis, Bayesian causal structures, and data envelopment analysis.
- 5303. Work Physiology (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).** 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).** Implications of human perceptual, cognitive, and psycho-motor capabilities for the design of systems for effective human use and control.
- 5306. Safety Engineering (3).** 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).** Advanced topics in worker safety and health; hazard recognition and analysis; system safety techniques and applications; loss assessment and control.
- 5308. Risk Assessment of Human Behaviors (3).** Prerequisites: MATH 2360, IE 3341. Topics include risk perception, psychophysics, multinomial logit choice, life regression, competing risks, proportional hazards, multi-objective and multi-attribute decision models, group decisions, Choquet integral, copula, social networks.
- 5309. Human Factors in Engineering and Design (3).** 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).** 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).** 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).** Prerequisite: IE 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).** 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)**. Prerequisite: Proficiency in a current discrete event simulation language. Generation of random variants. 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)**. 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)**. 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)**. 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)**. Philosophy, theory, and practice of management; decision theory and social responsibility.
5322. **Industrial Cost Analysis (3)**. 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)**. Management of research and development; the legal, financial, and professional interrelationships of engineers and their environment in relation to the modern production organization.
5324. **Advanced Economics of Systems (3)**. Prerequisite: Course in basic engineering economy. 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)**. Productivity and performance improvement (including efficiency, effectiveness, quality, QWL, innovation, profitability, and budget ability theories, techniques, analysis, and applications for industrial systems).
5328. **Activity Scheduling (3)**. 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)**. 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)**. Prerequisites: 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)**. Prerequisites: Consent of instructor and departmental approval. Individual experimental study of an advanced topic selected on the basis of departmental recommendation. May be repeated.
5342. **Design of Experiments (3)**. Prerequisite: Understanding of basic probability and statistics. Single factor, factorial, blocked, split plot designs. Means comparisons, contrasts, estimates of variation. Confounding and fractional factorials.
5344. **Statistical Data Analysis (3)**. Prerequisite: Understanding of basic probability and statistics. Exploratory data analysis, graphical displays and analysis. Linear and nonlinear regression, response surfaces. Selected mainframe and microcomputer packages.
5345. **Reliability Theory (3)**. Prerequisite: Understanding of basic probability and statistics. System level reliability, redundancy, maintainability, and availability analysis and modeling. Life testing, acceleration, parametric, and nonparametric models.
5346. **Total Quality Systems (3)**. 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)**. 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)**. 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.
5353. **Sustainable Manufacturing (3)**. Prerequisite: Consent of instructor. Life Cycle Assessment for product design and manufacturing process design; three-dimensional sustainability—environmental, social, and economical aspects.
5355. **Computer-Aided Manufacturing (3)**. 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)**. 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)**. 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)**. 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)**. Fundamentals of bioengineering with an emphasis on a systems viewpoint. Use of engineering tools to understand, mimic, and utilize biological processes.
5380. **Information Systems Engineering (3)**. Information systems design for decision support, data modeling, database design and access, internet data, data security, data mining and warehousing, social and ethical issues.
5381. **Introduction to Critical Infrastructure (3)**. Introduction to the analysis and implementation of critical infrastructure and analysis of their security and resilience.
5382. **Cybersecurity for Information Systems (3)**. Countermeasures for combating risks, threats, and vulnerabilities of information technology, access control, security policy, audits, testing, monitoring, cryptography, networking principles and defenses, compliance laws/standards.
5383. **Industrial and Networked Control Systems (3)**. Introduction to the analysis and implementation of networked control systems, including applications in critical infrastructure.
5384. **Security for Systems and Software (3)**. Provides a comprehensive understanding of a secure systems and software development process.
5385. **Cyber Attacks (3)**. Provides a comprehensive understanding of cyber attacks that include systems engineering and software/hardware/network environments for national infrastructure.
5386. **Requirement Engineering for Systems and Software (3)**. Introduces the definition of and rationale for systems and software requirements engineering processes. Includes the fundamentals, principles, and techniques for requirements engineering.
6000. **Master's Thesis (V1-6)**.
6304. **Control Theory for Humans (3)**. Prerequisites: MATH 2360, IE 3341. Topics include cybernetics, feed-back and feed-forward, Fitts' law, linear system, laplace transforms, gain and lag, Fourier analysis, coherence, stochastic resonance, frequency domain, bode analysis, optima control law.
6323. **Systems Management Global Environment (3)**. Prerequisite: Admission to the doctoral program. Explores the critical quantitative as well as qualitative issues shaping the practice and research of systems-technical management.
6329. **Systems Management Seminar (3)**. 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)**. Prerequisites: 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)**. Prerequisites: 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)**.

Department of Mechanical Engineering

Jharna Chaudhuri, Ph.D., Chairperson

Professors: Anderson, Barhorst, J. Berg, Blawdziewicz, Castillo, Chaudhuri, Chyu, Ekwaro-Osire, Ertas, Hussain, James, Jankowski, Ma, Maxwell, Pantoya, Parameswaran, Rasty

Professor of Practice: Westergaard

Associate Professors: Bhattacharya, He, Hui, Idesman, Oler, Sheng, Yang, Yeo

Assistant Professors: Aksak, Cho, Christopher, Kim, Kumar, Lillian, Moussa, Qiu, Ren, Snoeyink

Research Assistant Professors: Araya, Khan, Pol

Lecturers: C. Berg, Branson, Fanning, Gray, Han, Hanson, Mosedale

CONTACT INFORMATION: 101 Mechanical Engineering Building, Box 41021, Lubbock, TX 79409-1021, T 806.742.3563, F 806.742.3540, www.me.ttu.edu

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 state-of-the-art technology. The department programs support technological development and innovation to meet many goals, including the needs of the 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. Within a few years of earning the baccalaureate degree in mechanical engineering, graduates are expected to achieve one or more of the following program educational objectives:

- Develop successful careers as mechanical engineers, demonstrate professional engineering competence via positions of increasing responsibility and/or assignments.
- Successfully complete or pursue graduate education in engineering or related fields, participate in professional development and/or industrial training courses and/or obtain engineering certification.
- Participate in research and development and other creative and innovative efforts in science, engineering and technology; and/or pursue entrepreneurial endeavors.
- If not in a mechanical engineering career, successful transition into an education, business, legal, medical or government career.
- Demonstrate a commitment to the community and profession through involvement with community and/or professional organizations.

Student Outcomes. Student outcomes are statements of the expectations for the knowledge and skills that students should possess when they graduate with a B.S. in Mechanical Engineering from Texas Tech University.

Graduates of the program must demonstrate 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 within realistic constraints such as economic,

environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

- 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.
- A broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- A recognition of the need for 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.

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 life-long 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 healthcare, 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. 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

General Standards and Requirements. Admission requirements and academic standards for the Department of Mechanical Engineering are consistent with the dynamic enrollment plan for the Edward E. Whitacre Jr. College of Engineering. Refer to the introduction to the Whitacre College of Engineering section of this catalog for a description of the criteria for initial admission to the Whitacre College of Engineering and the lower-division foundational curriculum. The recommended foundational curriculum for mechanical engineering consists of ENGL 1301, 1302; MATH 1451, 1452; CHEM 1307/1107; PHYS 1408; ENGR 1315.

A student may apply for admission to the upper division of a degree program upon completion of the foundational curriculum and a minimum of 12 credit hours of Texas Tech coursework. The acceptance criterion is based exclusively on a cumulative GPA for coursework completed at Texas Tech. The specific GPA standard varies among the degree programs and may change from one academic year to the next as necessary to align enrollments with the educational

Graduate Program

For information on graduate programs offered by the Department of Mechanical Engineering, visit the Graduate School section of the catalog on page 143.

resources. For students who entered Texas Tech prior to June 1, 2012, a minimum 2.5 GPA is required for admission to the mechanical engineering upper-division degree program. Students entering Texas Tech after June 1, 2012, must have a minimum 2.75 GPA.

The academic standards required by the Whitacre College of Engineering and the Department of Mechanical Engineering are given in the introduction to the Whitacre College section of the catalog and summarized below. Exceptions to these standards are at the discretion of the dean of the Whitacre College of Engineering.

- A grade of C or better is required for all courses in an engineering degree plan.
- A grade of C or better must be achieved in all prerequisites before the subsequent course may be attempted.
- A minimum 2.5 GPA is required to maintain academic good standing and continued membership in the Whitacre College of Engineering.
- A full-time student must achieve a C or better in 18 credit hours of coursework in the degree plan in each 12-month period.
- An engineering course may be repeated only one time after a course drop, withdrawal, or failure to achieve a C or higher. A maximum of three engineering courses may be repeated.

Assessment. The department uses outcome assessments to monitor quality. All mechanical engineering students are required to take a comprehensive assessment examination during the senior year. The results of this examination and other assessment measures are used to evaluate the extent to which the program goals and student outcomes are met, for which actions are taken in an effort to continually improve the program. This examination is patterned after the national NCEES Fundamentals of Engineering (FE) examination.

Minors. B.S.M.E. students who are interested in obtaining a minor can do so through the application of the electives and dual credit towards the 18-hour minors requirement. The department encourages minors in the following areas: 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, contact the department advisor.

A minor in mechanical engineering consists of 18 or more hours of mechanical engineering coursework, including 6 credit hours of upper-division courses beyond any mechanical engineering or equivalent courses already required by the student's home department.

Combined Bachelor's–Master's Degree Program. An accelerated program is available for outstanding students to pursue a combined B.S.M.E.–M.S.M.E. degree in five years. Students interested in this program while pursuing a B.S.M.E. degree should inform their academic advisor during the first (fall) semester of the junior year, follow the suggested curriculum in the next (spring) semester, and apply before the beginning of the fourth year. Students admitted to the accelerated program may apply up to 9 graduate credit hours to the B.S.M.E. degree requirements.

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.

Bachelor of Science in Mechanical Engineering

FIRST YEAR

Fall		Spring	
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
CHEM 1307, Principles of Chemistry I	3	PHYS 1408, Principles of Physics I	4
CHEM 1107, Exp. Prin. of Chemistry I	1	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	EGR 1206, Engineering Graphics	2
ENGR 1315, Intro to. Engineering	3	Elective (History)*	3
HIST 2300, History of U.S. to 1877	3		
TOTAL	17	TOTAL	16

SECOND YEAR

Fall		Spring	
MATH 2450, Calculus III	4	MATH 3350, Math. for Engr. & Sci. I	3
PHYS 2401, Principles of Physics II	4	ME 2322, Engineering Thermodyn. I	3
ECE 3301, General Electrical Eng.	3	ME 2302, Dynamics	3
ME 2301, Statics	3	ME 2115, Intro. to Programming Lab	1
POLS 1301, American Gov., Org.	3	Political Science Elective*	3
		Elective (Oral Communication)*	3
TOTAL	17	TOTAL	16

THIRD YEAR

Fall		Spring	
ME 3403, Mechanics of Solids	4	ME 3165, Computational Fluid Dyn.	1
ME 3164, Finite Element Analysis (Lab)	1	ME 3333, Dynamic Syst. & Vibrations	3
ME 3322, Engineering Thermodyn. II	3	Department Elective †	3
ME 3311, Material Science	3	ME 3365, Introduction to Design	3
ME 3370, Fluid Mechanics	3	ME 3228, Materials & Mechanics (Lab)	2
ME 3215, Numerical Methods	2	ME 3371, Heat Transfer	3
		MATH 3342, Math Stats for Engineers	3
TOTAL	16	TOTAL	18

FOURTH YEAR

Fall		Spring	
ME 4334, Control of Dynamic Systems	3	Elective (Math or Science) †	3
ME 4234, Systems & Controls (Lab)	2	ME 4371, Engineering Design II	3
ME 4370, Engineering Design I	3	IE 2311, Engineering Econ. Analysis	3
ME 4251, Thermal Fluid Systems (Lab)	2	Department Elective †	3
Elective (Lang., Philosophy, & Culture)* ‡	3	Elective (Visual/Performing Arts)* ‡	3
Department Elective †	3		
TOTAL	16	TOTAL	15

TOTAL HOURS: 131

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.

‡ Choose either a Language, Philosophy, and Culture or Creative Arts course that also meets the multicultural 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 years 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 applied toward the mechanical engineering degree. The department rigorously enforces prerequisite requirements for all courses.

Course Descriptions

(To interpret course descriptions, see page 23.)

Mechanical Engineering (ME)

Undergraduate Courses

2115. Introduction to Programming Lab (1). Prerequisites: ENGR 1315, MATH 1352, PHYS 1408. Introduction to programming

Combined Bachelor of Science and Master of Science in Mechanical Engineering

THIRD YEAR

Fall		Spring	
ME 3403, Mechanics of Solids	4	ME 3165, Computational Fluid Dyn.	1
ME 3164, Finite Element Analysis (Lab)	1	ME 3333, Dynamic Syst. & Vibrations	3
ME 3322, Engineering Thermodyn. II	3	Elective (Creative Arts)* †	3
ME 3311, Material Science	3	ME 3365, Introduction to Design	3
ME 3370, Fluid Mechanics	3	ME 3228, Materials & Mechanics (Lab)	2
MATH 3342, Math Stats for Engineers	3	ME 3371, Heat Transfer	3
TOTAL	17	TOTAL	15

FOURTH YEAR

Fall		Spring	
ME 4334, Control of Dynamic Systems	3	ME 4371, Engineering Design II	3
ME 4234, Systems & Controls (Lab)	2	POLS Elective	3
ME 4370, Engineering Design I	3	Department Elective ‡	3
ME 4251, Thermal Fluid Systems (Lab)	2	ME 5000-Level Elective	3
ME 5000-Level Elective	3	5000-Level Math Elective	3
Elective (Lang., Philosophy, & Culture)* †	3		
TOTAL	16	TOTAL	15

FIFTH YEAR

Fall		Spring	
5000-Level ME Elective	9	5000-Level ME Elective	6
ME 5120, Graduate Seminar	1	ME 6000, Master's Thesis	6
TOTAL	10	TOTAL	12

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.

† Choose either a Language, Philosophy, and Culture or Creative Arts course that also meets the multicultural requirement.

‡ Select from departmentally approved list.

- fundamentals needed for basic engineering analyses through laboratory exercises; focuses on text-based programming.
- 2301. Statics (3).** Prerequisites: MATH 1452, PHYS 1408. Analyses of particles, rigid bodies, trusses, frames, and machines in static equilibrium with applied forces and couples.
- 2302. Dynamics (3).** Prerequisites: C or better in MATH 2450 and ME 2301. Kinematics and kinetics of particles and rigid bodies.
- 2315. Computer-Aided Analysis (3).** Prerequisites: ME 1315, PHYS 1408, MATH 1452. Introduces numerical methods used in the solution of typical engineering problems. Includes design activity.
- 2322. Engineering Thermodynamics I (3).** Prerequisites: PHYS 1408, MATH 1452. Properties of pure substances, ideal gas behavior, first and second law analysis, and applications to energy conversion and power cycles.
- 3164. Finite Element Analysis (FEA) (1).** Prerequisite: ME 3403 (may be taken concurrently). Introduces students to the use of finite element analysis software to perform load and stress analysis on mechanical components.
- 3165. Computational Fluid Dynamics (1).** Prerequisite: ME 3370. Introduces students to computer-based analysis and design of fluid/thermal systems.
- 3215. Numerical Methods (2).** Prerequisites: ME 2115, MATH 3350. Introduction to numerical methods used in the solution of engineering problems.
- 3228. Materials and Mechanics Laboratory (2).** Prerequisites: ME 2301 and 3311, PHYS 2401. Evaluating and reporting the characteristics of materials and mechanical systems.
- 3311. Materials Science (3).** Prerequisites: CHEM 1307, 1107 and ME 2301. Fundamental and applied knowledge of the structure and properties of materials.
- 3322. Engineering Thermodynamics II (3).** 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.
- 3333. Dynamic Systems and Vibrations (3).** Prerequisites: MATH 3350, ME 2302 and 3215, PHYS 2401, and either ECE 3301 or 3302.

- Modeling and analysis of dynamic systems, equilibrium, stability and linear systems theory, introduction to mechanical vibrations.
- 3365. Introduction to Design (3).** Prerequisites: ME 3403. Analysis, design, and evaluation of mechanical elements.
- 3370. Fluid Mechanics (3).** Prerequisites: ME 2301 and 2322 or CE 2301. Basic principles of fluid statics, fluid dynamics, ideal and viscous flows, and turbo-machinery. Includes design activity.
- 3371. Heat Transfer (3).** Prerequisites: ME 3215 and 3370. Introduction to heat transfer by the mechanisms of conduction, convection, and radiation. Includes design activity.
- 3403. Mechanics of Solids (4).** Prerequisites: ME 2301 or CE 2301. Analysis of structures to determine stresses, strains, and deformations.
- 4000. Special Topics in Mechanical Engineering (V1-6).** Prerequisite: Departmental approval. Individual studies of special topics in mechanical engineering. May be repeated for credit.
- 4234. Control of Dynamic Systems Laboratory (2).** Corequisite: ME 4334. Hands-on experience in the modeling and control of dynamic systems.
- 4251. Thermal-Fluid Systems Laboratory (2).** Prerequisites: ME 3370, 3322, 3371. Measurements, testing, performance evaluation, and documentation of thermal-fluid systems.
- 4330. Advanced Topics in Mechanical Engineering (3).** Prerequisite: Departmental approval. Advanced topics in mechanical engineering. May be repeated for credit. Approved departmental elective.
- 4331. Individual Study in Mechanical Engineering (3).** Prerequisite: Departmental approval. Individual study in advanced mechanical engineering areas. Approved departmental elective. May be repeated for credit.
- 4334. Control of Dynamic Systems (3).** Prerequisite: ME 3333. Introduction to analysis and design of control systems, including applications to electromechanical systems.
- 4335. Robot and Machine Dynamics (3).** 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 departmental elective.
- 4342. Failure Analysis/Forensic Engineering (3).** Prerequisite: ME 3311. 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 departmental elective.
- 4345. Probabilistic Mechanical Design (3).** 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 departmental elective.
- 4354. Sustainable Transportation Design (3).** 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 departmental elective.
- 4356. Aerodynamics (3).** Prerequisite: ME 3370. An introduction to aerodynamics, including wing and airfoil theory, aircraft performance, and aircraft stability and control. Approved departmental elective.
- 4358. Combustion (3).** 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 departmental elective.
- 4360. Sustainable Energy (3).** Prerequisites: 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. Approved departmental elective.
- 4370. Engineering Design I (3).** Prerequisites: ME 2302, 3311, 3365; prerequisite or corequisite: ME 3371. Design problems characteristic

- of mechanical engineering, including consideration of cost, design optimization, codes and standards, and ethics. (Writing Intensive)
- 4371. Engineering Design II (3).** 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).** Prerequisites: ME 3322 and 3371. The determination of loads and the design of heating, ventilating, and air conditioning systems. Approved departmental elective.
- 4376. Manufacturing Processes (3).** Introduction to the fundamental industrial manufacturing processes. A hands-on approach will be utilized to develop an applications-oriented understanding of basic manufacturing and production methods.
- 4377. Innovation, Discovery and Commercialization (3).** Develops and applies specialized, real-world, interdisciplinary opportunity creation and discovery skills to technology commercialization using integrated processes for projects with technical and business content.
- 4385. Introduction to Microsystems I (3).** 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 departmental elective.
- 4386. Introduction to Microsystems II (3).** Prerequisite: ME 4385. For majors only or with departmental consent. Application of microfabrication to create microsensors systems. Integration of optics, optoelectronics, and microfluids. Includes other MEMS projects. Approved departmental elective.
- 4390. Foundations of Nuclear Engineering (3).** Prerequisites: PHYS 2401, MATH 2450. 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 departmental elective.

Graduate Courses

- 5120. Graduate Seminar (1).** Discusses mechanical engineering research topics. Teaches written and oral communication techniques for professional engineers. Registration is required first semester for all ME graduate students.
- 5301. Analysis of Engineering Systems (3).** 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).** Prerequisite: ME 3215, MATH 3350, or consent of instructor. Numerical analysis of ordinary and partial differential equations and other advanced topics applied to mechanical engineering problems.
- 5311. Advanced Dynamics (3).** Prerequisite: ME 3302, 3333, 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).** 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).** 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).** 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).** Prerequisite: ME 3302, 3333, or consent of instructor. Vibration of single and multiple-degree of freedom systems, continuous systems, FE formulation, computer aided modal analysis, random vibrations.
- 5317. Robot and Machine Dynamics (3).** An overview of planar mechanisms (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.
- 5321. Thermodynamics (3).** 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).** 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.
- 5325. Convection Heat Transfer (3).** 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).** Prerequisites: ME 3322 and 3371. Introduction to chemical thermodynamic combustion kinetics; the theory of premixed flames; diffusion combustion; formation of products in combustion systems; liquid and solid phase reactions; and examples of combustion devices which include internal combustion engines, gas turbines, furnaces and waste incinerators; alternative fuel sources.
- 5327. Advanced Heat Transfer (3).** Advanced topics in conduction, convection, and radiation heat transfer.
- 5330. Boundary Layer Theory (3).** 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.
- 5334. Gas Dynamics (3).** 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).** Prerequisite: ME 5330. Nature of turbulence, the Reynolds equations, and the transport equations for Reynolds stresses. Different kinds of closure models and their application to boundary layer flows.
- 5336. Computational Fluid Dynamics (3).** Prerequisite: ME 5302 or equivalent. Simultaneous solution of momentum, heat, and mass transfer problems by applying various computational techniques.
- 5337. Mechanics and Processing of Nanomaterials (3).** The testing and evaluation of mechanical properties for nanostructured materials are considered in relationship to their synthesis and processing.
- 5338. Advanced Fluid Mechanics (3).** Basic laws, fundamental theories, and engineering applications in fluid mechanics, including Stokesian dynamics, lubrication theory potential flow, vortex dynamics, boundary layers and turbulence.
- 5339. Transmission Electron Microscopy (3).** Prerequisite: ME 3311. Introductory course in theory and practical use of the transmission electron microscope (TEM) as a research tool. Provides background information for designing research protocols and using instrumentation for recording and analyzing images.
- 5340. Elasticity (3).** Prerequisite: Consent of instructor. Stress, deformation, and strain; basic equations; analytical solutions; energy principles and principles of virtual displacements; finite element; and solutions of problems with elements of design.
- 5342. Fracture and Failure Analysis (3).** 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.
- 5343. Contact Mechanics of Engineering Materials (3).** Prerequisite: Departmental approval. Knowledge of material science, engineering mechanics, and MATLAB programming. Introduction and advanced knowledge of surface interactive forces and interface contact mechanics of engineering materials.
- 5344. Introduction to High Pressure Science and Technology (3).** Prerequisite: ME 3311. 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)**. 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)**. 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)**. Prerequisites: ME 3311 and 5340. Shape memory effect, pseudoelectricity, pseudoplasticity. Crystallography, continuum thermodynamics, and kinetics of phase transformations. Constitutive equations for phase transformations in elastic materials.
5351. **Advanced Engineering Design (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)**. Application of probabilistic approaches in engineering design. Techniques for the quantification of uncertainty and risk inherent in mechanical systems.
5353. **Fundamentals of Transdisciplinary Design and Process (3)**. 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)**. 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)**. Prerequisites: ME 5353. Fundamentals of complexity theory to apply to engineering designs, processes, and systems to improve control and reliability.
5356. **Digital Human Modeling for Human-Centric Design (3)**. Prerequisite: Departmental approval. Knowledge of kinematics and dynamics, vector and matrix algebra, C programming. Introduction to human anatomy, skeletal model, anthropometry, human modeling packages, kinematics of human multibody system, posture prediction and dynamic motion prediction.
5357. **Transdisciplinary Discovery and Innovation (3)**. Process of scientific discovery and technology development, integrated tools and processes for engineering innovation, and theoretical foundations and current topics in transdisciplinary engineering and science.
5358. **Biomaterials (3)**. Prerequisite: Materials Science. Develops an understanding of structure and manufacturing-dependent properties for both synthetic and natural biomaterials used in biomedical engineering.
5360. **Bio-Fluid Mechanics (3)**. Prerequisite: Knowledge of basic fluid mechanics. Teaches fundamentals of blood flow mechanics, blood rheology, blood vessel tissue mechanics, blood flow measurements, cardiovascular disease and therapeutic techniques related to blood flow, hemodynamics in main organs, and airflow in the airway.
5361. **Engineering Biomechanics (3)**. Develops quantitative understanding of biophysical processes in biological and human physiological systems. Applies engineering concepts to such systems.
5366. **Healthcare Engineering (3)**. Principles of engineering and advanced topics involved in all major aspects of healthcare delivery processes and systems.
5385. **Introduction to Microsystems (MEMS) I (3)**. 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)**. 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)**. 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)**. 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)**. 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)**.

Photo credit: John Carroll/Student Media



Bob L. Herd Department of Petroleum Engineering

Marshall Watson, Ph.D., Chairperson

George P. Livermore Professor: Soliman

Professors: Heinze, Hussain

Associate Professor:s Menouar, Sheng, Watson

Assistant Professors: Ettehadtavakkol, Panacharoensawad

Associate Professor of Practice: Bateman

Instructors: Emadibaladehi, Gamadi, Giussani, House

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About the Program

In 2014 the department moved into the new 42,000 square-foot Terry Fuller Petroleum Engineering Research Building.

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 life-long professional development.
- To conduct research that generates, communicates, and applies 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 the use of resources, protection of the environment, and development of infrastructures.

Program Educational Objectives. The undergraduate program educational objectives embody the expected accomplishments of graduates during their first few years following graduation. The program educational objectives of the Bob L. Herd Department of Petroleum Engineering (PE) as adopted by the PE faculty, students, and Industry Advisor Board are as follows:

- 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.

These objectives are published in the university's catalog and on the Bob L. Herd Department of Petroleum Engineering website.

Student Outcomes. Student outcomes are statements of the expectations for the knowledge and skills that students should possess when they graduate with a Bachelor of Science in Petroleum Engineering from Texas Tech University.

Graduates of the program must demonstrate 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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- 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, economic, environmental, 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.

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 2,800 B.S. degrees since the program's inception in 1946. A high-priority goal is to produce quality B.S. graduates measured by the following:

- 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.
- Recruitment of 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 students to find employment—both summer internships and full-time positions—upon graduation. Approximately 50 companies have recruited the department's students and nearly 100 percent of them have been placed upon graduation for the previous 16 years. A large percentage of the department's 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 petroleum engineering's 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 nine 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 Bachelor of Science in Petroleum Engineering is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, 410.347.7700.

Undergraduate Program

General Standards and Requirements. Admission requirements and academic standards for the Department of Petroleum Engineering are consistent with the dynamic enrollment plan for the Edward E. Whitacre, Jr. College of Engineering. Refer to the introduction to the Whitacre College of Engineering section of this catalog (page 315) for a description of the criteria for initial admission to the Whitacre College of Engineering and the lower-division foundational curriculum. The required foundational curriculum for petroleum engineering consists of ENGL 1301, 1302; MATH 1451, 1452; CHEM 1307, 1107; PHYS 1408; PETR 1305 or ENGR 1315.

Admission to the petroleum engineering upper-division degree program is very competitive. Consequently, only 250 students in any academic year will be allowed to transition from the lower-division foundational program to the upper-division petroleum degree program, no later than between the third and fourth semesters. The 250-student limit to the petroleum engineering degree program will be effective Spring 2016 and thereafter. Thus, the admission change will affect students entering Texas Tech in Fall 2014 and after, and those students who entered prior to Fall 2014 but have not successfully transitioned into the upper-division degree program.

To apply for admission in the petroleum engineering upper-division degree program (beginning with PETR 2322), students must meet ALL of the following requirements:

- completion of the foundational curriculum;
- completion of 12 credit hours of Texas Tech University coursework
- minimum institutional GPA of 3.2.

Students meeting all three of the required criteria will be considered for admission to the petroleum engineering program based on their institutional GPA. Where necessary to distinguish among students, math, science and engineering coursework GPAs will be weighted higher than other courses in the core or foundational curriculum. Once the enrollment cap of 250 has been reached for any given academic year, no additional students will be admitted to the petroleum engineering upper-division program for that year. Students meeting all three of the required criteria who are not among the 250 admitted students may declare majors in any other department in the college of engineering, provided standards for those majors are met. To apply to the petroleum degree program, students must complete the Authorization for Transfer into Upper Division Degree Program form. Students may complete an electronic copy of the form, located on the college of engineering website, or complete the paper copy located in the Engineering Opportunities Center of the college of engineering Dean's Office. Entry requirements for the petroleum engineering degree program are subject to change and students must meet the requirements at the time of submitting the Authorization for Transfer into Upper Division Degree Program form.

Upon acceptance into the upper-division petroleum degree program students will be placed on the most current catalog and upper-division degree plan to fulfill graduation requirements in place at that time.

All students in the department are required to have a Windows-based laptop computer, safety glasses, and steel-toed boots. Many instructors require students to transfer homework via email. Some

instructors transfer information to students using the Internet. Students should check the department website for hardware and software recommendations; most petroleum-based software applications will run only on Windows-based PCs. The department has laptop accessible classrooms. Computer labs are not provided.

The academic standards required by the Whitacre College of Engineering and the Bob L. Herd Department of Petroleum Engineering are given in the introduction to the Whitacre College section of this catalog and summarized below. Exceptions to these academic standards are at the discretion of the petroleum engineering faculty in concurrence with the dean of the Whitacre College of Engineering. The standards are as follows:

- A grade of C or better must be achieved in all prerequisites before the subsequent course may be attempted.
- A minimum 2.5 GPA is required to maintain academic good standing and continued membership in the Whitacre College of Engineering.
- A full-time student must achieve a C or better in 18 credit hours of coursework in the degree plan in each 12-month period.
- An engineering course may be repeated only one time after a course drop, withdrawal, or failure to achieve a C or higher.
- A maximum of three engineering courses may be repeated.

The department requires students in their junior year to conduct a degree audit. Following this audit, they must meet with their academic advisors to discuss all courses remaining for completion of their degree. Students must select "operations" or "reservoir" concentration upon registration for fall (first semester senior) courses. The student will be expected to enroll only in courses within their designated concentration. To graduate, the student must complete the required concentration courses.

Curriculum. Petroleum engineering applies the curriculum management of the Whitacre College of Engineering. Because of the rigidity of the upper-division petroleum degree program, students should be aware of the implications of not successfully completing coursework as prescribed in the degree plan.

Per the Academic Advising and Support section of this catalog, students should "notify their advisor immediately when receiving a course grade of D or F," before dropping a course, or when withdrawing from the university in order to gain a full understanding of the implications and develop a plan for the future.

Minors. Currently, petroleum engineering does not offer a minor. In conjunction 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, and mathematics. These minors can be earned with some additional hours.

Course Descriptions

(To interpret course descriptions, see page 23.)

Petroleum Engineering (PETR)

PETR classes may require evening exams that may be out of the normal exam timeframe.

Undergraduate Courses

1305. Engineering Analysis I (3). Corequisites: C or better in MATH 1451 (concurrent enrollment allowed). 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. ENGR 1315 may be substituted for PETR 1305.

Bachelor of Science in Petroleum Engineering**FIRST YEAR**

Fall		Spring	
CHEM 1307/1107, Prin. of Chem. I & Lab.	4	Oral Communications*	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
POLS 1301, American Govt., Org.	3	POLS 2302, American Public Policy	3
MATH 1451, Calculus I	4	MATH 1452, Calculus II	4
PETR 1305 [†] or ENGR 1315, Engr. Anal.	3	PHYS 1408, Principles of Physics I	4
TOTAL	17	TOTAL	17

SUMMER

International Experience Requirement – Study Abroad, Int'l Research, Int'l Internship

SECOND YEAR

Fall		Spring	
CE 2301 or ME 2301, Statics	3	PETR 3302, Reservoir Fluid Properties [†]	3
GEOL 3324, Geology for Petroleum Engr.	3	CE 3305 or ME 3370, Mech. of Fluids	3
ME 2322, Engineering Thermodyn. I	3	GEOL 4324, Geology of Hydrocarbons [†]	3
MATH 2450, Calculus III	4	MATH 3350, Higher Math for Engrs.	3
PHYS 2401, Principles of Physics II	4	PETR 2322, Petroleum Methods [†]	3
		CE 3303 or ME 3403, Mech. of Solids	3
TOTAL	17	TOTAL	18

THIRD YEAR

Fall		Spring	
GEOL 4334, Structural Analysis [‡]	3	PETR 3304, Formation Evaluation [†]	3
PETR 3105, Geology Field Trip [‡]	1	CE 3302 or ME 2302, Dynamics	3
PETR 4303, Petroleum Prod. Methods [‡]	3	PETR 3306, Reservoir Engineering [†]	3
MATH 3342 or IE 3341, Stat. for Engr.	3	PETR 3401, Petroleum Dvlpmt. Design [†]	4
IE 2311, Engr. Economic Analysis [§]	3	ENCO 3350, Basic Land Practices [†]	3
PETR 3402, Reservoir Rock Properties [‡]	4	HIST 2300, History of the U.S. to 1877	3
TOTAL	17	TOTAL	19

FOURTH YEAR

Fall#		Spring	
PETR 4121, Petroleum Design I [‡]	1	PETR 4222, Petroleum Design II [†]	2
PETR 4300, Property Eval. and Mgmt. [‡]	3	HIST 2301, History of U.S. Since 1877*	3
PETR Senior Elective I [†]	3	PETR Senior Elective III [†]	3
PETR Senior Elective II [‡]	3	PETR Senior Elective IV [†]	3
Creative Arts/Multicultural*	3	ENGR 2392, Engineering Ethics**	3
TOTAL	13	TOTAL	14

TOTAL HOURS: 132

One year (two semesters) of a single foreign language required if student did not successfully complete two years of foreign language in high school.

* Students must complete the university's core curriculum consisting of ENGL 1301 and 1302; HIST 2300 and 2301; POLS 1301 and 2302; and 3 hours each from Creative Arts, Social and Behavioral Sciences, Oral Communication, and the Multicultural list.

† Spring only.

‡ Fall only.

§ Fulfills the university's core Behavioral Sciences requirement.

Select concentration, degree audit.

** Fulfills the university's core Language, Philosophy, and Culture requirement.

Senior Electives:

Operations Concentration - Fall: PETR 4307, 4314; Spring: 4309, 4405

Reservoir Concentration - Fall: PETR 4306, 4324; Spring: 4308, 4319

- 2322. Petroleum Methods (3).** Prerequisites: PETR majors only; 3.0 TTU GPA; C or better in PETR 1305 or ENGR 1315, CHEM 1107 and 1307, MATH 2450, PHYS 2401, ME 2322, CE 2301 or ME 2301, and GEOL 3324; GEOL 4324 (concurrent enrollment allowed). Corequisite: PETR 3302. Introduction to petroleum engineering and the close relationships of geology, exploration, formation evaluation, drilling, production, and reservoir. A Saturday lab/fieldtrip is required to pass the course. Time arrangements will be discussed during class time.
- 3105. Petroleum Field Trip (1).** Prerequisite: 3.0 TTU GPA; C or better in PETR 2322 and 3302, CE 3303 or ME 3403, CE 3305 or ME 3370, MATH 3350, and GEOL 4324; GEOL 4334 (concurrent enrollment allowed). Corequisites: PETR 3402 and PETR 4303. Weekend field trip to study geological outcroppings and experience oil operations. A weekend lab/fieldtrip is required to pass the course. Time arrangements will be discussed during class time.
- 3302. Reservoir Fluid Properties Design (3).** Prerequisites: PETR majors only; 3.0 TTU GPA; C or better in PETR 1305 or ENGR 1315, CHEM 1107 and 1307, MATH 2450, PHYS 2401, ME 2322, CE 2301 or ME 2301, GEOL 3324; GEOL 4324 (concurrent enrollment allowed). Corequisites: PETR 2322. Design of reservoir fluid properties, including PVT behavior of hydrocarbon systems. Investigation of the nature, methods

Combined Bachelor of Science and Master of Science in Petroleum Engineering

(Apply to the Graduate School prior to the start of the fourth year.)

FOURTH YEAR

Fall		Spring	
PETR 4121, Petroleum Design I	1	PETR 4222, Design II	2
PETR 4300, Property Eval. & Mgmt.	3	PETR 5309, Hydrocarbon Reserv. Simul.	3
PETR 5307, Enhanced Oil Recovery	3	PETR 5308, Pressure Transient Analysis	3
PETR 5324, Geostatistics for Reservoir Eng.	3	PETR 5121, Graduate Seminar	3
PETR 5121, Graduate Seminar	1	ENGR 2392, Ethics	3
Creative Arts/Multicultural*	3	HIST 2301, History of U.S. Since 1887	3
TOTAL	14	TOTAL	15

FIFTH YEAR

Fall		Spring	
PETR 5303, Advanced Drilling Tech.	3	PETR 5318, Gas Production Engineering	3
PETR 5314, Nodal Analysis & Well Opt.	3	PETR 5317, Well Completion & Stimulation	3
PETR 6000, Master's Thesis	3	PETR 6000, Master's Thesis	3
PETR 5121, Graduate Seminar	1	PETR 5121, Graduate Seminar	1
TOTAL	10	TOTAL	10

TOTAL HOURS: 154

One year (two semesters) of a single foreign language required if student did not successfully complete two years of foreign language in high school.

Students must maintain a 3.0 GPA to continue in the program.

* Students must complete the university's core curriculum consisting of ENGL 1301 and 1302; HIST 2300 and 2301; POLS 1301 and 2302; and 3 hours each from Language, Philosophy, and Culture; Creative Arts; Social and Behavioral Sciences; Oral Communication, and the Multicultural list.

of estimation, and use of reservoir fluid properties. Laboratory PVT demonstrations. (Design Course)

- 3304. Formation Evaluation (3).** Prerequisites: 3.0 TTU GPA; C or better in GEOL 4334, PETR 3402, 3105 and 4303; ENCO 3350 (concurrent enrollment allowed). Corequisites: PETR 3306 and 3401. Evaluation of sub-surface formation petrophysical properties using mud logs, wireline logs, cores and wireline formation tests to determine rock type, porosity, permeability, and hydrocarbon content.
- 3306. Reservoir Engineering (3).** Prerequisites: 3.0 TTU GPA; C or better in GEOL 4334, PETR 3402, 4303, and 3105; ENCO 3350 (concurrent enrollment allowed). Corequisites: PETR 3401 and 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.
- 3401. Drilling I (4).** Prerequisites: 3.0 TTU GPA; PETR majors only; C or better in PETR 3105, 3402, 4303, and GEOL 4334. Corequisites: PETR 3304, 3306, and ENCO 3350. Rotary drilling; well completion practices, including casing, cementing, hydraulics, perforating, workover design and rheology lab. Design and use of equipment. (Design Course)
- 3402. Reservoir Rock Properties (4).** Prerequisites: 3.0 TTU GPA; C or better in PETR 2322 and 3302, ENGL 1302, CE 3305 or ME 3370, CE 3303 or ME 3403, MATH 3350, and GEOL 4324; GEOL 4334 (concurrent enrollment allowed). Corequisite: PETR 3105 and PETR 4303. 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 (VI-6).** Prerequisites: 3.0 TTU GPA; department and instructor consent. 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 or PETR elective. May be repeated for credit.

Graduate Program

For information on graduate programs offered by the Department of Petroleum Engineering, visit the Graduate School section of the catalog on page 144.

- 4121. Petroleum Design I (1).** Prerequisites: PETR majors only; 3.0 TTU GPA; C or better in PETR 3304, 3306 and 3401, MATH 3342 or IE 3341, IE 2311, GEOL 4324, 4334, CE 3303 or ME 3403, CE 3305 or ME 3370, CE 3302 or ME 2302, ENCO 3350, and 3 hrs of oral communications. Corequisite: PETR 4300 and 6 PETR elective hrs in either PETR 4306, 4307, 4314, or 4331. Design projects characteristic of petroleum engineering, including consideration of cost, design optimization, codes and standards, and ethics. (Writing Intensive)
- 4222. Petroleum Design II (2).** Prerequisites: 3.0 TTU GPA; C or better in IE 2311, GEOL 4324 and 4334, CE 3303 or ME 3403, CE 3305 or ME 3370, CE 3302 or ME 2302, ENCO 3350, PETR 4121 and 4300 and 6 PETR elective hrs in either PETR 4331, 4306, 4307, or 4314. Corequisite: 6 PETR elective hrs in either PETR 4308, 4309, 4319, 4405, or 4331. Design projects characteristic of petroleum engineering, including consideration of cost, design optimization, codes and standards, and ethics. (Writing Intensive)
- 4300. Petroleum Property Evaluation and Management (3).** Prerequisites: 3.0 TTU GPA; C or better in GEOL 4324 and 4334, CE 3303 or ME 3403, CE 3305 or ME 3370, PETR 3401, 3304 and 3306, MATH 3342 or IE 3341, IE 2311, CE 3302 or ME 2302 and ENCO 3350. Corequisites: PETR 4121, and 6 PETR elective hrs in either PETR 4306, 4307, 4314, or 4331. 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).** Prerequisites: 3.0 TTU GPA; C or better in PETR 2322 and PETR 3302, MATH 3350, CE 3305 or ME 3370, CE 3303 or ME 3403, and GEOL 4324; GEOL 4334 (concurrent enrollment allowed). Corequisites: PETR 3105 and PETR 3402. 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).** Prerequisites: 3.0 TTU GPA; instructor and departmental approval. Corequisites: PETR 4121 and 4300. Introduction to EOR processes mechanisms, frontal advance theory and application, mechanisms of water-flooding and miscible processes and application to reservoir performance prediction.
- 4307. Drilling II (3).** Prerequisites: 3.0 TTU GPA; PETR majors only; C or better in PETR 3304, 3306, 3401, GEOL 4334, ENCO 3350, MATH 3342, CE 3302 or ME 2302, CE 3303 or ME 3402, and IE 2311. Corequisites: PETR 4121 and 4300. Rotary drilling; well completion practices, including casing, cementing, hydraulics, perforating, workover design and rheology lab. Design and use of equipment. (Design Course) (Writing Intensive)
- 4308. Advanced Reservoir Engineering (3).** Prerequisites: 3.0 TTU GPA; C or better in PETR 4306. Corequisites: PETR 4222. 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 and Stimulation (3).** Prerequisites: C or better in PETR 4121, 4300, 4314; two senior PETR electives; PETR major; 3.0 GPA. Corequisites: PETR 4222, PETR senior elective. Downhole equipment, production testing, production logging, wellbore diagnostics, well maintenance, completion techniques, acidizing, and hydraulic fracturing. (Design Course)
- 4314. Nodal Analysis and Artificial Lift (3).** Prerequisites: C or better in PETR 3304, 3306, 3401; GEOL 4334; ENCO 3350; MATH 3342, 3350; CE 3302 or ME 2302; CE 3303 or ME 3402; IE 2311; PETR major; 3.0 GPA. Corequisites: PETR 4300, 4121, PETR senior elective. Production issues, including fluid reservoirs, new wellbore conditions, well flow performance, perforations, well deliverability, material balance, and lift techniques.
- 4319. Simulation Methods (3).** Prerequisites: 3.0 TTU GPA; C or better in PETR 4314. Corequisite: PETR 4222. The development of unsteady state fluid flow equations for hydrocarbon reservoirs and the application of finite difference methods to obtain solutions to the equations.
- 4324. Petroleum Geostatistics (3).** Prerequisites: C or better in PETR 3304, 3306, 3401; GEOL 4334; ENCO 3350; MATH 3342, 3350; CE 3302 or ME 2302; CE 3303 or ME 3402; IE 2311; PETR major; 3.0 GPA. Corequisites: PETR 4300, 4121; PETR senior elective. Reservoir characterization, geostatistics, estimation, quantifying uncertainties, case studies, geological simulation, data integration and grid block properties, and geophysics.
- 4331. Special Problems in Petroleum Engineering (3).** Prerequisites: PETR majors only with a senior standing; 3.0 TTU GPA; consent of instructor and department. Corequisites: C or better in PETR 4121 or 4222. Individual studies in advanced engineering areas of special interests. May be repeated for credit.
- 4385. Multinational Energy, Environment, Technology and Ethics (3).** Prerequisites: C or better in ENGL 1301, 1302, MATH 1320 and 3 hours of oral communications; junior or senior standing; departmental approval. Energy use in modern society and the consequences of past, current, and future energy use patterns.
- 4386. Petroleum Geology, Exploration, Drilling and Production (3).** Prerequisites: PETR majors only; 3.0 TTU GPA; C or better in ENGL 1301, 1302 and MATH 1320 or higher; junior or senior standing; departmental approval. Exposes students to both engineering and geological aspects of the petroleum business and enables them to operate in an oil company team environment or independently.
- 4405. Production Facilities and Processing (4).** Prerequisites: 3.0 TTU GPA, PETR major only; C or better in PETR 4121, 4300, and two senior PETR electives (concurrent enrollment allowed). Corequisite: PETR 4222. The design and understanding of surface facilities for the processing and disposition of oil, gas, and water. Three Saturday field trips are required to pass this course. (Design Course)

Graduate Courses

- 5000. Studies in Advanced Petroleum Engineering Topics (3).** 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).** Prerequisite: 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).** 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).** Prerequisite: 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).** Prerequisite: 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).** Prerequisite: Department approval. Methods of analyzing various types of well logs to obtain quantitative hydrocarbon reservoir parameters.
- 5305. Advanced Formation Evaluation (3).** Prerequisite: Department approval. Must have graduate standing in petroleum engineering. Application of both conventional and new formation evaluation tools and techniques to non-vertical wells, unconventional reservoirs, and legacy log files.
- 5306. Advanced Artificial Lift Methods (3).** Prerequisite: 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)**. Prerequisite: 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)**. Prerequisite: Department approval. Theory of transient fluid flow in petroleum reservoirs and applications of methods to interpret transient pressure behavior.
5309. **Hydrocarbon Reservoir Simulation (3)**. Prerequisite: 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)**. Treatment of advanced concepts of reservoir simulation for multidimensional, multiphase flow in hydrocarbon reservoirs.
5311. **Thermal Oil Recovery (3)**. Prerequisite: 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)**. Prerequisite: 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)**. Prerequisite: 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)**. Prerequisite: 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)**. Prerequisite: Department approval. 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)**. Prerequisite: Department approval. 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)**. Prerequisite: 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)**. Prerequisite: 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)**. Prerequisite: 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)**. Prerequisite: Department approval. Recovery prediction, tensor permeabilities, multiphase flow, drainage equations, flow potential, streamline-streamtube methods, injectivity, displacements in layered reservoirs, and line source solutions.
5322. **Computational Phase Behavior (3)**. Prerequisite: 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)**. Prerequisite: 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)**. Prerequisite: 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)**. Prerequisite: Department approval. Frontal advanced theory for multiphase flow, immiscible flow, capillary cross flow, psuedofunctions, streamlines, measures of heterogeneity, field case studies, pattern flooding, and use of black oil reservoir simulators.
5328. **Advanced Property Evaluation (3)**. Prerequisite: 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)**. Prerequisite: 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)**. Prerequisite: 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)**. Prerequisites: 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)**. Prerequisite: Department approval. Use of open-hole logs, survey of induction and lateralog suites to determine reserves. (Leveling program course)
5383. **Reservoir Engineering Fundamentals (3)**. Prerequisite: 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. **Fluid Properties (3)**. Prerequisite: Departmental approval. Reservoir fluids; fluid sampling; phase behavior; hydrocarbon gas-liquid fractions; z-factors; equations of state; flash and differential calculations; formation volume factors for gas, oil, and water. (Leveling program course)
5385. **Rock Properties (3)**. Prerequisite: Consent of Instructor. Reservoir rock properties, sampling, core analysis, rock/fluids interaction, 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)**. 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)**.
8000. **Doctor's Dissertation (V1-12)**.



Honors College

Michael San Francisco, Ph.D., Dean

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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: Elbow, San Francisco

Associate Professors: Bradatan, Brink, Caswell, McGinley, Tomlinson, Wong

Assistant Professor: Williams

About the College

The Honors College provides highly motivated and academically talented students opportunities to maximize their potential and develop skills for global citizenship. The Honors College combines the personal attention and 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 analytical 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 the honors arts and major, 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, including early registration, housing in an Honors residence hall and learning community (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), travel abroad scholarships, and opportunities to do research. The college also schedules a variety of special events such as speakers, recreational activities, and cultural performances. The Honors College is able to award scholarships for high achieving students as well as those qualifying on a needs basis.

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 one honors seminar and one capstone summit experience course in the student's final year) 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 and 6 additional hours graduate with "Highest Honors."

Degree Program

The college offers programs leading to the following degrees:

- Bachelor of Arts in Honors Arts and Letters
- Bachelor of Arts in Environment and the Humanities*

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.honors.ttu.edu.

To remain in good standing in the Honors College, a student must maintain a minimum 3.25 unadjusted GPA while at Texas Tech and demonstrate adequate progress toward completion of the Honors degree requirements. For more details, see the *Honors Student Handbook* (www.honors.ttu.edu/current.php).

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 20 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.

*Degree being phased out, effective August 31, 2016. No new students.

TTUHSC 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 TTUHSC. 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.

See www.depts.ttu.edu/honors for further information.

Undergraduate to Pharmacy School Initiative (UPSI)

By meeting the special requirements and deadlines of this joint program between Texas Tech University (TTU) and Texas Tech University Health Sciences Center School of Pharmacy (TTUHSC SOP), a select group of entering freshmen is guaranteed admission to TTUHSC SOP without the PCAT requirement.

The primary qualifications for admission are as follows:

- Must be a Texas resident
- High school senior classification
- Minimum SAT of 1300 or an ACT of 29
- Preference will be given to students in the top 10% of high school class
- Minimum high school GPA of 3.7 in a college preparatory curriculum

Students must apply and be admitted to TTU and the Honors College as entering freshmen before the application process for UPSI starts. UPSI students are required to spend four years as undergraduates at TTU and demonstrate significant evidence of health-related activities in a pharmacy, hospital or clinical setting before entering the School of Pharmacy.

Students accepted into the UPSI program are required to complete the Honors College requirements as well. Completion of the required coursework, activities, and events in the Honors College are a condition of matriculation to TTUHSC SOP. The main steps to applying to the program are as follows:

Step 1: Applications to Texas Tech University and the Honors College

Step 2: School of Pharmacy application (in September of the second year in the Honors College)

Step 3: Interview at the School of Pharmacy

Step 4: Notification of the outcome

Acceptance offers are made in the fall semester of the second year, and students are required to accept or decline the offer within two weeks. Alternates are selected and notified at the same time. Students accepted to UPSI cannot apply to other pharmacy schools.

Undergraduate Requirements at Texas Tech. UPSI students are welcome to pursue a major of their choice. However, the following prerequisite courses must be completed by everyone in the program:

- General Chemistry (for majors), with lab 8 SCH*
- Organic Chemistry, with lab 8 SCH*
- General Physics (trig or calculus based), with lab 4 SCH*
- General Biology (for majors), with lab 8 SCH*
- Microbiology, with lab 4 SCH*
- Human-based sciences 3 SCH*
- Calculus 3 SCH*
- Statistics 3 SCH*
- Speech (public speaking) 3 SCH*
- Economics, macro (preferred) or micro 3 SCH*
- English Comp I 3 SCH†
- English Comp II 3 SCH†
- English Literature 3 SCH†
- Humanities/Social Sciences 15 SCH minimum†

Maintaining UPSI Qualifications. To maintain UPSI qualifications students must do the following:

- Take all coursework and prerequisites at Texas Tech University and complete all the Honors College requirements
- Maintain a 3.7 overall GPA and a 3.6 pre-pharmacy GPA.

Students wishing to earn credits from universities other than TTU must make an appeal to the Dean of the Honors College.

Matriculation will occur four years from acceptance into the UPSI program and is dependent on completion of an undergraduate degree and maintenance of program requirements.

UPSI students must be in good standing in the Honors College, meet all requirements of the Program Guidelines, and show evidence of continued health care related and non-related activities.

NOTE: Criminal background checks will be completed on all students matriculating to TTUHSC School of Pharmacy.

Honors College/School of Law Early Acceptance Program

Early Decision Plan. The Honors College and the Texas Tech University 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:

- An undergraduate GPA of at least 3.5.
- An LSAT score that places them in the top half nationwide.
- An SAT score of at least 1300 (verbal and math only) or an ACT of at least 29.
- Enrollment in the Honors College, 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.

* These courses will be used to calculate the pre-pharmacy grade point average (PPGPA)

† Students who have earned a bachelor's degree or higher from an accredited U.S. college or university prior to enrolling in the School of Pharmacy will be exempt from these courses.

Sample Curriculum for Bachelor of Arts in Honors Arts and Letters

The B.A. in Honors Arts and Letters (HAL) is designed to allow students to exercise creativity in crafting a flexible course of study rooted firmly in the humanities while permitting space for five to 10 unspecified track courses of the student's own choosing. Track classes must be writing intensive and have thesis-related, upper-level hours approved by the HAL advisor. The degree requires 120 credit hours, 30 of which must be upper level. Minors are not required for the HAL degree but are optional and should be chosen in consultation with the HAL advisor.

FIRST YEAR

Fall		Spring	
HIST 1300, Western Civilization*†	3	ANTH 2302 or GEOG 2351*	3
POLS 1301, American Gov., Org.‡	3	POLS 2302, American Public Policy †‡§	3
ENGL 1301, Essentials of Coll. Rhetoric‡	3	COMS 2300 or equivalent †‡	3
Foreign Language*	5	ENGL 1302, Advanced College Rhetoric‡	3
		Foreign Language*	5
TOTAL	14	TOTAL	17

SECOND YEAR

Fall		Spring	
HUM 2301, Western Intell. Tradition I*†	3	HUM 2302, Western Intell. Tradition II*†	3
HIST 2300, History of US to 1877 †‡§	3	HIST 2301, Hist. of US Since 1877 †‡§	3
HONS 2406, Hon. Integrated Sci. II †‡§	4	HONS 2405, Hon. Integrated Science I †‡	4
ENGL 2391, Intro. to Critical Writing*§	3	Track Course 1*	3
Foreign Language (2301)*	3	Foreign Language (2302)*	3
TOTAL	16	TOTAL	16

THIRD YEAR

Fall		Spring	
MATH 2300 or other math course‡	3	Study abroad semester. Courses taken	
ECO 2305 or equivalent‡	3	abroad may be foreign language, track,	
PHIL 2320, Introduction to Ethics*§	3	or core curriculum. Students who do not	
Track Course 2*	3	study abroad must complete the multi-	
Foreign Language (3000 level)*	3	cultural requirement through alternate	
		eligible university courses.	
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
PHIL 2310 or alternate MATH Course‡	3	Creative Arts‡	3
Track Course 3*	3	Track Course 5*	3
Track Course 4*	3	HONS 3305, European Fine Arts*	3
HONS 4302, Summit Experience Course	3	HONS 4300, Individual Honors Research*	3
HONS 3300, Individual Honors Research*	3	Submit HAL thesis	
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

Students who will graduate under a catalog previous to 2012-2013 must meet the Technology and Applied Science requirement of the core.

NOTE: Students should take ENGL 2391 during any of their first three semesters.

* Required for HAL major.

† Course offered regularly in an Honors section.

‡ Required for university core curriculum credit.

§ Course offered regularly as an Honors FYE.

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 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.

Bachelor of Arts in Honors Arts and Letters

The Bachelor of Arts in Honors Arts and Letters (HAL) degree 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 lives. Therefore, this degree emphasizes "portable skills" such as critical thinking and problem solving that equip students with career flexibility. HAL also provides knowledge and skills that qualify students for admission to graduate and professional programs such as law and medical schools. 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. Students pursuing a HAL major must be admitted to the Honors College. 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 one of the following 15-hour tracks: Pre-Law, Health and Humanities, Art and Aesthetics, American Studies, Western Civilization, and Open Track. Students in the Open Track may propose a program of study that fits their personal interests (subject to approval from the HAL advisory committee). For further information about HAL see www.depts.ttu.edu/honors.

HAL majors are strongly encouraged to include a study abroad experience as part of their education and 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 and Humanities track may opt to study abroad in the summer to avoid interrupting the sequence of required science courses.

Contact: Dr. James Brink, 213 McClellan Hall, jim.brink@ttu.edu, 806.742.1828

Course Descriptions

(To interpret course descriptions, see page 23.)

Environment and the Humanities (EVHM)

Undergraduate Courses

1301. The Natural History Tradition (3). An introduction to the field of nature writing. Field trip required. Special field trip fee.

Minors

Environment and the Humanities

To earn a minor in environment and the humanities, students must complete 18 hours of coursework chosen from the courses listed below:

Required Courses

- EVHM 1302 (Introductory Fieldcraft)
- EVHM 3300 (Research Methods: Writing the Natural World)
- EVHM 3350 (Advanced Fieldcraft)
- EVHM 4302 (Summit Experience)

Elective Courses

- Selected Honors "portal" seminars (as approved by EVHM faculty)
- EVHM 2302 (The Literature of Place)
- EVHM 3305 (Ecology)
- EVHM 3306 (Course Readings)
- EVHM 4300 (Senior Portfolio)

Contact: Professor Kurt Caswell, 201B McClellan Hall, 806.742.1828, kurt.caswell@ttu.edu

Humanities

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,

1302. **Introductory Fieldcraft: Nature as Text (3)**. 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)**. An introduction to the literature of place through a series of writing and reading workshops. Fulfills core Language, Philosophy, and Culture requirement.
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)**. An introduction to the ecology of individuals, populations, and ecosystems. Special field trip fee. (Writing Intensive)
3306. **Course Readings in Natural History (3)**. An exploration of contemporary writers whose focus is primarily the relationship of people with nature.
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.
4300. **EVHM Senior Portfolio (3)**. Prerequisite: Proposal Approval. Individual project work under the guidance of a faculty member. (Writing Intensive)
4302. **EVHM Summit Experience (3)**. Field experience in Green River, UT. Students will develop leadership skills as they explore canyons. Must be taken for Honors Summit credit. Fee required.

Honors Studies (HONS)

Undergraduate Courses

1101. **FYE Learning Community Group (1)**. Required learning community group provides orientation to Honors College and university for students in Honors College First Year Experience classes.
1102. **Honors Arts and Letters Seminar II (1)**. Required for all Honors Arts and Letters majors. Integrates content from English, history, and political science required core courses.
1301. **Honors First-Year Seminar in Humanities (3)**. Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing the development of critical thinking and oral and written communications skills through the framework of a humanities discipline. Topics vary. Fulfills core Language, Philosophy, and Culture requirement.
1302. **Honors First-Year Seminar in Sciences (3)**. Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing 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.
1303. **Honors First-Year Seminar in Social Sciences (3)**. Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing 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 requirement.
1304. **Honors First-Year Seminar in Fine Arts (3)**. Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing 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 Creative Arts requirement.
2301. **Honors Experience in Fine Arts I (3)**. 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. May be repeated as the topic varies with permission of the Honors dean.
2311. **Seminar in International Affairs (3)**. 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. May be repeated as the topic varies with permission of the Honors dean. Fulfills core Language, Philosophy, and Culture requirement.
2314. **Honors Seminar in International Cinema (3)**. Analysis of foreign and ethnic cinema as an expression of human values and creativity viewed through the lens of a distinctive culture or cultures. May be repeated as the topic varies with permission of the Honors dean. Fulfills core Creative Arts requirement.
2405. **Honors Integrated Science I (4)**. 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. Partially fulfills core Life and Physical Sciences requirement. Not open to science majors. Part of a two-semester integrated presentation.
2406. **Honors Integrated Science II (4)**. 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. Partially fulfills core Life and Physical Sciences requirement. Not open to science majors. Part of a two-semester integrated presentation.
3300. **Individual Honors Research (3)**. Prerequisite: Enrollment in the Honors College and approval from the Honors Dean. Contents will vary to meet the needs of students. 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)**. 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. May be repeated as the topic varies with permission of the Honors Dean. (Writing Intensive)
3302. **Honors Seminar in Sciences (3)**. Considers the developments and applications of modern science as they affect life today, directed toward cultivating sound individual judgments in the contexts of a technological, scientific, or medical environments. May be repeated as topic varies with permission of the Honors Dean.
3303. **Honors Seminar in Social Sciences (3)**. 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. May be repeated as the topic varies with permission of the Honors Dean.
3304. **Honors Seminar in Fine Arts (3)**. 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. May be repeated as the topic varies with permission of the Honors Dean.
3305. **European Fine Arts (3)**. Hands-on survey of European fine arts, including visual arts, architecture, music, theatre, and dance. May be repeated as the topic varies with permission of the Honors dean.
4300. **Individual Honors Research (3)**. Prerequisites: Enrollment in the Honors College, approval from the Honors Dean, and HONS 3300. 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)
4301. **Selected Topics in Honors (3)**. Special areas of interest not commonly included in other courses. Content normally different each time offered. May be repeated for credit up to two times.
4302. **Honors College Summit Experience Course (3)**. Provides the opportunity for development and enhancement of skills that are essential to a well-rounded education as honors students from various disciplines meet to complement and augment each other. Taken in the senior year.

Humanities (HUM)

Undergraduate Courses

2301. **[HUMA 1301]. The Western Intellectual Tradition I (3)**. An exploration of Western intellectual development in literature, philosophy, and the arts from the Greek and Roman Eras to the Renaissance. Fulfills core Language, Philosophy, and Culture requirement. (Writing Intensive)
2302. **[HUMA 1302]. The Western Intellectual Tradition II (3)**. The exploration of Western intellectual development in literature, philosophy, and the arts from the Renaissance to the present. Fulfills core Language, Philosophy, and Culture 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).

College of Human Sciences

“Improving and enhancing the human condition”

Linda C. Hoover, Ph.D., Dean

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Lubbock, TX 79409-1162
T 806.742.3031 | F 806.742.1849
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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 University 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 nine 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
- Human Sciences
- Interior Design
- Nutrition
- Nutritional Sciences and Dietetics
- Personal Financial Planning
- Restaurant, Hotel, and Institutional Management
- Retail Management

For additional information about undergraduate degree programs in the various departments, contact the office of Academic Advising Services, 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 scholarship coordinator 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 website 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, visit www.ttuhs.timetrade.com, call Academic Advising Services at 806.742.1180, or visit the advising office in Human Sciences 159. Office hours are from 8 a.m. 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.

Credit by Examination. A matriculated student may attempt credit by examination (see Undergraduate Admissions 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 3311 and 3313. 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.

Curriculum for B.S. in Human Sciences

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	Human Sciences Core Elective [†]	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics or Logic*	3
Mathematics*	3	Social and Behavioral Sciences*	3
Creative Arts*	3	ENGL 1302, Advanced College Rhetoric [†]	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy [‡]	3
Concentration	3		
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
Language, Philosophy, and Culture*	3	CFAS 2300, Community, Civility, & Ethics	3
Life and Physical Science*	4	Concentration	9
Concentration	6		
TOTAL	16	TOTAL	15
THIRD YEAR			
Fall		Spring	
Life and Physical Science*	4	Elective	3
Concentration	9	Concentration	12
TOTAL	13	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Elective	6	Elective	6
Concentration	9	Concentration	9
TOTAL	15	TOTAL	15
TOTAL HOURS: 120			
* Choose from core curriculum requirements.			
[†] Choose from ADRS 2310, HDF5 2322, PFP 3301, NS 1325.			
[‡] Prerequisites and restrictions apply.			

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. Introductory level human sciences courses will be helpful in clarifying career goals. See an academic advisor for additional information.

Undergraduate Programs Administered by Office of the Dean

FACULTY

Associate Professors: Alexander, Allison, Dodd

Assistant Professors: Godfrey

Bachelor of Science in Human Sciences

The Bachelor of Science in Human Sciences 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.

Students are required to select three areas of concentration, which are similar in content to a minor. Each concentration consists of a minimum of 18 semester hours for a total of 54 minimum hours. Two concentrations must be in the College of Human Sciences and may be selected from addictive disorders and recovery studies; apparel design and manufacturing; community, family, and addiction services; human development and family studies; interior design; nutritional sciences; personal financial planning; restaurant, hotel, and institutional management; retail management; studies in personal finance, youth development, and family and consumer sciences extension education.

Curriculum for Bachelor of Science in Family and Consumer Sciences with Teacher Certification

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric [†]	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics or Logical Reasoning*	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy [†]	3
FCSE 2102, Intro. to FCSE	1	NS 1410, Science of Nutrition	4
ADM 1302, Fund. of Clothing Tech.	3	EDCI 2301, The Education Effect	3
Mathematics*	3		
CFAS 2300, Community, Civility, & Ethics	3		
TOTAL	17	TOTAL	16
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
ID 1381, Intro. to Interior Design [†]	3	HDFS 3331, Parenting [†]	3
ANSC 3404 or BIOL 1305/1113 or ZOO 2403 or CHEM 1305/1105	4	HDFS 3301, Theories of Human Devel. [†]	3
NS 2330, Nutrition for Health, Fitness	3	ENGL 2305 or 2306 or 2307 or 2308 or 3	
ADM 2311, Textiles [†]	3	2351 or 2388 or 2391	3
		NS 3340, Nutrition in the Lifecycle	3
		PFP 3321, Financial Counsel. & Cons. Cr.	3
TOTAL	16	TOTAL	18
THIRD YEAR			
Fall		Spring	
FCSE 3301, Foundation of FCSE [†]	3	FCSE 4302, Professional. App. in FCS [†] §	3
HDFS 3310, Prenatal and Infant Devel. [†]	3	EDLL 4382, Read/Write 2nd Class [†] §	3
FDSC 3303, Food Sanitation	3	EDSE 4312, Sec. Classroom Mgmt. [†] §	3
RHIM 3360, Food: Culinary Approach	3	HDFS 3312, Develop. During Childhood [†]	3
FCSE 4325, US Family Issues	3	PFP 3301, Intro. to PFP	3
Creative Arts*	3		
TOTAL	18	TOTAL	15
FOURTH YEAR			
Fall		Spring	
FCSE 4308, Res. and Eval. in FCS [†] §	3	FCSE 4012, Student Teaching [†] §	12
FCSE 4306, Career Prep in FCSE [†] §	3		
RHIM 3370, Restaurant Ops. & Mgmt. [†]	3		
HUSC 3325, Adolescent Wellness [§]	3		
HDFS 3313, Supervised Exp. with Children [†]	3		
or HDFS 3311, Supervised. Exp. Infants [†]			
TOTAL	15	TOTAL	12
TOTAL HOURS: 127			
* Choose from core curriculum requirements.			
[†] Prerequisites apply.			
[‡] Admission to Teacher Certification (Education) Program and minimum 2.75 GPA required.			
§ Concurrent enrollment required.			
NOTE: ADM 1302 is taught as a fall offering in even years.			

The concentrations in youth development and family and consumer sciences extension education can also be completed as a minor. The 18-hour minor in youth development provides a foundation in human development targeting developmental issues unique to adolescence. Students will learn to work with youth audiences, particularly in promoting comprehensive wellness and leadership development. The 18-hour family and consumer sciences extension education minor consists of extension-based program development and evaluation, including an internship. For information on other concentration areas listed above, see individual program sections of the catalog.

Students are also required to complete the core curriculum required by both the university and the College of Human Sciences for a total of 120 semester hours. For additional information about the requirements and course offerings, see an academic advisor in the College of Human Sciences.

Bachelor of Science in Family and Consumer Sciences

The family and consumer sciences teacher certification program is designed to prepare students for teaching careers in middle and high school family and consumer sciences; adult- and community-based education; Extension Service; educational support services such as curriculum development and media, business, government, human services; and other fields. It includes coursework in all

Graduate Program

For information on graduate programs offered by the College of Human Sciences, visit the Graduate School section of the catalog on page 145.

family and consumer sciences content areas and required professional education courses.

The program 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.

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 2.75 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 2.75 or better overall GPA and also a 2.75 or better GPA in all professional education courses and in the teaching field. 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 the Family and Consumer Sciences Composite Certificate 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 nutrition or 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. For more information, see www.fcsalliance.org or contact an FCSE advisor. Permission is required to enroll in these courses.

All teacher certification programs at Texas Tech University are accredited by the Texas Education Agency and the Council for the Accreditation of Educator Preparation (CAEP).

Course Descriptions

(To interpret course descriptions, see page 23.)

Family and Consumer Sciences Education (FCSE)

Undergraduate Courses

2102. **Introduction to Family and Consumer Sciences (1).** 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.
3301. **Foundations of Family and Consumer Sciences Education (3).** Prerequisites: C or better in FCSE 2102, 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).** Designed for nonmajors. Focus on the teaching-learning process in professional settings outside the traditional classroom.
3350. **Special Topics in Family and Consumer Sciences (3).** 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: Instructor consent. May be repeated for credit.
4012. **Student Teaching in Family and Consumer Sciences (V1-12).** Prerequisites: C or better in FCSE 4306 and 4308. Supervised teaching in an approved secondary family and consumer sciences program. (Writing Intensive)
4302. **Professional Applications in Family and Consumer Sciences (3).** Prerequisite: C or better in FCSE 3301. Methods of teaching family and consumer sciences content and skills in secondary classrooms. Includes roles and responsibilities of FCS teachers through field experience and observation in schools, participation in FCCLA and 4-H activities, and other professional development opportunities. (Writing Intensive).
4304. **Instructional Management in Family and Consumer Sciences (3).** Prerequisites: C or better in FCSE 4306, 4308. Corequisite: FCSE 4012. Principles and procedures for managing the family and consumer sciences classroom. Designed to support the student teaching experience.
4306. **Career Preparation in Family and Consumer Sciences (3).** Prerequisite: C or better in FCSE 4302. Application of family and consumer sciences knowledge and skills in career preparation programs. Includes state and federal requirements regarding work-based learning and safety.
4307. **Internship in Family and Consumer Sciences (3).** Prerequisites: 2.5 TTU GPA; C or better in FCSE 3303 or 4302 or 4325. 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).** Prerequisite: C or better in FCSE 3303 or 4302. Introduction to methods of research and evaluation in family and consumer sciences. Includes practical applications.
4325. **U.S. Family Issues and Social Action (3).** C or better in Prerequisites: ENGL 1302, 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)

Graduate Courses

5118. **Seminar (1).** May be repeated for credit.
5301. **Administration in Family and Consumer Sciences Education Professions (3).** 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).** 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).** 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).** Methods of research in family and consumer sciences, including research design, proposal development, data collection and analysis, interpretation and reporting of results, and evaluation of published research.
5307. **Techniques of Supervision in Family and Consumer Sciences Education (3).** Methods and theories of supervision in family and consumer sciences educational settings.
5309. **Career Education Programs in Family and Consumer Sciences (3).** Teaching methods in family and consumer sciences career preparation programs. Includes state and federal requirements regarding work-based learning and safety.
5311. **Problems in Family and Consumer Sciences Education (3).** May be repeated for credit.
5341. **History and Philosophy of Family and Consumer Sciences Education (3).** 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, and other areas.
5342. **Contemporary Adult and Continuing Education in Family and Consumer Sciences Education (3).** 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).** Prerequisite: Instructor consent. 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).** 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.
5355. **Advanced Teaching Methods in Family and Consumer Sciences Education (3).** Application of theories of learning and human development to the selection of teaching strategies and instructional resources for FCS. Content includes long-range instructional planning, classroom management, laboratory management, student assessment, program evaluation, FCCLA, and models of teaching.
6000. **Master's Thesis (V1-6).**
6307. **Professional Issues in Family and Consumer Sciences Education (3).** 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).** 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).**

Human Sciences (HUSC)

Course descriptions for the various specializations within the College of Human Sciences can be found in the catalog information for each department. Those courses with an HUSC prefix that are common to many disciplines within the college can be reviewed below.

Undergraduate Courses

1100. **Introduction to Human Sciences (1).** 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).** 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.
3221. **Introduction to the Nursing Profession (2).** An introduction to the health care delivery system and the nursing profession.
3325. **Comprehensive Wellness for Adolescents (3).** Prerequisite: Sophomore or higher standing. Focuses on physiological and psychosocial development during adolescence through a comprehensive wellness perspective. Examine existing theories and explores practical ways to integrate wellness concepts into promoting healthy behaviors characterized by self-leadership and self-care.
3350. **Special Topics in Human Sciences (3).** Topics will rotate to meet needs of undergraduate students majoring in an interdisciplinary human sciences program. May be repeated for credit.
4000. **Individual Study in Human Sciences (V1-6).** Prerequisite: Consent of instructor. Topics will vary to meet curriculum needs of students in interdisciplinary/human science programs.
4308. **Developing and Evaluating Youth Programs (3).** Prerequisite: HDFS 3316 or equivalent. Expand knowledge and skills in developing and evaluating educational/enrichment experiences for youth audiences in extracurricular learning environments. Includes practical applications and a service-learning component.
4341. **Leadership Skills for Human Sciences Professionals (3).** Prerequisite: Senior standing or consent of instructor. Principles, theories, and development of competencies essential to the exercise of effective leadership in the human sciences professions.

Graduate Courses

5311. **Problems in Human Sciences (3).** May be repeated for credit.
5345. **History and Philosophy of Extension Education (3).** Historical and philosophical foundations of Extension education with emphasis given to origins and development of family and consumer sciences programs. Online delivery.
6000. **Master's Thesis (V1-12).**

Department of Community, Family, and Addiction Services

Sterling T. Shumway, Ph.D., Chairperson

Professors: Harris, Ivey, Whiting

Associate Professors: Jordan, Kimball, Prouty, Shumway, Smith

Assistant Professors: Bradshaw, Cravens, D'Sauza, Morelock, Soloski

Associate Professor of Practice: Springer

Instructor: Comiskey

CONTACT INFORMATION: 271 Human Sciences Bldg., 1301 Akron Ave. Box 41250, Lubbock, TX 79409-1250, T 806.742.3060, F 806.742.0053, www.hs.ttu.edu/cfas

About the Program

The department supervises the following degree programs and certificates:

- Bachelor of Science in Community, Family, and Addiction Services
- Master of Science in Marriage and Family Therapy
- Doctor of Philosophy in Marriage and Family Therapy
- Graduate Certificate in Addictions and the Family

Vision. The vision of the Department of Community, Family, and Addiction Services (CFAS) is to enrich the lives of individuals, families, and communities. To achieve this vision, the department offers programs of study in human services, addictive disorders and recovery studies, and marriage and family therapy.

The Institute for the Study of Addiction, Recovery, and Families is housed in the department. The institute oversees the Center for Family Systems Research and Intervention, the Center for Collegiate Recovery Communities, and the Center for Addiction Recovery Research.

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 enhance the experience of students and improve the quality of life for others.

Undergraduate Program

Bachelor of Science in 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

Curriculum for Bachelor of Science in Community, Family, and Addiction Services

FIRST YEAR

Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302 Advanced College Rhetoric†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	PSY 1300, General Psychology	3
Mathematics*	3	Creative Arts*	3
Language, Philosophy, and Culture*	3	ADRS 2310, Understanding Addict. Beh.	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
CFAS 2301, Introduction to CFAS	3		
TOTAL	16	TOTAL	15

SECOND YEAR

Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
NS 1410 Science of Nutrition	4	ADRS 2327, Substance Abuse Prevention	3
CFAS 2300, Commun., Civility, & Ethics	3	HDFS 2322, Partnering: Int. Relation.	3
CFAS 2360, Multicultural Competence	3	PFP 3301, Personal & Family Finance	3
Free Elective	3	Life & Physical Sciences*	4
TOTAL	16	TOTAL	16

THIRD YEAR

Fall		Spring	
MATH 2300 or PSY 2400, Statistics†	3	Family Issues Elective‡	3
ENGL 2311, Technical Writing†	3	HDFS 3320, Contemporary Family†	3
PSY 4305, Abnormal Psychology†	3	CFAS 4330, Administration in CFAS†	3
ADRS 3325, Fam. Dyn. of Addiction†	3	ADRS 4325, Treat. of Addictive Disorders†	3
HDFS 3390, Research Meth. in HDFS†	3		
TOTAL	15	TOTAL	12

SUMMER

CFAS 4314, Practicum in CFAS†

FOURTH YEAR

Fall		Spring	
CFAS 4380, Development & Evaluation†	3	FCSE 4325, U.S. Fam. Issues & Soc. Act.†	3
FCSE 3303, Educational Proc. in FCSE	3	CFAS 4300, Coaching Leaders†	3
CFAS 4331, Intro to Marriage & Fam. Ther.†	3	CFAS 4390, Senior Seminar†	3
Treatment Elective§	3	Free Elective	3
TOTAL	12	TOTAL	12

TOTAL HOURS: 120

* Choose from core curriculum requirements.

† Prerequisites apply.

‡ Choose from HDFS 3321, 3326, or 3331 (prerequisites apply).

§ Choose from ADRS 3329 or 4329 (prerequisites apply).

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 practicum in which students work with an existing human service organization during the summer between the junior and senior years.

Addictive Disorders and Recovery Studies

Established in 1986, The Center for Collegiate Recovery Communities (CRC) at Texas Tech (formerly known as the Center for the Study of Addiction and Recovery) assists individuals recovering from drug and alcohol addiction and eating disorders with their pursuit of a college education. The CRC has created a community support and relapse prevention program, which provides an environment in which recovering students can focus on staying sober without delay-

Graduate Program

For information on graduate programs offered by the Department of Community, Family, and Addiction Services, visit the Graduate School section of the catalog on page 146.

ing their educational goals. The CRC was selected to receive support from the federal government to develop a model to replicate collegiate community support and relapse-prevention programs at other universities.

The CFAS department 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 ADRS. The Department of Community, Family, and Addiction Services, 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 at least **two** classes in any order from the following:
 - ADRS 2327 (Prevention of Substance Abuse)
 - ADRS 3329 (Addiction, Recovery, and Relationships)
 - PSY 4325 (Drugs, Alcohol, and Behavior)
4. Choose **one** class from the following:
 - PFP 3321 (Financial Counseling and Consumer Credit)
 - SOC 3383 (Alcohol, Drugs, and Society)
 - 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.

Course Descriptions

(To interpret course descriptions, see page 23.)

Addictive Disorders and Recovery Studies (ADRS)

Undergraduate Courses

2125. **Collegiate Community Seminar (1).** 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).** Designed to provide students with an introduction to addiction, including the nature of addiction, its history, biology, inter/intra personal, and social aspects. Fulfills core Social and Behavioral Sciences requirement.
2327. **Substance Abuse Prevention (3).** Introduction to different perspectives on current research and methodologies in the field of substance abuse.
3325. **Family Dynamics of Addiction and Recovery (3).** Prerequisite or corequisite: C or better in ADRS 2310. An examination of the family system with specific reference to the causes and effects of chemical abuse, addiction, and the process of recovery.
3329. **Addiction, Recovery, and Relationships (3).** Prerequisite or corequisite: C or better in ADRS 2310. 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: C or better in ADRS 2310 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)**. Prerequisites: C or better in ADRS 2310 and written consent of a supervising faculty member. Supervised faculty-initiated research experience in selected areas. May be repeated twice for credit.
4325. **Treatment of Addictive Disorders (3)**. Prerequisites: C or better in ADRS 2310 and ADRS 3325. Survey of the current treatment philosophies and programs designed to assist individuals and families affected by addictive disorders.
4329. **Eating Disorders (3)**. Prerequisite: C or better in ADRS 2310. Nature of eating disorders and approaches to prevention and intervention.

Graduate Courses

5310. **Issues of Addiction and Recovery (3)**. 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)**. 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)**. 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.
6320. **Adolescent Substance Use: Assessment, Treatment, and Recovery (3)**. Through a didactic and interactional approach, students will examine a variety of topics related to the cause, assessment, treatment, and recovery of adolescent substance abuse.
6329. **Eating Disorders: An Overview of Advanced Topics (3)**. Provides an overview of advanced topics related to eating disorders. Topics range from their definitions in the current literature to a continuum of treatment options and recovery.
6330. **Process Addictions (3)**. Examines theories and research related to process/behavioral addictions. Etiology, research implications, assessment, diagnosis, and treatment of process addictions will be reviewed from a systemic perspective.
7000. **Independent Research in Addictive Disorders and Recovery Studies (V1-12)**. Independent research in ADRS.
7395. **Internship in Addictive Disorders and Recovery Studies (3)**. Prerequisite: Consent of graduate advisor. Supervised experience in appropriate setting.
8000. **Doctoral Dissertation in Addictive Disorders and Recovery Studies (V1-12)**. Doctoral research in ADRS.

Community, Family, and Addiction Services (CFAS)

Undergraduate Courses

2300. **Communication, Civility, and Ethics (3)**. 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)**. 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)**. Focuses 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 (V1-6)**. Prerequisites: 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)**. Prerequisite: CFAS 2301, 2.5 GPA, junior or senior standing. Theories of leadership training and personal and professional development are presented with the goal of developing and cultivating effective leadership relationships within teams and other organizational groups.
4314. **Practicum in CFAS (3)**. Prerequisites: CFAS 2301 with a grade of C or higher, 2.5 GPA, and consent of instructor. This practicum provides students with experience in administra-

- tive 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)**. 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)**. Prerequisite: 2.5 GPA. An overview of the history, conceptual foundations, clinical methods, research literature, scope, and future trends of marriage and family therapy.
4380. **Development and Evaluation of CFAS Programs (3)**. 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)**. Prerequisites: C or better in ENGL 2311, CFAS 2301, 4380; 2.5 GPA. Capstone experience in grant writing and board/community/staff management. Includes final preparation of grant proposal for a community agency. (Writing Intensive)

Marriage and Family Therapy (MFT)

Graduate Courses

5300. **Introduction to Marriage and Family Therapy Practice (3)**. Prerequisites: MFT majors only; consent of instructor. Analyses of and solutions for common problems in marriage and family therapy practice.
5302. **Family Therapy II (3)**. 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)**. Prerequisites: MFT majors only; consent of instructor. Provides an in-depth examination of a systemic approach to clinical evaluations. Students receive training in administration and application of systemic assessment methods.
5305. **Use of the DSM, Psychopathology, and Assessment in Marriage and Family Therapy (3)**. Students will be trained to use the Diagnostic and Statistical Manual of Mental Disorders (DSM) in family therapy assessment and practice.
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)**. Prerequisites: 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)**. 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)**. Prerequisites: 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)**. Prerequisite: MFT majors only
6303. **Family Therapy III (3)**. Prerequisites: MFT majors only, instructor consent. Focuses on the theory and practice of couple therapy and sex therapy. Includes approaches to enhance couple relationships through therapeutic intervention.
6311. **Contemporary Directions in Marriage and Family Therapy (3)**. Prerequisites: MFT majors only, instructor consent. An examination of postmodern thought on marriage and family therapy with emphasis on the collaborative and narrative approaches.
6322. **Family Systems II (3)**. Prerequisites: MFT majors only, instructor consent. 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)**. Prerequisites: MFT majors only, instructor consent.

- 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).** Prerequisites: MFT majors only, instructor consent. 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).** Prerequisites: MFT majors only, instructor consent. 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 multi-culturally competent therapists.
- 6395. Practicum in Marriage and Family Therapy (3).** Prerequisites: MFT majors only, instructor consent. 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).** Prerequisites: MFT majors only, instructor consent. Theory, research, and supervised practicum in supervision of family therapy.
- 6397. Supervision Practicum in Marriage and Family Therapy (3).** Prerequisites: MFT majors only; C or better in MFT 6396, instructor consent. Course provides structured experience in supervision of marriage and family therapy students.
- 7000. Research (VI-12).** Prerequisites: MFT majors only, instructor consent.
- 7395. Internship in Marriage and Family Therapy (3).** Prerequisites: 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 (VI-12).** Prerequisites: MFT majors only, instructor consent

Department of Design

Sharran F. Parkinson, Ph.D., Chairperson

Professors: Parkinson, Pati

Associate Professors: Collier, Khan, Shin

Assistant Professors: Gaines, Pinson, Robinson, Schambureck

Instructors: Anderson, Haynie

CONTACT INFORMATION: 211 Human Sciences Bldg. 1301 Akron Ave. Box 41220, Lubbock, TX 79409-1220, T 806.742.3050 F 806.742.1639, www.depts.ttu.edu/hs/dod

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

The Bachelor of Interior Design and Bachelor of Science in Apparel and Design Manufacturing degree programs are accredited by the National Association of Schools of Art and Design. The Bachelor of Interior Design degree program is also accredited by the Council for Interior Design Accreditation.

Mission. The Department of Design provides the highest standards of excellence in higher education in the fields of environmental design, apparel design and manufacturing, and interior design while contributing to new knowledge in these areas through meaningful research and community outreach.

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.

Laptop Computer Requirement. All incoming freshmen and transfer students are required to have a laptop computer.

Sophomore Portfolio Review. At the end of the third semester, sophomores submit a portfolio with representative work from specific studio courses (ADM 1303, 1304, 2308, and 2310). A consensus of opinion by the faculty is required for determining recommendations for the student. Prior to being admitted to ADM 3308 or 3303, students who received "conditional" evaluations must have met the recommended conditions identified by the reviewers.

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, 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.

Sophomore Portfolio Review. At the end of the third semester, sophomores submit a portfolio with representative work from specific studio courses (ARCH 1341, 2342, ID 1382, 2380, 2383). A consensus of opinion by the faculty is required for determining recommendations for the student. Prior to being admitted to ID 3385, 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.

Graduate Program

For information on graduate programs offered by the Department of Design, visit the Graduate School section of the catalog on page 146.

Senior Portfolio Review. During the senior year 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.

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.

Admission Requirements. For admission to the interior design program, freshmen must meet assured admission requirements and transfer students must have at least a 2.7 GPA.

Undergraduate Minors

Students from other departments may minor in interior design by completing 18 hours of selected coursework or in apparel design and manufacturing by completing 27 hours of selected coursework. Courses for the minor should be finalized and approved in conjunction with the student's major and minor advisors.

Students in the Department of Design may pursue a minor in art history, studio art, fine arts photography, general business or architecture. Depending on their choice of minor, students are required to consult with an advisor from the respective program to complete a Minor Approval Form.

Course Descriptions

(To interpret course descriptions, see page 23.)

Apparel Design and Manufacturing (ADM)

Undergraduate Courses

- 1301. Introduction to Apparel Design (3).** Corequisite: ADM 1303. Overview of apparel design room practices. Emphasis on the business, art, and craft of apparel design. F (Writing Intensive)
- 1302. Fundamentals of Clothing Techniques and Processes (3).** Emphasis on the development of techniques and processes that meet rigorous business and industry standards. Fundamentals of equipment, quality, and career applications for non-majors. F
- 1303. [HECO 1328] Clothing Construction (3).** Corequisite: ADM 1301. Application of basic apparel assembly methods, including the fundamentals of fit and use of sewing machines and sergers. F
- 1304. [HECO 1329] Intermediate Clothing Construction (3).** Prerequisites: ADM 1301 and 1303 with a grade of C or better. Corequisite: ADM 2308. Intermediate apparel assembly, alteration of patterns, and selection of appropriate fabrics. S
- 2302. Fashion Illustration (3).** Prerequisites: ART 1302 and 1303 with a grade of C or better. 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).** Prerequisites: ADM 1301 and 1303 with a grade of C or better. Corequisite: ADM 1304. Application of basic flat pattern techniques to bodices, skirts, sleeves, neckline, and bodice-sleeve combinations. S
- 2310. Design Through Draping (3).** Prerequisites: ADM 1303, 1304, 2308 with a grade of C or better. 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. F
- 2311. [HECO 1320] Textiles (3).** Prerequisites: ADM 1301 and 1303 with a grade of C or better. Selection, use, and care of textiles in relation to fiber characteristics, yarn, and fabric structure. F
- 3303. Tailoring (3).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, and 2311 with a grade of C or better. Advanced patternmaking, fit, construction, assembly, and finishing techniques for lined, tailored apparel. Emphasizes jackets and coats. F
- 3305. Computer Applications in Apparel Design (3).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, and 2311 with a grade of C or better. 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).** Prerequisites: ADM 1301, 1303, 1304, 2302 (may be taken concurrently), 2308, 2310, and 2311 with a grade of C or better. Application of advanced flat patterning techniques in apparel design. S
- 3310. Knitwear Product Development (3).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, and 2311 with a grade of C or better. 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).** Prerequisites: Junior or senior standing, ADM majors only. Apparel throughout the ages as reflected in cultures of the past and as an influence on contemporary design. F (Writing Intensive)
- 3314. Digital Design Fashion (3).** Prerequisite: C or higher in ADM 1301, 1302, 2302; ART 1303, 2304, 3323. Illustration techniques using industry-relevant software to render fashion figures and garment details. Includes research, forecasting, and development of digital trend boards and apparel lines. S
- 3325. Study Tour in Apparel Design (3).** Study of the development, practice, and effect a specific locale has had on the fashion design industry. Study and presentation in a seminar format and a trip to that area during spring break. Advisor permission. Trip fee non-refundable 48 hours after enrollment. S
- 4000. Individual Study (VI-6).** Prerequisite: Consent of instructor. 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).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, 2311, 3305, and 3308 with a grade of C or better. 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).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, 2311 and ART 1302, 1303, 2304 with a grade of C or better. Exploration of textile dyeing, printing, and painting with emphasis on composition using varied media and materials. F
- 4310. Apparel Product Development (3).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, 2311, and either 3303 or 3308 with a grade of C or better; junior standing. Research, planning, and development of an apparel collection for a target market, meeting relative workmanship, cost, and quality standards. May be repeated for up to 6 hours credit. S, F
- 4350. Apparel Portfolio Development (3).** Prerequisites: ADM 1301, 1303, 1304, 2302, 2308, 2310, 2311, and 3305 with a grade of C or better; junior standing. Preparation of portfolio for internship and senior portfolio review. Emphasizes use of computers for layout and professionalism. S
- 4390. Internship in Apparel Design and Manufacturing (3).** Prerequisites: ADM 3305, 4389, 4350, 4307, 4309, and 4310 with a grade of C or better. Applied problems in apparel design emphasizing student participation in business and industry. SSI, SSII
- 4391. Internship in Apparel Design and Manufacturing (3).** Prerequisites: ADM 4390 with a grade of C or better. Applied problems in apparel design emphasizing student participation in business and industry. SSI, SSII
- 4489. Professional Practices for Apparel Design and Manufacturing (4).** Prerequisites: C or higher in ADM 2302, 2310, 2311, 3305, 3308, and 3312; senior standing. Planning and production of senior fashion show, development and construction of apparel clothing line, and fashion career job search. S

Curriculum for Bachelor of Interior Design

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics or Logic*	3
Mathematics*	3	ARCH 2342, Creative Process†	3
ARCH 1341, Arch. Freehand Drawing	3	POLS 1301, American Gov., Org.	3
ID 1381, Intro. to Interior Design	3	ID 1385, Interior Design Studio I†	3
ID 1101, Intro. to Interior Drafting	1		
TOTAL	14	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
HDFS 3350, Dev. in Cross-Cultural Persp.	4	Life & Physical Sciences*	4
Life & Physical Sciences*	3	POLS 2302, American Public Policy	3
ARCH 2311, History of World Arch.	3	ID 2385, Interior Design Studio III†	3
ARCH 2351, Arch. Construction I†	3	ID 3387, Computer Aided Drafting I†	3
ID 2381, Interior Design Studio II†‡	3	ID 3383, Period Furnishings	3
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ARTH 1301, Art History Survey I	3	HIST 2300, History of U.S. to 1877	3
or ARTH 2302, Art History Survey II		ARTH or ARCH Elective	3
ARCH 3350, Arch. Construction II†	3	ID 3385, Advanced Studio II†	3
ID 3380, Advanced Studio I#	3	ID 3311, Interior Materials†	3
ID 3381, Lighting Systems†	3	ID 3386, Studio Procedures†	3
ID 4383, Building Info. Modeling†	3		
TOTAL	15	TOTAL	15

SUMMER

ID 4307, (SSI) Internship†	3
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FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
BA 3301, Fundamentals of Mkt.†	3	HIST 2301, History of U.S. Since 1877	3
or RHIM 4316, Hospitality Mgmt. Mkt.		CFAS 2300, Commun., Civility & Ethics	3
Human Sciences Core§	3	Guided Elective	3
ID 4381, Interior Design Research†	3	ID 4388, Advanced Studio III†	3
ID 4606, Collaboration Studio†	6		
TOTAL	15	TOTAL	12

TOTAL HOURS: 121

* Choose from the university's core curriculum requirements.

† Prerequisites apply.

‡ Portfolio presented for review

§ HS core; choose 1 course from ADRS 2310, NS 1325, HDFS 2322, PFP 1305.

Student must pass sophomore review before registering for this class.

Curriculum for Bachelor of Science in Apparel Design and Manufacturing

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College 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, Flat Pattern Design†#	3
ADM 1301, Intro. to Apparel Design#	3	ADM 1304, Inter. Clothing Construct.†#	3
ADM 1303, Clothing Construction#	3		
TOTAL	16	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
CFAS 2300, Commun., Civility & Ethics	3	Life & Physical Sciences*	4
HIST 2300, History of U.S. to 1877	3	ADM 3308, Advanced Flat Pattern Design†	3
ART 3323, Drawing III Life Drawing†	3	ADM 2302, Fashion Illustration†	3
ADM 2311, Textiles†	3	ARTH 1301, Art History	3
ADM 2310, Design Through Draping†	3	Mathematics or Logic*	3
TOTAL	15	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy†	3
ADM 3312, Hist. and Philosophy of Dress†	3	ADM 3314 Digital Design for Fashion†	3
ADM 3305, Computer Apps. in App. Des.†	3	ARTH 3303, Art History Survey III†	3
ARTH 2302, Art History II	3	ADM 4310, Apparel Product Develop.†‡	3
ADM 4309 Surface Design†	3	Social & Behavioral Sciences*	3
or ADM 3310 Knitwear Prod. Devlpmt.†			
TOTAL	15	TOTAL	15

SUMMER

ADM 4390, Internship†	3
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FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Human Sciences Elective*	3	Language, Philosophy, and Culture*	3
Life & Physical Sciences*	4	Guided Elective§	3
HIST 2301 History of U.S. from 1877†	3	ADM 4307, Apparel Manufacturing†**	3
ADM 4350 Apparel Portfolio Develop.†	3	ADM 4489, Prof. Pract. Fash. Design†	4
TOTAL	13	TOTAL	13

TOTAL HOURS: 121

* Choose from core curriculum requirements.

† Prerequisites apply.

‡ Required for competition participation

§ Guided Electives: ADM 3303, 3308, 3310, 3325, 4000, 4310, or 4309

Concurrent enrollment required

** Portfolio presented to faculty

Interior Design (ID)

Undergraduate Courses

- 1101. Introduction to Interior Drafting (1).** Prerequisites: Interior design majors only. Introduces the principles of hand drafting for interior design and the planning of interior design projects. F.
- 1381. Introduction to Interior Design (3).** Prerequisite: Design majors must enroll concurrently in ID 1101. A survey of basic principles and concepts, including aesthetics and processes relevant to the built environment using a holistic approach. Includes, but is not limited to, design elements and principles. F.
- 1385. Interior Design Studio I (3).** Prerequisites: C or better in ID 1381. Introduces two-dimensional design principles and color theory using both hand and digital production techniques for projects in interior design. S.
- 2381. Interior Design Studio II (3).** Prerequisites: C or better in ID 1385, interior design majors and minors only. Study and construction of three dimensional design principles (manual and digital). Course includes portfolio review. An unconditional review restricts registration for upper-level studios. F.
- 2385. Interior Design Studio III (3).** Prerequisites: C or better in ID 2381 and an unconditional portfolio review. Interior design

majors and minors only. Concentrates on the design and renovation of residential interiors through both hand and digital techniques. Explores historical and contemporary styles in residential design. S.

- 3311. Residential Materials (3).** Prerequisites: C or better in ID 2380. Selection of materials used in residential environments based on characteristics, composition, installation methods, and maintenance requirements. F (Writing Intensive)
- 3312. Commercial Materials (3).** Prerequisite: C or better in ID 3311. Selection of materials used in commercial, hospitality, healthcare, or corporate environments based on characteristics, composition, installation methods, maintenance requirements, and codes. S.
- 3325. Study Tour in Interior Design (3).** Interior design majors and minors 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. Advisor permission. Trip fee non-refundable 48 hours after enrollment. S.
- 3380. Advanced Studio I (3).** Prerequisites: C or better in ID 2385. Interior design majors only. Introduction to the design of small commercial design project using both hand and digital techniques. Explores commercial code and sustainable issues effecting current construction and design of commercial interiors. F.
- 3381. Lighting Systems (3).** Prerequisites: C or better in ID 2383, ID majors and minors only. Survey of the human factors relat-

ing to the luminous environment that support health, safety, comfort, human performance, and aesthetics. F

- 3382. Period Furnishings (3).** Prerequisite: C or higher in ID 2383. Introduction to furniture and interior elements from Renaissance through modern periods. The evolution of forms, relationships to previous periods, and implications for current and future designs are emphasized. F
- 3385. Advanced Studio II (3).** Prerequisites: C or better in ID 3387 and 4383, interior design majors only. Emphasis on problem formulation, programming, design conceptualization, design development, specifications, schedules, furniture selection, layout and design presentation, ADA, life safety, and building codes. S. (Writing Intensive)
- 3386. Studio Procedures and Professional Practices for Interior Designers (3).** Prerequisites: Junior standing, interior design majors only, enrollment in spring immediately preceding ID 4307. Corequisite: ID 3385. Preparation of business documents. Study of the ethics and business of professional practice for interior design. Preparation for interior design internship, career opportunities, job search, and interview strategies. S.
- 3387. Computer Aided Drafting for Interior Designers I (3).** Prerequisites: C or better in ID 2380, interior design majors or minors only. Introduction to computer-aided design and two-dimensional 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, SS.
- 4104. Senior Portfolio Seminar (1).** Prerequisite: Senior ID majors only. Analysis of professional issues with emphasis on portfolio development and review. S.
- 4307. Internship in Interior Design (3).** Prerequisites: C or better in ID 3385 and 3386, ID majors only. Supervised intern experiences in established career-related positions. May be repeated as ID 4000 Individual Study. SSI.
- 4350. Sustainable Buildings and Communities (3).** Prerequisite: Junior or senior standing in interior design or consent of instructor. A review of concepts, strategies, and rating systems adopted by the Leadership in Energy and Environmental Design (LEED) program of the U.S. Green Building Council (USGBC).
- 4381. Design Research (3).** Prerequisites: C or better in ID 3385 and 4383. Directed research focusing on the development of the Bachelor of Interior Design capstone studio project in ID 4388. F

- 4383. Building Information Modeling (BIM) for Interior Design (3).** Prerequisite: C or higher in ID 3387. Examines BIM technology and its benefits and usage as a communication and collaboration tool. Discusses 3-D modeling and rendering as well as preparation of construction documents. F
- 4388. Advanced Studio III (3).** Prerequisites: C or better in ID 4606 and 4381. Department-approved senior interior design project. Advanced design of an interior environment of complex scope and scale to meet the needs of specific clients and prepare students for the practice of the profession. Addresses current issues of design and integrates all aspects of the curriculum. S.
- 4606. Collaboration Studio (6).** Prerequisites: C or better in ID 3385 and 4383, 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

- 5101. Seminar in Environmental Design (1).** May be repeated for up to 3 hours credit.
- 5301. Graduate Research Seminar (3).** Introduction to philosophies, technologies, and processes involved in research and graduate study.
- 5307. Internship (3).** Supervised internship experiences in established career-related positions. May be repeated for credit up to 6 hours.
- 5310. Readings (3).** 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).** May be repeated for credit.
- 5320. Writing for Scholarly Publication (3).** Teaches students to write effective scholarly publications in environmental design. Publication sources, submission requirements, and review processes will be discussed.
- 5378. Research Methods I (3).** Positivistic, interpretive, and critical modes of research inquiry.
- 5380. Human Factors: Ergonomics in Environmental Design (3).** Study of human factors and the anthropometric aspects of ergonomics as applied to environmental design.
- 5381. Environmental Design Analysis (3).** Implications from the social sciences as applied to analyzing causes and arriving at possible solutions to problems related to interiors in contemporary society.
- 5382. Environmental Design Systems (3).** Study of systems used in the design and research of residential and nonresidential interiors.
- 5383. Sustainable Communities and Design (3).** Examination of sustainability concepts related to design of communities, buildings, and interiors.
- 5384. Advanced Lighting Systems (3).** Advanced study and application of lighting systems.
- 5386. Acute Care Design Research (3).** Examination of important functions of and people working in major departments of typical community acute care hospitals in the United States.
- 5388. Design of Interior Environments for Physically and Mentally Challenged Populations (3).** 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.
- 6310. Research Design (3).** Examination of topics associated with research quality in designing quantitative and qualitative studies.
- 6370. Environmental Design Technology and Development (3).** 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).** Application of statistical packages to analyze data and interpret results.
- 6389. Environmental Design Studio (3).** Development of and/or response to specific environmental design programs. Study of design processes, including visual presentations that exemplify design solutions. Students will exhibit design projects.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**



Department of Hospitality and Retail Management

Shane C. Blum, Ph.D., Chairperson

Professors: Dodd, Fowler, Hoover, Huffman, Scott-Halsell

Associate Professors: Adams, Blum, McCool, Phelan, Velikova, Yuan

Assistant Professors: Chang, Jai, Li, Mathe-Soulek

Instructors: Boyce, Edwards, A. Sanchez, N. Sanchez

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About the Program

This department supervises the following degree programs:

- Bachelor of Science in Restaurant, Hotel, and Institutional Management
- Bachelor of Science in Retail Management
- Master of Science in Hospitality and Retail Management
- Doctor of Philosophy in Hospitality Administration

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 hospitality management and retail management.

Undergraduate Program

Bachelor of Science in Restaurant, Hotel, and Institutional Management

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.

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 1,200 hours of work experience allows students to become familiar with the hospitality industry. A 400-hour hospitality industry internship that does count toward the 1,200-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.

Tracks. The restaurant, hotel, and institutional management program offers tracks in (1) hospitality management, (2) food and beverage management, (3) lodging management, and (4) wine business to better meet the needs of students and the hospitality industry by focusing on specific competencies necessary to be successful hospitality practitioners. Students will choose a specific track for

industry focus and be able to fulfill their elective credits from any of the RHIM tracks. All tracks will take a hospitality core of courses. The hospitality management track will include additional selected course work from all areas of hospitality whereas the food and beverage management and lodging management tracks will delve further into coursework with their specific industry foci. The wine business track will include selected courses from the Department of Plant and Soil Sciences.

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, including a 400-hour hospitality internship and 400 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 2.75 GPA or better and a satisfactory level of performance on the THEA test or equivalent. Other requirements include a 2.75 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.

Minor in Restaurant, Hotel, and Institutional Management.

A student may minor in restaurant, hotel, and institutional management by completing a minimum of 18 semester hours of specific coursework. Specific courses for the minor should be finalized and approved in conjunction with the student's major and minor advisors.

Bachelor of Science in Retail Management

The mission of the retail management program is to prepare students to 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. Retail management courses emphasize integration of theory, e-commerce, category management, leadership, industry application, and career planning strategy (includes study in technology, communication, marketing, management, accounting and economics). An internship program, 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 retail management 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 3390, Internship in Retailing.

Tracks in Retail Management. The retail management program offers tracks in (1) store management and (2) corporate/research to better meet the needs of students and the retail community by focusing on the specific skills needed at the store level, operations or corporate level. Students may choose a single track or complete both tracks. Students may choose six hours from the following courses for the store management track: RTL 3345, 3375 or 3380; RTL 4340, RHIM 3308, 3320, and 4313. The requirements for the corporate/research track are a 2.8 GPA and RTL 3380, 4320, and 4330.

Minor in Retail Management. A student may minor in retail management by completing a minimum 18 semester hours of selected coursework. Specific courses for the minor should be finalized and approved in conjunction with the student's major and minor advisors.

Graduate Program

For information on graduate programs offered by the Department of Hospitality and Retail Management, visit the Graduate School section of the catalog on page 147.

Curriculum for B.S. in Retail Management

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric †	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics Elective*	3
Mathematics Elective *	3	ECO 2302 or 2305, Principles of Eco.	3
POLS 1301, American Gov., Org.	3	RTL 2340, Contemporary Iss. in Retail.	3
RTL 1320, Fashion and Culture	3	RTL 1340, Introduction 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, Hospitality Control I	3	POLS 2302, American Public Policy Elective	3
ENGL 2311, Intro. to Technical Writing †	3	BA 3303, Foundations of Finance †	3
RTL 2350, Retail Promotion	3	or RHIM 3322, Hospitality Control II †	3
Human Sciences Core ‡	3	COMS 2358, Business & Prof. Comm. or CFAS 2300, Comm., Civility, Ethics	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
Elective	3	RTL 3389, Profes. Pract. in Retailing †	3
Creative Arts* §	3	RTL 3380, Retail Buying & Control †	3
RTL 3340, International Retailing †	3	or RHIM 4313, Legal Aspects of Hospitality or RTL 3375, Retail Buying	3
BA 3305, Organizations Mgmt. or RHIM 4341, Hospitality Mgmt. †	3	RHIM 3358, Human Resource Mgmt. †	3
Life & Physical Sciences*	4	Life & Physical Sciences*	4
TOTAL	16	TOTAL	16
INTERNSHIP			
RTL 3390, Internship in Retailing †	3		
TOTAL	3		
FOURTH YEAR			
Fall		Spring	
RTL 4320, Retail Category Mgmt. †	3	Upper-Level Electives	6
or RHIM 3308, Hotel Group Sales & Serv. or RTL 4340, Entrepreneurship: Retail	3	RHIM 4316, Hosp. Sales & Marketing †	3
RTL 4330, Retailing Research †	3	or BA 3301, Mktg. Concepts & Strat.	3
or RHIM 3320, Facilities Management	3	RTL 4335, Practices in Web Retail Language, Philosophy, and Culture*	3
Electives	6	TOTAL	15
TOTAL	12	TOTAL	15
TOTAL HOURS: 120			
* Choose from core curriculum requirements.			
† Prerequisites apply.			
‡ Choose from ADRS 2310, HDFS 2322, PFP 1305 or 3301.			
§ Choose a course that also fulfills the multicultural requirement.			

Course Descriptions

(To interpret course descriptions, see page 23.)

Restaurant, Hotel, and Institutional Management (RHIM)

Undergraduate Courses

- 2210. Introduction to Hospitality Management (2).** Analyzes the nature of work, people, and the interrelationships within the hospitality industry. Explores various career options. F, S.
- 2308. Hotel Operations (3).** Prerequisite: C or better in RHIM 2210 (concurrent enrollment allowed). Principles and practices of managerial functions relating to the operation of lodging facilities. F, S.
- 2312. Introduction to Beverage Management (3).** Principles and practices regarding the production, selection, storage, and serving of beverages. Emphasis on responsible beverage use in business and social settings. F, S.
- 2340. Latin American Culture and Cuisine (3).** Examines how cuisine has influenced important cultural aspects of Latin America. Students will study the history behind Latin American dishes and learn how to prepare them. F, S.
- 3000. Internship in Hospitality (VI-6).** Prerequisites: C or better in RHIM 3100, RHIM major or minor, or instructor consent.

Experiences in hospitality settings. May be repeated for a maximum of six hours credit. F, S, SS.

- 3100. Introduction to Internship in Hospitality (1).** Prerequisite: C or better in RHIM 2210. Introduction to concepts and expectations of the internship experience. F, S, SS.
- 3140. Hospitality Leadership Forum (1).** Prerequisite: Junior standing. An interactive forum on current issues and trends affecting the hospitality industry from a practitioner's perspective. Leaders from major hospitality corporations, including alumni and young emerging leaders, will present. F, S.
- 3308. Hotel Group Sales and Services (3).** 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).** Prerequisite: C or better in RHIM 2210. 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. (Writing Intensive) F, S.
- 3321. Hospitality Control I (3).** Introduction to hospitality control devices needed to measure fiscal success. F, S.
- 3322. Hospitality Control II (3).** Prerequisite: C or better in RHIM 3321. Application of fiscal control devices in the hospitality industry. Includes computer applications in industry situations. F, S.
- 3330. Special Topics in Hospitality (3).** Prerequisite: Consent of instructor. Semester long study of a specific topic pertinent to the hospitality industry.
- 3345. Event Management in the Hospitality Industry (3).** Studies concepts and execution of event management in the hospitality industry. SS.
- 3350. Travel and Tourism (3).** Prerequisite: Sophomore 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. F, S.
- 3355. Club and Resort Management (3).** Principles and practices of the general managerial procedures utilized in private clubs and resorts.
- 3358. Human Resources in the Service Industry (3).** RHIM and RTL majors or departmental approval. Explore human relations theories as they pertain to managing in the hospitality industry. F, S.
- 3360. Food: A Culinary Approach (3).** Prerequisites: FDSC 3303 (concurrent enrollment allowed); C or better in RHIM 2210, and sophomore standing. Application of scientific food preparation and management principles to quantity food production. Includes laboratory experience in quantity food facility. F, S.
- 3370. Restaurant Operations and Management (3).** Prerequisite: FDSC 3303 and C or better in RHIM 2210. Optimum use of human, financial, and material resources by managers. Laboratory experiences include commercial food preparation and service. F, S.
- 3380. Managed Services in the Hospitality Industry (3).** Analysis of on-site food service management and its importance to the hospitality industry.
- 3390. Purchasing in the Hospitality Industry (3).** Prerequisite: C or better in RHIM 3321 or RHIM 3322 or consent of instructor. Current ethical, economic, legislative, and industrial developments related to purchasing food products and durable goods. F, S.
- 4000. Individual Study (VI-6).** May be repeated for up to 6 hours credit. F, S, SS.
- 4300. Practicum (3).** Prerequisites: C or better in RHIM 3000 and 3100, graduating senior's final semester, and 1,200 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.
- 4308. Lodging Operations Management (3).** Prerequisites: C or better in RHIM 2210, 2308, and 3322. Emphasizes the application of operating principles in lodging, from a middle- to upper-management perspective, including a strategic approach to problem solving at the individual and multi-property levels. F, S.
- 4312. Food and Beverage Operations Management (3).** Prerequisites: C or better in RHIM 2210, 3322, and 3370; junior standing. An overview of the roles and responsibilities of managers in food and beverage operations in hospitality operations, including control, sales promotion, and profits.

Curriculum for B.S. in Restaurant, Hotel, and Institutional Management: Food and Beverage Management Track

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric †	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics Elective*	3
Mathematics Elective*	3	FDSC 3303, Food Sanitation	3
POLS 1301, American Gov., Org.	3	HIST 2300, History of U.S. to 1877	3
RHIM 2210, Intro. to Hospitality Mgmt. Language, Phil., & Culture Elective*	2	POLS 2302, American Public Policy †	3
	3		
TOTAL	15	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
NS 1410, Science of Nutrition	4	HIST 2301, History of U.S. Since 1877	3
RHIM 3360, Food: A Culinary Approach †	3	Human Sciences Core Elective ‡	3
RHIM 3321, Hospitality Control I	3	RHIM 3370, Restaurant Ops. & Mgmt. †	3
ENGL 2311, Intro. to Technical Writing	3	RHIM 3100, Intro. to Internship in Hosp. †	1
RHIM Elective #	3	RHIM 3322, Hospitality Control II †	3
		Oral Communication*	3
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
RHIM 3320, Facilities Management †	3	RHIM 3358, Human Res. in Serv. Industry	3
ECO 2305, Principles of Economics	3	RHIM 4341, Hospitality Management †	3
RHIM 3390, Purchasing in Hosp. Ind. †	3	RHIM 4312, Food & Beverage Ops. †	3
Life & Physical Sciences*	4	RHIM 4313, Legal Aspects of Hosp. Ind. †	3
		RHIM Elective #	3
TOTAL	13	TOTAL	15

INTERNSHIP

RHIM 3000, Internship in Hospitality † 2

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
RHIM 4316, Hospitality Sales & Mkt. †	3	RHIM 4300, Practicum † **	3
RHIM 4322, Hospitality Cost Control III †	3	RHIM 4332, Customer Relations for Hosp. †	3
Creative Arts* §	3	RHIM 4315, Dinner Series Capstone †	3
RHIM Electives #	6	RHIM Electives #	4
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

NOTE: Students are expected to have competency in computer usage.

NOTE: Two hours of RHIM 3000 (Internship) must be taken after RHIM 3100 and prior to the last semester.

NOTE: Completing 800 hours of documented relevant hospitality industry experience is required prior to graduation in addition to the required 400-hour internship.

* Choose from core curriculum requirements.

† Prerequisites apply.

‡ HS core elective; choose 1 from ADRS 2310, HDFS 2322, PFP 1305 or 3301.

§ Choose a course that also fulfills the multicultural requirement.

Choose any non-required RHIM or RTL course.

** Must take graduating semester.

Curriculum for B.S. in Restaurant, Hotel, and Institutional Management: Hospitality Management Track

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric †	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics Elective*	3
Mathematics Elective*	3	POLS 2302, American Public Policy †	3
POLS 1301, American Gov., Org.	3	NS 1410, Science of Nutrition	4
RHIM 2210, Intro. to Hospitality Mgmt. Language, Phil., & Culture Elective*	2	RHIM 2308, Hotel Operations †	3
	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
ECO 2305, Principles of Economics	3	Human Sciences Core Elective ‡	3
RHIM 3321, Hospitality Control I	3	FDSC 3303, Food Sanitation	3
ENGL 2311, Intro. to Technical Writing	3	RHIM 3100, Intro. to Internship in Hosp. †	1
RHIM Elective #	3	RHIM 3322, Hospitality Control II †	3
TOTAL	15	TOTAL	13

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
RHIM 3320, Facilities Management †	3	RHIM 4341, Hospitality Management †	3
Oral Communications*	3	RHIM 3390, Purchas. in Hosp. Industry †	3
RHIM 3358, Human Res. in Serv. Industry †	3	or RHIM 4308, Lodging Ops. & Mgmt. †	3
Life & Physical Sciences*	4	RHIM 4312, Food & Beverage Ops. †	3
RHIM 3370, Restaurant Ops. & Mgmt. †	3	RHIM 4313, Legal Aspects of Hosp. Ind. †	3
		RHIM Elective #	3
TOTAL	16	TOTAL	15

INTERNSHIP

RHIM 3000, Internship in Hospitality † 2

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
RHIM 4316, Hospitality Sales & Mkt. †	3	RHIM 4300, Practicum † **	3
RHIM 4322, Hosp. Cost Control III †	3	RHIM 4332, Cust. Relations for Hosp. †	3
Creative Arts* §	3	RHIM 3350, Travel and Tourism †	3
RHIM Electives #	6	or RHIM 4350, Wine Tourism †	
		RHIM Elective #	4
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

NOTE: Students are expected to have competency in computer usage.

NOTE: Two hours of RHIM 3000 (Internship) must be taken after RHIM 3100 and prior to the last semester.

NOTE: Completing 800 hours of documented relevant hospitality industry experience is required prior to graduation in addition to the required 400-hour internship.

* Choose from core curriculum requirements.

† Prerequisites apply.

‡ HS core elective; choose 1 from ADRS 2310, HDFS 2322, PFP 1305 or 3301.

§ Choose a course that also fulfills the multicultural requirement.

Choose any non-required RHIM or RTL course.

** Must take graduating semester.

- 4313. Legal Aspects of Hospitality Industry (3).** Prerequisite: Sophomore standing. A study of the laws applicable to restaurants, hotels, and associated businesses. Includes duties, rights, and liabilities of institutions and guests. F, S.
- 4315. Dinner Series Capstone (3).** Prerequisites: FDSC 3303 and C or better in RHIM 3370 and 4312. Assumption of maximum responsibility of management of actual food service operation based on sound managerial principles and successful food production and service techniques.
- 4316. Hospitality Sales and Marketing (3).** Prerequisites: RHIM and RTL majors and concentrations only; junior standing; ENGL 1302 and 2311 and C or better in RHIM 2210. Application of hospitality sales and marketing concepts, methods, and techniques. Analysis of principles of consumer behavior, market research, promotion, and revenue management. F, S. (Writing Intensive)
- 4320. Hospitality Entrepreneurship (3).** Prerequisite: RHIM major; C or better in RHIM 4316 or MKT 3350 or BA 3301 or instructor consent. Aspects of opening and operating a small hospitality business.
- 4322. Hospitality Cost Control III (3).** Prerequisites: C or better in RHIM 3321 and 3322. 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).** 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).** Prerequisite: Senior RHIM majors. In-depth examination of selected problems in the hospitality industry.
- 4332. Customer Relations for Hospitality Enterprises (3).** Prerequisite: Graduating senior's final semester. A capstone experience in the evaluation of the customer experience in all facets of hospitality operations. (Writing Intensive) F, S, SS.
- 4340. Wine Marketing (3).** Prerequisite: 21 years of age or older and RHIM major or minor, or departmental approval. Analyzes the concepts of marketing as related to the wine industry. Students will develop a marketing plan for a winery. S.
- 4341. Hospitality Management (3).** Prerequisite: RHIM, RTL, and NSCI majors only; junior standing; ENGL 1302, ENGL 2311, and C or better in RHIM 2210. Factors involved in establishing hospitality operations, organization, administrative development, allocation of labor, and control. Examines hospitality

Curriculum for B.S. in Restaurant, Hotel, and Institutional Management: Lodging Management Track

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics Elective*	3
Mathematics Elective*	3	POLS 2302, American Public Policy†	3
POLS 1301, American Gov., Org.	3	NS 1410, Science of Nutrition	4
RHIM 2210, Intro. to Hospitality Mgmt.	2	RHIM 2308, Hotel Operations†	3
Language, Phil., & Culture Elective*	3		
TOTAL	15	TOTAL	16
SECOND YEAR			
Fall		Spring	
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
ECO 2305, Principles of Economics	3	Human Sciences Core Elective‡	3
RHIM 3321, Hospitality Control I	3	FDSC 3303, Food Sanitation	3
ENGL 2311, Intro. to Technical Writing	3	RHIM 3100, Intro. to Internship in Hosp.†	1
RHIM Elective#	3	RHIM 3322, Hospitality Control II†	3
TOTAL	15	TOTAL	13
THIRD YEAR			
Fall		Spring	
RHIM 3320, Facilities Management†	3	RHIM 4341, Hospitality Management†	3
Oral Communications*	3	RHIM 4308, Lodging Ops. & Mgmt.†	3
RHIM 3358, Human Res. in Serv. Industry†	3	RHIM 4312, Food & Beverage Ops.†	3
Life & Physical Sciences*	4	RHIM 4313, Legal Aspects of Hosp. Ind.†	3
RHIM 3370, Restaurant Ops. & Mgmt.†	3	RHIM Elective#	3
TOTAL	16	TOTAL	15
INTERNSHIP			
RHIM 3000, Internship in Hospitality†	2		
FOURTH YEAR			
Fall		Spring	
RHIM 4316, Hospitality Sales & Mkt.†	3	RHIM 4300, Practicum†**	3
RHIM 4322, Hosp. Cost Control III†	3	RHIM 4332, Cust. Relations for Hosp.†	3
Creative Arts*§	3	RHIM 4348, Hospitality Revenue Mgmt.†	3
RHIM Electives#	6	RHIM Elective#	4
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

NOTE: Students are expected to have competency in computer usage.

NOTE: Two hours of RHIM 3000 (Internship) must be taken after RHIM 3100 and prior to the last semester.

NOTE: Completing 800 hours of documented relevant hospitality industry experience is required prior to graduation in addition to the required 400-hour internship.

* Choose from core curriculum requirements.

† Prerequisites apply.

‡ HS core elective; choose 1 from ADRS 2310, HDFS 2322, PFP 1305 or 3301.

§ Choose a course that also fulfills the multicultural requirement.

Choose any non-required RHIM or RTL course.

** Must take graduating semester.

Curriculum for B.S. in Restaurant, Hotel, and Institutional Management: Wine Business Track

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics Elective*	3
Mathematics Elective*	3	FDSC 3303, Food Sanitation	3
POLS 1301, American Gov., Org.	3	HIST 2300, History of U.S. to 1877	3
RHIM 2210, Intro. to Hospitality Mgmt.	2	PSS 1411, Principles of Horticulture	4
TOTAL	12	TOTAL	16
SECOND YEAR			
Fall		Spring	
NS 1410, Science of Nutrition	4	HIST 2301, History of U.S. Since 1877	3
POLS 2302, American Public Policy†	3	Human Sciences Core Elective‡	3
RHIM 3321, Hospitality Control I	3	RHIM 3370, Restaurant Ops. & Mgmt.†	3
ENGL 2311, Intro. to Technical Writing	3	RHIM 3100, Intro. to Internship in Hosp.	1
PSS 3310, Viticulture I†	3	RHIM 3322, Hospitality Control II†	3
TOTAL	16	TOTAL	13
THIRD YEAR			
Fall		Spring	
RHIM 3320, Facilities Management†	3	RHIM 3358, Human Res. in Serv. Industry	3
ECO 2305, Principles of Economics	3	RHIM 4341, Hospitality Management†	3
RHIM 3390, Purchasing in Hosp. Ind.†	3	RHIM 4312, Food & Beverage Ops.†	3
Oral Communications*	3	RHIM 4313, Legal Aspects of Hosp. Ind.†	3
PSS 1311, The Science of Wine	3	RHIM or PSS Elective#	3
TOTAL	15	TOTAL	15
INTERNSHIP			
RHIM 3000, Internship in Hospitality†	2		
FOURTH YEAR			
Fall		Spring	
RHIM 4350, Wine Tourism†	3	RHIM 4300, Practicum†**	3
RHIM 4322, Hosp. Cost Control III†	3	RHIM 4332, Cust. Relations for Hosp.†	3
Creative Arts*§	3	RHIM 4340, Wine Marketing†	3
RHIM or PSS Electives#	3	RHIM 4316, Hospitality Sales & Mkt.†	3
Language, Phil., & Culture Elective*	3	RHIM or PSS Elective#	4
TOTAL	15	TOTAL	16

TOTAL HOURS: 120

NOTE: Students are expected to have competency in computer usage.

NOTE: Two hours of RHIM 3000 (Internship) must be taken after RHIM 3100 and prior to the last semester.

NOTE: Completing 800 hours of documented relevant hospitality industry experience is required prior to graduation in addition to the required 400-hour internship.

* Choose from core curriculum requirements.

† Prerequisites apply.

‡ HS core elective; choose 1 from ADRS 2310, HDFS 2322, PFP 1305 or 3301.

§ Choose a course that also fulfills the multicultural requirement.

Choose any non-required RHIM, RTL, or PSS course.

** Must take graduating semester.

organizations with emphasis on planning and problem analysis. F, S. (Writing Intensive) F, S.

- 4348. Hospitality Revenue Management (3).** Prerequisites: C or better in RHIM 4308 (concurrent enrollment allowed). Focus on hospitality revenue management activities for strategic decision making, including pricing, forecasting, and trend analysis. S.
- 4350. Wine Tourism (3).** Prerequisite: 21 years of age or older, RHIM major or minor, or departmental approval. Examines the business of wine with specific focus on wine tourism. Addresses global tourism and local economic impact of the wine industry. F.
- 4360. Experimental Methods with Food (3).** Prerequisites: C or better in RHIM 3460, 3470, or NS 2310. May not be enrolled as a dietetics major. Investigation of food quality factors through laboratory experiences which conclude with a comprehensive research project. Online courses do not apply to certifications. F, S.

Graduate Courses

- 5001. Internship in the Hospitality Industry (V1-6).** Prerequisite: Instructor consent. Internship experience in career-related positions in the hospitality industry.
- 5100. Seminar (1).** Introduction to graduate studies in Hospitality and Retail Management.

- 5300. Perspective in Restaurant Hotel and Institution (3).** Foundation concepts in hospitality management. May be repeated for credit. Does not apply to a graduate degree.
- 5301. Colloquium in Hospitality Management (3).** Introduction to philosophies and processes involved in graduate study in the hospitality sector.
- 5309. Leadership Practices in Hospitality Organizations (3).** A review of hospitality leadership practices, strategies, and philosophies to motivate and inspire individual employees and teams.
- 5310. Sensory Evaluation of Food Products (3).** Principles and techniques of sensory evaluation of food products in personal and professional settings.
- 5311. Problems in Restaurant, Hotel, and Institutional Management (3).** May be repeated for credit.
- 5315. Retail Space Management (3).** The application of space and category management strategy using industry software with emphasis on product selection, shelf merchandising, promotion, and pricing.
- 5316. Hospitality and Service Marketing (3).** Examination of marketing theories and specific applications to the hospitality and service industry. Concentrates on differences of marketing concepts in service versus products market.
- 5317. Convention and Events Sales and Services (3).** An examination of the management, marketing, and sales and services of the convention and event industry.

**Curriculum for B.S. in RHIM with
Secondary FCSE Teacher Certificate in
Hospitality, Nutrition, and Food Science**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics Elective*	3
Mathematics Elective*	3	POLS 2302, American Public Policy†	3
POLS 1301, American Gov., Org.	3	NS 1410, Science of Nutrition	4
RHIM 2210, Intro. to Hospitality Mgmt.	2	RHIM 2308, Hotel Operations†	3
Creative Arts*§	3		
FCSE 2102, Intro. to FCS	1		
TOTAL	16	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
ADRS 2310 or HDFS 2322 or PFP 1305	3	CFAS 2300, Comm., Civility, & Ethics	3
RHIM 3360, Food: A Culinary Approach†‡	3	RHIM 3370, Restaurant Ops. & Mgmt.†	3
ENGL 2311, Intro. to Technical Writing	3	RHIM 3100, Intro. to Internship in Hosp.†	3
FDSC 3303, Food Sanitation‡	3	ENGL 2305 or 2306 or 2307 or 2308	3
NS 2330, Health, Fitness and Sport	3	or 2351 or 2388 or 2391	
		NS 3325, Sports Nutrition	3
TOTAL	18	TOTAL	16

INTERNSHIP

RHIM 3000, Internship in Hospitality† 2

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
FCSE 3301, Found. of FCS Education**	3	FCSE 4302, Prof. Applications in FCS†	3
RHIM 4316, Hospitality Sales & Mkt.†	3	RHIM 3390, Purchasing in Hosp. Ind.†	3
RHIM 3358, Human Res. in Serv. Industry†	3	RHIM 3350, Travel and Tourism†	3
Life & Physical Sciences*	4	EDLL 4382, Reading, Writing, Second.‡#	3
RHIM 3322, Hospitality Control II†	3	EDSE 4312, Second. Classroom Mgmt.#	3
TOTAL	16	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
RHIM 4312, Food & Beverage Ops.†	3	FCSE 4012, Student Teaching**	12
RHIM 4341, Hospitality Management†	3		
FCSE 4308, Research & Eval. in FCS‡#	3		
FCSE 4306, Occupational FCS‡#	3		
HUSC 3325, Wellness in the Adolescent‡#	3		
TOTAL	15	TOTAL	12

TOTAL HOURS: 126

NOTE: Students are expected to have competency in computer usage.
NOTE: Two hours of RHIM 3000 (Internship) must be taken after RHIM 3100 and prior to the last semester.
NOTE: Completing 400 hours of documented relevant hospitality industry experience is required prior to graduation in addition to the required 400-hour internship.

* Choose from core curriculum requirements.
† Prerequisites apply.
‡ Concurrent enrollment is required
§ Choose a course that also fulfills the multicultural requirement.
Admission to Teacher Certification (Education) Program and minimum 2.75 GPA required.



- 5320. **Retail Trend Analysis (3).** Study of theories and frameworks underlying trend analysis and the execution of trend forecasting.
- 5333. **Hospitality Management Research and Application (3).** Examination of hospitality management and research concepts and their application in hospitality management settings.
- 5335. **Advanced Concepts in E-Commerce (3).** A continued examination of the current trends and influence of the online retail environment on consumer behavior.
- 5340. **Hospitality Consumer Behavior (3).** Analysis of hospitality customers with emphasis on application of theoretical based research.
- 5341. **Strategic Management in the Hospitality Industry (3).** Examination of strategy formulation, content development, implementation, and evaluation at the unit and multi-unit level.
- 5343. **Advanced International Retailing (3).** Study of the concepts and execution of international retailing, including an international experience.
- 5345. **Wine Marketing and Tourism (3).** An in-depth study of marketing and tourism in the wine industry. Wine products, brand development, and promotion are addressed.
- 5350. **Travel and Tourism (3).** 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).** 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).** 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).** Study of concepts and execution of event management in the hospitality industry.
- 5370. **Food Systems Management (3).** 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).** 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).** 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).** Internship experience in career-related position in the hospitality industry.
- 6101. **Doctoral Seminar I: Introduction to the Hospitality Administration Doctoral Program (1).** An introduction to the many facets of life as a doctoral student in hospitality administration. Responsibilities, expectations, teaching, research, service and other relevant topics will be discussed.
- 6102. **Doctoral Seminar II: Academic Publishing in Hospitality Business Management (1).** An introduction to publishing academic work in journals related to the hospitality, tourism and related business fields.
- 6103. **Doctoral Seminar III: Faculty Expectations in Hospitality Business Academic Settings (1).** An introduction to the many facets of faculty life and the role faculty are expected to play in business-related higher education environments.

6300. **Perspectives in Hospitality Administration (3)**. Foundation concepts in hospitality management. May be repeated for credit. Does not apply toward graduate credit.
6308. **Advanced Lodging and Leisure (3)**. 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)**. 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.
6322. **Financial Management In Hospitality Administration (3)**. Investigation of theories, strategies, and financial policies influencing corporate decisions in operations of domestic and international hospitality.
6330. **Theoretical Developments in Hospitality (3)**. 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)**. Investigation of strategic cost management that includes financial and managerial accounting concepts relevant to the hospitality industry.
6335. **Managing Crisis in the Hospitality Industry (3)**. Examines various crisis management scenarios in the hospitality industry, including natural and man-made disasters. Provides future executives with the basic knowledge to handle these challenges.
6340. **Organizational Management in Hospitality Administration (3)**. The study and practice of the latest concepts related to leadership and supervision in hospitality management.
6345. **Hospitality Business Ethics (3)**. 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)**. The role of category management strategies and best practices in the effective implementation of customer service in the retailing industries.
6350. **Advanced Travel and Tourism (3)**. 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.
6365. **Retail Buying, Assortment Planning, and Allocation for the Hospitality Industry (3)**. Study of concepts and execution of retail buying, assortment planning, and allocation in the retailing industries.
6370. **Advanced Food Systems Management (3)**. 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)**. 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)**. 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)**.
1340. **Introduction to Retailing (3)**. Basic principles, concepts, and practices in the operation of retail organizations. F, S.
2340. **Retail Consumer Behavior (3)**. Introductory survey of fundamental principles in consumer behavior that affect retailing. F, S.
2350. **Retail Promotion (3)**. Comprehensive study of the principles and practices of merchandise communication through the interaction and coordination of sales promotion, personal selling, visual merchandising, advertising, special events, and public relations. F, S.
3340. **International Retailing (3)**. Prerequisite: ECO 2302 or 2305; C or better in ENGL 2311 or concurrent enrollment. Cultural differences, world markets, and political constraints encountered in international retailing strategy. F, S. (Writing Intensive)
3345. **Event Management in the Retailing Industry (3)**. Study of concepts and execution of event management in the retailing industry. SS.
3360. **Applied Concepts in Teamwork (3)**. Basic issues and concepts in the team building process, emphasis on application of curriculum through academic service-learning team projects. F, S. (Service Learning)
3375. **Retail Buying (3)**. Prerequisites: C or better in RTL 2340, 6 hours of MATH 1000-4999 (concurrent enrollment allowed), and either RHIM 3321 or BA 3302. Designed to develop retail mathematical skills and apply those skills to the buying process.
3380. **Retail Buying and Control (3)**. Prerequisites: TTU GPA 2.8, C or better in RTL 2340, RHIM 3321 or BA 3302, and 6 hours of MATH 1000-4999 (may be taken concurrently). The application of planning, purchasing, and controlling inventories. S.
3389. **Professional Practices in Retailing (3)**. Prerequisites: C or better in RTL 3375 or 3380 (concurrent enrollment allowed) and RTL 2350; junior standing. Principles of professional practices focusing on legal, ethical, and human resource workplace issues and effective managerial strategies. Enrollment precedes RTL 3390. S.
3390. **Internship in Retailing (3)**. Prerequisite: C or better in RTL 3389. Supervised applications of concepts, principles, and techniques learned in the classroom; emphasis on student participation in the retailing industry. Minimum of 300-400 hours of supervised retail employment at a departmental approved site. May be repeated for credit. (Writing Intensive) F, S.
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.
4300. **Retailing Field Study Tour (3)**. Study of international/domestic retailers and manufactures. May be repeated once for credit. (Writing Intensive)
4320. **Retail Category Management (3)**. Prerequisite: 2.8 TTU GPA; Junior or senior standing. The application of planning, purchasing, and controlling inventories with emphasis on product selection, shelf merchandising, promotion, and pricing. F.
4330. **Retailing Research (3)**. Prerequisite: 2.8 TTU GPA; C or better in RTL 2340 and ENGL 2311 (concurrent enrollment allowed). 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)
4335. **Practices in Web-based Retail Management (3)**. Practices in web-based retail management and development of web-based resources. (Writing Intensive)
4340. **Entrepreneurship: Retail Business Planning (3)**. Basic principles, concepts, and practices in retail entrepreneurship. (Writing Intensive) F, S, SS.
4360. **Retail Management (3)**. Prerequisites: C or better in RTL 3340; senior standing; C or better in BA 3301 or RHIM 4316 and BA 3305 or RHIM 3341 (concurrent enrollment allowed). 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 (Writing Intensive) (Service-Learning)
4392. **Retail Externship (3)**. Prerequisites: C or better in RTL 3390, 4320, 4330, and 4360; senior in final semester.

Retailing (RTL)

Undergraduate Courses

1320. **Fashion and Modern Culture (3)**. Survey course analyzing the impact of modern culture on the fashion industry. F, S.

Department of Human Development and Family Studies

Ann Mastergeorge, Ph.D., Chairperson

Professors: Bell, Caldera, Hart, Mastergeorge, O'Boyle, Reifman, Scott
Associate Professors: Colwell, Cong, Fitzpatrick, McCarty, Mulsow, Niehuis, Sharp, Trejos

Assistant Professors: Chae, Oh, Weiser

Instructors: Johnson, Shine, Ziegner

CONTACT INFORMATION: 507 Human Sciences Bldg., 1301 Akron Ave., Box 41230, Lubbock, TX 79409-1230, T 806.742.3000, F 806.742.0285, www.depts.ttu.edu/hdfs

About the Program

This department supervises the following degree programs and certificates:

- Bachelor of Science in Human Development and Family Studies
- Bachelor of Science in Early Childhood
- Master of Science in Human Development and Family Studies
- Doctor of Philosophy in Human Development and Family Studies
- Graduate Certificate in Gerontology
- Graduate Certificate in Youth Development Specialist
- Graduate Certificate in Youth Program Management and Evaluation

Mission. The Department of Human Development and Family Studies is a multidisciplinary department that applies contextual and systemic frameworks to the study of individual development and relationship processes across the life span through research, teaching and service.

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.

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 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.

With respect to certifications, students may choose courses in HDFS 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.

Service-research skills are also enhanced by opportunities to observe and interact with infants, toddlers, and young children in the Child Development Research Center and TTU Early Head Start. The centers are 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 focus in one or more of the following areas in which courses are offered in the department:

- Childhood: HDFS 2305, 2311, 3306, 3310, 3312, 4306
- Adolescence-adulthood: HDFS 3316, 3318, 3319, 3332
- Family relationships: HDFS 2322, 3320, 3321, 3322, 3324, 3326, 3331
- Application/research: HDFS 2320, 3360, 3311, 3313, 4000, 4310, 4314, 4320, 4343, 4390.

Enrollment in the department is 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 chairperson's office.

Minor in Human Development and Family Studies. A student may minor in Human Development and Family Studies by completing 18 hours of HDFS coursework, 9 hours of which must be upper-level. Courses for this minor should be finalized and approved in conjunction with the student's major and minor advisors.

Bachelor of Science in Early Childhood

The Bachelor of Science in Early Childhood 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 Council for the Accreditation of Educator Preparation (CAEP). State teacher certification is granted from early childhood through the sixth 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 not less than a 2.75 overall GPA. 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.

The university is implementing a new teacher education program that includes a full year of student teaching (two semesters of the senior year) for students beginning their teacher education program in spring 2013 or later. Students wishing to obtain teacher certification should consult with the department's undergraduate advisor.

Graduate Program

For information on graduate programs offered by the Department of Human Development and Family Studies, visit the Graduate School section of the catalog on page 147.

Curriculum for Bachelor of Science 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 18 hours of electives.

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Life & Physical Sciences*	4
Mathematics Elective*	3	SOC 1301 or 1320	3
PSY 1300, General Psychology	3	POLS 2302, American Public Policy	3
POLS 1301, American Gov., Org.	3	Mathematics or Logic*	3
Language, Philosophy, and Culture*	3		
TOTAL	16	TOTAL	16
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
Life & Physical Sciences*	4	MATH 2300† or SOC 3391† or PSY 2400†	3
ENGL 2311, Intro. to Technical Writing†	3	HDFS 3301, Theories of Human Develop.†	3
HDFS 2303, Life Span Human Dev.	3	Creative Arts*	3
HIST 2300, History of U.S. to 1877	3	HDFS 2300, Gender Development	3
CFAS 2300, Commun., Civility & Ethics	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	16	TOTAL	15
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
HDFS Elective (Group A)	3	HDFS 3390, Research Methods†	3
HDFS 3322, Family in the Community†	3	HDFS 3324, Dynamics of Family Interact.†	3
HDFS 3350, Dev. in Cross-Cultural Persp.†	3	HDFS Elective (Group A)	3
HDFS 3320, Contemporary Families†	3	Minor or Elective	3
Human Science Core‡	3	Minor or Elective	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
HDFS Elective (Group A)	3	HDFS 4314† or 4320†	3
HDFS Elective (Group B)	3	Community or Research Practicum	3
HDFS Elective (Group A or B)	6	Minor or Elective	9
Minor or Elective	3		
TOTAL	15	TOTAL	12
TOTAL HOURS: 120			
* Choose from core curriculum requirements.			
† Prerequisites apply.			
‡ Choose from ADRS 2310, NS 1325, or PFP 3301.			
Group A: HDFS 2305, 2311, 2320, 2322, 3306, 3310, 3312, 3316, 3318, 3319, 3321, 3326, 3331, 3332, 4306			
Group B: HDFS 3360, 3311, 3313, 4000, 4310, 4314, 4320, 4343, 4390			

Course Descriptions

(To interpret course descriptions, see page 23.)

Human Development and Family Studies (HDFS)

Undergraduate Courses

- 2300. Gender Development: Life Span Perspectives (3).** Introduction to gender concepts and to the impact of gender on individual and family developmental processes. Fulfills multicultural requirement. F, S. (WS 2301)
- 2303. [PSYC 2311, 2314] Life Span Human Development (3).** Introduction to the theories, processes, and enhancement of development for infants, young children, adolescents, and adults. Fulfills core Social and Behavioral Sciences requirement. F, S.
- 2305. Developmental Assessment of Young Children (3).** Discusses the goals, benefits, and uses of assessment techniques in tracking development of young children. Emphasizes integration of family/professional perspectives in the development process. F, S.
- 2311. [TECA 1311] Introduction to Early Childhood (3).** 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).** 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).** Intimate relationship development from adolescence through adulthood with an emphasis on relationship processes,

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			
<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced College Rhetoric†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics or Logic*	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
FCSE 2102, Introduction to FCSE	1	CFAS 2300, Commun., Civility, & Ethics	3
HDFS Elective	3	HDFS Elective	3
ADM 1302, Fund. of Clothing Techniques	3		
Mathematics Elective*	3		
TOTAL	17	TOTAL	15
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 2305† or 2306† or 2307† or 2308† or 2351† or 2391†	3	HDFS 3310, Prenatal and Infant Develop.†	3
Life & Physical Sciences*	4	NS 1410, Science of Nutrition	4
NS 2330, Nutrition for Health, Fitness	3	PPF 3301, Intro. to Personal Finance	3
HDFS 3301, Theories of Human Develop.	3	HDFS 3350, Dev. in Cross-Cultural Persp.	3
ID 1381, Intro. to Interior Design	3		
TOTAL	19	TOTAL	16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
FCSE 3301, Foundations of FCSE†	3	FCSE 4302, Field Exp. & Prof. App.†§	3
HDFS 3320, Contemporary Families†	3	HDFS 3311† or 3313†	3
HDFS 3312, Dev. During Childhood†	3	EDLL 4382, Language, Literacy§‡	3
FCSE 4325, U.S. Family Issues†	3	FCSE 4312, Secondary Class. Mgmt.§‡	3
HDFS 3331, Parenting†	3	PPF 3321, Fin. Counsel. & Cons. Credit	3
Creative Arts*	3		
TOTAL	18	TOTAL	15
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
FCSE 4308, Res. and Eva. in FCS§‡	3	FCSE 4012, Student Teaching§	12
FCSE 4306, Occupational FCS§‡	3		
HUSC 3325, Wellness for Adolescents	3		
RHIM 3360, Food: A Culinary Approach	3		
FDSC 3303, Food Sanitation	3		
TOTAL	15	TOTAL	12
TOTAL HOURS: 127			
* Choose from core curriculum requirements.			
† Prerequisites apply.			
‡ Must take concurrently.			
§ Admission to Teacher Certification (Education) Program and a minimum 2.75 GPA required.			
NOTE: FCSE 3301 requires application and advisor approval. See advisor in HS 159.			

diversity in types of partnering, and developmental/contextual variations in relationships. Fulfills core Social and Behavioral Sciences requirement. F, S.

- 3301. Theories of Human Development and Family Studies (3).** Prerequisite: 2.5 TTU GPA. The major theories in human development and family studies. Course focuses on the meaning of theory to individual and family development over the lifespan. Implication of theory and program development and services are reviewed. (Writing Intensive) F, S.
- 3306. Child and Adolescent Guidance (3).** Prerequisites: C or better in HDFS 3301 and 2.5 TTU 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).** Prerequisites: 2.5 TTU 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.
- 3311. Supervised Experiences with Infants and Toddlers (3).** Prerequisite: 2.5 TTU GPA. Supervised experience with infants and toddlers. State law requires students to pass a background check. F, S. (Writing Intensive)
- 3312. Development During Childhood (3).** Prerequisites: 2.5 TTU GPA. Examination of psychomotor, social-emotional, and cognitive-language development during childhood. F, S.

Curriculum for B.S. in Early Childhood Teacher Certification: Infancy to Sixth Grade

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric*	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy*	3
MATH 1320, College Algebra	3	MATH 2370, Elementary Analysis I*	3
HDFS 3311, Exp. with Infants & Toddlers	3	Life & Physical Scie. (Earth/Space Sci.)	4
GEOG 2351, Region. Geog. of World	3	MUSI 2301, Essentials of Music	3
or GEOG 1300, Fundamentals of Geog.	3	HDFS 3310, Prenatal and Infant Develop.*	3
TOTAL	15	TOTAL	19

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	Life & Physical Sciences (Phys. Science)	4
MATH 3370, Elementary Geometry*	3	HDFS 3312, Dev. During Childhood*	3
ART 3372, Rethinking Art Education	3	HDFS 3350, Dev. Cross Cult. Persp.*	3
HDFS 3301, Theories of HDFS*	3	or EDEL 2300, Schools, Society, Diversity	3
HDFS 3313, Exp. with Young Children*	3	CFAS 2300, Commun., Civility, & Ethics	3
TOTAL	18	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
EDEL 3300, Introduction to Teaching I †	3	EDEL 4370, Teaching Mathematics ‡	3
EDSP 3300, Exceptional Children & Youth †	3	EDLL 3351, Found. in Reading Instr. ‡	3
EDLL 3350, Children's Literature ‡	3	EDLL 3352, Language Lit. Acquisition ‡	3
HDFS 3306, Child/Adolescent Guidance*	3	Life & Physical Sciences (Life)	4
ESS 3335, Health and P.E. for Children	3	HIST 2310, History of Texas (online)	3
TOTAL	15	TOTAL	16

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
EDBL 3335, Teaching Diverse Students ‡	3	EDLL 4380, Literacy in Content Areas ‡	3
EDEL 4375, Teaching Science ‡	3	EDEC 4000, Student Teaching EC-6 ‡	6
EDEC 4000, Student Teaching EC-6 ‡	3	EDEL 3318, Tech. in Elem. Education ‡	3
EDEL 4360, Teaching Social Studies ‡	3		
TOTAL	12	TOTAL	12

TOTAL HOURS: 123

* Prerequisites apply.

† Choose from core curriculum requirements.

‡ Concurrent enrollment and acceptance into Teacher Certification Program (apply prior semester); 2.7 GPA minimum

Please review the standards in choosing science courses at www.sbec.state.tx.us.

Educator Standards EC-Grade 6 Science:

- A. Life: PSS 2401 or 1411, BIOL 1401 or 1402, GEOL 1303/1101
- B. Earth & Space: GEOG 1401, ATMO 1300/1100, GEOL 1303/1101, 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.

- 3313. Supervised Experiences with Young Children (3).** Prerequisite: 2.5 TTU GPA. Supervised experience with young children. State law requires students to pass a background check. F, S. (Writing Intensive)
- 3316. Development in Adolescence (3).** Prerequisites: C or better in HDFS 3301 and 2.5 TTU GPA. Enhancing the psychosocial, social-emotional, and cognitive-language development of adolescents within their interactions with peers, adults, and the culture. S.
- 3318. Development in Young Adulthood (3).** Prerequisite: 2.5 TTU GPA. Examination of individual developmental processes during the transition to adulthood and the first two decades of adult life.
- 3319. Development in Middle Adulthood (3).** Prerequisite: 2.5 TTU GPA. Examination of individual developmental processes from the mid-life transition through the middle years of adult life.
- 3320. Contemporary Families (3).** Prerequisite: 2.5 TTU GPA. Analysis of family interaction patterns with an introduction to family research. A study of family heritage, development, and networks. Emphasizing sociocultural variations of families. F, S.
- 3321. Human Sexuality from a Life Span Perspective (3).** Prerequisite: 2.5 TTU GPA. Human sexuality from a life span perspective, with emphasis on developmental, familial, and societal factors that influence individual sexuality. F, S. (WS 3321)
- 3322. The Family in the Community (3).** Prerequisite: 2.5 TTU GPA. Study of community resources as they relate to welfare of children and families. F, S.

- 3324. Dynamics of Family Interaction (3).** Prerequisite: 2.5 TTU 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).** Prerequisites: 2.5 TTU 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).** Prerequisite: 2.5 TTU GPA. Basic principles and skills for parent effectiveness. Includes strategies for inclusion of parents in the developmental-educational processes of the child.
- 3332. Aging in Families (3).** Prerequisite 2.5 TTU GPA. Examination of aging individuals in family context with emphasis on intergenerational relationships and needs that arise from life transitions, living arrangements, employment, and health. F, S.
- 3350. Development in Cross-Cultural Perspective (3).** Prerequisite: 2.5 TTU 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).** Prerequisite: 2.5 TTU GPA. A problem-based approach to community family life education, with particular emphasis on teaching methodologies and professional ethics. F, S.
- 3370. Health, Safety, and Nutrition (3).** Offered online for GP-IDEA majors only. Covers planning, promoting, and maintaining healthy and safe learning/care environments. Topics include childhood illnesses, healthy lifestyles, first aid, food preparation, food allergies, and abuse.
- 3372. Professional Development (3).** Offered online for GP-IDEA majors only. Explores the professional role of teacher, administrator, or advocate in early childhood programs. Covers professionalism and ethics, identifying child abuse, and applying universal precautions.
- 3374. Practicum I (3).** Offered online for GP-IDEA majors only. Prerequisite: C or better in all Block 1 courses. Guided learning experience in an agency that provides services to children and families. Opportunity to implement theories and practices from early childhood classes.
- 3376. Development of Curriculum for Children Ages Birth to Three (3).** Offered online for GP-IDEA majors only. Prerequisite: C or better in all Block 1 courses. Covers assessment and documentation to inform curriculum, planning and evaluation of developmentally appropriate activities, and conveying curriculum information to families.
- 3378. Development of Curriculum for Children Ages Four to Eight (3).** Offered online for GP-IDEA majors only. Prerequisite: C or better in all Block 1 courses. Covers assessment and documentation to inform curriculum, planning and evaluation of developmentally appropriate activities, and conveying curriculum information to families.
- 3379. Assessing Young Children and Their Environments to Enhance Development (3).** Offered online for GP-IDEA majors only. Prerequisite: C or better in all Block 1 courses. Selection, evaluation, and use of appropriate tools for children birth through age eight. Emphasis is on ethics, validity, multicultural sensitivity, and use with special needs.
- 3380. Understanding and Adapting for Developmental Differences (3).** Offered online for GP-IDEA majors only. Prerequisite: C or better in all Block 1 courses. Knowledge of disability conditions, assessment and identification, interventions in inclusive environments, and collaborations among family members and service providers.
- 3381. Practicum II (3).** Offered online for GP-IDEA majors only. Prerequisite: C or better in all Block 2 courses. Guided learning experience in an agency that provides services to children and families. Opportunity to implement theories and practices from early childhood classes.
- 3383. Diversity in the Lives of Young Children and Families (3).** Offered online for GP-IDEA majors only. Prerequisite: C or better in all Block 2 courses. Exploration of cultural diversity in daily life and beliefs in families with young children.
- 3384. Working with Families (3).** Offered online for GP-IDEA majors only. Prerequisite: C or better in all Block 2 courses. Application of an ecological model to the understanding of variation in parental roles, perspectives, relationships, approaches, and challenges.
- 3385. Technology and Young Children (3).** Offered online for GP-IDEA majors only. Prerequisite: C or better in all Block 2

- courses. Examines how technology impacts the development of young children and how technology can be used to enhance teaching and learning.
- 3390. Research Methods in Human Development and Family Studies (3).** Prerequisite: 2.5 TTU GPA. Introduction to methods of research in human development and family studies. F, S. (Writing Intensive)
- 3686. Practicum III: Capstone Experience (6).** Offered online for GP-IDEA majors only. Prerequisite: C or better in Practicum I and II and all Block 1 and 2 courses. Application of developmentally appropriate teaching techniques and skills, actual teaching experience, and development feedback.
- 4000. Individual Study (V1-6).** Prerequisites: 2.5 TTU GPA and consent of instructor. Teaching assistantships, independent coursework, or student-initiated research experience. F, S.
- 4101. Introduction to Child Life (1).** Prerequisites: Junior standing and a C or better in HDFS 3301 or consent of instructor. Theory and practice of child life in medical settings. Topics include assessment, therapeutic play, and psychological preparation. Online course.
- 4306. Preparing Environments for Children (3).** Prerequisites: 2.5 GPA and C or better in HDFS 3311 or 3313. 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.
- 4308. Developing and Evaluating Youth Programs (3).** Prerequisite: HDFS 3316 or equivalent. Expand knowledge and skills in developing and evaluating educational/enrichment experiences for youth audiences in extracurricular learning environments. Includes practical applications and a service-learning component.
- 4310. Managing Early Childhood Programs (3).** Prerequisite: 2.5 TTU 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 TTU GPA, C or better in HDFS 3322, 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).** Prerequisites: 2.5 TTU GPA and C or better in 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).** Prerequisite: 2.5 TTU 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).** Prerequisite: 2.5 TTU GPA. Knowledge and experience in the practice of program development and evaluation. Class evaluates an ongoing program
- 5319. Development in Adulthood (3).** 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).** Group processes; factors influencing personal and family adjustment.
- 5321. Family Theory (3).** 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).** 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).** 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).** 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 Development (3).** Survey of contemporary theory and research on sex/gender and the impact of sex and gender on psychosocial development and relationship processes.
- 5353. Issues and Research in Human Development and Family Studies (3).** History, philosophy, and current issues relevant to the areas of family studies and human development. May be repeated for credit under various topics. See website for topics.
- 5361. Parent-Child and Peer Relationships (3).** Review of current research in parenting and peer relationships and implications for program development.
- 5380. Relationship Development (3).** 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).** Survey of theory and research in adolescent and adult risk-taking behaviors.
- 6330. Family Problems (3).** 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).** Prerequisites: B or better in HDFS 5349 and 3.0 TTU 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).** Current topics in human development across the life course. May be repeated for credit under various topics. See website for topics.
- 6364. Quantitative Methods III in Human Development and Family Studies (3).** Prerequisites: 3.0 TTU GPA and B or better in HDFS 5349, 5351, and 6352. The third course in the quantitative methods sequence focusing on multivariate techniques involving multiple dependent variables in human development and family studies.
- 6365. Quantitative Methods IV in Human Development and Family Studies (3).** Prerequisites: 3.0 TTU GPA and B or better in HDFS 5349, 5351, 6352, and 6364. The final course in a four-course sequence on methods for conducting research through a developmental perspective. A focus on factor analysis, structural equation modeling, HLM, etc.
- 6366. Qualitative Methods in Human Development and Family Studies (3).** Prerequisites: 3.0 TTU GPA and B or better in HDFS 5349 and 5351. This course will provide students with an overview of qualitative research methods in HDFS and will include exposure to qualitative data collection and analyses of data from multiple family members.
- 6370. Analyzing Developmental Data (3).** Prerequisite: C or better in HDFS 5351 and HDFS 6365; or consent of instructor. Statistical methods for analyzing individual and family change over time and time ordered processes of interactional data.
- 6371. Practicum in Human Development and Family Studies (3).** Supervised experiences in professional positions. May be repeated for credit up to 9 hours.
- 6373. Advanced Topics in Family Studies (3).** Current topics in family studies. May be repeated for credit. See website for topics.
- 6390. Program Development and Evaluation (3).** Reviews evaluation issues, critiques evaluation research, and undertakes evaluation of programs.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

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).** 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).** A multidisciplinary introduction to aging and gerontological issues.
- 5310. Theories of Human Development (3).** Introduction to the application of concepts and theories in human development.
- 5311. Problems in Human Development and Family Studies (3).** May be repeated for credit.
- 5313. Psychosocial Development (3).** In-depth study of social, emotional, and psychological growth with emphasis on the development of personal and interpersonal competency.
- 5314. Infant Development (3).** Analysis of empirical research regarding development processes during the first two years of life.
- 5317. Adolescent Development (3).** Multidisciplinary survey of adolescent development including theories, research, and enhancement strategies.

Department of Nutritional Sciences

Nikhil V. Dhurandhar, Ph.D. Chairperson

Professors: Boylan, Dhurandhar, Moustaid-Moussa, Murimi, Oldewaga-Theron, Reed, Spallholz

Associate Professor: Binks, Wang

Assistant Professors: Cooper, Dawson, Hegde, Rahman

Professors of Practice: Fillipp, Kloiber

Instructors: Childress, Pascall, Simnacher

CONTACT INFORMATION: 402 Human Sciences Bldg., 1301 Akron Ave., Box 41270, Lubbock, TX 79409-1270 T 806.742.5270
www.depts.ttu.edu/hs/ns

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Nutrition
- Bachelor of Science in Nutritional Sciences and Dietetics
- Master of Science in Nutritional Sciences
- Doctor of Philosophy in Nutritional Sciences

In addition to the regular degree programs, this department provides a 15-month post-baccalaureate dietetic internship that is accredited by the Accreditation Council for Education and Dietetics (ACEND) of the Academy of Nutrition and Dietetics and meets the Commission on Dietetic Registration (CDR) eligibility requirements for dietetic registration. For more information, see www.depts.ttu.edu/hs/ns.

Mission. The mission of the Department of Nutritional Sciences 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.

Bachelor of Science in Nutrition

This program emphasizes the role of nutrition in the health and well-being of people. The degree prepares competent professionals for nutrition 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 science and health education of students who take the introductory level classes or take additional classes for a minor in nutrition.

Concentrations. A degree in nutrition offers the following concentrations:

- **Preprofessional Health Careers.** This option requires a strong science background supported with courses in chemistry, biochemistry, human anatomy and physiology, and food microbiology/sanitation and safety. Students will study food preparation, science of nutrition, nutrition in the life cycle, medical nutrition therapy, community nutrition, and experimental methods in food preparation. Depending on the student's post-graduate plans, the degree plan may vary to ensure the student has completed all courses required for entrance into a chosen post-graduate program. Transfers into this program must have

a minimum GPA of 3.0. Students may visit with their academic advisor for details.

This option also offers an academic path for individuals interested in medicine, optometry, pharmacy, dental, physical therapy, physician assistant, and other allied health options.

- **Nutrition, Health and Wellness Careers.** This degree track is designed for students interested in a variety of careers in nutrition outside of the clinical setting. Students will study food preparation, science of nutrition, nutrition in the life cycle, sports nutrition, nutrition education, health coaching, nutrition and chronic disease, community nutrition, emerging issues in nutrition. The degree track also includes courses such as human anatomy and physiology, exercise physiology, technical writing, hospitality management, fundamentals of marketing, and writing for the media.

Employment opportunities from this degree are diverse. Potential jobs range from nutritional entrepreneurship to corporate wellness, sales of pharmaceuticals and nutritional formulas, health reporting and media, personal training, cooperative extension, government programs (e.g., Women, Infants, and Children) and various food companies.



- **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

Graduate Program

For information on graduate programs offered by the Department of Nutritional Sciences, visit the Graduate School section of the catalog on page 148.

Curriculum for B.S. in Nutrition with a Concentration in Preprofessional Health Careers

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ZOOL 2404, Human Anat. & Phys. II†§	4
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric§	3
Mathematics Elective*	3	CHEM 1308/1108, Prin. of Chem. II†§	4
CHEM 1307/1107, Prin. of Chem I†	4	NS 1410, Science of Nutrition	4
POLS 1301, American Gov., Org.	3		
TOTAL	14	TOTAL	15
SECOND YEAR			
Fall		Spring	
NS 2310, Princ. of Food Preparation	3	HIST 2300, History of U.S. to 1877	3
POLS 2302, American Public Policy	3	NS 3340, Nutrition in Life Cycle§	3
CHEM 3305/3105, Organic Chem. I†§	4	BIOL 1404, Biology II	4
BIOL 1403, Biology I	4	CHEM 3306/3106, Organic Chem. II†§	4
NS 2380, Cultural Aspects of Foods§	3	MATH 2300, Statistical Methods§	3
TOTAL	17	TOTAL	17
THIRD YEAR			
Fall		Spring	
CFAS 2300, Comm., Civility, & Ethics	3	PHYS 1404, General Physics II	4
NS 3310, Intro. to Med. Nutr. Therapy§	3	HIST 2301, History of U.S. Since 1877	3
NS 3302, Survey of Biochemistry§	3	NS 4320, Nutritional Biochem.§	3
or CHEM 3310, Molecular Biochem.§		NS 4220, Medical Terminology	2
PHYS 1403, General Physics I	4	MBIO 3400, Microbiology	4
ADRS 2310, or HDFS 2322, or PFP 3301	3	or MBIO 3401, Prin. of Microbiology	
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
NS 4340, Medical Nutr. Therapy I§	3	NS 4350, Emerging Issues§	3
NS 4330, Community Nutrition§	3	NS 4341, Medical Nutr. Therapy II§	3
RHIM 4360, Exp. Methods with Foods§	3	Elective	1
NS 3325, ADRS 4329, or FCSE 3303	3	Creative Arts*	3
		Language, Phil., & Culture Elective*	3
TOTAL	12	TOTAL	13

TOTAL HOURS: 120

* Choose from core curriculum requirements.
† Concurrent enrollment is required.
‡ It is highly recommended that students enroll in the in-class (not online) section.
§ Prerequisites apply.

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.

Minor in Nutrition. A student may minor in nutrition by completing a minimum of 18 hours of selected coursework. Specific courses for the nutrition minor are finalized and approved by the student in conjunction with the major and minor advisors. Required courses are NS 1410 (for majors and minors) and five courses from NS 2310, 2380, 3325, 3340, 4220, 4301, 4330, and 4350.

Bachelor of Science in Nutritional Sciences and Dietetics

The nutritional sciences and dietetics degree plan has a strong focus in the sciences, with support courses in chemistry, physiology, mathematics, food microbiology/sanitation and safety. Career courses include nutritional sciences, food preparation, biochemistry, experimental foods, foodservice systems management, medical nutrition therapy and community nutrition.

The program is designed for students who have an interest in food, nutrition, and dietetics and enjoy working with people. Employment opportunities include positions in hospitals, clinics, community agencies, private consulting, long-term care, extension services, foodservice operations, and corporate wellness of fitness centers.

Curriculum for B.S. in Nutrition with a Concentration in Nutrition, Health, and Wellness

FIRST YEAR			
Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Advanced Coll. Rhetoric‡	3
ENGL 1301, Essentials of Coll. Rhetoric	3	NS 1410, Science of Nutrition	4
Mathematics Elective*	3	CHEM 1306/1106, Chem. That Matters†	4
CHEM 1305/1105, Chemical Basics†	4	POLS 2302, American Public Policy	3
POLS 1301, American Gov., Org.	3	ESS 1301, Intro. to Exer. & Sports Sci.	3
TOTAL	14	TOTAL	17
SECOND YEAR			
Fall		Spring	
NS 2310, Princ. of Food Preparation	3	ZOOL 2404, Human Anat. & Phys.‡	4
FDSC 3303, Food Sanitation	3	NS 2330, Nutrition for Health, Fitness	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
ZOOL 2403, Human Anat. & Phys. I	4	CFAS 2300 or or COMS 2358	3
MATH 2300, Statistical Methods‡	3	ENGL 2311, Intro. to Technical Writing	3
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
FCSE 3303 or HDFS 3320	3	NS 2320‡ or 3360‡	3
NS 4220, Medical Terminology§	2	ESS 3305, Exercise Physiology‡	3
NS 3340, Nutrition in the Life Cycle‡	3	ADRS 4329, Eating Disorders‡	3
RHIM 4341, Hospitality Management	3	NS 2380, Cultural Aspects of Food	3
ADRS 2310, Understanding Alcohol, Drugs	3	NS 3325, Sports Nutrition‡	3
TOTAL	14	TOTAL	15
FOURTH YEAR			
Fall		Spring	
NS 4301, Nutr. & Chronic Diseases‡§	3	ESS 3318‡ or ESS 4368‡	3
NS 4350, Emerging Issues in Food Sci‡	3	NS 4330, Community Nutrition†‡	3
MCOM 2320, Writing for Media & Comm.	3	NS 4130, Field Work in Food & Nutr.†	1
CFAS 4300 or HLTH 4307	3	RHIM 4316 or MKT 3301	3
Language, Phil., & Culture Elective*	3	Creative Arts*	3
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

* Choose from core curriculum requirements.
† Concurrent enrollment is required.
‡ Prerequisites apply.
§ Offered online only.

The Didactic Program in Dietetics at Texas Tech University is approved by the Accreditation Council for Education in Nutrition and Dietetics of the Academy of Nutrition and Dietetics, 120 South Riverside Plaza, Ste. 200, Chicago, IL 60606-6995. More information can be found by visiting www.eatright.org/ACEND or calling 312.899.0040. The curriculum is designed to achieve the core knowledge and competencies necessary to prepare graduates for an internship program or to pursue careers in the food, wellness and health, nutrition or foodservice industries.

Acceptance into the Didactic Program in Dietetics is granted after completing 60 hours and is based on an overall 3.0 GPA, an average of a 3.0 GPA after the first three NS courses, and a minimum of a 2.0 GPA in the first three chemistries, as well as human physiology. A list of the exact courses and criteria for acceptance may be found at www.depts.ttu.edu/hs/ns/pdf/DPD_Requirements.pdf. Transfers into this program must have a minimum GPA of 3.0. Once accepted, students are eligible to complete upper-level NS courses. Students who successfully complete the academic program receive a verification statement that qualifies them to apply for a dietetic internship (such as the post-baccalaureate offered at Texas Tech University). The dietetic internship consists of a minimum of 1,200 hours of supervised practice to gain the competencies needed to practice as an entry-level dietitian. Upon completion of the internship, graduates are eligible to take a national examination to become a registered dietitian.

Curriculum for B.S. in Nutrition with Secondary Teacher Certification in Hospitality, Nutrition, and Food Science

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 Gov., Org.	3	NS 1410, Science of Nutrition	4
CHEM 1305/1105, Chemical Basics [†]	4	CHEM 1306/1106, Chem. That Matters [†]	4
FCSE 2102, Intro. to FCS	1		
TOTAL	15	TOTAL	17

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 Anat. & Phys. I	4	CFAS 2300, Comm., Civility, & Ethics	3
ENGL 2311, Intro. to Technical Writing	3	FDSC 3303, Food Sanitation	3
NS 2380, Cultural Aspects of Food [‡]	3	ENGL 2305 or 2306 or 2308 or 2351 or 2388 or 2391	3
NS 2310, Principles of Food Prep.	3	ADRS 2310 or HDFS 2322 or PFP 3301	3
TOTAL	16	TOTAL	15

THIRD YEAR

Fall		Spring	
NS 3340, Nutrition in the Life Cycle [‡]	3	FCSE 4302, Prof. App. in FCS**	3
NS 3325, Sports Nutrition [‡]	3	EDLL 4382, Adolesc., Multiliteracies [†] §	3
RHIM 4341, Hospitality Management [‡]	3	EDSE 4312, Secondary Class. Mgmt. [†] §	3
RHIM 3370, Restaurant Ops. & Mgmt.	3	NS 4330, Community Nutrition	3
FCSE 3301, Foundations of FCS [‡]	3	Creative Arts*	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
FCSE 4308, Research and Eval. in FCS [§]	3	FCSE 4012, Student Teaching in FCS [§]	12
FCSE 4306, Career Preparation in FCS [§]	3		
HUSC 3350, Special Topics	3		
RHIM 4360, Exp. Methods with Food [‡]	3		
NS 4350, Emerging Iss. in Food & Nutr. [‡]	3		
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

* Choose from core curriculum requirements.

† Concurrent Enrollment is required.

‡ Prerequisites or restrictions apply.

§ Admission to Teacher Certification (Education) Program and a minimum 2.75 GPA required (www.edu.ttu.edu)

NOTE: FCSE 3301 requires application and advisor approval.

Curriculum for Bachelor of Science in Nutritional Sciences and Dietetics

This is a six-semester sequenced curriculum. Courses must be taken in sequence as indicated by the prerequisites and semesters offered. Acceptance into the Didactic Program in Dietetics at the junior level is based on an overall 3.0 GPA, a 3.0 GPA in NS courses, and a 2.0 GPA in CHEM and ZOOL courses. For more information see www.depts.ttu.edu/hs/ns/undergraduate/bnsnd.php.

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	NS 1201, Introduction to Dietetics	2
HIST 2300, History of U.S. to 1877	3	NS 1410, Science of Nutrition [‡]	4
CHEM 1307/1107, Princ. of Chem. I [†] ‡	4	CHEM 1308/1108, Princ. of Chem. II [†] ‡	4
TOTAL	14	TOTAL	16

SECOND YEAR

Fall		Spring	
HIST 2301, History of U.S. Since 1877	3	ENGL 2311, Intro. to Technical Writing	3
RHIM 3322, Hospitality Control II [‡]	3	FDSC 3303, Food Sanitation	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
NS 2310, Prin. of Food Preparation	3	ZOOL 2404, Human Anat. and Phys. II	4
CHEM 2303/2103, Intro. Organic Chem. [†] ‡	4	CFAS 2300 or COMS 2358	3
TOTAL	16	TOTAL	16

THIRD YEAR

Fall		Spring	
NS 3302, Survey of Biochemistry [‡]	3	NS 3411, Dietetic Counseling Strat. [‡]	4
RHIM 3390, Purchasing in Hosp. Ind. [‡]	3	NS 3325, or ADRS 4329, or FCSE 3303	2
NS 3340, Nutrition in the Life Cycle [‡]	3	NS 4220, Medical Terminology	3
RHIM 4341, Hospitality Management [‡]	3	NS 4320, Nutritional Biochemistry [‡]	3
NS 3310, Essen. of Dietetic Practice [‡]	3	NS 2380, Cultural Aspects of Food [‡]	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
NS 4340, Medical Nutritional Therapy I [†] ‡	3	Language, Phil., & Culture Elective*	3
NS 3470, Institutional Food Systems [‡]	4	NS 4341, Medical Nutr. Therapy II [‡]	3
NS 4201, Professional Issues in Diet. [‡]	2	NS 4350, Emerging Issues in Food Sci. [‡]	3
Creative Arts*	3	RHIM 4360, Experimental Meth. w/Foods [‡]	3
NS 4330 /4130, Community Nutr. & Field [†] ‡	4		
TOTAL	16	TOTAL	12

TOTAL HOURS: 120

NOTE: It is highly recommended that students enroll in the in-class (rather than the online) section of ZOOL 2404.

* Choose from core curriculum requirements.

† Concurrent enrollment is required.

‡ Prerequisites apply.

Course Descriptions

(To interpret course descriptions, see page 23.)

Nutritional Sciences (NS)

Undergraduate Courses

- 1201. **Introduction to Dietetics (2)**. Prerequisite: NS Dietetic majors only; 2.5 TTU GPA. Introduction to the field of dietetics including registration, ethical, legal, and professional issues. S.
- 1325. **[BIOL 1322, 1323; HECO 1322] Nutrition, Foods, and Healthy Living (3)**. No nutrition or nutritional sciences and dietetics 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)**. Study of the nutrients found in foods and utilization of those nutrients by the body. Designed to convey the basic principles of nutritional science. Partially fulfills core Life and Physical Sciences requirement. F, S.
- 2310. **[HECO 1315] Principles of Food Preparation (3)**. Prerequisite: Nutrition, nutritional sciences and dietetics majors, minors, and concentrations only. Application of scientific principles to food preparation.. F, S.
- 2320. **Fundamentals of Human Health Behavior Change (3)**. Behavioral and psychological theory that forms the basis for assisting and motivating people to make health behavior changes. S.
- 2330. **Nutrition for Health, Fitness and Sport (3)**. Introduces students to nutrients, their content in food, energy utilization, and their role in health, fitness and sports. Particular attention

will focus on body weight, weight loss and weight gain through nutrition and exercise.

- 2350. **Medical Physiology (3)**. Concepts of normal nutrition in relation to the biochemistry and physiology of the human body.
- 2380. **Cultural Aspects of Food (3)**. Prerequisite: Sophomore standing. A study of the historical, social, psychological, economic, religious, and aesthetic significance of food customs in various cultures. Fulfills multicultural and core Social and Behavioral Sciences requirement. (Writing Intensive)
- 3302. **Survey of Biochemistry (4)**. Prerequisites: C or better in CHEM 2303 and 2103 or CHEM 3305 and 3105, nutrition and nutritional sciences and dietetics majors only. Survey of general biochemistry.
- 3310. **Introduction to Medical Nutrition Therapy (3)**. Prerequisites: Nutrition, nutritional sciences and dietetics majors only; C or better in NS 1410 or 2420; CHEM 2303 or 3305; ZOOL 2402 or 2403 or 2404; 2.75 TTU GPA; Didactic Program in Dietetics approval. Role of dietitian in modern health care system, including the legal aspects of the health care industry. Techniques of assessment, nutrition care planning, and documentation.
- 3325. **Sports Nutrition (3)**. Prerequisite: C or better in NS 1325 or 1410 and ZOOL 2403 or 2404. Nutrition concepts and applied nutritional practices for the competitive and amateur athlete and physically active individual. F, S.
- 3340. **Nutrition in the Life Cycle (3)**. Prerequisites: Junior standing, C or better in NS 1410 or 2420. Didactic Program in Dietetics approval. Factors that affect diet and nutrition throughout the life cycle. F, S.
- 3360. **Nutrition Education (3)**. Prerequisite: C or better in NS 1410 or 2420. Nutritional sciences (NTRN) majors only. Nutrition education and resources for diverse populations across the lifespan.

- 3411. Dietetic Counseling Strategies (4).** Prerequisites: NSGD majors only, C or better in NS 3310. Application of interviewing, counseling, and educational techniques in dietetics, including individual and group methods. S.
- 3470. Institutional Food Systems Management (4).** Prerequisites: C or better in NS 2310 and 3310. Nutrition dietetics majors only. Overview of institutional food management, including cycle menus, delivery systems, meeting special diet needs, and quality improvement of the facility. F.
- 4000. Individual Study (VI-6).** Prerequisite: Written consent of supervising faculty member. May be repeated for up to 6 hours credit.
- 4130. Field Work in Food and Nutrition (1).** Prerequisite: C or better in NS 3340 and either 1410 or 2420. 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).** Prerequisites: Nutritional sciences and dietetics majors only; C or better in NS 3310, 3.0 GPA, junior standing. Final fall semester prior to graduation; for dietetic nutrition majors only. Prepares students for professional careers in dietetics and/or dietetic internships. F.
- 4220. Medical Terminology (2).** Prerequisite: Junior Standing; NSCD, NSCI, and NTRN majors only. 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 (online only).
- 4301. Nutrition and Chronic Diseases (3).** Prerequisites: C or better in NS 1410 or 2420 and NS 3340. No nutrition or nutritional sciences and dietetics majors. Introduction to the role of nutrition in the development and management of chronic diseases. Online. F.
- 4320. Nutritional Biochemistry (3).** Prerequisite: C or better in ZOOL 2403 or 2404 and NS 3302 or 3402 or CHEM 3310. Concepts of normal nutrition in relation to the chemistry and physiology of the human body.
- 4330. Community Nutrition (3).** Prerequisite: C or better in NS 3340 and NS 1410 or 2420; corequisite: NS 4130 or of nutrition-related problems in the community and the various resources, activities, agencies, and programs involved in health promotion and disease prevention. (Writing Intensive) F, S.
- 4340. Medical Nutritional Therapy I (3).** Prerequisites: C or better in ZOOL 2403 or 2404; NS 3310 and NS 3302, NS 3402, or CHEM 3310. 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, S.
- 4341. Medical Nutritional Therapy II (3).** Prerequisites: C or better in NS 3310, 4220, 4340; and either ZOOL 2403 or 2404. 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).** Prerequisites: C or better in NS 1410 or 2420 and 3340; senior standing. Readings, discussion, and analysis of trends and developments in food science and nutrition. (Writing Intensive) F, S.

Graduate Courses

- 5000. Independent Study in Nutrition (VI-6).** Independent study in nutrition. May be repeated for credit.
- 5118. Seminar (1).** May be repeated for credit.
- 5311. Problems in Nutrition (3).** May be repeated for credit.
- 5313. Clinical Nutrition Applications (3).** Prerequisite: C or better in NS 5601 (concurrent enrollment allowed). Dietetic internship students present case studies related to their internship experiences.
- 5315. Nutrition Education (3).** Nutrition education and resources for a diverse population across the lifespan.
- 5327. Lipids in Nutrition (3).** Structure, function, requirement digestion, absorption and metabolism of lipids; and current research in lipids.
- 5329. Minerals in Nutrition (3).** Prerequisite: C or better in NS 4320 or instructor consent. Study of minerals and their interrelationships in nutrition.
- 5330. Introduction to Nutrition Research (3).** 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).** Current issues in human nutrition with emphasis on interrelationships of nutrients in metabolism and their impacts on health.
- 5333. Vitamins in Nutrition (3).** Study of essential vitamins and factors affecting vitamin utilization.
- 5334. Advanced Medical Nutrition Therapy (3).** Physiological and metabolic bases for dietary modification in disease including assessment of biochemical and anthropometric indicators.
- 5335. Issues in Sports Nutrition (3).** Current issues in sports nutrition with emphasis on physiology of exercise, physical activity, and athletes.
- 5336. Nutritional Assessment and Data Interpretation (3).** Methods, techniques, and data interpretation for assessing nutritional status of individuals and groups.
- 5345. Nutrition and Sustainability of Global Food Supplies (3).** Examination of sustainable nutrition practices and global food issues such as starvation and malnutrition.
- 5350. Nutritional Pathophysiology (3).** 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).** Prerequisite: Consent of instructor. Study of community nutrition needs, resources, policies, programs, and applications of skills in health promotion.
- 5365. Vitamins and Minerals (3).** Sources and requirements, deficiencies and toxicities, vitamins and minerals in gene regulation and metabolism, DNA methylation, vitamins and minerals in health promotion and disease prevention.
- 5380. Carbohydrates and Proteins in Nutrition (3).** Carbohydrate and protein structure, function, synthesis, requirement, digestion, absorption and metabolism; and current research in carbohydrates and proteins.
- 5601. Internship in Dietetics (6).** 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 (VI-6).**
- 6118. Seminar (1).** Graduate-level seminar.
- 6310. Nutrition Education (3).** Nutrition education and resources for diverse population across the lifespan.
- 6315. Genetic Regulation of Metabolism (3).** Study of molecular-genetic regulation of metabolism with an emphasis on mammalian species, genetically modified animals, and human metabolic disease.
- 6318. Maternal and Child Nutrition (3).** Overview of the major nutrition issues, policies, and intervention programs for women and children in the United States and globally.
- 6320. Nutritional Epidemiology (3).** Examines methodologies used in nutritional epidemiological studies and reviews the current state of knowledge regarding diet and other nutritional indicators as etiologic factors in disease.
- 6325. Nutrition, Exercise, and Sport (3).** The study and application of nutrition as it relates to the physiology of exercise, physical activity, and individual and team sport athletes.
- 6330. Sports Supplements and Ergogenic Aids (3).** The study and application of supplements and ergogenic aids as they relate to the physiology of exercise, physical activity, and individual and team sport athletes.
- 6335. Motivating Health Behavior—Coaching Theory and Application (3).** The study of behavioral and psychological theory for assisting and motivating clients and the application of these theories in the context of health coaching with various patients.
- 6340. Nutrition and Chronic Disease (3).** Examination of nutrition-related chronic diseases, including cardiovascular disease, cancer, diabetes, and obesity.
- 6345. Nutrition Immunology (3).** Topics include immune system, vitamins and minerals in immune function, nutrition, immunity and diseases, impact of alcohol and smoking on immune function, aging and immunity.
- 6350. Advanced Research Methods (3).** Presentations and discussions about research methods across various areas of nutrition and biological sciences.
- 7000. Research (VI-12).**
- 8000. Doctor's Dissertation (VI-12)**

Department of Personal Financial Planning

Vickie Hampton, Ph.D., Chairperson

Professors: Finke, Hampton, James

Associate Professors: Gilliam, Gustafson, Huston, Kalenkoski, Katz, Lauderdale, Salter

Assistant Professors: Browning, Mulholland

Professor of Practice: Evensky

Instructors: Barnhill

CONTACT INFORMATION: 260 Human Sciences Bldg., 1301 Akron Ave., Box 41210, Lubbock, TX 79409-1210, T 806.742.5050, F 806.742.5033, www.depts.ttu.edu/pfp

About the Program

The Department of Personal Financial Planning 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
- Graduate Certificate in Charitable Financial Planning
- Graduate Certificate in Personal Financial Planning

Dual Degree Program

- Master of Science in Personal Financial Planning/Master of Business Administration
- Master of Science in Personal Financial Planning/Master of Science in Accounting
- Master of Science in Personal Financial Planning/Doctor of Jurisprudence

Mission and Vision. The mission of the Department 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 department 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 Department of Personal Financial Planning will do 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 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 program features extensive

coursework in financial planning in addition to courses in business, accounting, economics, and communications. 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. The program also requires a paid residency 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 9 hours of graduate coursework in personal financial planning to count towards the undergraduate degree and the master's degree.

Minors. Two minors are available within the Department of Personal Financial Planning. A student may minor in personal financial planning (PFP) by completing a minimum of 28 hours to satisfy the education requirements set by the CFP® Board of Standards. A student who is not interested in meeting the CFP Board education requirement but wants to work in an affiliated profession may minor in personal finance (PFI) by completing a minimum of 18 hours from selected courses. Some of the minor is offered online only.

Course Descriptions

(To interpret course descriptions, see page 23.)

Personal Finance (PFI)

Undergraduate Courses

- 1101. Money for College Students (1).** Introduces basic financial decision-making regarding spending plans and use of consumer credit. Not for credit towards a PFP major. Distance and on campus. F, S, SS.
- 1302. Cultural and Gender Diversity in Personal Finance (3).** Introductory study of financial attitudes and behaviors affected by culture and gender, including financial issues related to career choice, debt accumulation, and expenditure patterns of affected groups in the United States. Fulfills multicultural requirement. F, S.
- 1305. Life, Love, and Money (3).** Examines the interconnected behaviors among various human relationships and money to improve decision-making abilities in the areas of money, relationships, time, and values. Fulfills core Social and Behavioral Sciences requirement. F, S, SS.
- 2101. Money Management Basics: Major Purchases and Insurance (1).** For nonmajors only. Introduction to basic financial decision making regarding the acquisition of transportation, housing, and other major purchases and ways to protect assets through the use of various types of insurance.
- 2301. Personal Financial Literacy (3).** Focuses on developing a financially literate citizen who is capable of making sound financial decisions based on financial and life goals.

Graduate Program

For information on graduate programs offered by the Department of Personal Financial Planning, visit the Graduate School section of the catalog on page 149.

Curriculum for Bachelor of Science in Personal Financial Planning

FIRST YEAR

Fall		Spring	
HUSC 1100 or IS 1100	1	ENGL 1302, Adv. College Rhetoric*	3
ENGL 1301, Essentials of Coll. Rhet.	3	MATH 1331, Intro. Math. Analysis*	3
MATH 1330, Intro. Math. Analysis*	3	PFP 3301, Intro. to Personal Finance	3
CFAS 2300, Commun., Civility & Ethics	3	ECO 2301, Princ. of Economics I	3
POLS 1301, American Govt., Org.	3	Life & Physical Sciences†	4
PFP 1115, Intro. to PFP	1		
TOTAL	14	TOTAL	16

SECOND YEAR

Fall		Spring	
PHIL 2320, Introduction to Ethics†	3	POLS 2302, American Public Policy	3
ENGL 2311, Intro. to Tech. Writing*	3	ACCT 3307, Income Tax Acct.*	3
ACCT 2300, Financial Accounting*	3	PFP 3321, Fin. Couns. & Cons. Credit	3
MATH 2345, Intro. to Statistics*	3	ECO 2302, Principles of Economics	3
PFP 2315, PFP for Professionals*	3	PFP 2333, Legal & Reg. Asp. of PFP*	3
TOTAL	15	TOTAL	15

THIRD YEAR

Fall		Spring	
PFP 3378, Estate Planning*	3	PFP 3497, Risk Mgmt. & Ins. Plan.*	4
PFP 3330, Comm. & Couns. Skills*	3	PFP 3350, Ind. Tax Planning Topics*	3
PFP 3376, Fund. of Asset Mgmt.*	3	Creative Arts†	3
PFP 3374, Retirement Planning*	3	PFP 3298, Prof. Develop. in PFP II*	2
PFP 3198, Prof. Develop. in PFP I*	1	PFP 3386, Wealth Management*	3
TOTAL	13	TOTAL	15

SUMMER

PFP 3399 Prof. Residency in PFP*	3
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FOURTH YEAR

Fall		Spring	
PFP 4175, Special Topics in PFP	1	PFP 4370, PFP Capstone*	3
HIST 2300, History of U.S. to 1877	3	PFP Elective (see advisor)	5
PFP 4367, Mktg., Sales, & Soc. Media	3	HIST 2301, Hist. of U.S. Since 1877	3
PFP 4380, Prof. Technology in PFP*	3	PFP 4175, Special Topics in PFP	1
Life & Physical Sciences†	4	Human Sciences Core Elective‡	3
TOTAL	14	TOTAL	15

TOTAL HOURS: 120

* Prerequisites apply.

† Choose from core curriculum requirements.

‡ HS core choose 1 course from ADRS 2310, NS 1325, HDFS 2322.

- 3101. Money Management Basics: Personal Investing (1).** Not for credit towards the PFP major, PFP minor, or CFP® educational requirements. Introduces common savings and investment vehicles and strategies used by individuals and families to meet their financial goals.
- 3301. Introduction to Personal Finance (3).** Introduction to personal finance, including goal setting, cash management, credit, insurance, taxes, housing, investment alternatives and retirement plans. Distance and on-campus. F, S, SS.
- 3321. Personal Finance: Financial Counseling and Consumer Credit (3).** Introduces students to the financial counseling process and provides a detailed examination of various types of consumer credit and strategies to manage debt. Distance, face-to-face, and service-learning. F, S, SS.
- 3341. Personal Finance: Financial Goal Strategies (3).** Examines the process related to achieving major financial goals, including emergency fund planning, purchasing/leasing automobiles, buying/renting housing, and funding education and retirement. Distance. F, S, SS.
- 3361. Personal Finance: Managing Risk (3).** Focuses on the concepts of risk management and how to plan for managing risk, including building cash reserves, investing in human capital, and purchasing insurance. Also covers employee benefits, government entitlements, and estate planning. Distance. F, S, SS.
- 3381. Personal Finance: Investing (3).** Focuses on the fundamentals of personal investing to meet financial goals, including cash management, investing terminology, risk and return, tax impli-

cations of investments, stocks and bonds, mutual funds and exchange traded funds, portfolio management, and retirement income management. Distance. F, S, SS.

- 4101. Getting Your First Job (1).** Introduces practical financial choices regarding employee benefits when starting a career, including basic understanding of job searching, tax planning, investment options, and risk management. Not for credit towards the PFP major, PFP minor, or CFP® educational requirements. Distance and on campus. F, S, SS.
- 4361. Personal Finance: Advanced Topics and Case Studies (3).** Prerequisites: PFP 3301, 3321, 3341, 3361, and 3381. Students are expected to develop a sound financial plan; analyze information; justify financial decisions; and describe the process used to track, evaluate, and adjust financial plans to meet goals. Distance. F (Writing Intensive)

Graduate Course

- 5322. Introduction to Applied Personal Finance (3).** Survey course in personal financial planning for any students wanting to use this information in their personal and professional lives. Distance and on-campus. F, S, SS, Study Abroad.

Personal Financial Planning (PFP)

Undergraduate Courses

- 1115. Introduction to Personal Financial Planning (1).** Prerequisite: PFP major. An introductory course to the PFP major. Topics include advising, study techniques, involvement in the program and profession, academic integrity, professionalism, student motivation, and networking. F, S.
- 2315. Personal Financial Planning for Professionals (3).** Prerequisite: PFP majors and minors only; C or better in PFP 3301. Prerequisite or corequisites: PFP 1115, any 1000- or 2000-level MATH course, ACCT 2300, and ECO 2301 or 2302 with a grade of C or better. Introduction to personal financial planning, including goal setting, cash management, credit, housing, education planning, and selected professional issues. F, S.
- 2330. Financial Problem Solving (3).** Prerequisite or corequisite: PFP 2315. Methods and skills to assist individuals and families in resolving financial problems. Addresses personal and professional attitudes and behaviors toward money.
- 2333. Legal and Regulatory Aspects of Personal Financial Planning (3).** Prerequisite or corequisite: PFP 2315 and 3301, PFP majors and minors only. Application of law, ethics, and regulatory policies to personal financial planning. S.
- 3198. Professional Development in Personal Financial Planning I (1).** Prerequisite: 2.8 TTU GPA; C or better in PFP 2315 (concurrent enrollment allowed). Topics on professional development in preparation for PFP 3399. Enrollment precedes PFP 3298 and 3399. (Writing Intensive) F.
- 3210. Professional Field Experience (2).** Prerequisites: 2.8 GPA, C or better in PFP 2315; PFP majors or minors only. 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. This is a pass/fail course. F, S.
- 3298. Professional Development in Personal Financial Planning II (2).** Prerequisite: 2.8 TTU GPA; C or better in PFP 3198 and PFP 2315 (concurrent enrollment allowed). Preparation for internship experience. Advanced topics in business models, back office, and staffing. Includes 30 hours of volunteer work with VITA to give students client experience before professional residency. Enrollment precedes PFP 3399. (Writing Intensive) S.
- 3301. Introduction to Personal Finance (3).** Introduction to personal finance, including goal setting, cash management, credit, insurance, taxes, housing, investment alternatives, and retirement plans. Distance and on campus. F, S, SS.
- 3321. Personal Finance: Financial Counseling and Consumer Credit (3).** Introduces the financial counseling process and examines types of consumer credit. Distance. F, S, SS. (Writing Intensive)

- 3330. Communication and Counseling Skills for Financial Planners (3).** Prerequisites: C or better in PFP 2330 or 3321 and ENGL 2311; 2.8 GPA; PFP majors and minors only. A self-discovery class, with an introduction to counseling and communication techniques, as well as interviewing strategies for use in financial counseling and planning settings. Emphasizes the importance of communication processes in helping individuals and families. F (Writing Intensive)
- 3350. Individual Tax Planning Topics (3).** Prerequisites: 2.8 GPA; C or better in PFP 2315 and 3378, ACCT 3307. For majors or minors only. Study of the impact of federal and state taxation on personal financial planning decisions. S.
- 3374. Retirement Planning (3).** Prerequisites: 2.8 GPA; C or better in PFP 2315, ACCT 3307, and ENGL 2311. Prerequisite or corequisite: PFP 3376. A foundation course in retirement planning. Topics include corporate and individual retirement plans, planning strategies to meet client goals, and retirement income management. F.
- 3376. Fundamentals of Asset Management (3).** Prerequisites: 2.8 GPA, C or better in MATH 2345, PFP major, minor or instructor consent. Focuses on the theory and practice of investment analysis with a special emphasis on the basic tools, techniques, and methodologies employed by financial planners. F.
- 3378. Estate Planning (3).** Prerequisites: 2.8 GPA; PFP 2315. Prerequisite or corequisite: ACCT 3307. Application of estate planning methodologies and policies to personal financial planning. F.
- 3386. Wealth Management (3).** Prerequisites: 2.8 GPA, C or better in PFP 3376 and ACCT 3307. Theory and practice of wealth management, including modern portfolio design and implementation, evaluation and use of risk tolerance, tax management, behavioral finance, product evaluation and selection, and regulatory issues. S.
- 3398. Professional Development in Personal Financial Planning (3).** Prerequisites or corequisites: C or better in PFP 3374, 3376, 3378, and 3497; 2.8 GPA. Prerequisite or corequisite: PFP 2330. Preparation for internship experience. Business models, back office and staffing. Includes 30 hours of volunteer service work with VITA to give students client experience before internships. S.
- 3399. Professional Residency in Personal Financial Planning (3).** Prerequisites: C or better in PFP 3198 and 3298 (or 3398 in lieu of both), 3374, 3376, 3378, and 3497; 2.8 GPA. Supervised residency experiences in established career-related positions in the financial planning field. SS.
- 3497. Risk Management and Insurance Planning (4).** Prerequisites: 2.8 GPA, C or better in PFP 2315, ENGL 2311. Explores the application of risk management and insurance planning for individuals in the personal financial planning environment. F.
- 4000. Individual Study (V1-6).** Prerequisites: 2.8 GPA and instructor consent. 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).** Prerequisites: PFP major or minor; 2.8 GPA. Study of special topics in personal financial planning. May be repeated for up to 6 hours when topics vary. This is a pass/fail course. F, S.
- 4325. Introduction to Charitable Giving (3).** Prerequisite: C or better in PFP 3378, 2.8 TTU GPA. Introduces students to the techniques and tax laws of charitable planning. F.
- 4367. Marketing, Sales, and Social Media in Personal Financial Planning (3).** Prerequisites: PFP 2315, 3374, 3376, 3298 or 3398. Provides a global introduction to the sales and marketing techniques available to advisors, a web presence, marketing materials, and social media vehicles. F.
- 4370. Personal Financial Planning Capstone (3).** Prerequisites: 2.8 TTU GPA; C or better in PFP 3374, 3376, 3378, 3298 or 3398, 3399, 3497. Prerequisites or corequisites: C or better in PFP 3330 and 4380. Integrates the financial planning content areas into the development of comprehensive financial plans. Coursework includes case studies and work with clients. F, S.
- 4377. Practicum in Personal Financial Planning (3).** Prerequisites: 2.8 GPA and instructor consent. Supervised experience designed to prepare the student for a career in financial planning/counseling. F, S.
- 4380. Professional Technology in Personal Financial Planning (3).** Prerequisites: 2.8 GPA; C or better in ACCT 3307, PFP 3374, 3376, 3378, 3386, and 3497. Advance coursework in professional software packages for financial planning and investment portfolio applications. F, S.

Graduate Courses

- 5000. Individual Study in Personal Financial Planning (V1-6).** 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 up to 6 hours credit. F, S.
- 5115. Seminar in Personal Financial Planning (1).** Prerequisite: PFP major. An introductory course to the graduate PFP major. Topics will include advising, involvement in the program and profession, academic integrity, professionalism, student motivation, and networking. F, S.
- 5175. Special Topics in Personal Financial Planning (1).** Prerequisites: 3.0 GPA, PFP major, dual degree, or consent of instructor. Study of special topics in personal financial planning. May be repeated for up to 6 hours when topics vary. This is a pass/fail course. F, S.
- 5189. Professional Development in Personal Financial Planning I (1).** Prerequisite or corequisite: C or better in PFP 5371. Topics on professional development in preparation for PFP 5399. Enrollment precedes PFP 5289 and 5399.
- 5210. Professional Field Experience (2).** Prerequisite: C or better in 6 hours of PFP courses, PFP major, dual degree, or instructor consent. 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. This is a pass/fail course. F, S.
- 5289. Professional Development in Personal Financial Planning II (2).** Prerequisite or corequisite: C or better in PFP 5371 and 5189. Preparation for internship experience. Advanced topics in business models, back office staffing. Includes 30 hours of volunteer work with VITA to give students client experience before internships. Enrollment precedes 5399. S.
- 5311. Independent Study in Personal Financial Planning (3).** 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.
- 5320. Legal and Regulatory Aspects of Personal Financial Planning (3).** Prerequisite or corequisite: PFP 5371, PFP major, dual degree student, or consent of instructor. Application of law, ethics, and regulatory policies to personal financial planning. S.
- 5325. Introduction to Charitable Giving (3).** Introduces students to the techniques of charitable planning as viewed from the perspective of donors, financial planners, and fundraising professionals. F.
- 5326. Advanced Charitable Planning (3).** Review of sophisticated charitable planning techniques with a special emphasis on creative uses of private foundations, donor advised funds, charitable remainder trusts, and advanced charitable estate planning techniques. S.
- 5327. Charitable Giving: Research, Theory and Marketing (3).** Review of research findings and theoretical models of charitable giving from the academic literature. Focuses on determinants and motivations in charitable giving with an emphasis on applying these findings in a professional context for financial advisors and fundraising professionals. F.
- 5341. Economic Principles of Financial Decision Making (3).** Covers the key microeconomic and macroeconomic principles related to financial decision making. S, SS.
- 5350. Individual Tax Planning Topics (3).** Prerequisites: C or better in PFP 5371 and ACCT 5311. Studies legal research skills and the impact of federal and state tax regulations on personal financial planning decisions. S, SS.
- 5360. Economics of Retirement (3).** Analysis of individuals' retirement decisions from an economic perspective. Labor supply theory will be heavily utilized. Taxes, social security, and other government policies and programs will be discussed as they relate to individuals' decision making. F.

5362. **Fundamentals of Asset Management (3)**. Prerequisite: PFP major, dual degree or consent of instructor. Investment management concepts in a personal financial planning context; client goals, expectations, and risk tolerance; capital markets; investment alternatives; security valuation; risk assessment; and portfolio management concepts. F, SS.
5365. **Financial Life Planning (3)**. Examines the topics of financial planning around the unique life transitions, goals and fiscal philosophy within individual client settings.
5367. **Marketing, Sales, and Social Media in Personal Financial Planning (3)**. Prerequisite: PFP 5371. Provides a global introduction to sales and marketing techniques available to advisors. Students will create a complete marketing strategy, including a web presence, marketing materials, and social media vehicles. S.
5371. **Fundamentals of Personal Financial Planning (3)**. Prerequisites or corequisites: PFP 5115 and 5322, 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. F, S, SS.
5372. **Wealth Management (3)**. Prerequisites: PFP 5362 or FIN 5325 and ACCT 5311 or LAW 6434 with a grade of C- or higher. Theory and practice of wealth management to include concepts of modern portfolio design and implementation, tax management, behavioral finance, product evaluation and selection, and regulatory issues. F, S.
5373. **Personal Financial Planning Capstone (3)**. Prerequisites: C or better in PFP 5362 or FIN 5325, and PFP 5371. Prerequisites or corequisites: C or better in PFP 5372, 5380, 5394, 5497, 5398 or LAW 6227; ACCT 5311 or LAW 6434. Techniques and methods for utilizing financial planning practice standards in the development of comprehensive financial plans for clients. F, S.
5377. **Client Communication and Counseling (3)**. Prerequisite: PFP majors only, dual degree students, or consent of instructor. Using self-discovery, students will explore and apply theory, counseling fundamentals, and communication techniques for effective interactive client communication in financial planning and counseling. Addresses personal relationships with money, including emotions, beliefs, and behaviors. S, SS.
5379. **Practice Management in Personal Financial Planning (3)**. Prerequisite: PFP 5371. Provides a global introduction to the process of creating, developing, and managing a successful financial planning practice. Students will create a business and marketing plan, using real industry data and techniques as a case study for profitable practices.
5380. **Professional Technology in Personal Financial Planning (3)**. Prerequisite or corequisite: C or better in PFP 5372, 5394, 5497, 5398 or LAW 6227; ACCT 5311 or LAW 6434, PFP major, dual degree student, or consent of instructor. Advanced studies in professional software packages for financial planning and investment portfolio applications. F, S.
5385. **Behavioral Finance from a Personal Financial Planning Perspective (3)**. Introduces concepts in behavioral finance that relate to an individual's decision making within the area of personal financial planning. S.
5389. **Professional Development in Personal Financial Planning (3)**. Prerequisite: Completion or concurrent enrollment in PFP 5371 with a grade of C or better. Preparation for internship experience. Advanced topics in business models, back office and staffing. Includes 30 hours of volunteer work with VITA to give students client experience before internships. Enrollment precedes PFP 5399.
5390. **Practicum in Personal Financial Planning (3)**. Prerequisites: GPA of 3.0 and instructor consent. Supervised experience designed to prepare the student for a career in financial planning/counseling. May be repeated for up to 6 hours credit. F, S.
5394. **Retirement Planning (3)**. Prerequisites: C or better in PFP 5371 and ACCT 5311. Prerequisite or corequisite: C or better in PFP 5362. 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, SS.
5398. **Estate Planning (3)**. Prerequisites: C or better in PFP 5371 and ACCT 5311; PFP major, dual degree student, or consent of instructor. Application of estate planning methodologies and policies to personal financial planning. F, SS.
5399. **Professional Residency in Personal Financial Planning (3)**. Prerequisite: C or better in PFP 5189 and 5289. Supervised residency experiences in established career-related positions in the financial planning field. SS.
5497. **Risk Management and Insurance Planning (4)**. Prerequisite or corequisite: PFP 5371. Explores risk management theory, personal risk analysis, and financial loss prevention with private insurance. F, S.
6000. **Master's Thesis (V1-6)**.
6101. **Academic Leadership in Personal Financial Planning (1)**. Seminar focusing on leadership in the academic setting, including teaching, research, and service.
6301. **Academic Leadership in Personal Financial Planning (3)**. Prerequisite: Ph.D. student in PFP program or consent of instructor. Addresses a wide selection of topics and issues related to teaching, research, and service/outreach.
6305. **Introduction to Ph.D. Studies in Personal Financial Planning (3)**. Prerequisite: PFP major. Provides an introduction to doctoral study in personal financial planning. Includes an explanation of the unique program of study in PFP, culture, expectations, professional development, and the research process. F.
6330. **Seminar in Research and Philanthropic Fund Development (3)**. Prerequisite: PFP 6377. 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.
6340. **Development and Pedagogy of Distance Education Courses (3)**. Prerequisite: Ph.D. student in PFP program or consent of instructor. Focuses on the development and pedagogy of classes specifically designed to enhance personal financial literacy and personal financial planning primarily within an online environment.
6374. **Household Economic Theory (3)**. Prerequisites: Doctoral standing in the PFP division and C or better in PFP 5341. Personal financial planning doctoral students are required to have an understanding of the household from an economic perspective. Consumption, saving, and investment behavior are the topics of focus.
6377. **Research Methods I (3)**. Prerequisites: PFP 6305 and 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.
6378. **Research Methods II (3)**. Prerequisite: PFP 6377. A continuation of Research Methods I. Students will be expected to formulate and conduct scientific research as well as prepare a manuscript to communicate the results of their research study.
6381. **Research Seminar in Asset Management (3)**. Prerequisite: PFP 6374. Introduces the theory of investment, literature and theory describing the unique process of household investment decision-making, quantitative investment analysis and the instruments used to construct an efficient household portfolio.
6383. **Seminar in Regulatory Policy (3)**. Review of theory and academic literature related to the regulation of professional financial advice and analysis of the current regulatory structure governing financial planning services.
6395. **Financial Planning Program Development Seminar (3)**. Seminar focusing on the development and management of high-quality, university-level programs in personal financial planning.
6397. **Research Seminar in Personal Financial Planning (3)**. 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)**. 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)**.

College of Media and Communication

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About the College

The College of Media and Communication is one of the largest media and communication undergraduate programs in the United States. Texas Tech University is recognized as a leader among the nation's elite media and communication programs with an undergraduate curriculum that emphasizes a broad-based communication education to prepare students for rapid changes in information/communication industries. The college offers internship information 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 undergraduate and graduate programs prepare students for careers in professional areas of mass communications and higher education, including faculty positions at other universities.

Degree Programs

The college supervises the following degree programs:

- Bachelor of Arts in Advertising
- Bachelor of Arts in Communication Studies
- Bachelor of Arts in Electronic Media and Communications
- Bachelor of Arts in Journalism
- Bachelor of Arts in Media Strategies
- Bachelor of Arts in Public Relations
- Master of Arts in Communication Studies
- Master of Arts in Mass Communications
- Doctor of Philosophy in Mass Communications

Undergraduate Program

The college requires a minimum of 120 semester hours for a Bachelor of Arts degree. Students must complete no fewer than 58 of those semester hours in the basic liberal arts. The college seeks to offer a curriculum that stays abreast of trends and changes in the field while providing a broad education in media and communication with introductory survey courses, media theory and society, media 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 premajors. 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 2.5 or higher (2.0 for communication studies majors).

Specific major status will be accomplished after completion of the media and communication core curriculum and the following requirements:

1. Completed ACT or SAT examination with scores submitted to the college.
2. Made at least a C in ENGL 1301 and 1302.
3. Completed MCOM 1300 with a grade of C or better.
4. Completed 27 to 33 hours from general degree requirements with a 2.5 GPA (2.0 for communication studies majors).

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 Media and Communication prior to each registration period to ensure all requirements are being met in a manner consistent with timely graduation.

Course Load. A normal full-time course load is 15-19 hours per semester. In calculating the course load, the associate dean for undergraduate affairs will consider all distance education courses as a part of the course load. Course loads in excess of 19 hours require approval by the associate dean for undergraduate affairs. 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.

Distance Education Courses. Approval for courses to be taken by distance education must be obtained in the Advising Center. All course prerequisites must be met to be granted enrollment. Students must have junior status to enroll in a 3000- or 4000-level distance 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 associate dean for undergraduate affairs 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.

Graduate Program

For information on graduate programs offered by the College of Media and Communication, visit the Graduate School section of the catalog on page 150.

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 for undergraduate students.

Second Bachelor's Degree. Permission to enroll in courses to pursue a second bachelor's degree must be obtained from the associate dean for undergraduate affairs. 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 consultation with an academic advisor. Students report to their advisors for individual conferences or group meetings as 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, including MCOM 1100, 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 21 hours of media and communication courses will be accepted in transfer. Students requesting permission to transfer from another college at Texas Tech must have a GPA of 2.5 (2.0 for communication studies majors) or better. In addition, they must provide the Advising Center 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. Credit for courses taken without prior approval from the associate dean for undergraduate affairs may not be applied to degree program requirements.

Degree Plan and Intention to Graduate. Students declare their major upon completion of the Media and Communication core curriculum. Students must file a degree plan declaring the major before completing 45 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 media and communication 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 media and communication core course or a course required in a media and communication 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 2.5 GPA (2.0 for communication studies majors) at the end of the semester before enrolling in required writing classes or enrolling in an internship or practicum in their major.
5. Journalism majors must pass the college's grammar, spelling, and punctuation exam prior to enrolling in JOUR 2310 or 3310.
6. No course may be repeated for credit unless so designated.
7. No course required by the college may be taken pass/fail unless required by a media and communication major-minor sequence.

8. Prerequisites are governed by the catalog in effect at the time the course is taken.
9. Students in majors in the college must take the following core courses: MCOM 1300, 3300 (or approved theories course in a specific major), and 3320. Journalism majors also must take JOUR 2310.
10. Sophomore standing (at least 30 hours) is required for entry into 3000-level courses in the college if prerequisites are not stated.
11. Students with majors in the College of Media and Communication are not required to declare a minor.
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 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-hour 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. The college offers minors in advertising, communication studies, electronic media and communications, journalism, media strategies, and public relations. The requirements for each minor are discussed in the catalog section of the supervising department.

Undergraduate Certificates

Entertainment Media. The College of Media and Communication offers a 12-hour Undergraduate Certificate in Entertainment Media for students focusing on pursuing careers in the entertainment industry. Students learn critical skills for jobs as directors, screenwriters, and producers of popular media. Interested students can select four courses, each with three units of credit, from a list of courses offered in various departments of the college. At least two of the courses must come from a department or program outside the student's major.

Students choose four courses from ADV 4301 (Film Trailers), ADV 4301 (Mad Men), ADV 4301 (Sex/Drugs and Rock n' Roll), EMC 3340, EMC 3345, EMC 4301 (Rock and Roll Media), EMC 4301 (The Blockbuster), EMC 4301 (Issues in Global Film and Media), PR/EMC 4301 (Production and Promotion – cross-listed and co-taught), EMC 4370, EMC 4375, EMC 4380, PR 4301 (Event Management), PR 4301 (Entertainment PR).

Students may also apply 3 credit hours from activities courses, such as EMC/JOUR 2000 or 3100 or EMC 4300, which offer practicum credit for work in the entertainment media industry (department chair approval required).

Sports Media. The College of Media and Communication offers a 12-hour Undergraduate Certificate in Sports Media for students planning on media careers in the sports industry. Sports media jobs are often interdisciplinary, cutting across the traditional media disciplines of journalism, electronic media, public relations, and advertising. The certificate consists of four courses, each with three units of credit, taken from various college departments. Students can choose four courses from ADV 4301 (Sports Advertising), EMC 4301 (Producing for Sports), JOUR 4305, PR 3354, PR 4301 (Event Management), PR 4301 (Global Sports).

Students also can choose 3 credit hours from activities courses, such as EMC/JOUR 2000 or 3100 or EMC 4300, which offer practicum credit for work in the sports media industry. These activities include, but are not limited to, college-sponsored programs, such as Raider Vision (TTU Athletics Broad casting), the HUB, the Outpost, or Double T Insider (department chair approval required).

Students also can earn a maximum of 3 credit hours by taking one of two courses offered in the Department of Health, Exercise and Sport Sciences, ESS 4355 and 4356 (based on agreement with the Department of Health, Exercise and Sport Sciences to waive any and all prerequisites for these courses).

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 arts 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 Undergraduate Admissions section of this catalog for information on credit provided by test scores to meet these requirements. Students must take the specified number of hours in the areas listed below. 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 COMS 2300, COMS 2358, MCOM 2310, or from other courses on the core curriculum requirements approved list.

Foreign Language 6-16

Students who have completed two years of a single foreign language in high school have the option of completing the sophomore foreign language requirements or completing 12 hours of media and communication courses in global, international, or intercultural affairs and/or study abroad programs. Students who did not complete two years of foreign language in high school may choose from the following two options:

- Complete first-year foreign language requirement (6-10 hours) and 6 hours of global communication/experience courses and other international and intercultural courses as offered by the college, and/or 6 hours of study abroad courses offered by the college (courses will vary by year).
- Complete first-year foreign language requirement (6-10 hours) and 6 hours of sophomore or above foreign language coursework. All coursework should be in a single foreign language.

International students whose native language is not English and who graduated from a secondary school in their native country may satisfy the language option by bringing their certificate of graduation to the college advising center. 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 of a language placement test administered by the language laboratory upon their return from the study abroad. Approval must be received in advance from the assistant dean for undergraduate students.

Mathematics 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 media and communication majors and will satisfy 3 hours of this requirement.

Life and Physical Sciences 8

Two courses including matching labs must be selected from the Life and Physical Sciences list in the core curriculum options.

Social and Behavioral Sciences 6

All majors in the College of Media and Communication 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 social and behavioral sciences may come from the core curriculum options.

United States History 6

Students will normally enroll in HIST 2300 and 2301, although any U.S. history course from the core curriculum requirements approved list will satisfy this requirement.

United States and Texas Government 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.

Language, Philosophy, and Culture 3

Fulfilled by MCOM 2330 or English literature required for English requirement.

Creative Arts 3

Select MCOM 2301 or 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 MCOM 2320 or JOUR 2310 or have reached 45 hours. 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. Students are expected to develop a degree plan no later than the second semester of the sophomore year. Forms and information are available in the Advising Center. 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)

Undergraduate Courses

- 1100. Success in Media and Communication (1).** Introduces students to media and communication academic programs and professional career opportunities. Provides a structured approach to academic, social, and personal success in the university.
- 1300. [COMM 1307] Media History and Principles (3).** A broad survey of media history, principles, and practices up to the modern era, with particular emphasis on print media, broadcasting, advertising, and public relations. Fulfills core Social and Behavioral Sciences requirement.
- 1301. Introduction to Digital and Social Media (3).** An introduction to the online world of interactive digital and social media and its effects on individuals, society, and communication-related professions such as journalism, advertising, public relations, and organizational communications.

- 2301. Visual Storytelling (3).** Designed to immerse students in visual storytelling and help them learn to examine aesthetic, ethical, and intercultural issues related to the creative art of telling stories using a visual format. Fulfills core Creative Arts requirement.
- 2310. Professional Communication (3).** Develops professional persuasive communication skills for media practitioners, including pitching stories and entrepreneurial proposals, writing speeches, responding to RFPs, and producing effective media presentations. Fulfills core Communication (Oral) requirement.
- 2320. Writing for Media and Communication (3).** Introduction to professional and academic writing for the media disciplines. Focuses on writing appreciation and mechanics, as well as specific writing strategies for journalism, the web, advertising, public relations, business, and the academy. (Writing Intensive)
- 2330. Media Literacy (3).** Critiques and analyzes media, the audience, the mediated environment, media industry, digital media, and media professions, particularly advertising, electronic media, public relations, and journalism. Fulfills core Language, Philosophy, and Culture requirement.
- 3300. Mass Media Theories and Society (3).** Theory-based exploration of the relationship between the mass media and society, such as aggression and television violence.
- 3320. Mass Communications Law (3).** 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).** Prerequisites: C or better in MATH 2300 or 2345. Comprehensive overview of mass communications research focusing on planning, designing, conducting, analyzing, interpreting, and applying research to address communication issues and problems.
- 3390. Internship in Media Strategies (3).** Prerequisite: 2.5 TTU GPA, C or better in MCOM 1300, 2310, 2320 and recommendation of faculty member and internship coordinator. Minimum of 160 hours of supervised employment in media or communication organization. Weekly reports, interviews, and term paper required.
- 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.
- 4301. Special Topics in Media and Communication (3).** Considers selected topics in media and communication. May be repeated for credit when topic varies.
- 4303. Sex and Violence in the Media (3).** Introduces issues surrounding the prevalence of sex and violence in the media, including free speech, viewer motivations, market forces, and media effects.
- 4325. Media Economics and Entrepreneurship (3).** Prerequisite: Junior or senior standing; C or better in MCOM 2310, 2320, and either MCOM 3380 or PR 3380. An analytical study of media economics and entrepreneurship in digital media industries. Includes examining market competition, technological innovation and value creation in the production and distribution of digital media content. (Writing Intensive)
- interaction with a focus on design principles, aesthetics, usability, and interactivity.
- 5322. Multimedia Story Telling (3).** Focuses on a multimedia approach to storytelling in strategic communication practice. Heavy emphasis on mobile technology and social media.
- 5324. Audience/Data Analysis and Reporting (3).** Collecting, using, analyzing, and presenting data and metrics as a means of understanding reach, target audience opinion/attitude/behavior, and message effectiveness.
- 5326. Risk Communication/Management (3).** Survey of research and theory relevant to risk communication with an emphasis on the application to real-world risk scenarios.
- 5332. Special Topics in Strategic Communication (3).** A rotating topics course examining best practices in areas related to strategic communication.
- 5334. Interpersonal Communication (3).** Covers research and application of interpersonal communication theory as it relates to human relations in personal and professional contexts.
- 5344. Seminar in Public Opinion and Propaganda (3).** A study of propaganda theory and methods. Investigation of how public opinion is formed and influenced.
- 5347. Studies in International Communications (3).** A critical examination of the structure, control, and performance of the media systems of nations and regions.
- 5349. Administration of Communications Media (3).** For mass communications majors only. Problems of executive planning and management of newspapers, magazines, and broadcast media.
- 5362. Seminar in Mass Communications (3).** A comprehensive exploration of theory and research into the social, psychological, and economic problems affecting modern mass communications.
- 5364. Research Methods (3).** 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).** 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).** Prerequisite: B or better in MCOM 5364. The use and interpretation of statistics for data analysis. Covers the selection of statistical techniques, the use of statistics packages, and the interpretation of results.
- 6000. Master's Thesis (V1-6).**
- 6050. Master's Report (V1-6).**
- 6302. Mass Communications Pedagogy (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).** 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).** Seminar in managing and analyzing the success of integrated communications campaigns.
- 6330. Seminar in Media and Sport (3).** Examines the interaction of mass media and sport, including the related history; media economics; and the use of media by athletes, teams, and organizations.
- 6336. Digital Media (3).** Students will put web usage into the context of human-computer interaction and discuss design principles, aesthetics, usability, and interactivity. Students will learn coding basics.
- 6364. Selected Research Methods (3).** Prerequisites: B or better in MCOM 5364 and 5374. Rotating research methods course focusing on experimental, survey, content analysis or others. May be repeated twice when topics vary.
- 6366. Advanced Mass Communications Theory (3).** Prerequisite: MCOM 5366. Explores philosophical foundations underlying the social scientific approach and investigate the fundamental components of social scientific theory as a tool of scientists.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Graduate Courses

- 5160. Proseminar in Mass Communications (1).** 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.
- 5310. Strategic Communication Planning and Writing (3).** Utilizes a case method approach to examine best practices across a variety of contexts offering students hands-on experience in developing a strategic communication plan.
- 5312. Media Management, Entrepreneurship and Consulting (3).** Explores the management needs and entrepreneurial efforts occurring in the traditional and digital media industries, as well as the role that consultants and freelancers play.
- 5314. Strategic Communication in a Global Environment (3).** Offers an investigation of the challenges and opportunities involved with practicing strategic communication in a complex global environment.
- 5316. Communication in Organizations (3).** Examines contemporary organizational practice and organizational communication theory, along with current research and applications of issues related to human communication in workplace settings.
- 5318. Advanced Social Media Practice (3).** Survey of best practices and current trends in the use of social media as a tool for strategic communications.
- 5321. Production of Digital Media Content (3).** Introduces students to fundamental web design in the context of human-computer

Department of Advertising

Shannon Bichard, Ph.D., Chairperson

Marshall and Sharleen Formby Regents Professor: Bucy

Associate Professor: Bichard

Assistant Professors: Farnall, Gotlieb, McLaughlin, Ortiz, Sarge

Instructors: Lowry, Rodriguez

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About the Program

The Department of Advertising offers a 120-hour degree program leading to a Bachelor of Arts in Advertising. The program gives students the training and background to enter and become leaders in advertising communications.

Students majoring in advertising gain an understanding of the creative and business-related aspects of advertising, including copywriting, sales, production, creative strategy, design and layout, media planning, and research. The department also hosts industry professionals who speak to students about internships and careers in advertising.

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 ENGL 1301 and 1302 with grades of C or better; and have a 2.5 GPA prior to enrolling in ADV 3312. 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, 3320; MCOM 1300, 3380; and nine hours of electives chosen from ADV 3312, 3330, 3340, 3351, 3361, 4000, 4300, 4301, 4308, and 4313.

Additional minors are listed in each supervising department and are available in electronic media and communications, journalism, media strategies, and public relations.

Course Descriptions

Advertising (ADV)

(To interpret course descriptions, see page 23.)

Undergraduate Courses

- 3310. Principles of Advertising (3).** 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).** Prerequisites: Sophomore standing or higher; C or better in ADV 3310; 2.5 TTU GPA. Principles and practice of writing for advertising. Includes writing for internal audiences as well as for various media to meet advertising goals to persuade and inform mass audiences. (Writing Intensive)
- 3320. Advertising and Society (3).** Examines advertising's role in modern society and its relationship to the consumer in historical and contemporary contexts.
- 3330. Advertising Theory (3).** Prerequisite: ADV 3310 or PR 3310. Examines the development and practical application of theories

Bachelor of Arts in Advertising: Sample Curriculum

FIRST YEAR

Fall		Spring	
MCOM 1300, Intro. to Mass Comm.	3	MCOM 2310, Prof. Communication	3
POLS 1301, American Gov.,Org.	3	POLS 2302, American Public Policy	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1300,1320, or 1330	3	MATH 2300 or 2345 or 1331†	3
Life & Physical Sciences*	4	Life & Physical Sciences*	4
MCOM 1100, Success in Media & Comm.	1		
TOTAL	17	TOTAL	16

SECOND YEAR

Fall		Spring	
ADV 3310, Principles of Advertising	3	ADV 3320, Advertising and Society	3
ENGL 2000-Level Literature	3	ENGL 2000-Level Literature	3
Foreign Language‡	3	Foreign Language‡	3
ECO 2305, Principles of Economics§	3	Creative Arts*	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	15	TOTAL	15

THIRD YEAR

Fall		Spring	
MCOM 3320, Mass Comm. Law	3	MCOM 3380, Research Methods	3
ADV 3312, Advertising Writing	3	ADV 3351, Advertising Media Plan.	3
Foreign Language‡	3	Foreign Language‡	3
Group A	3	Group A	3
Group B	3	Group B	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
ADV 3361, Advertising Design & Layout	3	ADV 4308, Advertising Account Planning	3
Group A	6	ADV 4312, Advertising Campaigns	3
Group B	3	Multicultural Elective #	3
Group C	3	Group C	3
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

* Choose from core curriculum requirements

† If MATH 1330 is chosen for the first math requirement, MATH 1331 will satisfy the second math requirement. MATH 2300, 2345 or 1331 must be passed with a C or better.

‡ See the college requirements for foreign language.

§ ECO 2301 and 2302 may replace ECO 2305. ECO 2305 or 2302 must be passed with a C or better.

Select a course that also fulfills the Language, Philosophy, and Culture core curriculum requirement.

Students majoring in advertising are required to complete 57 semester hours within the college, including the following: ADV 3310, 3312, 3320, 3351, 3361, 4308, 4312; MCOM 1300, 3320, 3380

Group A (12 hours): ADV 3330, 3340, 3390, 4000, 4300, 4301, 4304, 4313

Group B (9 hours): COMS 2301, 3313, 3315, 3332; EMC 3308, 3315, 3333, 3335, 3380, 4301, 4315, 4325; JOUR 3317, 4301; MCOM 3300, 4303; PHOT 3330; PR 3310, 3312, 3341, 4301

Group C (6 hours): BA 3301, 3305; ENGL 2311, 2351, 3365; PFP 3301; PSY 3304 (or approved by department chairperson)

and models related to advertising effects, audience response, and return on investment.

- 3340. Internet and New Media Advertising (3).** Prerequisites: ADV 3310 or PR 3310 and ADV 3312 or PR 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).** Prerequisites: ADV 3310 or PR 3310, MATH 2300 or 2345 with a grade of C or better. 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 Design and Layout (3).** Prerequisite: ADV 3312 with a grade of C or better. Corequisite: Non-credit lab. Covers the creative aspects of advertising design, strategy, copy, layout, typography, and production in a variety of visual media. Provides practical training for planning and executing effective print and broadcast messages. Teaches computer proficiency with software packages such as Adobe Creative Suite, which includes Illustrator, InDesign, and Photoshop.
- 3390. Internship in Advertising (3).** Prerequisites: ADV 3351 with a grade of C or better; 2.5 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: 9 hours of advertising courses with a grade of C or better and consent of instructor prior to registration. May be repeated once for credit. Prerequisites may vary depending on course topic.
- 4301. Special Topics in Advertising (3).** Considers selected topics in advertising. May be repeated for credit when topic varies.
- 4304. Advanced Creative Strategy (3).** Prerequisite: ADV 3361 with a grade of C or better. 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 Account Planning (3).** Prerequisites: C or better in ADV 3312. Inspiring communication ideas with audience and market insights to connect brands and consumers through authentic, relevant experiences.
- 4312. Advertising Campaigns (3).** Prerequisites: ADV 3351, 3361, and MCOM 3380 with a grade of C or better. 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).** Prerequisites: ADV 3310 or PR 3310 with a grade of C or higher. A study of the practices and procedures of advertising on the international market.

Graduate Courses

- 5326. Advertising and the Consumer (3).** 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).** 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 Communication Studies

Narissa M. Punyanunt-Carter, Ph.D., Interim Chairperson

Professors: Olaniran, Roach, Stewart

Associate Professors: Punyanunt-Carter, Gring, Heuman, Hughes, Langford

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About the Program

The Department of Communication Studies prepares students for careers in business, industry, social service, and education. Communication studies degree plans 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 co-curricular 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 is an option providing an opportunity for practice in applied settings.

Requirements for the Major. Students seeking an undergraduate degree in communication studies will complete a course of study that consists of 30 hours of COMS courses, at least 15 hours of which must be in advanced COMS elective courses. A minimum of 120 total hours is required for the degree (including state core and College of Media and Communication core 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 complete in residence at Texas Tech.

All students who major in communication studies must complete COMS 1301, 2300, 3301, 3302, and 3311. The remaining 15 hours of coursework may be a mix of courses that focus in areas of communi-

cation in public affairs, interpersonal communication, and corporate organizational communication.

Requirements for the Minor. A minor consists of 18 hours of COMS courses, at least 6 hours of which must be completed in residence at Texas Tech. Students who minor in communication studies must complete COMS 3301 and either COMS 1300 (transfer credit) or 2300. Of the remaining 12 hours, 9 must be in advanced courses. The other 3 hours may be COMS 1301 (recommend but not required) or an additional advanced course.

Teacher Certification. Students desiring secondary certification in speech communication must complete the following: COMS 2300, 3314, 3351; MCOM 1300; and 12 hours of electives in communication studies, 9 hours of which must be at the upper-division level. Students planning to become high school teachers should minor in secondary education. They must consult with an advisor in the College of Education to set their requirements for professional education courses and for student teaching.

Course Descriptions

(To interpret course descriptions, see page 23.)

Communication Studies (COMS)

Undergraduate Courses

- 1300. [SPCH 1311] Introduction to Communication Studies (3).** A broad-based introduction to the field of communication studies, covering the major content areas in the discipline. Required for the minor.
- 1301. [SPCH 1318] Interpersonal Communication (3).** A study of the human communication process in one-to-one encounters. Required for all majors. Fulfills core Social and Behavioral Sciences requirement.
- 2300. [SPCH 1315] Public Speaking (3).** Equips students with the skills necessary for successful public speaking. Students will

learn to prepare and deliver effective presentations, adapt to various audiences, and adjust to different speaking contexts. Emphasizes the application of public speaking theory. Fulfills core Communication (Oral) requirement. Required for all majors and minors.

- 2350. Introduction to Communication Disorders (3).** Explores the range and types of communication disorders and examines their impact on an individual's psychological, social, emotional, cultural, and educational status. Does not count toward COMS major credit.
- 2358. Business and Professional Communication (3).** Basic business and organizational communication principles applied to the communication needs of the professional. Practice in the construction and delivery of the various types of business and workplace presentations and participation in interviews and group discussions. Fulfills core Communication (Oral) requirement.
- 3102. Forensic Activities (1).** Offers students the opportunity to receive credit for extensive participation in forensic activities. May be repeated up to 4 semester hours; 2 semester hours may be applied toward communication studies major.
- 3301. Communication Theory (3).** Analysis and critique of communication theories in social-scientific, empiricist, interpretive, and humanistic research traditions. Required for all communication studies majors and minors. (Writing Intensive)
- 3302. Communication Research (3).** Critique and application of research methods in communication studies research projects. Required for all communication studies majors. (Writing Intensive)
- 3310. Rhetoric in Western Thought (3).** Explores theories of rhetoric from ancient Greece to present day. Students examine how rhetoric affects, and is affected by, individual and cultural understandings of truth and reality claims, ethics, justice, and power. Required for all majors.
- 3313. Persuasion (3).** Analyzes representative theories and models of persuasive processes and their implications for communication behavior. Includes theories of public, interpersonal, and mass communication.
- 3314. Argumentation and Debate (3).** Surveys the evolution of argumentation with emphasis on modern viewpoints and application of theory to selected controversies.
- 3315. Political Campaign Communication (3).** Studies the strategies of communication and persuasion in American political campaigns, focusing on campaigns currently in progress.
- 3319. Persuasion and Social Movements (3).** Studies the role of persuasion in social movements, both historical and contemporary. Analyzes the various persuasive strategies employed as social movements evolve.
- 3332. Intercultural Communication (3).** Explores communication and culture within global, national, and local contexts. Examines cultural group values, practices, and communicative behaviors from diverse perspectives. Applies topics such as cultural barriers, cultural similarities/differences, prejudice, and privilege to everyday communicative encounters.
- 3333. Communication in Relationships (3).** Prerequisite: Consent of instructor. Surveys research concerning the role of communication in the development, maintenance, and decay of interpersonal relationships.
- 3334. Gender and Communication (3).** Examines gender in contemporary society, giving attention to gender roles, masculine and feminine communication styles, social institutions that shape gender, and everyday applications of gender in the lives of people. (WS 3312)
- 3335. Nonverbal Communication (3).** Studies the origin, function, and control of nonverbal, symbolic elements inherent in communication.
- 3351. Communication in Instruction and Training (3).** Applies instructional communication theory to the processes of instruction, training, and performance in varied learning contexts. Students gain experience in assessing needs; developing objectives, a training plan, and presentational materials; delivering a training presentation; and reporting training outcomes.

Graduate Program

For information on graduate programs offered by the Department of Communication Studies, visit the Graduate School section of the catalog on page 150.

B.A. in Communication Studies: Sample Curriculum

FIRST YEAR

Fall		Spring	
MCOM 1300, Intro. to Mass. Comm.	3	COMS 1301, Interpersonal Commun.†	3
ENGL 1301, Essentials of Coll. Rhetoric	3	MCOM 1301, Intro. Digital/Social Media	3
American History*	3	ENGL 1302, Advanced College Rhetoric	3
POLS 1301, American Govt. Org.	3	American History*	3
Life and Physical Sciences*	4	POLS 2302, American Public Policy	3
TOTAL	16	TOTAL	15

SECOND YEAR

Fall		Spring	
COMS 2300, Public Speaking‡	3	MATH 1331 or 2300 or 2345#	3
MATH 1300 or 1320, or 1330	3	ECO 2305, Principles of Economics**	3
ENGL 2000-level Literature	3	ENGL 2000-level Lit. or Intro. Tech. Writing 3	3
Foreign Language§	5	Foreign Language§	3
Creative Arts*	3	Life and Physical Sciences*	4
TOTAL	17	TOTAL	16

THIRD YEAR

Fall		Spring	
COMS 3331, Nonverbal Communication	3	COMS 3302, Communication Research	3
COMS Junior/Senior Elective	3	COMS Junior/Senior Elective	3
MCOM 3300, Mass Media Theor. & Soc.	3	MCOM 3320, Mass. Comm. Law	3
Foreign Language§	3	Multicultural Elective††	3
Any Junior/Senior Elective	3	Any Junior/Senior Elective	3
TOTAL	15	TOTAL	15

FOURTH YEAR

Fall		Spring	
COMS 3311, Rhetoric in West. Thought	3	COMS Junior/Senior Elective	3
COMS Junior/Senior Elective	3	COMS Junior/Senior Elective	3
Any Junior/Senior Elective	3	Any Junior/Senior Elective	1
Any-Level Elective	3	Any-Level Elective	3
Any-Level Elective	1	Any-Level Elective	3
TOTAL	13	TOTAL	13

TOTAL HOURS: 120

This sample course sequence applies only if the student enters the department as a freshman.

* Select from the university's core curriculum.

† Meets core requirement for Social and Behavioral Sciences.

‡ Meets core requirement for Oral Communication.

§ See the college requirements for foreign language.

If MATH 1330 is chosen for the first math requirement, MATH 1331 will satisfy the second math requirement. MATH 2300, 2345, 1331 must be passed with a C or better.

** ECO 2301 and 2302 may replace ECO 2305. ECO 2305 or 2302 must be passed with a C or better.

†† Choose from the university's multicultural requirement list. Choose a course that also fulfills the core Language, Philosophy, and Culture requirement.

- 3353. Small Group Communication (3).** Addresses group process and interaction; specifically, how to make group functional while focusing on factors such as leadership, diversity, conflicts, and other appropriate contemporary topics.
- 3355. Communication in Organizations (3).** Surveys theories, research, and applications of communication in all forms of organizations with emphasis on leadership, diversity, culture, technology applications, and other communication issues facing traditional and modern organizations.
- 3356. Leadership and Communication (3).** A broad-based theoretical approach to the study of leadership and communication. Application to a variety of settings will be discussed.
- 3359. Interviewing: Process and Procedures (3).** Principles drawn from contemporary interpersonal communication theory are specifically applied to informational, employment, and persuasive interview situations. Practical application of theoretical concepts is achieved through specific in-class interview projects and through analysis of actual interviewing techniques.
- 3365. Communication in Healthcare (3).** Introductory survey of the influence of communication in health and healthcare delivery within interpersonal, organizational, and mass-mediated contexts.
- 4000. Independent Research in Communication Studies (V1-3).** Prerequisites: 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).** Prerequisites: Junior standing or consent of instructor. Student internship, under supervision of Media and Communication coordinator, in a selected area of applied communication.



4310. **Special Topics in Rhetoric (3)**. Prerequisite: Junior or senior standing and consent of instructor. Consideration of selected topics in rhetoric. May be repeated for credit.
4314. **Directing Speech and Debate Activities (3)**. Methods and principles involved in directing extracurricular speech activities such as debate, oral, interpretation, and public speaking.
4330. **Special Topics in Interpersonal Communication (3)**. Prerequisite: Junior or senior standing. In-depth analysis of selected areas and topics in interpersonal communication such as intimate relationships and family as well as the intersections of interpersonal and intercultural communication. May be repeated for credit.
4350. **Special Topics in Corporate-Organizational Communication (3)**. Prerequisite: Junior or senior standing. In-depth consideration of selected topics in corporate-organizational communication. May be repeated for credit.

Graduate Courses

5111. **Communication Instruction in Higher Education I (1)**. First of two courses required of all communication studies teaching assistants. Provides individual development in instruction skills, particularly in leading discussions, delivering lectures, and facilitating experiential activities in basic oral communication courses.
5112. **Communication Instruction in Higher Education II (1)**. Second of two courses required of all communication studies teaching assistants. Provides guidance in articulating a teaching philosophy, constructing a teaching portfolio, and developing new courses within the communication studies discipline.
5300. **Communication Theory (3)**. Provides a comprehensive overview and history of contemporary communication theories and research. Students will read, comprehend, and critique original scholarly research beginning with general semantics theory and culminating with the most recently published reviews of theoretical work in communication studies.
5301. **Qualitative Research Methods (3)**. Introduces students to ethical and practical applications of qualitative research methodologies. Through hands-on experience, students will conduct a research project related to their area of interest, analyze data, and write a final essay.
5302. **Intercultural Communication (3)**. Examines scholarly studies of the relationship between culture and communication in global, national, and local contexts. Explores cultural group values, practices, and communicative behaviors from diverse theoretical and philosophical perspectives.
5303. **Communication in Small Groups (3)**. 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)**. Examines theoretical perspectives, contemporary, and traditional research and practical models and related issues affecting human communication in workplace settings and other organized structures (e.g., nonprofit, government).
5305. **Quantitative Research Methods (3)**. Examines quantitative research methods in communication research with emphasis on research questions and design, measurement, statistical analysis, and interpretation. Course requirements will include data collection, statistical analysis, and a research prospectus.
5306. **Theories of Rhetoric (3)**. An intensive study of rhetorical theories and rhetoricians that have significantly impacted the research, teaching, and practice of rhetoric. Students must write a research paper in order to successfully complete this course.
5307. **Historical Critical Research Methods (3)**. 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)**. Study and research of conflict management with emphasis on functional approach to conflicts through mediation, negotiation, and other conflict management approach.
5313. **Theories of Persuasion (3)**. 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)**. Exploration of the nature and roles of discourse processes in healthcare interactions, including interpersonal, organizational, public, new media, and intercultural communication contexts.
5315. **Nonverbal Communication (3)**. 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)**. 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)**. 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)**. Focuses on research in specific topics in corporate-organizational communication. Topics vary with students' needs and/or the research interests of the instructor.
6304. **Seminar in Rhetorical Theory (3)**. Research seminar focusing on specific topics in rhetoric. Topics will vary. Course may be repeated for credit.
6307. **Seminar in Instructional Communication (3)**. Research course exploring current topics in instructional communication. Topics vary with students' needs. May be repeated for credit.
6308. **Seminar in Cultural and Intercultural Communication (3)**. In-depth analysis of selected areas and topics in intercultural and/or critical cultural human communication. Course topics may explore international and U.S. co-cultural communication research.
7000. **Research (V1-12)**.

Department of Journalism and Electronic Media

Robert M. Peaslee, Ph.D., Chairperson

Professors: Perlmutter, Reddick, Wilkinson

Associate Professors: Chambers, Cummins, Dean, Peaslee, Saathoff, Sternadori, Stoker

Assistant Professors: Hellmueller, Keene, Luo, Oviedo, Velez

Professors of Practice: Foster

Assistant Professor of Practice: Stone

Instructors: Brewton, Edwards, Hensley

CONTACT INFORMATION:

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About the Program

This department supervises the 120-hour Bachelor of Arts in Journalism and the 120-hour Bachelor of Arts in Electronic Media and Communications (EMC) degree programs.

Bachelor of Arts in Journalism

The journalism degree program prepares students for meaningful careers in today's leading news organizations. Journalism classes are steeped in traditional journalism values and emphasize the importance of storytelling, clarity, conciseness, accuracy, and fairness in reporting.

Augmenting journalism education based in valued traditions, the College of Media and Communication journalism faculty and staff work with news organizations in the Southwest to provide students meaningful internships and other career-advancing opportunities.

Texas Tech offers a multi-platform journalism program. All journalism majors study the unique attributes of print, broadcast, and online news content and production. Students have the opportunity to produce news and information using a variety of media including social, print, broadcast and online.

Minor. Students choosing to 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 better; and have a 2.5 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.

Bachelor of Arts in Electronic Media and Communications (EMC)

This program is designed to train storytellers proficient in convergent media forms who can create, analyze, and compete in diverse U.S. and global media marketplaces. The EMC program offers professional courses in electronic media, visual communication, digital media production, photography, and writing to provide a broad and thorough liberal arts education. This is not simply a skills-oriented program. It is devoted to preparing students for leadership positions in electronic media industries.

A successful graduate of the electronic media and communications program should be able to do the following:

- Demonstrate the ability to specify audience and purpose and make appropriate communication choices with a competence in storytelling.

- Construct, present and defend critical and aesthetic judgments of works in the creative arts by exhibiting critical thinking skills through written and verbal presentation.
- Exhibit knowledge and awareness of distinctive issues related to race, gender, and ethnicity in electronic media and/or international communication.
- Show understanding of how technology and applied science affects society and the environment and demonstrate understanding of the relationship of ethics and technology with competence in the areas of multimedia design and production.
- Demonstrate knowledge about management issues in the industries 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 will take core courses in the college's mass communications curriculum as well as courses in the department. The EMC core requires coursework in electronic media industries, digital media production, visual communications, writing in electronic media, diversity in electronic media, and management issues in electronic media.

Minor. Students selecting a minor in electronic media and communications are required to pass ENGL 1301 and 1302 with grades of C or better and have a 2.5 adjusted GPA prior to enrolling in the first writing course (MCOM 2320). If a student chooses to take JOUR 2310 as their first writing course, the student is required to pass the department's grammar, spelling, and punctuation exam in addition to other pre-requisites for the course. 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 3310, 3315, 4320; MCOM 2320 or JOUR 2310; 3 hours selected from EMC 3370, 4370, 4375; 3 hours selected from EMC 3300, EMC 3355, EMC 3358, EMC 4301, PHOT 3310; and 3 hours of electives from EMC or PHOT courses.

Journalism and Visual Media Concentration

Students enrolled in the B.S. or B.A. in University Studies may choose the journalism and visual media concentration. This concentration allows students to study issues related to news, writing, photography, and publications. It will appeal to students who have an interest in travel and destination journalism. The concentration is offered only at the Texas Tech Hill Country campus in Fredericksburg, Texas. Required courses are JOUR 2300, 2310, 3316; PHOT 3310, 4300, 4312.

Course Descriptions

(To interpret course descriptions, see page 23.)

Electronic Media and Communications (EMC)

Undergraduate Courses

- 2000. **Electronic Media Activities (V1-3).** Prerequisite: 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.
- 3100. **Electronic Media Activities (1:0:3).** Prerequisite: 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).** Current and emerging electronic media technologies, their integration into modern society and impact on information transfer.
- 3308. **Visual Communications (3).** An introduction to photographic techniques and visual design, including message interpretation,

**Bachelor of Arts in Journalism:
Sample Curriculum**

FIRST YEAR			
Fall		Spring	
MCOM 1300, Intro. to Mass Comm.	3	JOUR 2300, Principles of Journalism	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, 1320, or 1330	3	MATH 2300 or 2345 or 1331 †	3
Life & Physical Sciences*	4	Life & Physical Sciences*	4
MCOM 1100, Success in Media & Comm.	1		
TOTAL	17	TOTAL	16
SECOND YEAR			
Fall		Spring	
JOUR 2310, News Writing	3	MCOM 3300 Mass Media Theories	3
MCOM 3310, Prof. Communication	3	Foreign Language §	3
ENGL 2000-Level Literature	3	ENGL 2000-Level Literature	3
ECO 2305, Principles of Economics ‡	3	PHOT 2310, Prin. of Photography	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
MCOM 3320, Mass Comm. Law	3	JOUR 3311 News Presentation II	3
JOUR 3310, News Presentation I	3	JOUR 3350, History of American Jour.**	3
JOUR 3312, Reporting	3	JOUR 3380, Editing	3
JOUR 3355, Media Ethics**	3	Creative Arts*	3
Foreign Language §	3	Foreign Language §	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
JOUR 3390, Internship in Journalism	3	JOUR 4350, Multiplatform News	3
JOUR 4370, Advanced Reporting	3	Multicultural Elective #	3
MCOM/JOUR Elective	6	MCOM/JOUR Elective	3
Foreign Language §	3		
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

A grammar, spelling, and punctuation examination must be passed with a 70 or better as a prerequisite to enrolling in JOUR 2310

* Choose from core curriculum requirements.

† If MATH 1330 is chosen for the first math requirement, MATH 1331 will satisfy the second math requirement. MATH 2300, 2345 or 1331 must be passed with a C or better.

‡ ECO 2305 or 2301 and 2302.

§ See the college requirements for foreign language.

Choose a course that also fulfills the Language, Philosophy, and Culture requirement.

** JOUR 3355 is usually offered in the fall; JOUR 3350 is usually offered in the spring.

Students majoring in journalism are required to complete 58 hours within the college, including the following: JOUR 2300, 2310, 3310, 3311, 3312, 3350, 3355, 3380, 3390, 4350, 4370; MCOM 1100, 1300, 3300, 3320; PHOT 2310; and 12 hours of mass communications electives.

- evaluation, recent trends, theories of visual perception, and use of images in media.
- 3310. Introduction to Electronic Media and Communications (3).** Basic instruction in the origin, history, development, regulation, and social responsibilities of broadcasting and cable communications. Examines new technology and telecommunications systems.
- 3315. Principles of Digital Media Production (3).** Prerequisite: JOUR 2310 or ADV 3312 or PR 3312 with a grade of C or better. Provides students with the working knowledge of online interaction and practice in basic Web design production.
- 3333. Multimedia Development (3).** Prerequisite: One of EMC 3315, PR 3341, ADV 3361, JOUR 3314, or JOUR 3317 with a grade of C or better. Using authoring tools and design software, students will create static and animated vector images for the purposes of multimedia production.
- 3335. Video Production and Editing (3).** Prerequisite: EMC 3315 with a grade of C or better. 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).** A comprehensive study of programming and promotion in the electronic media, covering audience analysis, plus historical development and current programming practices and promotions.

**Bachelor of Arts in Electronic Media
and Communications: Sample Curriculum**

FIRST YEAR			
Fall		Spring	
MCOM 1300, Intro. to Mass Comm.	3	MCOM 3310, Prof. Communication	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330, 1320, or 1330	3	MATH 2300 or 2345 or 1331 †	3
Life & Physical Sciences*	4	Life & Physical Sciences*	4
MCOM 1100, Success in Media & Comm.	1		
TOTAL	17	TOTAL	16
SECOND YEAR			
Fall		Spring	
EMC 3310, Intro. to Electronic Media	3	MCOM 3300 Mass Media Theories	3
MCOM 2320 or JOUR 2310	3	ENGL 2000-Level Literature	3
ENGL 2000-Level Literature	3	Foreign Language §	3
ECO 2305, Principles of Economics ‡	3	EMC 3308, Visual Communications #	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
MCOM 3320, Mass Comm. Law	3	EMC Writing	3
EMC 3315, Prin. of Digital Media Prod.	3	Multicultural Elective #	3
Foreign Language §	3	Foreign Language §	3
Group A	3	Group A	3
Group B	3	Group B	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
EMC 3355 or 3358**	3	EMC 4320, Electronic Media Ops.	3
Group A	6	Group A	6
Group B	6	Group B	3
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

The grammar, spelling, and punctuation (GSP) examination is required only for students electing to take JOUR 2310. Students must pass the GSP with a 70 or better prior to enrolling in JOUR 2310. The GSP is not required for MCOM 2320.

* Choose from core curriculum requirements

† If MATH 1330 is chosen for the first math requirement, MATH 1331 will satisfy the second math requirement. MATH 2300, 2345 or 1331 must be passed with a C or better.

‡ ECO 2305 or 2301 and 2302

§ See the college requirements for foreign language.

Choose a course that also fulfills the Language, Philosophy, and Culture requirement.

** EMC 3355 is offered in the fall; EMC 3358 is offered in the spring. If students choose 3358, they must take 9 hours of either Group A or Group B in the fall of the third year.

Students majoring in electronic media and communications are required to complete 31 hours from the following core courses: MCOM 1100, 1300, 3300, 3320; MCOM 2320 or JOUR 2310, EMC 3310, 3308, 3315, and either 3355 or 3358; EMC 3370 or 4370 or 4375; EMC 4320.

Group A (15 hours): EMC 3300, 3333, 3335, 3340, 3345, 3355, 3358, 3370, 3380, 3390, 4301, 4315, 4325, 4370, 4375; PHOT 2310, 3310, 3316, 3330, 3335, 4300; MCOM 2301.

Group B (12 hours): ADV 3310, 3312, 3320, 4301, 4313; JOUR 3310, 3350, 4301; MCOM 3380; PR 3310, 4301; or see a department advisor for additional options.

- 3345. Analyzing Television (3).** An introduction to scholarly media analysis that examines the economic, technological, cultural, and creative dimensions of American television.
- 3355. Ethnicity, Race, Gender in Media (3).** Examines issues surrounding ethnic, racial, and gender differences in media production and content from historical and contemporary perspectives.
- 3358. International Electronic Media (3).** 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).** Prerequisites: JOUR 2310 and either EMC 3300 or 3310 with a grade of C or better. 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).** Prerequisite: MATH 2300 with a grade of C or better. 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).** Prerequisites: EMC 3380 for sales or promotion or EMC 3315 for production with a grade of C or better, 2.5 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)**. Prerequisites: 9 hours of EMC courses with a grade of C or better, and consent of instructor. May be repeated once for credit with different emphasis.
4301. **Special Topics in Electronic Media (3)**. Considers selected topics in electronic media. May be repeated for credit.
4305. **Sports and Media (3)**. An examination of media issues and challenges regularly confronting those who participate in and cover sports.
4315. **Advanced Web Production (3)**. Prerequisite: EMC 3315 or JOUR 3310 with a grade of C or better. Corequisite: Non-credit lab. Preparation and dissemination of media content to mass and niche audiences. Use advanced production tools to personalize and manage Web content.
4320. **Electronic Media Operations (3)**. An analytical study of the legal, economic, operational, sales, and policy factors of station organization and administration. Case studies and individual projects.
4370. **Writing for Series Television (3)**. Prerequisites: JOUR 2310 and EMC 3300 or EMC 3310 with a grade of C or better. 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)**. Prerequisites: JOUR 2310 and either EMC 3300 or 3310 with a grade of C or better. 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)**. Prerequisite: EMC 3315 or JOUR 3314 with a grade of C or better 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)**. 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)**. 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)**.

Journalism (JOUR)

Undergraduate Courses

2000. **Journalism and Electronic Media Activities (V1-3)**. Prerequisite: 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.
2300. **[COMM 2302] Principles of Journalism (3)**. 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. **News Writing (3)**. Prerequisites: 2.50 GPA; C or better in ENGL 0301 (if required), 1301, and 1302; pass the grammar, spelling, and punctuation exam with a grade of 70 or higher. Corequisite: Non-credit lab. Evaluation of news, newsgathering methods, and writing. Required lab. (Writing Intensive)
3310. **News Presentation I (3)**. Prerequisites: C or better in JOUR 2300 and 2310. Contemporary design and production of news package delivery, including newspaper, magazine, video and web formats.
3311. **News Presentation II (3)**. Prerequisite: C or better in PHOT 2310, JOUR 3310. Continued study and practice of using digital communication (i.e. digital and multimedia tools) for reporting, producing and delivering news programs.
3312. **Reporting (3)**. Prerequisites: C or better in JOUR 2300 and 2310; pass department's grammar, spelling, and punctuation exam with a grade of 70 or better. May be taken after or concurrent with JOUR 3310. Discussion and practice in interviewing; reporting; and writing various types of stories, including meet-

ings, conventions, accidents, and other general news stories. (Writing Intensive)

3314. **Broadcast Journalism (3)**. Prerequisite: C or better in JOUR 3311 and 3312. 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)**. 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)**. Prerequisite: C or better in JOUR 2310. A study of the scope, influence, and responsibilities of the magazine as a cultural and social force. Survey of editorial problems; intensive writing practice and emphasis on marketing magazine articles. (Writing Intensive)
3317. **Publication Design and Graphics (3)**. 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)**. Study of the development of journalism in America from its European roots to the present and its interrelation with society.
3355. **Media Ethics (3)**. An exploration of the ethical principles and issues facing news media practitioners, philosophical and professional standards of reporting.
3380. **Editing (3)**. Prerequisites: C or better in JOUR 3310 and 3312. Advanced study of purposes and methods of preparing copy for media presentation, including headline writing and editing. Study and practice in print and online publishing.
3390. **Internship in Journalism (3)**. Prerequisites: Junior or senior standing, C or better in JOUR 3310 and 3312, 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)**. Prerequisites: C or better in 9 hours of journalism courses, and consent of instructor.
4301. **Special Topics in Journalism (3)**. 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)**. The nature of public opinion and propaganda; the role of the press in its formation and how the press is influenced by public opinion.
4350. **Multiplatform News Delivery (3)**. Prerequisites: C or better in JOUR 3311 and 3312. Capstone course on production of news in print, online, and broadcast environments. (Writing Intensive)
4370. **Advanced Reporting (3)**. Prerequisites: C or better in JOUR 3310 and 3312. A course in the interrelation and writing of news on social, political, and economic topics. Emphasis on precision journalism and the use of online computer technologies to acquire and disseminate information, implementation through lab assignments. (Writing Intensive)
4390. **Journalism Practicum (3)**. Prerequisites: Junior or senior standing, C or better in JOUR 3311, 3312 and 3380, 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

6315. **Special Topics in Journalism (3)**. 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)**.

Photography (PHOT)

Undergraduate Courses

2310. **[COMM 1318] Principles of Photography (3)**. Covers the fundamentals of photography and photo appreciation. Students will need a digital 35mm SLR camera with manual capabilities.
3310. **Photography I (3)**. Prerequisite: Sophomore standing. This class will cover the use of a 35mm digital SLR camera with manual capabilities.

- 3330. Digital Photography I (3).** 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.
- 3390. Internship in Photocommunications (3).** Prerequisites: C or better in PHOT 3310 and 3316, 2.5 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: C or better in PHOT 3310. 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.

- 4312. Senior Portfolio (3).** Prerequisites: Junior or senior standing, C or better in EMC 3335 or PHOT 3310. Students will create a professional portfolio and promotional materials. The business and legal aspects of photography will be discussed.

Graduate Course

- 7000. Research (V1-12).**

Department of Public Relations

Trent Seltzer, Ph.D., Chairperson

Professors: Callison, Perlmutter

Associate Professors: Dean, Seltzer, Zhang

Assistant Professors: Gardner, Graybeal, King, Lee, Rasmussen, Shafer

Assistant Professors of Practice: Gilmore, Grant, Low

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About the Program

The Department of Public Relations offers two 120-hour degree programs leading to a Bachelor of Arts in Public Relations and a Bachelor of Arts in Media Strategies.

Bachelor of Arts in Public Relations

Widely recognized as one of the fastest-growing career fields worldwide, public relations has become the largest program in the College of Media and Communication. The curriculum develops students' critical thinking, written communication skills, and oral communication skills.

Coursework for the B.A. in Public Relations emphasizes relationship management and strategic campaign planning, the role of traditional and new media in public relations practice, principles of persuasive communication, globalization and diversity, the history of the field, and legal and ethical challenges that practitioners may face.

Graduates will be prepared for technical and managerial roles in public relations firms, as well as corporate and nonprofit organizations. Special topic courses enhance students' understanding of the public relations function as it relates to media relations, crisis communication, social media, community relations, sports communication, government relations, international communication, and other practice areas.

Minor. Students selecting a minor in public relations are required to pass ENGL 1301 and 1302 with grades of C or better and have a 2.5 GPA prior to enrolling in PR 3311. 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 MCOM 1300, 3300 (or PR 3300), 3380 (or PR 3380); PR 3310, 3311; and six hours of electives chosen from PR 3300, 3351, 3353, 3354, 3380, 4301 (may be repeated when topics vary), or 4351.

Bachelor of Arts in Media Strategies

The department offers a 120-hour degree program leading to a Bachelor of Arts in Media Strategies. The program prepares students for the

rapidly evolving media environment and emphasizes strategic knowledge related to media content and resources.

The program stresses integration across media and communication disciplines to drive media innovation and entrepreneurial thinking. By emphasizing critical thinking across media forms and industries, theoretical domains, cultural contexts, and historical periods, the program prepares students for a rapidly evolving media environment. Courses in media literacy and professional communication will enhance critical understanding of media and audiences and provide skills for pitching creative ideas to management and investors. Graduates will learn to think entrepreneurially, identify opportunities, work in teams, problem solve, and communicate persuasively and effectively.

Minor. Students selecting a minor in media strategies are required to have a grade of C or better in ENGL 1301 and 1302 and have a 2.5 GPA prior to enrolling in the first ADV, EMC, JOUR, or PR course. A minor in media strategies consists of a minimum of 21 hours. At least 12 of the 21 hours must be taken in residence. Specific required courses include: MCOM 1300, 2310, 2330, 3300, 3320, and 6 hours from ADV 3310, 4301; EMC 3310, 4301; JOUR 2300, 4301; PR 3310, 4301.

Course Descriptions

(To interpret course descriptions, see page 23.)

Public Relations (PR)

Undergraduate Courses

- 3300. Applied Public Relations Theory and Concepts (3).** Prerequisite: C or better in ADV 3310 or PR 3310. Examination of public relations and relevant persuasion, media, and communication theories; practical application of theory for understanding and solving public relations problems and developing strategy.
- 3310. Principles of Public Relations (3).** 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).** Prerequisite: C or better in 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).** Prerequisites: C or better in PR 3311 and either JOUR 2310 or MCOM 2320. An overview of audience analysis, media analysis, and the logic and language skills needed to construct persuasive messages used in the public relations profession. (Writing Intensive)
- 3315. Online and Digital Public Relations (3).** Prerequisites: C or better in PR 3310 and 3311. Examination of online, mobile, and social media tools in public relations practice; consideration of issues related to monitoring, engagement, crisis and relationship management, and analytics.
- 3341. Public Relations Graphics and Production (3).** Prerequisite: C or better in PR 3310 or 3311. Design, composition,

**Bachelor of Arts in Public Relations:
Sample Four-Year Curriculum**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
MCOM 1300, Intro. to Mass Comm.	3	MCOM 2310, Prof. Communication	3
POLS 1301, American Gov.,Org.	3	POLS 2302, American Public Policy	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1320 or 1330	3	MATH 2300 or 2345 or 1331 †	3
Life & Physical Sciences*	4	Life & Physical Sciences*	4
MCOM 1100, Success in Media & Comm.	1		
TOTAL	17	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
PR 3310, Prin. of Public Relations	3	PR 3311, Public Relations Strategies	3
MCOM 2330, Media Literacy	3	ENGL 2000-Level Literature	3
ENGL 2000-Level Literature	3	MCOM 3300 or PR 3300, Theory	3
ECO 2305, Principles of Economics ‡	3	MCOM 2320, Media Writing	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	15	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MCOM 3320, Mass Comm. Law	3	MCOM 3380 or PR 3380, Research	3
PR 3312, Public Relations Writing	3	Foreign Language §	3
PR 3315, Online & Digital PR	3	PR 4308, PR Practice & Professionalism	3
Foreign Language §	3	Group Elective	6
Group Elective	3		
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
PR 3341 or 3345, Graphics/Content	3	PR 4312, Public Relations Campaigns	3
Creative Arts*	3	Foreign Language §	3
Foreign Language §	3	Group Elective	3
Group Elective	6	Multicultural Elective	3
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

* Choose from core curriculum requirements.

† If MATH 1330 is chosen for the first math requirement, MATH 1331 will satisfy the second math requirement. MATH 2300, 2345 or 1331 must be passed with a C or better.

‡ ECO 2301 and 2302 may replace ECO 2305. ECO 2305 or 2302 must be passed with a C or better.

§ See college foreign language requirements.

Students majoring in public relations are required to complete 57 hours within the college, including the following core courses (36 hours): PR 3310, 3311, 3312, 3315, 3341 or 3345, 4308, 4312; MCOM 1300, 2320 (or JOUR 2310), 3300 (or PR 3300), 3320, 3380 (or PR 3380).

Group A Public Relations Electives (6 hours): Approved courses include PR 3351, 3352, 3353, 3354, 3390, 4000, 4300, 4301 (may be repeated when topics vary), 4350, 4351. PR 3300, 3380, 3341, and 3345 may also be taken as Group A electives if not used to satisfy major core requirements.

Group B Media and Communication (9 hours): Students are encouraged to develop a specialization within another media and communication major area. Students not desiring to specialize may take any media and communication courses in any combination to satisfy the Group B requirement, including additional public relations courses beyond those needed to satisfy the public relations core and elective requirements.

Group C Cognate (6 hours): Students majoring in public relations are encouraged to take 6 hours outside the college to develop a cognate, ideally focusing on a topic that will prepare them for a particular public relations role or practice area. Alternately, public relations majors also have the option of selecting additional Group B courses to satisfy the Group C requirement.

**Bachelor of Arts in Media Strategies:
Sample Four-Year Curriculum**

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
MCOM 1300, Intro. to Mass Comm.	3	MCOM 2310, Prof. Communication	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MATH 1330,1320, or 1330	3	MATH 2300 or 2345 or 1331 †	3
POLS 1301, American Gov.,Org.	3	POLS 2302, American Public Policy	3
Life & Physical Sciences*	4	Life & Physical Sciences*	4
MCOM 1100, Success in Media & Comm.	1		
TOTAL	17	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MCOM 3300, Mass Media Theories	3	MCOM 3320, Mass Comm. Law	3
MCOM 2330, Media Literacy	3	Foreign Language §	3
ENGL 2000-Level Literature	3	ENGL 2000-Level Literature	3
ECO 2305, Principles of Economics ‡	3	MCOM 2320, Media Writing	3
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
TOTAL	15	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MCOM 3380, Research Methods	3	Creative Arts*	3
Foreign Language §	3	Foreign Language §	3
PR 3310, Principles of Public Relations	3	EMC 3310, Intro. to Elec. Media & Comm.	3
ADV 3310, Principles of Advertising	3	JOUR 2300, Principles of Journalism	3
Group Elective	3	Group Elective	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Foreign Language §	3	MCOM 4325, Media Eco. & Entrepreneur.	3
Group Electives	9	Multicultural Elective	3
Elective	3	Group Electives	6
TOTAL	15	TOTAL	12

TOTAL HOURS: 120

* Choose from core curriculum requirements

† If MATH 1330 is chosen for the first math requirement, MATH 1331 will satisfy the second math requirement. MATH 2300, 2345 or 1331 must be passed with a C or better.

‡ ECO 2301 and 2302 may replace ECO 2305, all of which require a grade of C or better.

§ See college foreign language requirements.

Students majoring in media strategies are required to complete 57 hours within the college, including the following core courses (36 hours): MCOM 1300, 2310, 2320, 2330, 3300, 3320, 3380, and 4325; ADV 3310; EMC 3310; JOUR 2300; PR 3310.

Group A Media and Communication Electives (15 hours): Select from COMS, MCOM, ADV, EMC, JOUR, and PR courses, including electives, internships, practicums, and special projects. Media strategies majors are encouraged to develop a specialization or minor within another media and communication discipline.

Group B Cognate (6 hours): Students majoring in media strategies are encouraged to take 6 hours outside the college to develop a cognate, ideally focusing on a topic that will prepare them for a particular media and communication industry role, or that will help them develop media innovations or entrepreneurial endeavors. Media strategies majors have the option of selecting additional Group A courses to satisfy the Group B requirement.

- layout, typography and production applied to public relations; use of computer as a layout and design tool for visual communications.
- 3345. Public Relations Content Development (3).** Prerequisites: Sophomore standing, C or better in PR 3310 and 3311. Development, design, management, and implementation of multimedia public relations content for organizational media; organizational storytelling; content strategy and creation for mobile, social, and web distribution.
- 3351. Public Relations for Nonprofits (3).** Examination of public relations strategies and techniques used to advance goals of nonprofit organizations, including generating coverage, finding and sustaining financial support, recruiting and retaining volunteers.
- 3352. Public Relations Event Management (3).** Examination of public relations event management within various settings. Role of events in building organizational reputation. Strategy, planning, marketing, logistics, finance, risk assessment, and evaluation.
- 3353. Political Public Relations (3).** Examination of public relations applications and functions in political settings, including political campaigns, issues management, political crises, citizen engagement, government relations, public affairs, public information.
- 3354. Sports Public Relations (3).** Examination of the roles and responsibilities of public relations practitioners working in the sports industry at the professional and collegiate levels.
- 3380. Applied Public Relations Research (3).** Prerequisites: Sophomore standing, C or better in MATH 2300 or 2345 and PR 3310. In-depth examination of the applied research function in public relations. Designing, implementing, analyzing, interpreting, and applying research to address real-world problems; evaluating program effectiveness.
- 3390. Internship in Public Relations (3).** Prerequisite: Junior or senior standing; C or better in MCOM 2320 or JOUR 2310, and PR 3311 and 3312; 2.5 TTU 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: Instructor consent. 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: C or better in 9 hours of public relations courses.
- 4301. Special Topics in Public Relations (3).** Considers selected topics in public relations. May be repeated for credit when topics vary.
- 4308. Public Relations Practice and Professionalism (3).** Prerequisite: C or better in PR 3311. Investigation of the professional world of public relations practice as it relates to personnel, program, and career management. Consideration of legal, financial, and ethical issues.
- 4312. Public Relations Campaigns (3).** Prerequisites: C or better in PR 3312 and either MCOM 3380 or PR 3380. Public relations campaign planning, preparation, and presentation in problem-solving mode. Setting objectives; executing research projects; evaluating creative media promotion; and preparing public relations plans, messages, budgets. (Writing Intensive)
- 4350. Crisis Communication (3).** Role of public relations in the prevention, management, and response to crises. Analysis of corporate, nonprofit, and government sector crises from a public relations perspective.
- 4351. International and Multicultural Public Relations (3).** Prerequisites: C or better in PR 3310 or ADV 3310. Investigation of the challenges and opportunities of practicing public relations in international, multicultural, and cross-cultural contexts. Examination of public relations function as practiced in other cultures.

Graduate Courses

- 5340. Foundations of Public Relations (3).** Public relations history, principles, theory, writing, and critiques of cases and campaigns.
- 5343. Public Relations Problems and Cases (3).** 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).** A rotating topics course examining theory, research, and application related to planning, implementation, and evaluation in public relations. May be repeated twice when topics vary.
- 7000. Research (V1-12).**



College of Visual and Performing Arts

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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/Concentration, and Electives. In addition to core curriculum requirements, students must take major, minor/concentration, and elective courses sufficient to total 120-129 semester hours. The minor/concentration (if applicable) may be any departmental minor/concentration from outside the major area discipline, an established interdisciplinary minor/concentration, or a student-initiated interdisciplinary or multidisciplinary minor/concentration (with approval of the appropriate associate dean of the college). Many departments and programs have residency requirements for the major and minor/concentration. See departmental or program listings for specific information.

Students should have selected their major and minor/concentration (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/concentration, 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/concentration 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 Undergraduate Admissions section of this catalog.

Admission of Transfer Students. Students requesting permission to transfer from another academic institution must meet the university-wide admission requirements. Students requesting permission to transfer from another college at Texas Tech must have a GPA of at least 2.0. Any student requesting to transfer into the College of Visual and Performing Arts 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.

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 Undergraduate Admissions section of this catalog) by obtaining written approval from the dean's office. Approval is required to take an examination if more advanced material in the same subject has already been completed.

Grading Practices. The college conforms to university grading practices as set forth in the Undergraduate Academics section of this catalog. Credit for a course in which a grade of D is earned may not be applied toward fulfillment of the major (sometimes including adjunct requirements), minor, or teaching field requirements for any degree program. Except for those courses designated "may be repeated for credit" in this catalog, no course may be used more than once on a degree plan unless it has been approved by the dean in the college.

Second Bachelor's Degree. Permission to enroll in courses to pursue a second bachelor's degree must be obtained from the office of the dean in the college. No second bachelor's degree is conferred until the candidate has completed at least 24 semester hours in residence in addition to the courses counted toward the first bachelor's degree. Out-of-state students must meet Texas Tech core curriculum requirements. Credit by examination and 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 areas of interest.

Final 30 Credit Hours. The final 30 credit hours of a degree program must be completed with Texas Tech enrollments.

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 45 hours of coursework. The Intent to Graduate form must be submitted no later than one year before the proposed date of graduation. Students must be enrolled at Texas Tech during their graduation semester.

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 life and physical sciences. Bachelor of Arts degrees are offered with fields of specialization in art history, studio art, dance, music, and theatre arts.

General Requirements. See "Undergraduate Credit by Examination" in the Undergraduate Admissions section of this catalog for information on credit provided by test scores to meet these requirements. Students must take the specified number of hours in the areas listed below. With a few exceptions, courses from the major and minor may be used to satisfy these requirements. Except for the multicultural requirement, a course may not be counted in two different areas of the general requirements nor may a course be counted in requirements for both the major and minor.

	<i>Semester Hours</i>
English	6-12
At least 6 hours of English must consist of ENGL 1301 and 1302.	
Oral Communication	3
Foreign Language	0-16
Specific foreign language requirements are determined in consultation with an academic advisor. A student must complete 0-6 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 Academic Testing Services 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.	
Mathematics	6
Life and Physical Sciences	8
Select from the life and physical sciences laboratory courses listed in the university's core curriculum.	
Social and Behavioral Sciences	3-6
Three hours must come from courses in social and behavioral sciences 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.	
United States History	6
Students normally enroll in HIST 2300 and 2301.	
United States and Texas Government	6
Students will enroll in POLS 1301 and 2302.	
Language, Philosophy, and Culture	3-6
Courses must be selected from the list of core curriculum options.	
Creative Arts	3-6
Satisfied in the majors.	
Multicultural Requirement	3
Three hours of coursework chosen from the 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.

Bachelor of General Studies: Sample Sequence

FIRST YEAR			
	<i>Fall</i>		<i>Spring</i>
IS 1100, Freshman Seminar	1	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Math	3
Mathematics*	3	Oral Communication*	3
U.S. History*	3	U.S. History*	3
Elective	3	Concentration Two	3
Concentration One	3		
TOTAL	16	TOTAL	15
SECOND YEAR			
	<i>Fall</i>		<i>Spring</i>
Political Science*	3	Political Science*	3
Foreign Language † or Elective	3	Foreign Language † or Elective	3
Social & Behavioral Sciences*	3	Multicultural Elective	3
Concentration One	3	Concentration Two	3
Life & Physical Sciences*	4	Life & Physical Sciences*	4
TOTAL	16	TOTAL	16
THIRD YEAR			
	<i>Fall</i>		<i>Spring</i>
Language, Philosophy, and Culture*	3	Elective	3
Elective	3	Elective	3
Concentration One	3	Concentration One	3
Concentration Two	3	Concentration Two	3
Concentration Three	3	Concentration Three	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
	<i>Fall</i>		<i>Spring</i>
Concentration One	3	Concentration One	3
Concentration Two	3	Concentration Two	3
Concentration Three	3	Concentration Three	3
Concentration Three	3	Concentration Three	3
Elective	3		
TOTAL	15	TOTAL	12
TOTAL HOURS: 120			
* Choose from the university's core curriculum.			
† 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 information, refer to the "Foreign Language Requirement" in the Undergraduate Academics section of the catalog.			

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 discipline area faculty and 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 listings for specific information.

All courses in the major and minor must be approved by the appropriate academic unit. Students are expected to develop a degree plan upon completion of 45 hours. Forms and information are available in department offices. A minimum of 40 semester hours of junior and senior work are required to graduate.

Graduate Program

For information on graduate programs offered by the College of Visual and Performing Arts, visit the Graduate School section of the catalog on page 151.

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.

The college is developing innovative new tracks within the existing B.G.S. degree. The first of these is the interdisciplinary design, arts and technology (IDAT) track, a unique liberal arts track featuring specialized training in the arts with an orientation toward technology and design. IDAT may be of particular interest to students preparing for growing career opportunities combining or integrating such fields as art direction, game design, event design, interactive and convergent media, animation, app design, song writing, sound design for time-based media, and concept art. The track would also be appropriate for students who want to produce technology-oriented work that crosses boundaries between fine art and design or between theatre, music and the visual arts. The interdisciplinary technology concentration (ITC) is the cornerstone of the IDAT track, and includes VPA 2310, 18 hours of courses selected from communication, technology and interdisciplinary courses, and VPA 4110, which is the IDAT capstone course. The second concentration is chosen from existing minors in art, music, or theatre and dance. The third concentration is selected in close consultation with the college advisor and a faculty mentor from courses within or outside the college that support the student's broader interdisciplinary interests. The IDAT course of study culminates in the one-credit capstone course, taken concurrently with two credits in an appropriate 4000-level independent study with the faculty mentor. At least 36 credit hours must be in courses within the College of Visual and Performing Arts.

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 or cvpa.advisors@ttu.edu) 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
United States and Texas Government	6
United States History	6
Mathematics	6
Life and Physical Sciences	8

Social and Behavioral Sciences	3-6
Language, Philosophy, and Culture	3-6
Creative Arts	satisfied in concentrations
Personal Fitness and Wellness	0-2
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
TOTAL FOR DEGREE.....	120

Bachelor of Fine Arts

The curriculum leading to the Bachelor of Fine Arts (B.F.A.) degree provides fields of specialization in theatre arts—acting, theatre arts—design technology, 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
United States and Texas Government	6
United States History	6
Oral Communication	3
Mathematics	6
Life and Physical Sciences	8
Social and Behavioral Sciences	3
Language, Philosophy, and Culture	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 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 approved list. This course may be used to satisfy another General Degree requirement. No additional hours are required if the multicultural requirement is satisfied within the requirements for art and theatre majors.	
Professional Program (Select One)	
• Theatre Arts	86
• Visual Studies	67
(leading toward teacher certification)	
• Communication Design	85
• Studio Art	82
Professional Education	21
(teacher certification only)	
TOTAL FOR DEGREE	120-129

Bachelor of Music

Bachelor of Music degrees are offered with fields of specialization in performance (MUPF), composition (MUCP), 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	6
Foreign Language	0-16
Specific foreign language requirements are determined in consultation with an academic advisor. 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.	
Language, Philosophy, and Culture	3
Life and Physical Sciences	8
United States and Texas Government	6
United States History	6
Social and Behavioral Sciences	3
Multicultural Requirement	3

Three hours of coursework from the approved list. This course may be used to satisfy another General Degree requirement. No additional hours are required if the multicultural requirement is satisfied within the requirements for music majors.

Music Courses for Major (Select One)

MUPF	69-80
MUCP	81
MUTH	74
MUTC	59-62

Professional Education 18 (teacher certification only)

TOTAL FOR DEGREES

MUPF	121-124
MUCP	121
MUTH	120
MUTC	121-122

'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 College of Visual and Performing Arts, the 30-hour limit applies to courses from outside the student's major 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 encour-

aged 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.

For further information see www.honr.ttu.edu, www.prelaw.ttu.edu, and www.law.ttu.edu/prospective/specialprograms/honors3/.

Course Descriptions

(To interpret course descriptions, see page 23.)

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)

Undergraduate Course

- 2301. Critical Issues in Arts and Culture (3).** Analysis of music, visual arts, theatre and dance as fundamental to contemporary society and relationship of arts to broader social context. Fulfills multicultural and core Language, Philosophy, and Culture requirement.
- 2302. Yoga and the Creative Arts: Philosophy and Practice (3).** Surveys Raja Yoga and considers how its ethics, philosophy, and physical and mental practice influence past, present, and future experiences and creations of works of art. Fulfills multicultural and core Language, Philosophy, and Culture requirement (pending THECB approval).
- 2310. Introduction to Interdisciplinary Design/Arts and Technology (3).** Required for the B.G.S. interdisciplinary design/arts and technology track. Introduces students to the diversity and applicability of interdisciplinary studies within design/art and technology.
- 4110. Capstone Seminar: Interdisciplinary Design/Art and Technology (1).** A capstone course in the interdisciplinary design/arts and technology track. Class meets weekly and students also meet individually with their project advisor/mentor. Includes traditional instruction and discussion exploring applicable aspects of the large-scale project.

Graduate Course

- 5300. Topics in the Visual and Performing Arts (3).** 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.
- 5301. Colloquium: Inter/Disciplinarity in the Arts (3).** Foundation for practice of interdisciplinary scholarship in the arts, including formation of interdisciplinary, disciplinary labor of various approaches to arts research, and function of critical theory.
- 5310. Arts Histories (3).** Examines the changing nexus of disciplinarity across world-historical space and time through selected instances of visual art, music, and theatre.
- 5314. The Arts in a Contemporary Context (3).** Investigates contemporary practices, trends, problems, and values across the arts by examining key figures whose work is crucial to understanding ways in which interdisciplinarity informs contemporary arts.

School of Art

Lydia Thompson, M.F.A., Director

Professors: Dingus, Fuentes, Germany, Glover, Granados, A. Martin, Morrow, Tate, Thompson, Wink

Associate Professors: Akins-Tillet, W. Cannings, Check, Chua, Cortez, Elko, Elliott, Flueckiger, D. Fowler, Lindsay, Orfila, Ortega, Slagle, Steele, Tedeschi, Venhuizen, Yoo

Assistant Professors: Fremaux, Gong, Humphreys, Johnson, Ögüs-Uzun, Peralta

Adjunct Faculty: S. Cannings, C. Fowler, Milosevich, Peaslee, Sizer

CONTACT INFORMATION: 101 Art Building, Box 42081, Lubbock, TX 79409-2081, T 806.742.3826, F 806.742.1971, www.art.ttu.edu

About the Program

This school supervises the following degree and certificate programs:

- Bachelor of Arts in Art
Fields of Specialization: Art History, Studio Art
- Bachelor of Fine Arts in Art
Fields of Specialization: Communication Design, Studio Art, Visual Studies (leading toward teacher certification)
- Master of Art Education
- Master of Arts in Art History
- Master of Fine Arts in Art
Field of Specialization: Studio Art
- Doctor of Philosophy in Fine Arts
Field of Specialization: Art (Critical Studies and Artistic Practice)
- 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. The Bachelor of Interior Design and Bachelor of Science in Apparel Design and Manufacturing degree programs in the College of Human Sciences are also 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 seeking a degree 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; ARTH 1301, Art History Survey I; ARTH 2302, Art History Survey II; and ARTH 3303, Art History Survey III.

Advanced Placement. Students entering art programs 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 students 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 who are awarded advanced placement through the College Board Advanced Placement Program (AP) may earn 6 hours of college credit. Entering art students who receive a 4 or 5 on the College Board Advanced Placement Program in art history will be exempt from taking ARTH 1301 and 2302.

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 fields of specialization, minors, concentrations, or emphases. Most upper-level art courses are repeatable for credit with a change of topics and allow for individualized instruction.

Semester Credit Hour and Contact Hour Equivalents. For most purposes a traditionally offered face-to-face course will have a minimum of 15 contact hours for each semester credit hour. Thus, a 1-credit-hour course should meet for at least 15 hours over a long semester and a 3-credit-hour course should meet for 45 hours over the semester. Courses taught during a summer session are expected to have the same number of contact hours as if they were taught during a long semester. It is permitted to offer a course in a shortened schedule, online, or in other non-traditional formats that do not meet the contact hour requirement if the course has been reviewed by a college faculty committee and the Office of the Provost and approved as having the same learning outcomes as a comparable course delivered traditionally.

In-residence students and any students in their semester of graduation must be enrolled in a minimum of one credit-bearing semester hour. Registration in remedial and other zero-credit hour coursework must be accompanied by one credit-bearing course. Should a student drop to zero credit hours, the student will be withdrawn from the institution.

Pursuant to the Texas Tech University *Undergraduate/Graduate Catalog*, the Texas Administrative Code, and norms stated in the *NASAD Handbook*, the credit and time expectations for School of Art courses are as follows:

- For studio- or project-based courses, a standard of 30 in-class contact hours per credit hour per term is employed. Further, non-contact hour time expectations for out-of-class student activity typically range from 15 to 30 hours per credit hour per term.
- For traditionally delivered 3-credit-hour lecture- or seminar-based courses during a regular semester, students should expect to be in class for 3 hours per week and work outside of class a minimum of 6 hours per week. For 3-credit-hour studio- or project-based courses, students should expect to be in class for 6 hours per week and work outside of class between 3 and 6 hours per week.

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. in Art with a field of specialization in art history or studio art must complete at least 24 hours of upper-division courses in their field of specialization in residence. At least 9 hours of upper-division courses must be taken in residence for the minor.

Distance Learning Courses. Field of specialization or minor courses may not be taken by distance learning.

Writing Intensive Requirement. Students must complete at least 6 hours of writing intensive courses in their field of specialization. ART 4335, 4359, ARTH 3303, ARTV 4365, and most upper-level ARTH courses are writing intensive.

Laptop Initiative Program. As students begin their major coursework in the photography, communication design, and visual studies programs, they will be required to have a laptop computer that meets specific criteria. For current information consult the School of Art website, www.art.ttu.edu.

Minors/Concentrations. The School of Art offers three minors: art history, studio art, and fine arts photography. Declaration of one of these minors must be approved by the School of Art academic advisor prior to completion of minor coursework. Students working toward any of these minors must complete a minimum of 18-21 semester hours, which must include 9 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 minor. Neither visual studies nor communication design offers a minor.

Specific requirements are as follows:

- **Art History Minor/Concentration.** Students working toward an art history minor must complete a minimum of 18 hours and include ARTH 1301, 2302, and 3303. The remaining 9 hours must be taken in residence and must be chosen from a menu of courses offered at the 3000 and 4000 level. These courses are ARTH 3320, 3333, 3345, 3350, 3364, 3366, 3380, 4307, 4308, 4335, 4340, and 4389.
- **Studio Art Minor/Concentration.** Students working toward a minor in studio art must complete a minimum of 18 hours of coursework in the School of Art. 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. Nine of the 18 required hours must be taken at the junior or senior level in residency.
- **Fine Arts Photography Minor/Concentration.** 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, 3326, 4325 (may be repeated); ARTH 3380 (or ART 1309). All advanced hours must be taken in residence.

Undergraduate Degrees

Bachelor of Arts in Art

The Bachelor of Arts in Art will provide School of Art students with a liberal arts degree in art, offering a broader emphasis of visual arts and related studies than is currently provided through the Bachelor of Fine Arts. The bachelor of arts degree is a 120-hour program that can be completed in four years and will include the requisite percentage of studio art, art history, and general studies classes. The degree will provide students an opportunity to participate in a more individualized degree through the choice of elective courses for a minor from outside the major area discipline that is consistent with the university philosophy and policies for a liberal arts degree.

Field of Specialization in Art History

Students working toward the Bachelor of Arts in Art with a field of specialization in art history 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 24 of which must be taken in residence, including Senior Thesis in Art History), a minor course of study from outside the major area discipline, sophomore-level in a foreign language, and the university core curriculum requirements for a B.A. in the College of Visual and Performing Arts. The number of credit hours required for a field of specialization in art history is 120 (including a minimum of 39 credit hours of art history). ARTH 3303 and most upper-level art history courses are writing intensive.

After completing three art history survey courses in Art Foundations (9 credit hours), students will achieve a breadth of study by selecting seven upper-level art history courses (21 credit hours) with at least one course from a minimum of five of the following fields: Medieval art, Renaissance and Baroque art, Native American and pre-Columbian art, Latin American art, 18th- and 19th-century European and American art, and Modern and Contemporary European and American art. Prior to the last semester of the senior year, students are required to take an additional 6 credit hours in a focus area in preparation for the senior thesis (another 3 credit hours). The capstone experience is the presentation of the senior thesis research at the Undergraduate Art History Symposium.

Art history students complete either a traditional 18-hour minor from outside the major area discipline or an 18-hour interdisciplinary research minor (subject to approval by the art history area advisor and the associate dean of the College of Visual and Performing Arts) in collateral fields that support their art history research focus area.

The field of specialization in art history requires sophomore-level proficiency in a foreign language. For further information on the foreign language requirement, see page 402.

Field of Specialization in Studio Art

The Bachelor of Arts in Art with a field of specialization in studio art provides School of Art students with a liberal arts degree in art, offering a broader emphasis of visual arts and related studies than is provided through the Bachelor of Fine Arts. Studio art courses in art are carefully selected with faculty guidance and are designed to culminate in a capstone project that can take the form of a paper, project or exhibition. The capstone offers students an opportunity to synthesize their learning in a way that can provide greater understanding of the relationships between disciplines. The degree will provide students a more individualized program through the choice of elective courses for a minor from outside the major area discipline that complements the studio courses and is consistent with the university philosophy and policies for a liberal arts degree.

This field of specialization is a 120-hour program that can be completed in four years and requires 46 credit hours in studio art and art history, 9 interdisciplinary credit hours from the other areas of the College of Visual and Performing Arts (music, theatre arts, and/or dance), 18 credit hours in a minor area of study from outside the major area discipline that may also be interdisciplinary, and 44 to 54 credit hours of general education requirements as stipulated by the discipline area advisor and the College of Visual and Performing Arts.

The field of specialization in studio art requires sophomore-level proficiency in a foreign

Graduate Program

For information on graduate programs offered by the School of Art, visit the Graduate School section of the catalog on page 151.

The field of specialization in studio art requires sophomore-level proficiency in a foreign language. For further information on the foreign language requirement, see page 402.

Bachelor of Fine Arts

The Bachelor of Fine Arts in Art will provide School of Art students with a professional degree in art, offering a comprehensive study with fields of specialization in either a 123-hour program in Communication Design, a 123-hour program in Studio Art, or a 129-hour program in Visual Studies (leading toward teacher certification). These degrees can be completed in four years and will provide students an opportunity to have an intensive and in-depth experience through visual concepts and practice.

Field of Specialization in Visual Studies

The Bachelor of Fine Arts with a field of specialization in visual studies (leading toward art teacher certification) prepares graduates for the realities facing teachers today. The program emphasizes contemporary theories and artists through the study of multiple and diverse visual cultures. Prior to student teaching, students participate in field practica in public schools and community settings.

This program requires 54 semester hours of studio art and art history, 30-36 semester hours of professional education, and 44-51 semester hours of general requirements as stipulated by the College of Visual and Performing Arts. The minimum number of hours required for visual studies (leading toward teacher certification) is a total of 129 credit hours. A minimum of 40 credit hours of junior- and senior-level courses are required for graduation.

Field of Specialization in Communication Design

The Bachelor of Fine Arts (B.F.A.) with a field of specialization in communication design addresses problem-seeking and problem-solving skills. It stresses the importance of conceptual development and the integration of form and information for the purpose of effective visual communication. The program emphasizes civic responsibility and the role of the graphic designer in the community. Students hone not only their artistic and professional skills but also their understanding of the fundamental issues of society and what, as professional artists, can do in service to others. This program prepares students for careers in design-related fields such as publication design, collateral design, and web design.

Students working toward a B.F.A. with a field of specialization in communication design must complete a minimum of 120 credit hours, including the Art Foundations coursework, 45 semester credit hours of communication design courses, 15 hours of studio art and art history electives, and the university's core curriculum requirements for a B.F.A. in the College of Visual and Performing Arts.

The communication design curriculum is based on a series of carefully sequenced courses. All courses must be taken in sequence and successfully completed with a passing grade in order to progress within the curriculum.

All students accepted into the communication design program are required to have a laptop computer meeting specific criteria as they enter their major coursework. For more detailed information see www.art.ttu.edu (click on Laptop Initiative).

Admission to the communication design program requires specific course requirements and a portfolio review. Admission to Texas Tech University does not guarantee admission to the communication design program.

Applicants are selected each year in the spring semester (mid-April) through a rigorous portfolio and interview process. Students must prepare for the portfolio review by enrolling in ART 2388 in the spring of their first year. The prerequisites for ART 2388, 1302 and 1303 must be taken prior to enrolling in ART 2388. Students enrolled in ART 2388 must concurrently enroll in ART 2303 and ART 2304, if the courses have not been taken previously.

Bachelor of Arts in Art: Sample Course Sequence for Field of Specialization 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	ARTH 2302, Art History Survey II	3
ARTH 1301, Art History Survey I	3	ENGL 1302, Advanced College Rhetoric	3
Social & Behavioral Sciences*	3	Oral Communication*	3
ENGL 1301, Essentials of Coll. Rhetoric	3		
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
ARTH 3303, Art History Survey III	3	Art History Credit	3
Minor Credit†	3	Art History Credit	3
Foreign Language Credit‡	3	Minor Credit†	3
ART 2309, Technology in the Arts	3	Foreign Language Credit‡	3
Life and Physical Sciences*	4	Life and Physical Sciences*	4
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
Art History Credit	3	Art History Credit	3
Art History Credit	3	Art History Credit	3
Minor Credit†	3	Minor Credit†	3
U.S. History*	3	U.S. History*	3
Mathematics*	3	Mathematics*	3
TOTAL	15	TOTAL	15
FOURTH YEAR			
Fall		Spring	
Art History Credit	3	ARTH 4309, Sr. Thesis in Art History	3
Art History Credit	3	Art History Credit	3
Minor Credit†	3	Minor Credit†	3
POLS 1301, American Gov., Org. Language, Philosophy, and Culture*	3	POLS 2302, American Public Policy	3
TOTAL	15	TOTAL	12
TOTAL HOURS: 120			
* Choose from the university's core curriculum.			
† Students are encouraged to select a minor in a foreign language or in collateral fields that support their art history research focus and senior thesis topic.			
‡ A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course.			

Communication design is a limited-access program and the selection process is highly competitive. Students who are not accepted have the option of reapplying one final time during the subsequent review process in the next spring semester. Students can complete the program in communication design in four years if they are accepted upon the first portfolio review.

A portfolio review will occur during the fall semester of a student's third year in the communication design curriculum. A faculty panel will review work produced in ART 3381, 3382, 3383, 3384, and 4357. A student whose work is found to be unsatisfactory will enter a probationary period but may continue taking courses within the curriculum. The faculty panel will conduct a second review the following spring semester. If the student's new work demonstrates improvement, the probationary period will be concluded. In the event that satisfactory improvements have not been made, the student will be dismissed from the program and may not pursue readmission.

Field of Specialization in Studio Art

The Bachelor of Fine Arts with a field of specialization in studio art offers depth in the studio areas and requires 82 hours of art and art history courses in addition to the 38 to 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

Bachelor of Arts in Art: Sample Course Sequence for Field of Specialization 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	ARTH 2302, Art History Survey II	3
ARTH 1301, Art History Survey I	3	ENGL 1302, Advanced College Rhetoric	3
Social and Behavioral Sciences	3	Oral Communication*	3
ENGL 1301, Essentials of Coll. Rhetoric	3		
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
ARTH 3303, Art History Survey III	3	Studio Art Elective Credit	3
Studio Art Elective Credit	3	Art History Credit	3
Minor Credit	3	Minor Credit	3
ART 2309, Technology in the Arts	3	Life and Physical Sciences*	4
Foreign Language Credit †	3	Foreign Language Credit †	3
TOTAL	15	TOTAL	16
THIRD YEAR			
Fall		Spring	
Studio Art Elective Credit	3	ART 4101, Capstone I	1
VPA 2301, Critical issues in Art & Culture	3	Art History Elective Credit	3
Minor Credit	3	VPA Elective Credit	3
U.S. History*	3	Minor Credit	3
Life and Physical Sciences*	4	U.S. History*	3
		Mathematics*	3
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
ART 4102, Capstone II	1	ART 4103, Capstone III	1
Studio Art Elective Credit	3	Studio Art Elective Credit	3
VPA Elective Credit	3	Minor Credit	3
Minor Credit	3	Mathematics*	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
TOTAL	13	TOTAL	13

TOTAL HOURS: 120

* Choose from the university's core curriculum.

† A student must complete 6 hours at the sophomore level or above in a single language. The prerequisite for all sophomore language courses is credit for the freshman level. This credit can be determined through credit by examination. The score attained on the exam will determine whether the student is placed in a second-year course, a 5-hour review course, or in some cases the first or second semester of a beginning (first-year) language course.

hours required in studio art is 123. A minimum of 40 credit hours of junior- and senior-level courses is 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 field of specialization 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. Students graduating in studio art are required to participate in a group exhibition during the spring semester of their graduating year.

Students selecting a concentration in painting will be expected to submit paintings or a combination of painting and drawing for a portfolio review during their first or second painting class (ART 3321 or 3322) in order to be admitted to the area. Students who are not selected in the first review of their work may submit once more before they are required to identify another concentration.

Students selecting a concentration in photography will be expected to submit photographs for a portfolio review after the first class (ART 3325) in order to be admitted to the area. Students who are not selected in the first review of their work may submit once more before they are required to identify another concentration.

Bachelor of Fine Arts in Art: Sample Course Sequence for Field of Specialization in Visual Studies

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	ARTH 2302, Art History Survey II	3
ARTH 1301, Art History Survey I	3	ENGL 1302, Advanced College Rhetoric	3
Social & Behavioral Sciences*	3	Oral Communication*	3
ENGL 1301, Essentials of Coll. Rhetoric	3		
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
ARTV 3360, Intro to Theor. & Pract. in Art ¹ †	3	ARTV 3364, Found. of Art in Soc. Inst. ² ‡	3
ARTH 3303, Art History Survey III	3	Studio Art Emphasis Credit	3
2-D Distribution Credit	3	2-D Distribution Credit	3
3-D Distribution Credit	3	3-D Distribution Credit	3
ART 2309, Technology in the Arts	3	Mathematics*	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
TOTAL	3	TOTAL	3
FOURTH YEAR			
Fall		Spring	
ARTV 4362, Curric. Theory & Instr. Meth. ³ †	3	ARTV 4361, Topics in Visual Studies [‡]	3
EDLL 4382, Read. & Writ. in Sec. Class [§]	3	ARTV 4315, Integrating Instr. Tech.	3
EDSP 3300, Exceptional Child. & Yth [§] or	3	3-D Distribution Credit	3
EDSE 4322, Diversity & Learn Environ. [§]	3	Studio Art Emphasis Credit	3
2-D Distribution Credit	3	Life and Physical Sciences*	4
Studio Art Emphasis Credit	3		
TOTAL	15	TOTAL	16
FOURTH YEAR			
Fall		Spring	
ARTV 4365, Visual Studies Seminar [†]	3	ART 4000, Student Teaching ⁴	6
Studio Art Emphasis Credit	3		
Additional Art History Credit	3		
Life and Physical Sciences*	4		
Language, Philosophy, and Culture*	3		
TOTAL	16	TOTAL	6

TOTAL HOURS: 129

¹⁻⁵ ARTV 3360, 3364, 4362, 4000 must be taken in sequence.

* Choose from the university's core curriculum.

† Offered in fall only.

‡ Offered in spring only.

§ Students must apply to the College of Education at the start of the semester prior to the semester they intend to enroll in EDLL 4382, EDSE 4322, or EDSP 3300.

Course Descriptions

(To interpret course descriptions, see page 23.)

Art (ART)

Undergraduate Courses

- 1100. Introduction to Art (1).** Introduction to art as an academic pursuit with its diverse elements and opportunities, objectives, resources, careers, and achievements. Required of all art programs prior to admission to upper-level courses. Offered fall semester only. Transfer credit acceptable.
- 1302. [ARTS 1311] Design I: Introduction (3).** Emphasis upon two-dimensional design; includes the fundamentals of line, color, value, texture, shape, space, and compositional arrangement. Students learn to apply verbal skills needed in advanced visual arts. Outside assignments. AP or portfolio waiver possible.
- 1303. [ARTS 1316] Drawing I: Introduction (3).** 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.

Bachelor of Fine Arts in Art: Sample Course Sequence for Field of Specialization 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	ARTH 2302, Art History Survey II	3
ARTH 1301, Art History Survey I	3	ART 2388, Design Process	3
Oral Communication*	3	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	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
ARTH 3303, Art History Survey III	3	ART 3382, Symbols	3
Studio Art Elective	3	Additional Art History Credit	3
Mathematics*	3	Mathematics*	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
Life and Physical Sciences*	4	Life and Physical Sciences*	4
U.S. History*	3	U.S. History*	3
TOTAL	16	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	POLS 2302, American Public Policy	3
POLS 1301, American Gov., Org.	3	Language, Philosophy, and Culture*	3
Social & Behavioral Sciences*	3		
TOTAL	15	TOTAL	12
TOTAL HOURS: 120			
* Choose from the university's core curriculum.			

Bachelor of Fine Arts in Art: Sample Course Sequence for Field of Specialization 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	ARTH 2302, Art History Survey II	3
ARTH 1301, Art History Survey I	3	ENGL 1302, Advanced College Rhetoric	3
Social & Behavioral Sciences*	3	Oral Communication*	3
ENGL 1301, Essentials of Coll. Rhetoric	3		
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
Studio Art Emphasis Credit	3	Studio Art Emphasis Credit	3
ART 3323, Drawing III: Life Drawing	3	2-D or 3-D Distribution Credit	3
ARTH 3303, Art History Survey III	3	2-D or 3-D Distribution Credit	3
2-D or 3-D Distribution Credit	3	Language, Philosophy, and Culture*	3
ART 2309, Technology in the Arts	3	Additional Art History Credit	3
TOTAL	15	TOTAL	15
THIRD YEAR			
Fall		Spring	
Studio Art Emphasis Credit	3	Studio Art Emphasis Credit	3
2-D or 3-D Distribution Credit	3	Studio Art Emphasis Credit	3
2-D or 3-D Distribution Credit	3	Additional Art History Credit	3
Mathematics*	3	Life and Physical Sciences*	4
Life and Physical Sciences*	4	Mathematics*	3
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
ART 4335, Sr. Sem. for Studio Art Majors	3	Studio Art Emphasis Credit	3
Studio Art Emphasis Credit	3	Studio Art Elective Credit	3
Studio Art Elective Credit	3	Studio Art Elective Credit	3
U.S. History*	3	U.S. History*	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
TOTAL	15	TOTAL	15
TOTAL HOURS: 123			
* Choose from the university's core curriculum.			

- 1309. [ARTS 1301, 1313, 1413] Art Appreciation (3).** 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 and core Creative Arts requirement.
- 2099. Problems in Art (VI-3).** Prerequisite: Consent of instructor. Explores a specific area of interest in art. May be repeated for credit with a different topic.
- 2303. [ARTS 1312] Design II: Introduction (3).** 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).** 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.
- 2309. Technology in the Arts (3).** Introduces students to the Macintosh environment, digital input and output, scanning and preparing presentations, and related ethical issues.
- 2388. Design Process (3).** Prerequisites: 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).** Prerequisites: ART 1303 (or ARCH 1341), 2303, and 2304. Introduction to wheel throwing, glazing and firing. Outside assignments.
- 3301. Ceramics I: Introduction to Handbuilding (3).** Prerequisites: ART 1303 (or ARCH 1341), 2303, and 2304. Introduction to handbuilding techniques, glazing, and firing. Outside assignments.
- 3308. Printmaking I: Introduction (3).** Prerequisites: ART 1302, 1303 (or ARCH 1341), and 2304. Introduction to printmaking with sections designated for waterbase screenprinting, lithog-

- raphy, relief, intaglio, and monotype. Outside assignments in print lab required.
- 3321. Painting I: Introduction (3).** Prerequisites: ART 1302, 1303 (or ARCH 1341), and 2304. Introduction to painting concepts and techniques with designated sections for watermedia or oil. Outside assignments. May be repeated once for credit in different emphasis.
- 3322. Intermediate Painting (3).** 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).** Prerequisites: 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).** 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. May be repeated for credit.
- 3325. Photographic Arts I (3).** Prerequisites: 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).** Prerequisite: ART 3325 or consent of instructor. Intermediate fine arts photography with topics that rotate between color, digital, and black and white darkroom. Outside assignments. May be repeated once for credit with different emphasis.
- 3328. Printmaking II (3).** Prerequisites: ART 3308 or consent of instructor. Advanced printmaking with topics that rotate each semester between in-depth study of printmaking methods of screenprinting, lithography, intaglio, or relief printing or papermaking. Outside assignments in print lab required. May be repeated for credit.

- 3329. Introduction to Digital Imaging (3).** Prerequisites: 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).** Prerequisite: ART 3300. Emphasis on developing student's technical expertise, conceptual skills, and problem-solving ability. Content normally different each time offered. Outside assignments. May be repeated for credit.
- 3331. Advanced Ceramics: Handbuilding (3).** Prerequisite: ART 3301. Develops student's technical expertise, conceptual skills, and problem-solving ability. Content normally different each time offered. Outside assignments. May be repeated for credit.
- 3333. Metal and Jewelry Design (3).** Prerequisites: ART 1303 (or ARCH 1341), 2303, and 2304 or consent of instructor. Introduction to basic techniques used in metalsmithing and jewelry making. Emphasis on fabrication and design. Outside assignments. May be repeated once for credit.
- 3334. Advanced Metal and Jewelry Design (3).** Prerequisite: ART 3333. Further study of techniques used in metalsmithing and jewelry design. Development of individual direction and exploration of various media. Outside assignments. May be repeated for credit.
- 3336. Sculpture I: Introduction to Metal Fabrication (3).** Prerequisites: 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).** Prerequisites: 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).** 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. May be repeated for credit.
- 3339. Advanced Sculpture: Intermedia (3).** 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. May be repeated for credit.
- 3372. Rethinking Art Education (3).** Prerequisite: Sophomore standing. Contemporary content and teaching in the visual arts. Non-majors only.
- 3381. Typography (3).** Prerequisites: 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).** Prerequisites: 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).** Prerequisites: 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).** Prerequisites: 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).** 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).** Prerequisites: 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.
- 4099. Advanced Problems in Art (V1-3).** Prerequisite: Consent of instructor. Explores a specific area of interest in art. May be repeated for credit with a different topic.
- 4101. Bachelors of Arts in Art Capstone I (1).** The first of a required three-part capstone for the B.A. in Art.
- 4102. Bachelors of Arts in Art Capstone II (1).** The second of a required three-part capstone for the B.A. in Art.
- 4103. Bachelors of Arts in Art Capstone III (1).** The third of a required three-part capstone for the B.A. in Art.
- 4104. Advanced Problems (1).** Prerequisite: Consent of instructor. Advanced problems in an area of production in which the student has achieved competence. May be repeated for credit.
- 4304. Independent Study in Art (3).** Prerequisite: Consent of instructor. Advanced problems in an area of production in which the student has achieved competence. May be repeated for credit.
- 4320. Experimental Drawing (3).** Prerequisites: 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. May be repeated for credit.
- 4321. Advanced Painting (3).** 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. May be repeated for credit.
- 4322. Senior Studio: Painting (3).** 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. May be repeated for credit.
- 4325. Advanced Photographic Arts (3).** Prerequisites: ART 3325 and at least one successful completion of 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. May be repeated for credit up to a maximum of 12 hours.
- 4326. Senior Studio Photography (3).** Prerequisites: Successful completion of two enrollments of 3326 and consent of instructor. Exploration of advanced topics in photography directed toward the creation of a mature body of work. Outside assignments. May be repeated for credit.
- 4328. Printmaking III (3).** Prerequisite: ART 3328 or consent of instructor. Advanced studies in printmaking process. Course emphasizes student's individual exploration of subject matter. Mature development of print work utilizing a variety of media and surfaces. Rotating topics in area include experimental and time-based media. May be repeated for credit.
- 4329. Advanced Digital Photo Imaging (3).** 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. May be repeated for credit.
- 4330. Senior Studio: Ceramics (3).** 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. May be repeated for credit.
- 4334. Senior Studio: Metal and Jewelry Design (3).** Prerequisite: ART 3334 or consent of instructor. Mature, individualistic exploration directed toward developing a comprehensive, cohesive body of work for evaluation. Outside assignments. May be repeated for credit.
- 4335. Senior Seminar for Studio Art Majors (3).** 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. (Writing Intensive)
- 4338. Senior Studio: Sculpture (3).** 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. May be repeated for credit.
- 4350. Topics in Communication Design (3).** Prerequisites: ART 4380 and 4381, or consent of instructor. Explores a specific area of interest in a particular kind of communication design problem. May be repeated for credit.
- 4354. Illustration (3).** Prerequisites: 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. May be repeated for credit.
- 4355. Professional Internship (3).** Prerequisite: Consent of instructor. Provides on-site internship experience. Placement is student initiated and faculty approved. Student's progress will be monitored. May be repeated for credit.

- 4356. Packaging (3).** Prerequisites: ART 4380 and 4381. Study and design of three-dimensional form and surface. Stresses problem solving and innovative thinking as they relate to the environment and ecological concerns. May be repeated for credit.
- 4357. Web Media Design (3).** Prerequisites: ART 3381, 3382, and 3386. Fundamentals of website 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).** Prerequisites: ART 4380 and 4381. Explores the interactive effects of time and motion, including visual rhythm, continuity, and relationship between form and content of visual communication. May be repeated for credit.
- 4359. Design History (3).** Prerequisite: Program acceptance. Examination of the evolution of the graphic arts. Discusses design innovators as well as styles and movements. Emphasis on 20th century. (Writing Intensive)
- 4380. Publication Design (3).** Prerequisites: 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).** Prerequisites: 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).** Prerequisites: ART 4380 and 4381 and a minimum of two communication design electives. Emphasizes resume development, final portfolio preparation and refinement, business procedures, self-promotion, and interviewing skills. Offered in spring semesters only.
- 4390. Advanced Transmedia Art (3).** Explores technology in contemporary arts with rotating topics, including video, animation, visual effects, and digital painting. Outside assignments. May be repeated three times for credit.

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).** 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).** 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).** 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.
- 5310. Historical and Critical Perspectives in the Visual Arts (3).** 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.
- 5314. The Visual Arts in Contemporary Context (3).** 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).
- 5320. Graduate Drawing (3).** Prerequisite: Consent of instructor. The development and execution of advanced problems in drawing. May be repeated for credit.
- 5322. Graduate Painting (3).** Prerequisite: Consent of instructor. The development and execution of advanced problems in painting. May be repeated for credit.
- 5326. Graduate Photography (3).** Prerequisite: Consent of instructor. Experimental investigation into varied aspects of photography as creative media. May be repeated for credit.
- 5328. Graduate Printmaking (3).** Prerequisite: Consent of instructor. The development and execution of advanced problems in printmaking. May be repeated for credit.
- 5330. Graduate Ceramics (3).** Prerequisite: Consent of instructor. The development and execution of advanced problems in ceramics. May be repeated for credit.
- 5334. Graduate Metal and Jewelry Design (3).** 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).** 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).** Prerequisite: Consent of instructor. 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).** 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).** 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).** 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).** Prerequisite: 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)
- 5390. Graduate Transmedia Art (3).** A graduate-level exploration of technology in contemporary art. May be repeated for credit.
- 6000. Master's Thesis (V1-6).** Prerequisite: Consent of instructor.
- 6001. Master's Thesis: Professional Project (V1-6).** Prerequisites: 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).** Prerequisites: 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. May be repeated for credit.
- 7000. Research (V1-12).** Prerequisite: Consent of instructor.
- 8000. Doctor's Dissertation (V1-12).** Prerequisite: Consent of instructor.

Art History (ARTH)

Undergraduate Courses

- 1301. [ARTS 1303] Art History Survey I (3).** A survey of painting, sculpture, architecture, and the minor arts from prehistoric times to the 14th century. AP waiver possible. Fulfills core Creative Arts requirement.
- 2302. [ARTS 1304] Art History Survey II (3).** A survey of painting, sculpture, architecture, and the minor arts from the 14th through 19th centuries. AP waiver possible. Fulfills core Creative Arts requirement.
- 3303. Art History Survey III (3).** Prerequisite: ARTH 2302 or consent of instructor. Introduction to artistic movements, events, innovations, and debates of the 20th and 21st centuries, as examined in an international cultural frame. (Writing Intensive)

- 3320. Medieval Art of Europe (3).** Prerequisite: ARTH 3303 or consent of instructor. Examines the artistic achievements of the medieval era, focusing on art and architecture of the Christian faith and culture. May be repeated for credit. (Writing Intensive)
- 3333. Native American Arts (3).** An examination of Native American cultures of the United States as revealed in ancient and contemporary architecture, arts, and crafts. May be repeated for credit. (Writing Intensive)
- 3345. Baroque Art (3).** Prerequisite: ARTH 2302 (or ART 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. Analysis of the devices, effects, and dynamics of the age of change. May be repeated for credit. (Writing Intensive)
- 3350. Latin American Art (3).** Prerequisite: ARTH 2302, 3303, or consent of instructor. May be repeated for credit. (Writing Intensive)
- 3364. Art of the United States (3).** Prerequisite: ARTH 2302 (or ART 1309) or consent of instructor. A survey of North American art and architecture during specified eras. May be repeated for credit. (Writing Intensive)
- 3366. 18th and 19th Century Art (3).** Prerequisite: ARTH 2302 (or ART 1309) or consent of instructor. Principal developments focusing on European painting, sculpture, and architecture during the 18th and 19th centuries. (Writing Intensive)
- 3380. Photographic Arts of the 19th and 20th Centuries (3).** Prerequisite: ARTH 2302 or consent of the instructor. An examination of the development of photography and its relation to the other visual arts. (Writing Intensive)
- 4304. Advanced Problems (3).** Prerequisite: Consent of instructor. Advanced problems in an area of art history in which the student has achieved competence. May be repeated for credit.
- 4307. History of the Book as Art (3).** Prerequisite: ARTH 1301 (or ART 1309) or consent of instructor. Historical investigations of books that have been regarded as visual art. May be repeated for credit. (Writing Intensive)
- 4308. Seminar in Art History (3).** Prerequisite: 6 hours of ARTH 3000-4999 or consent of instructor. Extensive exploration of a particular period in art history. May be repeated for credit. (Writing Intensive)
- 4309. Senior Thesis in Art History (3).** Prerequisite: Consent of instructor. An individual course of intensive study requiring in-depth reading and a substantial written project. (Writing Intensive)
- 4313. Art of the Ancient Mediterranean (3).** Prerequisite: ARTH 1301 or consent of instructor. Upper-level course focusing on architecture, sculpture, and monuments of the ancient Mediterranean region. (Writing Intensive)
- 4320. Topics in Medieval Art (3).** Prerequisite: Consent of instructor. Senior-level course focusing on the art, architecture, and culture of the European Middle Ages. (Writing Intensive)
- 4335. The Arts of Pre-Columbian America (3).** Prerequisite: ARTH 1301 (or ART 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. May be repeated for credit. (Writing Intensive)
- 4340. The Art of the Renaissance (3).** Prerequisite: ARTH 2302 (or ART 1309) or consent of instructor. A study of aesthetic and intellectual directions in the Age of Humanism. May be repeated for credit. (Writing Intensive)
- 4389. Topics in 20th and 21st Century Art (3).** Prerequisite: ARTH 3303 or consent of instructor. Major movements in modern and contemporary art, including aesthetic and critical theories. May be repeated when topic differs. (Writing Intensive)
- 5309. Theories of Contemporary Art (3).** 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.
- 5313. Arts of the Ancient World (3).** Prerequisite: Consent of instructor. An examination of major developments and historical approaches to the art and architecture of the Ancient Mediterranean.
- 5320. Arts of Medieval Europe (3).** 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.
- 5335. Arts of the Pre-Columbian and Native Americas (3).** Prerequisite: Consent of instructor. Examines art, culture, and architecture of North, Central, or South American Indians. May be repeated for credit.
- 5340. Renaissance and Baroque Art (3).** Prerequisite: Consent of instructor. Examination focusing upon major developments in Renaissance or Baroque painting, sculpture, architecture, and art criticism. May be repeated for credit.
- 5363. 18th and 19th Century Art (3).** Prerequisite: Consent of instructor. Principal developments in 18th and 19th century painting, sculpture, and architecture. Emphasis on Europe and the United States. May be repeated for credit.
- 5382. Modern and Contemporary Art (3).** Prerequisite: Consent of instructor. An examination of major developments in modern and contemporary painting, sculpture, graphic, and ceramic art. May be repeated for credit.
- 6000. Master's Thesis (V1-6).** Prerequisite: Consent of instructor. Research contributing toward the master's thesis.
- 7000. Research (V1-12).** Prerequisite: Consent of instructor. Research in an area of art history in which the student has achieved competence. May be repeated for credit.

Art-Visual Studies (ARTV)

Undergraduate Courses

- 3360. Introduction to Theories and Practice in Art (3).** Prerequisites: ART 1302, 1303 (or ARCH 1341), 2303, and 2304. Overview of the role of the visual arts in personal, social, and institutional contexts.
- 3364. Foundations of Art in Social Institutions (3).** Prerequisite: ART 3360. Examination of historical, political, and pedagogical issues and policies of the visual arts in institutional settings.
- 3365. Visual Culture (3).** Examination of contemporary thought and practice in the visual arts.
- 4000. Student Teaching in Art (V3-12).** Prerequisite: Admission to student teaching. Supervised teaching involving a period of responsibility for art instruction in an accredited school.
- 4315. Integrating Instructional Technology into Learning and Teaching in Visual Arts (3).** Instructional and studio emphasis on technology in the visual arts.
- 4361. Contemporary Visual Studies (3).** Modern and postmodern socioeconomics, political, and visual histories in art education.
- 4362. Curriculum Theory and Instruction Methodology in Art (3).** Prerequisite: ART 3364 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).** 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)

Graduate Courses

- 5305. Topics in Art History (3).** Prerequisite: Consent of instructor. Topics or issues in art historical research that present current disciplinary developments, areas of expertise, new directions of study, etc. May be repeated for a maximum of 12 credit hours.
- 5308. Methods and Theories in Art History (3).** Prerequisite: Consent of instructor. Graduate seminar course that exposes students to main methodology and theory of history of art from classical antiquity to the 20th century.

- 5315. Integrating Instructional Technology into Learning and Teaching Visual Arts (3).** Instructional and studio emphasis on technology in the visual arts.

School of Music

William L. Ballenger, M.A., Director

Horn Professor: Westney

Professors: Ballenger, Becker, Bjella, Brumfield, Deahl, D. Dees, Dent, Dolter, Dye, Gilbert, Killian, Meek, Rogers, L. Santa, M. Santa, Shea, Shinn, C.J. Smith, C.M. Smith, Stoune, Strieder, Wass

Associate Professors: Anderson, Cash, Cimarusti, Cruse, Decker, Fischer, Fried, Hollins, Hughes, Jocoy, Jones, Lastrapes, Lin, Martens, McKoin, Morton, A. Smith

Assistant Professors: Allen, Ankrum, Brookes, Chalex, Forrest, Haugland, Henninger, Hill, Salazar, Sparr, Stetson

Adjunct Instructors: Barrick, Brandon, J. Dees, Landes

CONTACT INFORMATION: 103 Music Building, Box 42033, Lubbock, TX 79409-2033, T 806.742.2270, F 806.742.2294, www.depts.ttu.edu/music

About the Program

The school supervises the following degree programs and certificates:

- Bachelor of Arts in Music
- Bachelor of Music in Music
Fields of Specialization: Music (leading toward teacher certification), Composition, Performance, Theory
- Master of Music Education
- Master of Music in Music
Fields of Specialization: Composition, *Conducting (pending NASM Plan Approval)*, Music Theory, Musicology, Pedagogy, Performance
- Doctor of Musical Arts
Fields of Specialization: Composition, Conducting, Performance, Piano Pedagogy
- Doctor of Philosophy in Fine Arts
Field of Specialization: Music
- Undergraduate Certificate in Community Arts Entrepreneurship
- Undergraduate Certificate in Jazz Studies
- Undergraduate Certificate in World Music
- Graduate Certificate in Early Music Performance Practice
- 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

General Information

Admission and Assessment Requirements. Students applying to the School of Music will be admitted as "music audition required" (MUAR) 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.

To qualify for advancement, students must earn a minimum grade of C during each semester of freshman and sophomore theory and aural skills.

Students wishing to change their field of specialization to performance after having been accepted into another field of specialization in music must proceed through a formal acceptance process for performance in the appropriate applied and ensemble areas. Students wanting to move from the Bachelor of Arts in Music to any of the Bachelor of Music specializations must follow the above procedure. 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 field of specialization.

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 Academic 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.

Residency Requirements. Students working toward a Bachelor of Music, Bachelor of Music (leading toward teacher certification), or a Bachelor of Arts in Music must complete a minimum of 24 hours of music in residence at Texas Tech. Minors in music require minimum of 9 hours of music in residence at Texas Tech. Information is available in the School of Music office.

Recital Requirements. Performance students are required to present a half-length junior recital and a full-length senior recital. Candidates for music with teacher certification 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. Permission to present each recital must be obtained from an examining jury at least two weeks prior to the recital.

Music composition students 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.

Graduate Program

For information on graduate programs offered by the School of Music, visit the Graduate School section of the catalog on page 152.

All School of Music undergraduate music majors enrolled in applied lessons are expected to experience a broad range of repertory through attendance each semester at such performance events as recitals, guest artist concerts, ensemble concerts, chamber music concerts, opera and music theatre productions, Lubbock Symphony Orchestra, and Presidential Lecture and Performance Series events.

Semester Credit Hour and Contact Hour Equivalents. Pursuant to the *Undergraduate/Graduate Catalog*, the Texas Administrative Code, and the norms stated in the *NASM Handbook*, credit and time expectations for School of Music courses are as follows:

- For applied lessons, the standard requirement is one contact hour of one-on-one instruction and one contact hour of studio class per week, thus totaling 30 in-class contact hours per semester. In addition, an average of two non-contact hours per day are expected for out-of-class student practice.
- For traditionally delivered 3-credit-hour lecture- and seminar-based courses during a regular semester, students should expect to be in class for three hours per week and work outside of class a minimum of six hours per week. For 3-credit-hour studio- and project-based courses, students should expect to be in class for six hours per week and work outside of class between three and six hours per week.
- For large ensembles, students should expect to be in class for a minimum of three hours per week for 1 credit hour. Small and medium ensembles normally meet in class a minimum of one or two hours per week for 1 credit hour.

Core Curriculum. All tracks have the same core curriculum and professional education courses. Consult an advisor for specific courses.

	<i>Semester Hours</i>
Written Communication	6
ENGL 1301 and 1302	
Oral Communication	3
Mathematics	6
Life and Physical Sciences	8
United States History	6
United States and Texas Government	6
Social and Behavioral Sciences	3
See an advisor	
Language, Philosophy, and Culture	3
Creative Arts	3
TOTAL HOURS	44

Minor/Concentration 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.

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 Matador Singers (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 in Western Civilization. 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 Creative Arts credit.

MUHL 2304, History of Jazz. Historical and analytical survey of jazz from its beginning through "Rock"—its form, style, literature, and influence on 20th century music. Fulfills core Creative Arts credit.

MUHL 2308, Musics of Latin America. Traditions, styles, and history of Latin American musics: Cuba, Puerto Rico, Mexico, Panama, Guatemala, Argentina, Brazil, Peru, Venezuela. Fulfills core Creative Arts requirement.

MUHL 2310, History of Rock and Roll. 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 Creative Arts credit.

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. Fulfills core Creative Arts credit.

Bachelor of Arts in Music

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 1300, MUHL 2301, 3302, 3303, MUTH 1103 and 1203, 1104 and 1204, 2103 and 2203, 2104 and 2204, and 3303. Bachelor of Arts students are required to enroll in four semesters of ensemble and lessons. The degree will provide students an opportunity to participate in a more individualized degree through the choice of elective courses for a minor from outside the major area discipline that is consistent with the university philosophy and policies for a liberal arts degree and complete the general degree requirements for the Bachelor of Arts degree. A minimum total of 120 hours is required for this degree.

Bachelor of Music in Music

The Bachelor of Music in Music has four fields of specialization: music (leading toward teacher certification), composition, performance, and theory. The performance field of specialization includes concentrations in piano, organ, voice, brass, woodwind, percussion, and stringed instruments. The field of specialization in music that leads toward teacher certification replaces the former Bachelor of Music Education.

For requirements in the fields of specialization in composition, performance, and theory, consult the curriculum tables that appear on subsequent pages.

Field of Specialization in Music Leading Toward Teacher Certification

The curriculum tables that follow are provided as a recommended sequence to students and advisors. All B.M. students pursuing a field of specialization in music must plan their individual courses of study in consultation with the School of Music advisor and consult the online catalog for any revisions to the curriculum. Students must have a 2.75 cumulative GPA to be admitted to upper-level music education classes. See music advisor for more information.

Students should contact the College of Education concerning professional education course requirements for all-level certification.

	<i>Semester Hours</i>
MUED 4315	3
MUED 4323	3
MUED 3311	3
MUED 3312	3
Student Teaching	6
TOTAL HOURS	18

All Level, Vocal Track

Principal Instrument: MUAP 1001, 1002, 2001, 2002, 3001 (2 credit hours each); 3002 (1), 3190

Bachelor of Arts in Music: Sample Course Sequence

FIRST YEAR

Fall		Spring	
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	1
MUSI 1300, Creating the Critical Listener	3	MUHL 2301, History of Music	3
MUAP 1001, Principle Instrument	1	MUAP 1002, Principle Instrument I	1
Ensemble	1	Ensemble	1
U.S. History*	3	U.S. History*	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Math	3		
TOTAL	17	TOTAL	14

SECOND YEAR

Fall		Spring	
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Intermediate Aural Skills II	1
MUHL 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUAP 2001, Principle Instrument	1	MUAP 2002, Principle Instrument	1
Ensemble	1	Ensemble	1
Mathematics*	3	Guided Elective Jr./Sr. Level	3
Guided Elective Jr./Sr. Level	3	POLS 1301, American Gov., Org.	3
TOTAL	14	TOTAL	14

THIRD YEAR†

Fall		Spring	
MUTH 3303, Form Analysis & Synthesis	3	Music Jr./Sr. Level Elective	3
Minor	3	Minor	3
Guided Elective Jr./Sr. Level	3	Minor	3
Life and Physical Sciences*	4	Guided Elective Jr./Sr. Level	2
POLS 2302, American Public Policy	3	MUSI 3341, Intro to Tech. for Musicians	3
		Oral Communication*	3
TOTAL	16	TOTAL	17

FOURTH YEAR

Fall		Spring	
Minor Jr./Sr. Level Elective	3	Minor Jr./Sr. Level Elective	3
Minor Jr./Sr. Level Elective	3	Life and Physical Sciences	4
Social & Behavioral Sciences*	3	Music Jr./Sr. Level Elective	3
VPA 2301, Critical Issues in Arts & Culture	3	Music Jr./Sr. Level Elective	3
Music Jr./Sr. Level Elective	3		
TOTAL	15	TOTAL	13

TOTAL HOURS: 120

A minimum of 18 semester hours in music must be junior or senior level. A minimum total of 40 semester hours in the degree must be junior or senior level.

MUAP must have a minimum of 4 semesters of private lessons from principal instrument instructor.

MUEN must have a minimum of 4 semester hours of ensemble. MUEN 1103 may not be used. (Ensemble is required each semester of private lessons.)

See music advisor in 221 Music Building for more details about the Bachelor of Arts in Music.

* Choose from the university's core curriculum.

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Composition

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 1300, Creating the Critical Listener	3	MUHL 2301, History of Music	3
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
Ensemble	1	Ensemble	1
Social & Behavioral Sciences*	3		
TOTAL	17	TOTAL	14

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 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
Mathematics*	3	Ensemble	1
Ensemble	1	Language, Philosophy, and Culture*	3
		Oral Communication*	3
TOTAL	14	TOTAL	17

THIRD YEAR†

Fall		Spring	
MUCP 4341, Computer Music I	3	MUCP 4342, Computer Music II	3
MUCP 3201, Music Composition	2	MUCP 3202, Music Composition	2
MUTH 3303, Form Analysis & Synthesis	3	MUTH 4316, Analysis of Post-Tonal	3
MUCP 4207, Instrumentation	2	MUCP 4208, Orchestration	2
Life and Physical Sciences*	4	Life and Physical Sciences*	4
Ensemble	1	Ensemble	1
TOTAL	15	TOTAL	15

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 Gov., Org.	3	HIST 2301, History of U.S. Since 1877	3
Ensemble	1	MUAP 3206, Conducting	2
Mathematics*	3	POLS 2302, American Public Policy	3
		Ensemble	1
TOTAL	15	TOTAL	14

TOTAL HOURS: 121

* Choose from the university's core curriculum.

† Continuance in 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 field of specialization 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.

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, 1300, 3216, 3217, 3237, 3238

Music History and Literature: MUHL 2301, 3302, 3303

Music Theory: MUTH 1103 and 1203, 1104 and 1204, 2103 and 2203, 2104 and 2204, 3303

Major Ensemble: 7 semesters

Instrumental Ensemble: MUEN 2101 (1 semester)

TOTAL TRACK HOURS: 65

TOTAL PROGRAM HOURS: 124

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 and 3208

Piano: Must pass proficiency level equivalent to MUAP 2124 if not piano principal.

Music: MUSI 1101, 1300, 3237, 3238, plus either 3218 and 3219 (orchestra) or 3325 and 3326 (band)

Music History and Literature: MUHL 2301, 3302, 3303

Music Theory: MUTH 1103 and 1203, 1104 and 1204, 2103 and 2203, 2104 and 2204, 3303

Major Ensemble: 7 semesters

Vocal Ensemble: MUEN 2102 (1 semester)

TOTAL TRACK HOURS: 65

TOTAL PROGRAM HOURS: 124

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, 1300, 3216, 3217, 3237, 3238

Music History and Literature: MUHL 2301, 3302, 3303

Music Theory: MUTH 1103 and 1203, 1104 and 1204, 2103 and 2203, 2104 and 2204, 3303

Major Ensemble: 7 semesters

Ensemble: MUEN 2101 or 2102

TOTAL TRACK HOURS: 64

TOTAL PROGRAM HOURS: 123

Advanced Bachelor's-to-Master's Degree. Advanced music education undergraduates may apply for admission to the B.M.+M.M.Ed. program. Admission allows qualified students to count 9 hours toward both an undergraduate degree and a Master

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Theory

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 1300, Creating the Critical Listener	3	MUHL 2301, History of Music	3
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College 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	16
SECOND YEAR			
Fall		Spring	
MUAP 2001, Instrument or Voice	2	MUAP 2002, Instrument or Voice	2
Applied Music, piano	1	MUHL 3303, Music as Cultural Hist. III	3
MUHL 3302, Music as Cultural Hist. II	3	Foreign Language*	3
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
Foreign Language*	3	Ensemble	1
Mathematics†	3	MUSI 3341, Intro to Tech. for Musicians	3
Ensemble	1		
TOTAL	16	TOTAL	15
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	1
MUCP 4207, Instrumentation	2	MUTH 4316, Analysis of Post-Tonal	3
Oral Communication‡	3	MUCP 4208, Orchestration	2
Language, Philosophy, and Culture‡	3	MUAP 3206, Conducting	2
Ensemble	1	Life and Physical Sciences‡	4
Mathematics‡	3	Ensemble	1
TOTAL	17	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
Life and Physical Sciences‡	4	Social & Behavioral Science‡	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
Ensemble	1	Ensemble	1
TOTAL	14	TOTAL	13
TOTAL HOURS: 121			

* The student must complete six hours of a language approved by the division at the sophomore level.

† Continuance in 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.

‡ Choose from the university's core curriculum.

of Music Education degree (either the 30-hour thesis track or 36-hour non-thesis 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.

Undergraduate Certificates

Community Arts Entrepreneurship. The School of Music, under the general supervision of the Vernacular Music Center, offers a 15-hour Undergraduate Certificate in Community Arts Entrepreneurship, particularly aimed at practitioners and participants in community arts. It provides practical and applicable skills for future arts administrators, working artists, performers, presenters, and community advocates. The certificate is available in either administrative or artistic practice concentrations (according to electives).

For most working artist/educators it is valuable, for both personal careers and artistic and creative campus and community projects, to develop strong skills in management, budgeting, promotions, and media. Those interested in advanced degrees will find material advantage through this foundational undergraduate certificate.

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Performance (Voice)

FIRST YEAR			
Fall		Spring	
MUAP 1001, Voice	2	MUAP 1002, Voice	2
MUSI 1300, Creating the Critical Listener	3	MUAP 1303, Sing. Diction I	3
MUAP 1304, Singers' Diction II	3	MUTH 1204, Elementary Theory II	2
MUTH 1203, Elementary Theory I	2	MUTH 1104, Elementary Aural Skills II	1
MUTH 1103, Elementary Aural Skills I	1	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	MUEN 3101, Choir	1
MUEN 3102, Music Theatre	1	MUHL 2301, Music as Cultural History	3
MUEN 3101, Choir	1		
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
MUAP 2001, Voice	2	MUAP 2002, Voice	2
MUHL 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Intermediate Aural Skills II	1
Foreign Lang. (German, French, Italian)	5	Foreign Lang. (German, French, Italian)	5
Oral Communication*	3	Language, Philosophy, and Culture*	3
MUEN 3101, Choir	1	MUEN 3101, Choir	1
TOTAL	17	TOTAL	17
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	Foreign Language	3-5
Life and Physical Sciences*	4	Mathematics*	3
Foreign Language	3-5	Life and Physical Sciences	4
MUEN 3101, Choir	1	MUEN 3101, Choir	1
		MUSI 3341, Intro to Tech. for Musicians	3
TOTAL	16-18	TOTAL	16-18
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 Gov., Org.	3	MUAP 3206, Conducting	2
MUEN 3101, Choir	1	POLS 2302, American Public Policy	3
MUAP 4305, Vocal Pedagogy	3	MUEN 3101, Choir	1
Mathematics*	3	Social & Behavioral Sciences*	3
		HIST 2301, History of U.S. Since 1877	3
TOTAL	15	TOTAL	14
TOTAL HOURS: 126-130			
* Choose from the university's core curriculum.			

Those involved in K-12 education will be greatly facilitated in speaking and advocating on behalf of their program initiatives.

Required courses for the certificate are PSY 3301, BA 3305, and VPA 2301. Students additionally select two 3-hour electives from BA 3302, ADV 3310, COMS 3356 (administrative concentration); or EMC 3300, ANTH 3300, ART 4304 (artistic concentration). Certificate candidates are also encouraged to participate actively in creative activities through the college.

Contact information: Dr. Christopher J. Smith, School of Music, 806.742.2270, christopher.smith@ttu.edu.

Jazz Studies. The School of Music offers a 17-hour Undergraduate Certificate in Jazz Studies to provide students with a foundation in the skills necessary to be a successful performer in the jazz idiom. The certificate program combines lecture and laboratory courses (performance ensembles) with private study, much like the mentor/apprentice tradition seen throughout the history of jazz music. Music education students are often required to teach jazz music and direct jazz ensembles after entering the workforce as professional music educators. Successful completion of this certificate program will make students more competitive in this job market.

The certificate requires the following courses: MUEN 3105 and 3106, MUTH 3205 (may substitute MUSI 4000—Jazz/Commercial Arranging with permission of program coordinator), MUAP 1001 and 3205, and MUHL 2304.

Contact information: Stephen Jones, School of Music, 806.834.8379, stephen.jones@ttu.edu

World Music. The School of Music offers a 15-hour Undergraduate Certificate in World Music. For most scholars involved in teaching or research, there is an expectation of familiarity with global music

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Performance (Stringed Instrument)

FIRST YEAR			
Fall		Spring	
MUAP 1001, Major Instrument	3	MUAP 1002, Major Instrument	3
MUSI 1300, Creating the Critical Listener	3	MUHL 2301, History of Music	3
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MUEN 3104, Orchestra*	1	MUEN 3104, Orchestra	1
MUEN 3106, Chamber Music	1	MUEN 3106, Chamber Music	1
Mathematics†	3		
TOTAL	17	TOTAL	14
SECOND YEAR			
Fall		Spring	
MUAP 2001, Major Instrument	3	MUAP 2002, Major Instrument	3
MUHL 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Intermediate Aural Skills II	1
Oral Communication†	3	Language, Philosophy, and Culture†	3
MUEN 3104, Orchestra	1	MUEN 3104, Orchestra	1
MUSI 3341, Intro to Tech. for Musicians	3	MUAP 3206, Conducting	2
MUEN 3106, Chamber Music	1	MUEN 3106, Chamber Music	2
TOTAL	17	TOTAL	16
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
Life and Physical Sciences†	4	Life and Physical Sciences†	4
MUEN 3104, Orchestra	1	HIST 2301, History of U.S. Since 1877	3
MUEN 3106, Chamber Music	1	MUEN 3104, Orchestra	1
		MUEN 3106, Chamber Music	1
TOTAL	15	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 Gov., Org.	3	MUCP 4207, Instrumentation	2
Mathematics†	3	Social & Behavioral Sciences†	3
MUEN 3104, Orchestra	1	POLS 2302, American Public Policy	3
MUHL 4300, Special Topics	3	MUEN 3104, Orchestra	1
TOTAL	16	TOTAL	12
TOTAL HOURS: 122			

* Guitar students participate in guitar ensemble for eight semesters and earn six additional credits for participating in any other ensemble.
† Choose from the university's core curriculum.

styles. Those interested in advanced degrees will find material advantage in this undergraduate certificate study. Those involved in K-12 education will be greatly facilitated in meeting global music and cultural diversity requirements. This certificate complements programs in music education, music composition, performance, and the Bachelor of Arts in Music.

The required courses for the certificate are MUHL 4300 (6 hours, requires topic approval), DAN 4301, MUEN 3110 (3 hours). Students can select one 3-hour elective from MUHL 4300, ANTH 4305, MUSI 3341, or MUSI 4000.

Contact information: Dr. Christopher J. Smith, School of Music, 806.834.2275, christopher.smith@ttu.edu; Dr. Thomas M. Cimarusti, School of Music, 806.742.2270, thomas.cimarusti@ttu.edu

Course Descriptions

(To interpret course descriptions, see page 23.)

Music (MUSI)

Undergraduate Courses

1101. Introduction to Music Teaching (1). Exploration and inquiry into music education environments, music teachers, and music students EC-12. Includes examination of music teachers' and

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Performance (Wind Instrument or Percussion)

FIRST YEAR			
Fall		Spring	
MUAP 1001, Major Instrument	3	MUAP 1002, Major Instrument	3
MUSI 1300, Creating the Critical Listener	3	MUHL 2301, History of Music	3
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	1
Mathematics*	3	ENGL 1301, Essentials of Coll. Rhetoric	3
Ensemble†	1	Ensemble†	1
TOTAL	13	TOTAL	13
SECOND YEAR			
Fall		Spring	
MUAP 2001, Major Instrument	3	MUAP 2002, Major Instrument	3
MUHL 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Intermediate Aural Skills II	1
ENGL 1302, Advanced College Rhetoric	3	Oral Communication*	3
Ensemble	1	Ensemble	1
Mathematics*	3		
TOTAL	16	TOTAL	13
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
Language, Philosophy, and Culture*	3	MUCP 4207, Instrumentation	2
Ensemble	2	HIST 2301, History of U.S. Since 1877	3
MUSI 3341, Intro to Tech. for Musicians	3	Life and Physical Sciences*	4
		Ensemble	2
TOTAL	17	TOTAL	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
Social & Behavioral Sciences*	3	MUHL or MUTH elective	3
POLS 1301, American Gov., Org.	3	POLS 2302, American Public Policy	3
Ensemble	2	Ensemble	2
MUHL 4300, Special Topics	3	Life and Physical Sciences*	4
TOTAL	17	TOTAL	15
TOTAL HOURS: 120			

* Choose from the university's core curriculum.
† Twelve registrations in ensemble required.

- music students' roles. Includes peer teaching, observation, and discussion. Open to all music majors.
- 1300. Creating the Critical Listener (3).** Drawing on classical, folk, popular, and world music traditions, this course cultivates a set of analytical tools that enables one to listen, read, speak, and write accurately, critically, and insightfully about music from a variety of global traditions. Fulfills multicultural and core Creative Arts requirement.
- 2000. Independent Studies in Music (VI-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).** 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 Creative Arts requirement.
- 3216. Choral Techniques (2).** Prerequisites: MUAP 3206 and 3207 (choral conducting). Materials, repertoire, and procedures for developing instructional programs in choir. Field experiences required.
- 3217. Choral Techniques (2).** Prerequisites: MUAP 3206 and 3207 (choral conducting); MUSI 3216. Materials, repertoire, and procedures for developing instructional programs in choir. Field experiences required.
- 3218. Orchestra Techniques (2).** Prerequisites: MUAP 3206 and 3208 (instrumental conducting). Materials, repertoire, and procedures for developing instructional programs in orchestra. Field experiences required.
- 3219. Orchestra Techniques (2).** Prerequisites: MUAP 3206 and 3208 (instrumental conducting); MUSI 3218. Materials, repertoire, and procedures for developing instructional programs in orchestra. Field experiences required.

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Performance (Piano)

FIRST YEAR			
Fall		Spring	
MUAP 1105, Keyboard Skills	1	MUAP 1106, Keyboard Skills	1
MUAP 1001, Piano	3	MUAP 1002, Piano	3
MUSI 1300, Creating the Critical Listener	3	MUHL 2301, History of Music	3
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MUEN 3106-301, Accompanying Mathematics*	1	MUEN 3106-301, Accompanying Mathematics*	1
	3	MUHL Elective	3
TOTAL	17	TOTAL	17
SECOND YEAR			
Fall		Spring	
MUAP 2001, Piano	3	MUAP 2002, Piano	3
MUHL 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Intermediate Aural Skills II	1
Oral Communication*	3	Language, Philosophy, and Culture*	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
TOTAL	13	TOTAL	13
THIRD YEAR			
Fall		Spring	
MUAP 3001, Piano	3	MUAP 3002, Piano	2
MUSI 3341, Intro to Tech. for Musicians	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	Life and Physical Sciences*	4
	1	MUEN 3106-301, Accompanying	1
TOTAL	16	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 Counterpoint & Fugue	3
POLS 1301, American Gov., Org.	3	or MUTH 4305, Modal Counterpoint	3
MUEN 3106-301, Accompanying	1	Social & Behavioral Sciences^	3
Mathematics*	3	POLS 2302, American Public Policy	3
	3	MUEN 3106-301, Accompanying	1
	1	Life and Physical Sciences*	4
TOTAL	16	TOTAL	17
TOTAL HOURS: 125			
* Choose from the university's core curriculum.			

3225. **Band Techniques (2)**. Prerequisites: MUAP 3206 and 3208 (instrumental conducting). Materials, repertoire, and procedures for developing instructional programs in band. Field experiences required.
3226. **Band Techniques (2)**. Prerequisites: MUAP 3206 and 3208 (instrumental conducting). Materials, repertoire, and procedures for developing instructional programs in band. Field experiences required.
3237. **Music for Children (2)**. 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.
3238. **Music for Children (2)**. Prerequisite: MUSI 3237. 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.
3341. **Introduction to Technology for Musicians (3)**. Outlines development and impact of music technology from outset of electric/electronic music synthesis to the present. Provides basic knowledge of website design, sound synthesis, elements of sound, MIDI, digital audio recording and FX, computer generated notation and MIDI sequencing. For both majors and non-majors.
4000. **Individual Studies in Music (V1-3)**.

Graduate Courses

5100. **Teaching Music in College (1)**.
5216. **Graduate Studies: Choral Techniques I (2)**. Materials, repertoire, and procedures for developing instructional programs in choir. Field experiences required. For graduate music certification candidates only.
5217. **Graduate Studies: Choral Techniques II (2)**. Materials, repertoire, and procedures for developing instructional programs in

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Performance (Organ)

FIRST YEAR			
Fall		Spring	
MUAP 1001, Organ	3	MUAP 1002, Organ	3
MUAP 1001, Piano*	1	MUAP 1002, Piano*	1
MUSI 1300, Intro. to Research & Style	3	MUHL 2301, History of Music	3
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	1
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
Mathematics†	3		
TOTAL	17	TOTAL	14
SECOND YEAR			
Fall		Spring	
MUAP 2001, Organ	3	MUAP 2002, Organ	3
MUHL 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Intermediate Aural Skills II	1
Oral Communication†	3	Language, Philosophy, and Culture†	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
Music Elective	3		
TOTAL	16	TOTAL	13
THIRD YEAR			
Fall		Spring	
MUAP 3001, Organ	3	MUAP 3002, Organ	2
MUSI 4000, Individual Studies in Music	2	MUAP 3190, Junior Recital	1
MUAP 3206, Conducting	2	MUAP 3207 or 3208, Choral or Instr.	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	Life and Physical Sciences†	4
MUSI 3341, Intro to Tech. for Musicians	3	MUEN 3106-301, Accompanying	1
	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 Gov., Org.	3	MUAP 4201, Organ Pedagogy	2
MUHL 4300, Special Topics	3	MUHL or MUTH elective	3
MUEN 3106-301, Accompanying	1	Social & Behavioral Sciences†	3
Life and Physical Sciences†	4	POLS 2302, American Public Policy	3
	1	MUEN 3106-301, Accompanying	1
TOTAL	17	TOTAL	15
TOTAL HOURS: 125			
* Optional for students with extensive piano background.			
† Choose from the university's core curriculum.			

- choir. Field experiences required. For graduate music certification candidates only.
5218. **Graduate Studies: Orchestra Techniques I (2)**. Materials, repertoire, and procedures for developing instructional programs in orchestra. Field experiences required. For graduate music certification candidates only.
5219. **Graduate Studies: Orchestra Techniques II (2)**. Materials, repertoire, and procedures for developing instructional programs in orchestra. Field experiences required. For graduate music certification candidates only.
5225. **Graduate Studies: Band Techniques I (2)**. Materials, repertoire, and procedures for developing instructional programs in band. Concert band is emphasized. Field experiences required. For graduate music certification candidates only.
5226. **Graduate Studies: Band Techniques II (2)**. Materials, repertoire, and procedures for developing instructional programs in band. Concert band is emphasized. Field experiences required. For graduate music certification candidates only.
5237. **Graduate Studies: Music for Children I (2)**. Music majors only; teaching certification candidates only. Contemporary pedagogical approaches to music teaching in primary grades; skill development in children emphasized. Field experiences required.
5238. **Graduate Studies: Music for Children II (2)**. Music majors only; teaching certification candidates only. Contemporary pedagogical approaches to music teaching in primary grades; skill development in children emphasized. Field experiences required.

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Music Leading Toward Teacher Certification (Vocal)

FIRST YEAR			
Fall		Spring	
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	1
MUSI 1300, Creating the Critical Listener	3	MUHL 2301, History of Music	3
MUAP 1001, Private Voice Lessons	2	MUAP 1002, Private Voice Lessons	2
MUAP 1303, Diction	3	Ensemble	1
Ensemble	1	MUSI 1101, Intro. to Music Teaching	1
Mathematics*	3	Mathematics*	3
ENGL 1301, Essentials of Coll. Rhetoric	3	ENGL 1302, Advanced College Rhetoric	3
TOTAL	18	TOTAL	16
SECOND YEAR			
Fall		Spring	
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Intermediate Aural Skills II	1
MUHL 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUAP 2001, Private Voice Lessons	2	MUAP 2002, Private Voice Lessons	2
Ensemble	1	Ensemble	1
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
Life and Physical Sciences*	4	Life and Physical Sciences*	4
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
MUTH 3303, Form Analysis & Synthesis	3	MUAP 3002, Private Voice Lessons	1
MUAP 3001, Private Voice Lessons	2	MUAP 3190, Junior Recital	1
MUAP 3206, Conducting	2	MUAP 3207, Choral Conducting	2
MUSI 3237, Music for Children	2	MUSI 3238, Music for Children	2
MUEN 2101, Instrumental Ensemble	1	MUAP 4205, Vocal Pedagogy for Ed.	2
Ensemble	1	Ensemble	1
COMS 2300, Public Speaking	3	Social & Behavioral Sciences*	3
TOTAL	14	TOTAL	12
FOURTH YEAR			
Fall		Spring	
MUSI 3216, Choral Techniques	2	MUED 3312, Methods in Educ. & Music	3
MUED 3311, Curr. & Inst. in Ed. & Music	3	MUED 4323, Divers., Equity, Excellence	3
MUED 4315, Integrating Instr. Tech.	3	POLS 2302, American Public Policy	3
Ensemble	1	Language, Philosophy, and Culture*	3
POLS 1301, American Gov., Org.	3	MUSI 3217, Choral Techniques	2
TOTAL	12	TOTAL	14
FIFTH YEAR			
Fall			
MUAL 4000, Student Teaching	6		
TOTAL	6		
TOTAL HOURS: 124			
* Choose from the university's core curriculum.			

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Music Leading Toward Teacher Certification (Instrumental)

FIRST YEAR			
Fall		Spring	
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	1
MUSI 1300, Creating the Critical Listener	3	MUHL 2301, History of Music	3
MUAP 1001, Principal Instrument	2	MUAP 1002, Principal Instrument	2
Ensemble	1	Ensemble	1
Mathematics*	3	MUSI 1101, Intro. to Music Teaching	1
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics*	3
TOTAL	15	TOTAL	16
SECOND YEAR			
Fall		Spring	
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Intermediate Aural Skills II	1
MUHL 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUAP 2001, Principal Instrument	2	MUAP 2002, Principal Instrument	2
MUAP (secondary instrument)	1	MUAP (secondary instrument)	1
Ensemble	1	Ensemble	1
HIST 2300, History of U.S. to 1877	3	Life and Physical Sciences*	4
MUEN 2102, Vocal Ensemble	1		
TOTAL	14	TOTAL	14
THIRD YEAR			
Fall		Spring	
MUTH 3303, Form Analysis & Synthesis	3	MUAP 3002, Principal Instrument	1
MUAP 3001, Principal Instrument	2	MUAP 3190, Junior Recital	1
MUAP 3206, Conducting	2	MUAP 3208, Instrumental Conducting	2
MUSI 3237, Music for Children	2	MUSI 3238, Music for Children	2
Ensemble	1	HIST 2301, History of U.S. Since 1877	3
MUAP (secondary instrument)	1	MUAP (secondary instrument)	1
COMS 2300, Public Speaking	3	Life and Physical Sciences*	4
		Ensemble	1
		Social & Behavioral Sciences*	3
TOTAL	15	TOTAL	18
FOURTH YEAR			
Fall		Spring	
MUSI 3218, Orchestra Techniques	2	MUED 3312, Methods in Educ. & Music	3
or MUSI 3225, Band Techniques		MUED 4323, Divers., Equity, Excellence	3
MUED 3311, Curr. & Inst. in Ed. & Music	3	POLS 2302, American Public Policy	3
MUED 4315, Integrating Instr. Tech.	3	Language, Philosophy, and Culture*	3
Ensemble	1	MUSI 3219, Orchestra Techniques	2
MUAP (secondary instrument)	1	or MUSI 3226, Band Techniques	
POLS 1301, American Gov., Org.	3		
TOTAL	12	TOTAL	14
FIFTH YEAR			
Fall			
MUAL 4000, Student Teaching	6		
TOTAL	6		
TOTAL HOURS: 124			
* Choose from the university's core curriculum.			

- 5305. **Administration in Music (3).** Study of basic structure of music programs in higher education; organizational characteristics related to curriculum, budget, and personnel; leadership principles; and administrative activities.
- 5306. **Music for Students with Exceptionalities (3).** Strategies and materials for assisting students from special populations to learn music. Includes characteristics of various disabilities and current policy affecting exceptional students.
- 5307. **Current Issues in Music (3).** Current issues in policy, learning, schools, and society affecting student musical learning. Continually revised based on current events. May be repeated for credit.
- 5310. **Historical and Critical Perspectives in Music (3).** 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).** 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).** Introduction to technological resources for all aspects of the musical experience, primarily from the standpoint of the Macintosh operating system. Topics covered include computer-assisted instruction, music printing, MIDI sequencing, digital sampling, HyperCard software development, and nonmusic topics such as word processing, graphics, multimedia, and electronic communication.

- 5342. **Applications of Technology in Music I (3).** Current technological applications in music settings related to learning music. Personal applications in educational settings emphasized. Continually updated to reflect current technological trends in music.
- 5343. **Applications of Technology in Music II (3).** Prerequisite: MUSI 5342 or consent of instructor. Advanced technological applications in music settings related to learning music. Personal applications in educational settings emphasized. Continually updated to reflect current technological trends in music.
- 7000. **Research (V1-12).**
- 7301. **Music Bibliography and Research (3).** Required of all doctoral students.
- 8000. **Doctor's Dissertation (V1-12).**
- 8301. **Doctoral Performance Project I (3).** Individual directed project in music performance or composition.
- 8302. **Doctoral Performance Project II (3).** Individual directed project in music performance or composition.
- 8303. **Doctoral Performance Project III (3).** Individual directed project in music performance or composition.
- 8304. **Doctoral Performance Project IV (3).** Individual directed project in music performance or composition.
- 8305. **Doctoral Pedagogy Project I (3).** Individual directed project in pedagogy of music.
- 8306. **Doctoral Pedagogy Project II (3).** Individual directed project in pedagogy of music.

Bachelor of Music in Music: Sample Course Sequence for Field of Specialization in Music Leading Toward Teacher Certification (Keyboard)

FIRST YEAR			
Fall		Spring	
MUTH 1203, Elementary Theory I	2	MUTH 1204, Elementary Theory II	2
MUTH 1103, Elementary Aural Skills I	1	MUTH 1104, Elementary Aural Skills II	1
MUSI 1300, Creating the Critical Listener	3	MUHL 2301, History of Music	3
MUAP 1001, Private Piano Lessons	2	MUAP 1002, Private Piano Lessons	2
Ensemble*	1		
Mathematics †	3	MUSI 1101, Intro. to Music Teaching	1
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics †	3
MUAP 1105, Keyboard Skills	1	ENGL 1302, Advanced College Rhetoric	3
		MUAP 1106, Keyboard Skills	1
TOTAL	16	TOTAL	17
SECOND YEAR			
Fall		Spring	
MUTH 2203, Intermediate Theory I	2	MUTH 2204, Intermediate Theory II	2
MUTH 2103, Intermediate Aural Skills I	1	MUTH 2104, Intermediate Aural Skills II	1
MUHL 3302, Music as Cultural Hist. II	3	MUHL 3303, Music as Cultural Hist. III	3
MUAP 2001, Private Piano Lessons	2	MUAP 2002, Private Piano Lessons	2
Ensemble*	1		
HIST 2300, History of U.S. to 1877	3	HIST 2301, History of U.S. Since 1877	3
Life and Physical Sciences †	4	Life and Physical Sciences †	4
TOTAL	16	TOTAL	16
THIRD YEAR			
Fall		Spring	
MUTH 3303, Form Analysis & Synthesis	3	MUEN 2101, Secondary Instr. Ensemble	1
MUAP 3001, Private Piano Lessons	2	MUAP 3002, Major Instrument	1
MUAP 3206, Conducting	2	MUAP 3190, Junior Recital	1
MUSI 3237, Music for Children	2	MUAP 3207, Choral Conducting	2
Ensemble*	1	MUAP 3238, Music for Children	2
COMS 2300, Public Speaking	3	MUAP 4205, Vocal Pedagogy for Educ.	2
		Ensemble*	1
		Social & Behavioral Sciences †	1
TOTAL	13	TOTAL	13
FOURTH YEAR			
Fall		Spring	
MUSI 3216, Choral Techniques	2	MUED 3312, Methods in Educ. & Music	3
MUED 3311, Curr. & Inst. in Ed. & Music	3	MUED 4323, Divers., Equity, Excellence	3
MUED 4315, Integrating Instr. Tech.	3	POLS 2302, American Public Policy	3
Ensemble*	1	Language, Philosophy, and Culture †	3
POLS 1301, American Gov., Org.	3	MUSI 3217, Choral Techniques	2
TOTAL	12	TOTAL	14
FIFTH YEAR			
Fall			
MUAL 4000, Student Teaching	6		
TOTAL	6		
TOTAL HOURS: 123			
* See Dr. Killian or Dr. Cash for individual ensemble options.			
† Choose from the university's core curriculum.			

Music Applied (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. **Applied Music (V1-4)**. Instrument or Voice.
1002. **Applied Music (V1-4)**. Prerequisite: MUAP 1001. Instrument or Voice.
1103. **[MUSI 1188] Percussion (1)**. Introduction to fundamentals of playing and teaching percussion instruments. Laboratory ensemble experience.
1104. **[MUSI 1189, 2188] Percussion (1)**. Prerequisite: MUAP 1103. Advanced study of fundamentals of playing and teaching percussion instruments. Laboratory ensemble experience.
1105. **Keyboard Skills (1)**. Sight reading and ensemble skills. Required of all piano majors. Enrollment limited to piano majors, or by instructor consent.
1106. **Keyboard Skills (1)**. Prerequisite: MUAP 1105. Sight reading and ensemble skills. Required of all piano majors. Enrollment limited to piano majors, or by instructor consent.
1113. **[MUSI 1183] Voice (1)**. Correct posture and studies for breath control; development of resonance; study of vowel formation; vocalization. Simple songs. Laboratory ensemble experience.

1123. **[MUSI 1114, 1181] Group Keyboard Instruction I (1)**. Beginning instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.
1124. **[MUSI 1115, 1182] Group Keyboard Instruction II (1)**. Prerequisite: MUAP 1123. Beginning instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.
1303. **Singers' Diction I (3)**. Singers' diction in Latin, Italian, and English utilizing the International Phonetic Alphabet. Prerequisite for MUAP 1304.
1304. **Singers' Diction II (3)**. Prerequisite: MUAP 1303. Singers' diction in French and German utilizing the International Phonetic Alphabet.
2001. **Applied Music (V1-4)**. Prerequisite: MUAP 1002 for 2001; 2001 for 2002. Instrument or Voice.
2002. **Applied Music (V1-4)**. Prerequisite: MUAP 1002 for 2001; 2001 for 2002. Instrument or Voice.
2103. **[MUSI 1195] Strings (1)**. Fundamentals of playing and teaching high string instruments. Laboratory ensemble experience.
2104. **Strings (1)**. Fundamentals of playing and teaching low string instruments. Laboratory ensemble experience.
2123. **[MUSI 2114, 2181] Group Keyboard Instruction III (1)**. Prerequisite: MUAP 1124. Intermediate instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.
2124. **[MUSI 2115, 2182] Group Keyboard Instruction IV (1)**. Prerequisite: MUAP 2123. Intermediate instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.
3001. **Applied Music (V1-4)**. Prerequisite: MUAP 2002. Instrument or Voice.
3002. **Applied Music (V1-4)**. Prerequisite: MUAP 3001. Instrument or Voice.
3101. **Dimensions of Performance (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)**. Introduction to fundamentals of playing and teaching brass instruments. Laboratory ensemble experience.
3104. **Brass Instruments (1)**. Prerequisite: MUAP 3103. Advanced study of fundamentals of playing and teaching brass instruments. Laboratory ensemble experience.
3190. **Junior Recital (1)**. Prerequisite: MUAP 3001 and 3002 (MUAP 3002 may be taken concurrently) on the same instrument or voice.
3205. **Jazz Improvisation (2)**. Prerequisite: Consent of instructor. Study and application of techniques of improvisation in jazz performance. May be repeated for credit.
3206. **Conducting (2)**. 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)**. Prerequisites: MUHL 2301, 2302. Historical and comparative analytical survey of the standard vocal literature of the 19th and 20th centuries.
4001. **Applied Music (V1-4)**. Prerequisite: MUAP 3002. Instrument or Voice.
4002. **Applied Music (V1-4)**. Prerequisite: MUAP 4001. Instrument or Voice.
4103. **Woodwinds (1)**. Introduction to fundamentals of playing and teaching woodwinds. Laboratory ensemble experience.
4104. **Woodwinds (1)**. 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.
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).** 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.
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. **Conducting Techniques and Analysis (3). Structural analysis and study of conducting problems.** Individual instruction course. Participation in a major ensemble required. May be repeated with consent of instructor.
5307. **Conducting Techniques and Analysis (3).** Structural analysis and study of conducting problems. Individual instruction course. Participation in a major ensemble required. May be repeated with consent of instructor.
5308. **Choral Conducting Methods (3).** Emphasizes choral performance excellence in schools through analysis and rehearsal of conducting techniques. May be repeated for credit.
5309. **Orchestral Conducting Methods (3).** Emphasizes orchestra performance excellence in schools through analysis and rehearsal of conducting techniques. May be repeated for credit.
5310. **Band Conducting Methods (3).** Emphasizes band performance excellence in schools through analysis and rehearsal of conducting techniques. May be repeated for credit.
5312. **Fundamentals of Piano Pedagogy (3).** Advanced study of the principles of effective teaching in the piano studio as related to the fundamentals of skill learning, history/development of piano pedagogy, and practical/professional issues of music teaching.
5313. **Pedagogical Literature for 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).** 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.
6301. **Master's Recital I (3).** Capstone requirement for master's degree in music performance.
6302. **Master's Recital II (3).** Capstone requirement for master's degree in music performance.

Music Composition (MUCP)

Undergraduate Courses

1201. **[MUSI 1286, 1326] Introduction to Contemporary Music (2).** For composition majors. A survey of current trends, with activities emphasizing creative musicianship and new technol-

ogy in composition. May be an individual study course. (For songwriting, see MUTH 1300.)

1202. **[MUSI 1287] Introduction to Contemporary Music (2).** Prerequisite: MUCP 1201. 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. Prerequisites: 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. Prerequisites: 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. Prerequisites: 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. Prerequisites: 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).** Prerequisite: MUTH 2204. 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.
4341. **Computer Music I (3).** Prerequisite: Consent of instructor. Techniques and tools for creating computer music, including audio recording, signal processing, MIDI sequencing, and sound design.
4342. **Computer Music II (3).** Prerequisite: MUCP 4341 or consent of instructor. Continuation of MUCP 4341. More advanced topics in computer music, including interactive media, live acoustic instruments with electronic tape, advanced sound design and software applications.

Graduate Courses

5308. **Composition (3).** Prerequisite: C or better in MUCP 4402 or MUTH 4303. 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: C or better in MUCP 5308. 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.
5341. **Computer Music I (3).** Prerequisite: Graduate-level composition student or consent of instructor. Techniques and tools for creating computer-generated music, including audio recording, sampling, signal processing, MIDI sequencing, and sound design.
5342. **Computer Music II (3).** Prerequisite: MUCP 5341 (or equivalent) or consent of instructor. Continuation of MUCP 5341. Offers more advanced topics in computer music, including interactive media, live acoustic instruments with electronic tape, advanced sound design, and software applications.
6000. **Master's Thesis (V1-6).**

Music Education (MUED)

Undergraduate Courses

3311. **Curriculum and Instruction in Education and Music (3).** Prerequisite: MUAP 3206 (track appropriate section), MUTH 2204 and MUTH 2104. 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).** 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.

4315. **Integrating Instructional Technology into Learning and Teaching Music (3)**. Prerequisite: Music majors only. Corequisite: MUED 3311. Introduces music teacher candidates to current instructional technology with integration strategies based on specified learning theories.
4323. **Teaching in the Music Classroom: Diversity, Equity, and Excellence (3)**. Prerequisite: Music majors only. Corequisite: MUED 3312. Organizing classrooms and rehearsals responsive to student learning styles, ethnic/cultural backgrounds, and special needs in music settings.

Graduate Courses

5031. **Graduate Topics in Music Education (V1-3)**. Examination of music education issues, including creativity, special populations, psychology of music, and learning theories. Discussion based. Different topic each semester. May be repeated for credit. May enroll in 1-3 hours with permission of instructor.
5315. **Integrating Instructional Technology into Learning and Teaching in Music (3)**. Prerequisite: Post-Baccalaureate Teacher Certification candidate. Corequisite: MUED 3311 or graduate equivalent. Introduces music teacher candidates to current instructional technology with integration strategies based on specified learning theories.
5323. **Teaching in the Music Classroom: Diversity, Equity, and Excellence (3)**. Prerequisite: Post-Baccalaureate Teacher Certification candidate. Corequisite: MUED 3312 or graduate equivalent. Organizing classrooms and rehearsals responsive to student learning styles, ethnic/cultural backgrounds, special needs in music settings.
5325. **Topics in Choral Music Education (3)**. Emphasizes curriculum, organization, and development of performance excellence among choral groups in schools. May be repeated for credit.
5326. **Topics in Band Music Education (3)**. 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 for credit.
5327. **Topics in Orchestral Music Education (3)**. Emphasizes curriculum, organization, and development of performance excellence among orchestras in schools. May be repeated for credit.
5332. **Learning and Music (3)**. Study of psychological and sociological responses to the arts. Emphasis given to the research that informs psychology of the arts as applied to music teaching and learning.
5333. **Tests, Measurements, and Evaluations in Music (3)**. 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. **Foundations of Music Education (3)**. 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.
5345. **Topics in Kodály Pedagogy (3)**. Prerequisite: Consent of instructor. Kodály pedagogical approach to music teaching to all ages. Materials, strategies, and sequences of Kodály approach emphasized.
6000. **Master's Thesis (V1-6)**.

Music Ensemble (MUEN)

ALL MUEN COURSES MAY BE REPEATED FOR CREDIT

Undergraduate Courses

1103. **Marching Band (1)**. Auditions Required. Fulfills Personal Fitness and Wellness requirement.
2101. **Secondary Instrumental Ensemble (1)**. Introduction to instruments for choral educators. Includes performance on brass, woodwinds, percussion and string instruments.
2102. **Vocal Ensemble for Instrumentalists in Music Education (1)**. Introduction to choral concepts for instrumental educators. Includes choral experiences, vocal pedagogy, and appropriate repertoire.
3101. **Choir (1)**. Auditions required.
3102. **Music Theatre (1)**. Auditions required.

3103. **Band (1)**. Auditions required.
3104. **Orchestra (1)**. Auditions required.
3105. **Jazz Ensemble (1)**. Auditions required.
3106. **Small Ensemble (1)**. Auditions required.
3110. **Medium Ensemble (1)**. Auditions required.
3201. **University Choir (2)**. Auditions required.
3203. **Band (2)**. Auditions required.
3204. **Orchestra (2)**. Auditions required.

Graduate Courses

5101. **Choir (1)**. Auditions required.
5102. **Music Theatre (1)**. Auditions required.
5103. **Band (1)**. Auditions required.
5104. **Orchestra (1)**. Auditions required.
5105. **Jazz Ensemble (1)**. Auditions required.
5106. **Small Ensemble (1)**. Auditions required.
5110. **Medium Ensemble (1)**. Auditions required.

Music History and Literature (MUHL)

Undergraduate Courses

1308. **[MUSI 1306, 1307, 1308] Music in Western Civilization (3)**. 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 Creative Arts requirement.
2301. **Music as Cultural History I (3)**. Prerequisite: MUSI 1300. Survey of music history, culture and style from 1750 to 1880. Part I of MUHL 2301, 3302, 3303 sequence.
2304. **History of Jazz (3)**. Historical and analytical survey of jazz from its beginning through "Rock" its form, style, literature, and influence on 20th century music. Fulfills core Creative Arts requirement.
2308. **Musics of Latin America (3)**. Traditions, styles, and history of Latin American musics: Cuba, Puerto Rico, Mexico, Panama, Guatemala, Argentina, Brazil, Perú, Venezuela. Fulfills core Creative Arts requirement.
2310. **History of Rock and Roll (3)**. 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 Creative Arts requirement.
3302. **Music as Cultural History II (3)**. Prerequisites: MUSI 1300, MUHL 2301. Survey of music history, culture and style from antiquity to 1750. Part II of MUHL 2301, 3302, 3303 sequence. (Writing Intensive)
3303. **Music as Cultural History III (3)**. Prerequisites: MUSI 1300, MUHL 2301, and 3302. Survey of music history, culture and style from 1880-present. Part III of MUHL 2301, 3302, 3303 sequence. (Writing Intensive)
4300. **Special Topics in Music History and Literature (3)**. Prerequisites: MUHL 2301 and 2302. Topics may cover any historical period of music, music literature, or composers. May be repeated under a different topic.
4330. **Music in the United States (3)**. Explores the interactions of American music and cultural history since first Colonial contact, with particular emphasis on vernacular traditions that have historically been unique to the North American experience.
4338. **Music, Folklore, and Traditional Culture in Irish History (3)**. An intensive topics-oriented survey of the styles, practices, and cultures of music and oral tradition in Ireland since St. Patrick.

Graduate Courses

5300. **Graduate Music History Survey (3)**. 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)**. Prepares graduate-level music students for the experience of teaching a college-level course in musicology or music history.
5311. **Symphonic Literature (3)**. Studies in the development of orchestral music from the Classic Period to the present.
5312. **Chamber Music Literature (3)**. Studies in the development of chamber music from the Classic Period to the present.
5313. **Great Composer Seminar (3)**. 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).** 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).** Detailed examination of topics in ethnomusicology (the study of musical behavior in its original contexts) and its history, philosophies, methods and areas of study.
5322. **Early Music Performance Practice (3).** Study of the use of period instruments, original sources, and musical techniques contemporary to medieval, Renaissance, and Baroque musics.
5323. **Music, Folklore and Tradition in Irish Cultural History (3).** Intensive topics seminar on music and oral culture in Ireland. Enhanced learning experience combining history folklore, ethnomusicology, literature, and geography. Includes field trip.
5330. **Music in the United States (3).** A study of 20th century American music together with its historical and cultural background.
5331. **Seminar in the History and Literature of Music: Medieval (3).** May be repeated with consent of instructor.
5332. **Seminar in the History and Literature of Music: Renaissance (3).** May be repeated with consent of instructor.
5333. **Seminar in the History and Literature of Music: Baroque (3).** May be repeated with consent of instructor.
5334. **Seminar in the History and Literature of Music: Classic Period (3).** May be repeated with consent of instructor.
5335. **Seminar in the History and Literature of Music: Romantic Period (3).** May be repeated with consent of instructor.
5336. **Seminar in the History and Literature of Music: 20th Century (3).** May be repeated with consent of instructor.
5337. **Seminar in the History and Literature of Music: World Music (3).** May be repeated with consent of instructor.
5339. **Music and American Radical Politics (3).** Intensive seminar exploring interactions of American music, cultural history, and radical thought across the political spectrum since the founding of the Republic.
6000. **Master's Thesis (V1-6).**

Music Theory (MUTH)

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] Elementary Aural Skills I (1).** Corequisite: MUTH 1203. For music majors or with consent of instructor. Dictation, sight-singing, and keyboard skills.
1104. **[MUSI 1117, 1217] Elementary Aural Skills II (1).** Prerequisites: C or better in MUTH 1203 and 1103 or equivalent. Corequisite: MUTH 1204. Dictation, sight-singing, and keyboard skills.
1203. **[MUSI 1211] Elementary Music Theory I (2).** Corequisite: MUTH 1103. For music majors or with consent of instructor. Melody, rhythm, and diatonic harmony.
1204. **[MUSI 1212] Elementary Music Theory II (2).** Prerequisites: C or better in MUTH 1203 and 1103 or equivalent. Corequisite: MUTH 1104. Melody, rhythm, and diatonic harmony.
1300. **Songwriting (3).** 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 Creative Arts requirement.
2103. **[MUSI 2116, 2216] Intermediate Aural Skills I (1).** Prerequisites: C or better in MUTH 1204 and 1104 or equivalent. Corequisite: MUTH 2203. Dictation, sight-singing, and keyboard skills.
2104. **[MUSI 2117, 2217] Intermediate Aural Skills II (1).** Prerequisites: C or better in MUTH 2203 and 2103. Corequisite: MUTH 2204. Dictation, sight-singing, and keyboard skills.
2203. **[MUSI 2211] Intermediate Music Theory I (2).** Prerequisites: C or better in MUTH 1204 and 1104 or equivalent. Corequisite: MUTH 2103. Diatonic and chromatic harmony.
2204. **[MUSI 2212] Intermediate Music Theory II (2).** Prerequisites: C or better in MUTH 2203 and 2103 or equivalent. Corequisite: MUTH 2104. Diatonic and chromatic harmony; survey of 20th century techniques.
3205. **Introduction to Jazz Harmony (2).** Prerequisites: MUTH 1104, 1204; MUAP 1124. Addresses fundamental concepts

in contemporary jazz theory and harmony, intervals, chord construction, chord/scale relationships, harmonic and melodic analysis, scale choice, basic jazz keyboard, and aural skills.

3303. **Form, Analysis, and Synthesis (3).** Prerequisites: C or better in MUTH 2204 and 2104 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.
4305. **Modal Counterpoint (3).** Prerequisites: C or better in MUTH 2204 and 2104 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).** Prerequisites: C or higher in MUTH 2204 and 2104 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. **20th-Century Analysis Techniques (3).** Prerequisites: C or higher in MUTH 2104 and 2204. A study of 20th century analytical techniques and their application to post-romantic 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. **Styles (3).** 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 16th 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 18th 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).** 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. **20th-Century Analysis Techniques (3).** Prerequisite: Successful completion of MUTH 5300 and MUTH 5301 or consent of instructor. A study of 20th century analytical techniques and their application to post-romantic 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).**

Student Teaching for Music (MUAL)

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.

Department of Theatre and Dance

Mark J. Charney, Ph.D., Chairperson

Professors: Bert, Charney, Marks

Associate Professors: Bilkey, Chansky, Donahue, Duffy, Durham, Gelber, Merz, Wesley

Assistant Professors: Corley, Gibb, Nolen, Schlieff, Warren-Crow

Professor of Practice: Reinsch, Olson

CONTACT INFORMATION: Charles E. Maedgen Jr. Theatre, Box 42061, Lubbock, TX 79409-2061, T 806.742.3601, F 806.742.1338, www.depts.ttu.edu/theatreanddance

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
Fields of Specialization: Acting, Design/Technology
- Master of Arts in Theatre Arts
- Master of Fine Arts in Theatre Arts
Fields of Specialization: Arts Administration, Design, Performance and Pedagogy, Playwriting
- Doctor of Philosophy in Fine Arts
Field of Specialization: Theatre Arts

The department, an accredited program of the National Association of Schools of Theatre and the National Association of Schools of Dance, sponsors a major season of plays in the University Theatre, a season of faculty- and student-directed plays in the Laboratory Theatre, and a summer season of performing laboratory events with nationally renowned professional artists. 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 Association for Theatre in Higher Education, the United States Institute of Theatre Technology, the Association of Arts Administration Educators, and the American College Dance Festival Association.

Undergraduate Program

Grades below C in courses required of theatre and dance majors and minors are not acceptable in fulfillment of degree requirements. A grade of C or better must be achieved in any DAN or THA course that is a prerequisite for another course. Transfer students must complete the following minimum credit hours of major or minor courses in residence at Texas Tech: B.A. theatre majors, 24 hours; B.F.A. theatre majors, 36 hours; B.A. dance majors, 24 hours; and theatre or dance minors, 9 hours.

Semester Credit Hour and Contact Hour Equivalents. Pursuant to the Texas Tech University *Undergraduate/Graduate Catalog*, the Texas Administrative Code, and norms stated in the *NAST Handbook*, the credit and time expectations for the Department of Theatre and Dance courses are as follows:

- For studio-based courses, a standard of 30 in-class contact hours per credit hour per term is employed. Further, non-contact hour time expectations for out-of-class student activity typically range from 20 to 30 hours per credit hour per term.
- For traditionally delivered 3-credit-hour lecture- or seminar-based courses during a regular semester, students should expect to be in class for 3 hours per week and work outside of class a minimum of 6 hours per week. For 3-credit-hour courses requiring a non-credit lab, students should expect to be in class

for 6 hours per week and work outside of class 3 to 6 hours per week.

Bachelor of Arts

Theatre Arts Major. The 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 a Bachelor of Arts 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, 2302, 2303, 3303, 3304, 3305, 3308, 3309, 3351, 4110, 4300, 4302, 4308, two hours of dance, and 6 hours of theatre arts electives for a total of 49 hours. The degree will provide students an opportunity to participate in a more individualized degree through the choice of elective courses for a minor from outside the major area discipline that is consistent with the university philosophy and policies for a liberal arts degree.

Dance Major. Students accepted to Texas Tech University who wish to seek a Bachelor of Arts 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 modern, ballet, and jazz; solos will not be seen. Auditions also include an expository writing component. Acceptance to Texas Tech University does not ensure admission as a dance major. The 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. The degree will provide students an opportunity to participate in a more individualized degree through the choice of elective courses for a minor from outside the major area discipline that is consistent with the university philosophy and policies for a liberal arts degree. Students seeking the B.A. in Dance must complete the following requirements in addition to those required by the university and the College of Visual and Performing Arts. Dance major requirements (55 total hours) are as follows:

- DAN 1100/3100 (3 semesters)
- At least 6 credit hours from DAN 1203, 2203, 3203, 4203 (levels to be determined; 2 hours must be upper level)
- At least 6 credit hours from DAN 1205, 2205, 3205, 4205 (levels to be determined; 2 hours must be upper level)
- At least 6 credit hours from DAN 1207, 2207, 3207, 4207 (levels to be determined; 2 hours must be upper level)
- 4 additional credit hours from DAN 3203, 3205, 3207, 4203, 4205, 4207
- DAN 1106, 2202, 2206, 2313, 3208, 3209, 3301, 3309, 3351, 4313, 4110
- 5 credit hours from DAN 1100, 1101, 1108, 1206, 2301, 3000, 4000, 4202

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 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 B.F.A. program. The number of hours required

Graduate Program

For information on graduate programs offered by the Department of Theatre and Dance, visit the Graduate School section of the catalog on page 153.

for B.F.A. theatre majors is 120, at least 40 of which must be at the junior and senior levels.

Acting Specialization (79 hours)

THA 1101 and 3303 (or 1102 and 3304 or 1103 and 3305), 1104, 1301, 1302, 2101, 2302, 2303, 2312, 3104, 3105, 3306, 3307, 3308, 3309, 3310, 3341, 3342, 3351, 4208, 4300, 4302; and two courses from THA 3302, 3322, 3332. In addition, students must complete 18 hours from the following options with at least 2 of the 18 hours from the courses in bold type: **DAN 1100, 1101, 1108, 1203, 1205, 1206, 1207, 2203, 2205, 2207**, 2301, 2313, 3000, 4313; ENGL 2306, 3304, 3385; MUAP 1001, 1002, 1113, 1114, 2001, 2002, 3001, 3002; THA 1101, 1102, 1103, 1301, 1302, 2305, 2306, 2312, 3105, 3302, 3303, 3304, 3305, 3306, 3307, 3311, 3322, 3332, 4000, 4303, 4308.

Design/Technology Specialization (79 hours)

ART 1303, 2304; THA 1101, 1102, 1103, 1104, 2101, 2302, 2303, 2305, 2306, 3104, 3105, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3351, 4208, 4300, 4302, 4303; three courses from THA 4309, 4310, 4311, 4319; one course from THA 4336, 4337. Also 7 hours must be selected from THA 3100, 3101, 3102, 3103, 3208, 4000, 4308, 4309, 4310, 4311, 4319, 4336, 4337, 4340; ADM 3312; AGSM 2303; ART 1302, 2303, 3323; ARTH 1301, 2302; or PHYS 1406.

Theatre and Dance Minors/Concentrations

Students working toward one of the four minors in theatre or dance must complete a minimum of 18-24 hours of specific coursework. 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/Concentration. 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 modern, ballet, and jazz. Solos will not be seen. Auditions also include an expository writing component. Acceptance to Texas Tech does not ensure admission as a dance minor. Students accepted as a dance minor must complete the following 24 credit hours:

- DAN 1100 (2 semesters)
- At least 4 credit hours from DAN 1203, 2203, 3203, 4203 (levels to be determined; 2 hours must be upper level)
- At least 4 credit hours from DAN 1205, 2205, 3205, 4205 (levels to be determined; 2 hours must be upper level)
- At least 4 credit hours from DAN 1207, 2207, 3207, 4207 (levels to be determined; 2 hours must be upper level)
- DAN 2202, 2313, 3208, 3309

Theatre Arts Minor/Concentration – General. Students completing a theatre arts – general minor must complete the following 18 credit hours:

- THA 2301 and 2303
- 3 courses from THA 1101, 1102, 1103, 1104, 3105; or any DAN course (with no course counted more than once)
- THA 3303 or 3304 or 3305
- 6 hours of advanced THA courses (3000 or 4000 level)

Theatre Arts Minor/Concentration – Acting. Students completing a theatre arts – acting minor must complete 21 credit hours, including THA 1301, 1302, 2302, 2303, 2312, 3310; and either THA 3302, 3322, or 3332.

Theatre Arts Minor/Concentration – Design. Students completing a theatre arts – design minor must complete 21 credit hours, including THA 2303, 2305, 3303, 3304, 3305; and two courses from THA 4309, 4310, 4311, and 4319.

Teacher Education

Students desiring all-level certification in theatre arts must include the following courses within their overall degree plan: THA 1301, 2303, 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, 2301 (or VPA 2301 or DAN 4313), 2313, 3100, 3203, 3205, 3207, 3208, 3209, 3301, 3309, 4110, 4203, 4205, and 4207. 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.

Course Descriptions

(To interpret course descriptions, see page 23.)

Dance (DAN)

Undergraduate Courses

1100. **Dance Production Activities (1).** Participation in a dance production as a performer, designer, or crew member. Must be concurrently enrolled in a dance technique course. May repeat twice for credit.
1101. [DANC 1110, 1210] **Tap I (1).** A study of basic tap dance techniques, performance, and choreography. May repeat once for credit.
1106. **Conditioning for Performers (1).** 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).** A study of basic hip hop dance techniques, performance, and choreography. May repeat once for credit.
1203. [DANC 1147, 1247, 1347] **Jazz I (2).** Prerequisite: Consent of instructor. An introduction to fundamental jazz dance technique. May be repeated once for credit.
1205. [DANC 1141, 1241, 1341] **Ballet I (2).** Prerequisite: Consent of instructor. An introduction to fundamental ballet dance technique. May be repeated once for credit.
1206. **Musical Stage Dance (2).** Prerequisite: DAN 1203 or 2203 (may be taken concurrently). 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 B.A. in Dance.
1207. [DANC 1145, 1245, 1345] **Modern I (2).** Prerequisite: Consent of instructor. An introduction to fundamental modern dance technique. May be repeated once for credit.
2202. **Improvisation (2).** A study of basic movement improvisation techniques and skills.
2203. [DANC 1148] **Jazz II (2).** Prerequisite: DAN 1203 or consent of instructor. A study of intermediate jazz dance technique and various jazz dance styles. May be repeated for credit.
2205. [DANC 1142] **Ballet II (2).** Prerequisite: DAN 1205 or consent of instructor. A study of intermediate ballet dance technique. May be repeated for credit.
2206. **Music for Dance (2).** An introduction to and exploration of fundamental elements of music as they relate to the study and practice of dance.
2207. [DANC 1146] **Modern II (2).** Prerequisite: DAN 1207 or consent of instructor. A study of intermediate modern dance technique and modern dance styles. May be repeated for credit.
2301. **World Dance Forms (3).** A study of dances from different cultures, their histories, and their influences on contemporary American dance and culture. Fulfills multicultural and core Creative Arts requirement.
2303. **Dance Appreciation (3).** Provides students with a general overview of dance as an art form and as entertainment, beginning with ancient forms and progressing to the present day. Fulfills core Creative Arts requirement (pending THECB approval).
2313. **Dance History (3).** History and philosophy of dance and the relationship of dance to allied arts. Fulfills core Creative Arts requirement.
3000. **Special Topics in Dance (VI-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 B.A. in Dance.

Bachelor of Arts in Theatre Arts: Sample Course Sequence

FIRST YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104	1	THA 3303, 3304, or 3305	3
THA 2302, Principles of Acting I	3	THA Elective	3
THA 2303, Theatre Appreciation (majors)	3	HIST 2300, 2301, or 2310	3
Oral Communication*	3	Mathematics*	3
HIST 2300, 2301, or 2310	3	Life and Physical Sciences*	4
IS 1100, RaiderReady: Freshman Seminar	1		
TOTAL	14	TOTAL	16
SECOND YEAR			
Fall		Spring	
THA 3303, 3304, or 3305	3	THA 3303, 3304, or 3305	3
THA 1301, Voice for the Actor	3	ENGL 1302, Adv. Coll. Rhetoric	3
THA 3351, Theatre in the Community	3	Life and Physical Sciences*	4
ENGL 1301, Essentials of Coll. Rhetoric	3	Social and Behavioral Sciences*	3
Mathematics*	3		
TOTAL	15	TOTAL	13
THIRD YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104	1	THA 3309, History of Theatre II	3
THA 3308, History of Theatre I	3	THA 4302, Directing Methods	3
DAN Course	2	Foreign Language †	5
Foreign Language †	5	POLS 1301, American Gov., Org.	3
Language, Philosophy, and Culture*	3	Minor	3
Minor	3		
TOTAL	17	TOTAL	17
FOURTH YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104	1	THA 1101, 1102, 1103, or 1104	1
THA 2101, Stage Makeup (or elective)	1	THA 4308, Topics in Theatre History	3
THA 4300, Script Analysis	3	THA Elective	3
POLS 2302, American Public Policy	3	Minor Required Course	6
Minor	6	THA 4110, Senior Seminar	1
TOTAL	14	TOTAL	14

TOTAL HOURS: 120

40 hours of upper division classes are required.

The sample course sequence above includes general minor classes for subject areas in which students can complete classes in any order at any time. Be aware that the minor in education (leading to Texas Teacher Certification) follows a much different pattern. To minor in education, students must meet specific GPA requirements, testing standards, and be admitted to the Teacher Education Program (TEP) through the College of Education. Application to the TEP typically does not occur until the student reaches approximately 70-75 credit hours. Teacher certification will most likely add one full year to a student's program due to the one year student teaching requirement.

* Choose from the university's core curriculum.

† The B.A. in Theatre Arts requires at least one year (or its equivalent) of the same foreign language on the college level.

Bachelor of Fine Arts in Theatre Arts: Sample Course Sequence for Field of Specialization in Design/Technology

FIRST YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104	1	THA 3303, 3304, or 3305	3
THA 2302, Principles of Acting I	3	ART 1303, Drawing I	3
THA 2303, Theatre Appreciation (majors)	3	HIST 2300, 2301, or 2310	3
THA 2305, Elements of Theatrical Design	3	Mathematics*	3
Oral Communication*	3	Social & Behavioral Sciences*	3
HIST 2300, 2301, or 2310	3		
TOTAL	16	TOTAL	15
SECOND YEAR			
Fall		Spring	
THA 3303, 3304, or 3305	3	THA 3303, 3304, or 3305	3
THA 2101, Stage Makeup	1	THA 4309, or 4311	3
THA 2306, 4336, or 4337	3	or Required B.F.A. Elective(s) †	
THA 3351, Theatre in the Community	3	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics*	3
		Language, Philosophy, and Culture*	3
TOTAL	13	TOTAL	15
SUMMER I			
THA 3306, Performance Lab I	3		
THA 3307, Performance Lab II	3		
TOTAL	6		
THIRD YEAR			
Fall		Spring	
THA 1101, 1102, 1103, or 1104	1	THA 1101, 1102, or 1103	1
THA 4208, Professional Career Mgmt.	2	THA 4302, Stage Directing Methods	3
THA 4300, Script Analysis	3	THA 4303, Playwriting	3
THA 4310 or 4319	3	THA 4309 or 4311	3
or Required B.F.A. Elective(s) †		or Required B.F.A. Elective(s) †	
THA 2306, 4336, or 4337	3	POLS 2302, Amer. Public Policy	3
POLS 1301, American Gov., Org.	3		
TOTAL	15	TOTAL	13
FOURTH YEAR			
Fall		Spring	
THA 3104, Adv. Activities: House Mgmt.	1	THA 1101, 1102, or 1103	1
THA 3308, History of Theatre I	3	THA 3105, Rehearsal and Performance ‡	1
THA 4310 or 4319	3	THA 3309, History of Theatre II	3
or Required B.F.A. Elective(s) †		Required B.F.A. Elective(s) †	4
ART 2304, Drawing II	3	Life & Physical Sciences*	4
Life & Physical Sciences*	4		
TOTAL	14	TOTAL	13

TOTAL HOURS: 120

* Choose from the university's core curriculum.

† 7 hours of electives must be taken from the following: THA 3100, 3101, 3102, 3103, 3208, 4000, 4308, 4309, 4310, 4311, 4319, 4340, 4336, 4337; ADM 3312; AGSM 2303; ART 1302, 2303, 3323; ARTH 1301, 2302; or PHYS 1406. Many of the above courses are repeatable for credit. Please see head of area for approved substitutions.

‡ THA 3105, Rehearsal and Performance, should be taken during the semester a student is stage managing a Lab or Mainstage theatre production.

- 3100. Dance Production Activities II (1).** Prerequisites: DAN 1100, 3208, 3209. Participation in a dance production as a choreographer. May be repeated once for credit.
- 3203. Jazz III (2).** Prerequisite: DAN 2203 or consent of instructor. A study of intermediate and advanced jazz dance technique, jazz dance styles, and jazz performance and choreography. May be repeated for credit.
- 3205. Ballet III (2).** Prerequisite: DAN 2205 or consent of instructor. A study of intermediate and advanced ballet dance technique, various ballet dance styles, and ballet performance and choreography. May be repeated for credit.
- 3207. Modern III (2).** Prerequisite: DAN 2207 or consent of instructor. A study of intermediate and advanced modern dance techniques, various modern dance styles, and modern performance and choreography. May be repeated for credit.
- 3208. Principles of Choreography I (2).** Prerequisites: B or higher in DAN 2203 or 3203, and 2205 or 3205, and 2207 or 3207, and 2202; or consent of instructor. An introduction to and practical application of basic principles and skills of dance making.
- 3209. Principles of Choreography II (2).** Prerequisite: DAN 3208 or consent of instructor. An exploration of skills and techniques used to hone choreographic style and process.
- 3301. Dance Aesthetics (3).** Prerequisite: C or better in DAN 2313. An investigation of history and trends in dance theory, research, and philosophy. (Writing Intensive)
- 3309. Pedagogy (3).** Prerequisite: C or better in DAN 2313. Investigation and practical application of contemporary teaching theories and methodologies. (Writing Intensive)

- 3351. Dance in the Community (3).** Combines community service (creating dance activities for or with non-profit community organizations that serve at-risk populations) with readings, discussions, and collaborations on societal applications for the performing arts.
- 4000. Projects in Dance (V1-3).** Prerequisite: Consent of instructor. Designed for students interested in pursuing guided independent projects in dance. May repeat for up to 6 credit hours.
- 4110. Capstone Concert (1).** Prerequisite: B or higher in DAN 3209 and consent of instructor. Corequisite: DAN 3100. Production of a fully realized dance concert and completion/presentation of a professional portfolio.
- 4202. Contact Partnering (2).** Prerequisites: A or better in DAN 2202; and 3203 or 4203; and 3205 or 4205; and 3207 or 4207; or consent of instructor. A study of contact partnering skills, techniques, and improvisations as practiced in contemporary dance. May repeat once for credit.
- 4203. Jazz IV (2).** Prerequisite: DAN 3203 or consent of instructor. A study of advanced jazz dance technique, various jazz dance styles, and jazz.
- 4205. Ballet IV (2).** Prerequisite: DAN 3205 or consent of instructor. A study of advanced ballet dance technique, various ballet dance styles, and ballet performance and choreography. May be repeated for credit.
- 4207. Modern IV (2).** Prerequisite: DAN 3207 or consent of instructor. A study of advanced modern dance techniques, various modern

**Bachelor of Fine Arts in Theatre Arts:
Sample Course Sequence for
Field of Specialization in Acting**

FIRST YEAR			
Fall		Spring	
THA 1104, Activities: House Management	1	THA 1302, Movement for the Actor	3
THA 1301, Voice for the Actor	3	THA 2312, Principles of Acting II	3
THA 2302, Principles of Acting I	3	THA 3303, 3304, or 3305	3
THA 2303, Theatre Appreciation (majors)	3	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics*	3
Oral Communication*	3		
TOTAL	16	TOTAL	15

SECOND YEAR			
Fall		Spring	
THA 1101, 1102, or 1103	1	THA 3105, Rehearsal and Performance ‡	1
THA 2101, Stage Makeup	1	THA 3302, 3322, or 3332	3
THA 3310, Auditioning	3	or Required B.F.A. Elective(s) †	
THA 3351, Theatre in the Community	3	THA 3342, Advanced Movement	3
THA 4300, Script Analysis	3	Language, Philosophy, and Culture*	3
Required B.F.A. Elective(s) †	2	Mathematics*	3
Social & Behavioral Sciences*	3		
TOTAL	16	TOTAL	13

SUMMER I	
THA 3306, Performance Lab I	3
THA 3307, Performance Lab II	3
TOTAL	6

THIRD YEAR			
Fall		Spring	
THA 3302, 3322, or 3332	3	THA 3302, 3322, or 3332	3
or Required B.F.A. Elective(s) †		or Required B.F.A. Elective(s) †	
THA 3308, History of Theatre I	3	THA 3309, History of Theatre II	3
THA 3341, Advanced Voice	3	POLS 2302, Amer. Public Policy	3
THA 4208, Professional Career Mgmt.	2	Life & Physical Sciences*	4
POLS 1301, American Gov., Org.	3		
TOTAL	14	TOTAL	13

FOURTH YEAR			
Fall		Spring	
THA 3302, 3322, or 3332	3	THA 3104, Adv. Activities: House Mgmt.	1
or Required B.F.A. Elective(s) †		THA 3302, 3322, or 3332	3
Additional B.F.A. Elective(s)	4	or Required B.F.A. Elective(s) †	
THA 4302, Stage Directing Methods	3	Additional B.F.A. Elective(s)	3
HIST 2300, 2301, or 2310	3	HIST 2300, 2301, or 2310	3
		Life & Physical Sciences*	4
TOTAL	13	TOTAL	14

TOTAL HOURS: 120

* Choose from the university's core curriculum

† 18 hours of electives must be taken from the following (with at least 2 hours from courses in bold type): DAN 1100, 1101, 1108, 1203, 1205, 1206, 1207, 2203, 2205, 2207, 2301, 2313, 3000, 4313; ENGL 2306, 3304, 3385; MUAP 1001, 1002, 1113, 1114, 2001, 2002, 3001, 3002; THA 1101, 1102, 1103, 1301, 1302, 2305, 2306, 2312, 3105, 3302, 3303, 3304, 3305, 3306/3307, 3311, 3322, 3332, 4000, 4303, 4308. Many of the above courses are repeatable for credit. Please see head of area for approved substitutions.

‡ THA 3105, Rehearsal and Performance, should be taken during a semester when the student has been cast in a major acting role in a lab or mainstage theatre production.

dance styles, and modern performance and choreography. May be repeated for credit.

4313. Topics in Dance History (3). Prerequisite: DAN 2313 or consent of instructor. An in-depth investigation of particular topics in dance history with a focus on the roles of dance in a larger cultural context. May be repeated once for credit.

Theatre Arts (THA)

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.

**Bachelor of Arts in Dance: Sample
Course Sequence**

FIRST YEAR			
Fall		Spring	
Two technique courses from approved level of Jazz, Ballet, and/or Modern	4	Two technique courses from approved level of Jazz, Ballet, and/or Modern	4
DAN 1100, Dance Production Activities	1	DAN 2202, Improvisation	2
DAN 1106, Conditioning for Performers	1	DAN 2206 or DAN Elective †	2
DAN 2313, Dance History	3	HIST 2300, 2301, or 2310	3
Oral Communication*	3	Life and Physical Sciences*	4
HIST 2300, 2301, or 2310	3		
TOTAL	15	TOTAL	15

SECOND YEAR			
Fall		Spring	
Two technique courses from approved level of Jazz, Ballet, and/or Modern	4	One technique course from approved level of Jazz, Ballet, and/or Modern	2
DAN 1100, Dance Production Activities	1	DAN 2206 or DAN Elective †	2
DAN 3351, Dance in the Community	3	ENGL 1302, Advanced College Rhetoric	3
ENGL 1301, Essentials of Coll. Rhetoric	3	Mathematics*	3
Mathematics*	3	Life and Physical Sciences*	4
TOTAL	14	TOTAL	14

THIRD YEAR			
Fall		Spring	
One technique course from approved level of Jazz, Ballet, and/or Modern	2	One technique course from approved level of Jazz, Ballet, and/or Modern	2
DAN 3208, Prin. of Choreography I	2	DAN 3209, Prin. of Choreography II	2
DAN 3301, Aesthetics	3	DAN 3309, Pedagogy	3
DAN 1100 or DAN Elective †	1	or DAN 4313, Topics in Dance History	
Foreign Language ‡	3	Foreign Language ‡	3
Language, Philosophy, and Culture*	3	Social and Behavioral Sciences*	3
Minor	3	Minor	3
TOTAL	17	TOTAL	16

FOURTH YEAR			
Fall		Spring	
One technique course from approved level of Jazz, Ballet, and/or Modern	2	One technique course from approved level of Jazz, Ballet, and/or Modern	2
DAN 3100, Dance Prod. Activities	1	DAN 3309, Pedagogy	3
DAN 4110, Capstone Concert	1	or DAN 4313, Topics in Dance History	
POLS 1301, American Gov., Org.	3	DAN Elective †	2
Minor	6	POLS 2302, American Public Policy	3
		Minor	6
TOTAL	13	TOTAL	16

TOTAL HOURS: 120
40 hours of upper-division classes are required.

The sample course sequence above includes general minor classes for subject areas in which students can complete classes in any order at any time. Be aware that the minor in education (leading to Texas Teacher Certification) follows a much different pattern. To minor in education, students must meet specific GPA requirements, testing standards, and be admitted to the Teacher Education Program (TEP) through the College of Education. Application to the TEP typically does not occur until the student reaches approximately 70-75 credit hours. Teacher certification will most likely add one full year to a student's program due to the one year student teaching requirement.

* Choose from the university's core curriculum.

† Dance electives (5 hours minimum) to be selected from: DAN 1100 (repeated for a 3rd time), 1101, 1108, 1206, 2301, 3000, 4000, 4202

‡ The B.A. in Dance requires at least one year (or its equivalent) of the same foreign language on the college level.

- 1301. [DRAM 2336] Voice for the Actor (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).** Explores the physical skills necessary for the actor with emphasis on individual physical creativity and imagination. May repeat once for credit. Enrollment in noncredit lab is required.
- 1303. Introduction to Theatre (3).** 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. Fall semester only. For theatre majors only.
- 2101. [DRAM 1141, 1241, 1341] Stage Makeup (1).**
- 2301. Introduction to Acting (3).** Fundamental principles of acting for nonmajors, with emphasis on establishing a working vocabulary and basic acting process. Fulfills core Creative Arts requirement.
- 2302. [DRAM 1351] Principles of Acting I (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.

2303. **[DRAM 1310] Theatre Appreciation (3)**. Study and application of the various activities and methods of theatrical practice. Attendance at representative plays is required. Fulfills core Creative Arts requirement.
2304. **[COMM 2366; DRAM 2366, 2367] Introduction to Cinema (3)**. A study of the cinematic art form. Fulfills core Creative Arts requirement.
2305. **Elements of Theatrical Design (3)**. Introduction to the elements, principles, and techniques of design for contemporary performing arts, including the design and practice of scenery, lighting, costume, and sound.
2306. **Stage Management (3)**. Prerequisite: THA 2303 (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)**. Prerequisite: THA 2302. Explores representative acting theories in practice with emphasis on given circumstances and character development. 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.
3208. **Scene Painting (2)**. Prerequisites: THA 3303 and 3304. Study of the art and craft of scene painting styles and techniques. May repeat once for credit.
3302. **Acting Period Styles I (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)**. 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)**. Prerequisite: C or better in THA 1303 or THA 2303. Study of the theory and practice of theatrical stage lighting. Elementary electricity, lighting control and instruments, lighting design. Enrollment in noncredit lab is required.
3305. **Principles of Theatrical Costuming (3)**. Prerequisite: THA 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. **Performance Lab I (3)**. An immersive learning experience in theatre and dance that explores avenues of production, theory, devising, and development with diverse professional artists in a laboratory setting. May be repeated once for credit.
3307. **Performance Lab II (3)**. Practical work in the organization, mounting, and presentation of plays in a summer performance laboratory. May be repeated twice for credit.
3308. **History of Theatre I (3)**. A comprehensive review of world theatre from its beginning to the 17th century. Fulfills multicultural requirement. (Writing Intensive)
3309. **History of Theatre II (3)**. A comprehensive overview of world theatre from the 17th century to the present. Fulfills multicultural requirement. (Writing Intensive)
3310. **Auditioning (3)**. Prerequisites: 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.
3311. **Acting for the Camera (3)**. Prerequisite: THA 2301 or 2302. Principles of acting for the camera, including industry terms, auditioning, and acting techniques.
3322. **Acting Period Styles II (3)**. Prerequisite: THA 2312. Scene study in a spectrum of periods and styles from Restoration to contemporary theatre. Enrollment in noncredit lab is required. May repeat once for credit.
3332. **Acting Period Styles III (3)**. Prerequisite: THA 2312. Scene study in the performance of Shakespearean texts and the conventions and performance styles of Elizabethan theatre. Enrollment in noncredit lab is required. May repeat once for credit.
3341. **Advanced Voice for the Actor (3)**. Prerequisite: Consent of instructor. A continuation of the development of the actor's "neutral" voice, resonating capability, range and quality of tone. Introduces dialects for the stage.
3342. **Advanced Movement for the Actor (3)**. Prerequisite: Consent of instructor. A continuation of the development of the actor's physical skill, clarity, and awareness. Emphasizes integrating mind, body, voice, and emotion in all work.
3351. **Theatre in the Community (3)**. Combines community service (creating theatre activities for or with non-profit community organizations that serve at-risk populations) with readings, discussions, and collaborations on societal applications for the performing arts.
4000. **Projects in Theatre and Dance (VI-6)**. Prerequisite: Consent of instructor. Individual study under the guidance of a faculty member. May repeat for up to 12 credit hours.
4110. **Senior Seminar for the B.A. in Theatre (1)**. A capstone course providing upper-level B.A. majors professional preparation tailored to their individual strengths.
4208. **Professional Career Management (2)**. 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)**. 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)**. 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)**. 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)**. Prerequisites: 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)**. Prerequisites: THA 1303 and 3303. Study of theory and practice of theatrical scene design. May repeat twice for credit.
4310. **Costume Design (3)**. Prerequisites: 1303 and 3305. Theory and practice of costume design for technical production. May repeat twice for credit.
4311. **Lighting Design (3)**. Prerequisites: THA 1303 and 3304. Study of the theory, process, and practice in lighting design for theatre, opera, and dance. May repeat twice for credit.
4319. **Theatre Sound Design (3)**. An exploration of the concepts and techniques of sound design for live performance structured around the typical workflow of a sound designer for a theatrical production.
4336. **Computerized Drafting for the Theatre (3)**. Traditional and computer-aided drafting techniques for theatrical presentation. May repeat once for credit.
4337. **Computer Rendering for the Theatre (3)**. Computer-aided rendering techniques and portfolio tools for theatrical presentation. May repeat once for credit.
4340. **Period Styles of Design (3)**. Advanced and in-depth research of historical periods as it relates to theatrical design.
4351. **Performing Arts in the Community (3)**. Prerequisites: 6 hours of 2000- or 3000-level THA and/or DAN courses or consent of instructor. Combines community service (creative theatre and dance for or with community agencies) with readings and

discussions on societal applications of performing arts. May be repeated once for credit when topics vary.

Graduate Courses

5300. **Dramatic Analysis (3)**. Study of dramatic structures and script analysis methods as a preparation for writing, directing, designing, performing, and criticizing plays.
5301. **Playwriting I (3)**. Prerequisite: THA 5300. Basic graduate-level study in the theory and practice of playwriting, focusing on crafting the short play.
5302. **Playwriting II (3)**. Prerequisite: THA 5301. Instruction and practice in crafting the full-length play script. May be repeated once for credit.
5303. **Theatre Scene Design (3)**. 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)**. 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)**. 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)**. 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. **Performance Lab I (3)**. An immersive learning experience in theatre and dance which asks students to explore avenues of production, theory, devising, and development with diverse professional artists in a laboratory setting. May be repeated once for credit.
5308. **Advanced Performance Lab II (3)**. An immersive learning experience in theatre and dance which asks students to explore avenues of production, theory, devising, and development with diverse professional artists in a laboratory setting. May be repeated once for credit.
5309. **Seminar in Theatre History (3)**. Consideration of the theatre of a specific historical epoch, or the comparative study of the theatre of several periods. May be repeated for credit.
5310. **Historical and Critical Perspectives in Theatre Arts (3)**. 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)**. 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)**. 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)**. Principles of dramatic criticism from Aristotle to the present day.
5314. **Theatre Arts in Contemporary Context (3)**. 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)**. Reading and analysis of numerous playscripts and a study of the way in which they are produced in performance.
5316. **Marketing the Arts (3)**. An approach to the field of current theories and practices of arts marketing.
5317. **Funding the Arts (3)**. A seminar in locating and arranging funding for arts organizations.
5318. **Advocacy for the Arts (3)**. Study of the importance and impact of external environments on the formation, production, and funding of arts activities.
5319. **Theatre Sound Design (3)**. An exploration of the concepts and techniques of sound design for live performance structured around the typical workflow of a sound designer for a theatrical production.
5320. **Theatre Planning (3)**. A study of the planning and design of theatre facilities.
5321. **Playwriting III (3)**. Prerequisite: C or better in THA 5301; 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. **Theatrical Collaboration (3)**. Development of scenery, costume, and lighting designs for selected plays and theatre buildings from research to presentation.
5324. **The Teaching of Acting (3)**. Study of modern theories and practices of acting and actor training. Design of the acting course.
5325. **Period Styles in Acting (3)**. Scene study in various periods ranging from Ancient Greece through Medieval, Spanish Golden Age, Jacobean, Restoration, and beyond. Enrollment in non-credit lab is required.
5326. **Seminar in Directing Methods (3)**. 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)**. 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. Enrollment in non-credit lab is required.
5331. **Studies in Contemporary Theatre (3)**. A seminar in contemporary theatre theories and practices.
5333. **Studies in the Production of Pre-Modern Drama (3)**. A study of the problems of producing classical, Elizabethan, French neoclassic, Restoration, and 18th century drama for present-day audiences.
5334. **Topics in Acting (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)**. Computer-aided drafting techniques for theatrical presentations.
5337. **Graphics Presentations for the Theatre: Computer Rendering (3)**. Computer-aided rendering techniques and portfolio tools for theatrical presentations.
5340. **Period Styles of Design (3)**. Advanced and in-depth research of historical periods as it relates to theatrical design.
5341. **Seminar in Dramatic Theory (3)**. The consideration of a specific theoretical approach to the theatre or the comparative study of several theoretical approaches. May be repeated for credit.
5343. **Seminar in Voice and Movement (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)**. Examination of research and critical processes in dramatic history, theory, and performance or production through current philosophical orientations, methodologies, and techniques.
5351. **Mentoring Community Outreach in the Arts (3)**. Methods of utilizing performing arts in community outreach to underserved populations. Combines pedagogical theory with mentorship of undergraduates. May be repeated once for credit.
5372. **Dramaturgy (3)**. 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)**. Prerequisite: Consent of instructor.
8000. **Doctor's Dissertation (V1-12)**.

Texas Tech University Health Sciences Center

The Texas Tech University Health Sciences Center (TTUHSC) is a separate institution in the Texas Tech University System and includes the School of Medicine, School of Nursing, School of Allied Health Sciences, Graduate School of Biomedical Sciences, and School of Pharmacy. Texas Tech University Health Sciences Center at El Paso is also a separate institution and includes the Paul L. Foster School of Medicine and the Gayle Greve Hunt School of Nursing. Together, the two TTUHSC institutions meet the health care needs of more than 2.5 million people who live throughout a vast 108-county area stretching from the Texas Panhandle south to the Permian Basin and west into Eastern New Mexico. TTUHSC also has regional campuses in Abilene, Amarillo, Dallas/Fort Worth, and Midland/Odessa.

This catalog section highlights the TTUHSC programs that cooperate with Texas Tech University to offer undergraduate and graduate programs in selected areas related to the health sciences. TTUHSC is accredited by the Southern Association of Colleges and Schools Commission on Colleges to award baccalaureate, master's, and doctorate degrees and certificates. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097, or call 404.679.4500 for questions about the accreditation of Texas Tech University Health Sciences Center. (Please note: All other inquiries regarding the educational programs of TTUHSC, admissions requirements, financial aid, etc. should be directed to the respective TTUHSC office and not to the Commission on Colleges of the Southern Association of Colleges and Schools.) The Commission should be contacted only if there is evidence that appears to support the insti-

tion's significant non-compliance with a requirement or standard. Additional information is available at www.ttuhs.edu.

The **School of Allied Health Sciences** offers degree programs in athletic training; clinical laboratory science; clinical services management; health sciences; occupational therapy; physical therapy; rehabilitation sciences; physician assistant studies; speech-language pathology; audiology; communication sciences and disorders; speech, language, and hearing sciences; molecular pathology; clinical practice management; and rehabilitation counseling.

The **Graduate School of Biomedical Sciences** offers programs at the master's and doctoral level within biotechnology (master's only), public health (master's only), pharmaceutical sciences. The school also offers programs at the master's and doctoral level within biomedical sciences with research concentrations in graduate medical sciences (master's only); biochemistry, cellular, and molecular biology; immunology and infectious diseases; pharmacology and neuroscience; and molecular biophysics.

The **School of Nursing** offers a variety of degree programs in which students can earn their bachelor's, master's and doctoral degree, as well as post-masters certificates.

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

Robin Satterwhite, Ed.D., Dean

Office of Admissions and Student Affairs | 2B194 HSC
Texas Tech University Health Sciences Center | 3601 4th St.
STOP 6294, Lubbock, TX 79430-6294 | T 806.743.3220
allied.health@ttuhsc.edu | www.ttuhs.edu/sah

About the Programs

The School of Allied Health Sciences at TTUHSC offers the following degree and certificate programs:

- Bachelor of Science in Clinical Laboratory Science
- Post-Baccalaureate of Science in Clinical Laboratory Science
- Bachelor of Science in Clinical Services Management
- Bachelor of Science in Health Sciences
- 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 Rehabilitation Counseling
- Doctor of Audiology
- Doctor of Philosophy in Communication Sciences and Disorders
- Doctor of Philosophy in Rehabilitation Sciences
- Doctor of Physical Therapy
- Doctor of Science in Physical Therapy
- Transitional Doctor of Physical Therapy
- Certificate in Clinical Laboratory Science

Most programs are fully accredited, and most include both didactic and clinical practice components. At its March 2013 meeting, the Accreditation Review Commission on Education for the Physician Assistant (ARC-PA) placed the Texas Tech University Health Sciences Center Physician Assistant program on Accreditation–Probation until its next validation review in March 2015. Probation is a temporary status, limited to two years, of accreditation conferred when a program does not meet the Standards and when the capability of the program to provide an acceptable educational experience for its students is threatened. Once placed on probation, programs that still fail to comply with accreditation requirements in a timely manner, as specified by the ARC-PA, may be scheduled for a focused site visit and/or risk having their accreditation withdrawn. Specific questions regarding the program and its plans should be directed to the interim program director and/or the appropriate institutional official(s). Upon notification of the probation status, the School of Allied Health Sciences immediately initiated steps to move the program toward compliance with educational standards established by the Accreditation Review Commission on Education for the Physician Assistant (ARC-PA).

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 ensure or guarantee 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 will be advised through the Office of Preprofessional Health Careers, Room 340, Chemistry Building, 806.742.3078.

School of Nursing

Michael Evans, RN, FAAN, Ph.D., Dean and Professor

Nursing Program Offices | 2B164 HSC
Texas Tech University Health Sciences Center | 3601 4th St.
Lubbock, TX 79430-6264 | T 806.743.2730 | www.ttuhsoc.edu/son
Undergraduate Program | T 806.723.9293 or 800.493.3954
Graduate Program | T 806.743.9295 or 800.851.8240
D.N.P. Program | T 806.743.2748 or 800.851.8240

About the Program

The School of Nursing is based at TTUHSC with various regional campus locations. The 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 TTUHSC and is committed to improving the availability and quality of nursing care. The ultimate goal of the School of Nursing is to prepare nurses who will develop into leaders for the future as they provide competent, compassionate patient care in the rapidly changing healthcare environment. Essential to the attainment of this goal is the development of interdisciplinary approaches created when nursing, medicine, allied health, and pharmacy work together. The faculty and staff of the School of Nursing are committed to excellence in nursing education, research, practice, and service.

The School of Nursing offers a Bachelor of Science in Nursing (B.S.N.) 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. 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.) with specialties in education, administration, family nurse practitioner, adult-gerontology acute care nurse practitioner, pediatric primary care nurse practitioner, pediatric acute care nurse practitioner, nursing informatics, and nurse midwifery. The School of Nursing also offers a post-masters certificate with tracks in education, family nurse practitioner, pediatric primary care nurse practitioner, pediatric acute care nurse practitioner, adult-gerontology acute care nurse practitioner, nurse midwifery, and informatics. At the doctoral level, the school offers the Doctorate of Nursing Practice (D.N.P.).

The 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) and has pre-accreditation for the nurse midwifery specialty from Accreditation Commission for Midwifery Education, 8403 Colesville Rd., Suite 1550, Silver Spring, MD 20910, phone 240.485.1800, fax 240.485.1818, www.midwife.org. For questions about accreditation of the School of Nursing program, contact the BON at 333 Guadalupe #3-460, Austin, Texas 78701, 512.305.7400.

Graduate School of Biomedical Sciences

Brandt L. Schneider, Ph.D., Dean

5BC100 HSC | Texas Tech University Health Sciences Center
3601 4th St. | Lubbock, TX 79430-6206 | T 806.743.2556
graduate.school@ttuhsc.edu | www.ttuhsoc.edu/gsbs

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 TTUHSC, is provided by the Graduate School of Biomedical Sciences (GSBS).

The program offers opportunities for study and research leading to the following degrees:

- Master of Public Health
- Master of Science in Biotechnology
- Master of Science in Biomedical Sciences
- Master of Science in Pharmaceutical Sciences
- Doctor of Philosophy in Biomedical Sciences
- Doctor of Philosophy in Pharmaceutical Sciences

Areas of concentration for the GSBS program include the following:

- Biochemistry, Cellular, and Molecular Biology
- Biomedical Studies – El Paso
- Molecular Biophysics
- Immunology and Infectious Diseases
- Pharmacology and Neuroscience
- Graduate Medical Sciences (master's level only)

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 benefits 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 form submitted to the American Medical College Application Service at www.aamc.org/students/amcas/start.htm.

GSBS graduate courses are available to graduate students at Texas Tech University as a graduate non-degree student (NDGD).

Further information about graduate programs offered through the TTUHSC 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 via e-mail at graduate.school@ttuhsc.edu. For more information and to apply online, visit www.ttuhsoc.edu/gsbs.

The policies and procedures for the Graduate School of Biomedical Sciences differ from those established by the Texas Tech University Graduate School. Policy information is available on the website at www.ttuhsoc.edu/gsbs. Programs are subject to change, depending on availability of resources and educational goals.

Faculty Directory

Horn Professorships

(Date following departmental affiliation indicates calendar year of Horn Professorship appointment.)

Henry Shine, Chemistry and Biochemistry, 1968
William J. Conover, Information Systems and Quantitative Sciences, 1981
Shelby D. Hunt, Marketing, 1983
David B. Knaff, Chemistry and Biochemistry, 1987
Kishor C. Mehta, Civil Engineering, 1991
Sankar Chatterjee, Museum Science and Geosciences, 1994
Kenneth Ketner, Institute for Studies in Pragmatism, 1999
Stefan Estreicher, Physics, 2000
William Westney, Music, 2001
Peter Westfall, Information Systems and Quantitative Sciences, 2002
Loretta Bradley, Educational Psychology, 2003
Greg McKenna, Chemical Engineering, 2005
Sunanda Mitra, Electrical and Computer Engineering, 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
David Larmour, Classical and Modern Languages and Literatures, 2008
Linda Allen, Mathematics and Statistics, 2010
Sindee Simon, Chemical Engineering, 2010
Victoria Sutton, Law, 2010
Bruce Clarke, English, 2011
Thomas Knight, Agricultural and Applied Economics, 2012
Hongxing Jiang, Electrical and Computer Engineering, 2013
William Hase, Chemistry and Biochemistry, 2014
Jingyu Lin, Electrical and Computer Engineering, 2014
Guigen Li, Chemistry and Biochemistry, 2015
Andreas Neuber, Electrical and Computer Engineering, 2015
Brian D. Shannon, Law, 2015

Teaching Faculty

(Date following departmental affiliation indicates calendar year of first employment at Texas Tech University.)

A

Abidi, Noureddine, Associate Professor of Plant and Soil Science, 2006.
B.S., University of Med I (Morocco), 1991; M.S., 1992; Ph.D., Montpellier II (France), 1996.

Abo-Zaid, Salem M., Assistant Professor of Economics, 2012.
B.A., Ben-Gurion U. (Israel), 2001; M.A., 2003; Ph.D., Maryland, 2011.

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.

Adams, Charlie, Associate Professor of Hospitality and Retail 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.

Akchurin, Nural, Professor of Physics, 2000.
B.A., Vassar Coll., 1982; Ph.D., Iowa, 1990.

Akers, Cynthia L., Professor of Agricultural Education and Communications, 1997.
B.S., Texas Tech, 1991; M.S., 1992; Ed.D., 2000.

Akins-Tillett, Future, Associate 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; M.A., Illinois (Urbana-Champaign), 1981; Ed.D., Texas Tech, 2002.

Aksak, Burak, Assistant Professor of Mechanical Engineering, 2012.
B.S., Middle East Technical U. (Turkey), 2003; M.S. Carnegie Mellon, 2005; Ph.D., 2008.

Alcumbac, Peter "Ole," Adjunct Faculty in Natural Resources Management, 2011.
B.S. Colorado State, 1986; D.V.M., 1989.

Alexander, Karen L., Associate 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.

Al-Hmoud, Rashid, Associate Professor of Economics, 2000.
B.Sc., Jordan, 1991; M.S., Texas Tech, 1992; Ph.D., 1994.

Allen, Deloran M., Adjunct Faculty in Animal and Food Sciences, 2004.
B.S., Kansas State, 1961; M.S., Idaho, 1963; Ph.D., Michigan State, 1966.

Allen, Edward J., Professor of Mathematics and Statistics, 1985.
B.S., Wisconsin, 1971; M.S., 1972; Ph.D., Tennessee, 1983.

Allen, Eric M., Assistant Professor of Music, 2012.
B.M., Florida State, 1998; M.M., 2004; D.M.A., Minnesota, 2012.

Allen, Linda J.S., Horn Professor, 1985.
B.A., Coll. of St. Scholastica, 1975; M.S., 1978; Ph.D., Tennessee, 1981.

Allen, Randy, Adjunct Faculty in Plant and Soil Science and Biological Sciences, 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.

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.

Alquist, Jessica L., Assistant Professor of Psychological Sciences, 2013.
B.A., Drew, 2007; M.S., Florida State, 2010; Ph.D., 2013.

Alvarado, Christine, Adjunct Faculty in Animal and Food Sciences, 2011;
B.S., Texas A&M, 1994; M.S., 1997; Ph.D., 2001.

Alvarez, Shelley, Lecturer in English, 2006.
B.A., Texas Tech, 2001; M.A., 2004.

Ancell, Brian C., Assistant Professor of Geosciences, 2009.
B.A. Illinois (Urbana-Champaign), 1998; Ph.D., Washington, 2006.

Anderson, Amy Brisco, Associate Professor of Music, 1995.
B.M., North Texas, 1978; M.M., 1982; P.C., Eastman School of Music, 1993.

Anderson, Connie A., Associate Professor of Curriculum and Instruction, 2001.
B.S., Northeastern State, 1973; M.Ed., 1975; Ed.D., Oklahoma State, 1988.

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; Licensed Prof. Engr. (Iowa).

Anderson, Rachel, Instructor in Apparel Design and Manufacturing, 2004.
B.S., Texas Tech, 1992.

Anderson, Shelby, Instructor in Teacher Education, 2008.
B.S., Abilene Christian, 1991; M.Ed., Texas Tech, 1997.

Anderson, Todd A., Chairperson, Professor of Environmental Toxicology, 1997.
B.S., Peru State Coll., 1986; M.S., Tennessee, 1988; Ph.D., 1991.

Ankrum, Quinn P., Assistant Professor of Music, 2010.
B.M., Trinity (Texas), 1993; M.A.T., 1994; M.M., Colorado, 1999; D.M.A., Eastman School of Music, 2010.

Aquino, Adelia, Research Professor of Chemistry and Biochemistry, 2011.
B.Sc., U. of Brasilia (Brazil), 1979; M.Sc., U. of Sao Paulo (Brazil), 1984; D.Sc., 1991.

Aranha, Joseph Leslie, Professor of Architecture, 1981.
B.Arch., Indian Inst. of Tech. (India), 1978; M.Arch., Iowa State, 1981; Reg. Arch. (India).

Araya, Guillermo, Research Assistant Professor of Mechanical Engineering, 2011.
B.S., Instituto Universitario Aeronáutico (Argentina), 1996; M.S., U. of Puerto Rico, 2004; Ph.D., Rensselaer Polytechnic Inst., 2008.

Arbeault, Patrice, Adjunct Faculty in Animal and Food Sciences, 2012.
Engineer Degree, PolyTech Institute Clermont-Ferrand (France), 1988; M.S. 1988; Ph.D., Claude Bernard U. (France), 1994.

Armstrong, William J., Assistant Professor of Accounting, 2012.
B.S., Colorado; M.B.A., Texas A&M, 1994.

Arnett, Dennis B., Area Coordinator and John B. Malouf Professor of Marketing, 2000.
B.A., Occidental Coll., 1986; M.A., Alliant International, 1992; Ph.D., Texas Tech, 1998.

Arnett, Edward B., Adjunct Faculty in Natural Resources Management, 2012.
B.S., Montana State, 1983; M.S. Wyoming, 1991; Ph.D., Oregon State, 2007.

Aruffi, 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.

Asquith, George B., Professor of Geosciences, 1988.
B.S., Texas Tech, 1961; M.S. Wisconsin-Madison, 1963; Ph.D., 1966

Assadi-Porter, Fariba., Research Associate Professor of Nutritional Sciences, 2013.
B.S. Wisconsin (Madison), 1987. M.S., Ph.D., 1994.

Atwood, Erin, Assistant Professor of Practice in Educational Psychology and Leadership, 2013.
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Knight, Thomas O., Horn Professor and Emabeth Thompson Professor of Risk Management, 2002.

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Kolosov-Wenthe, Jacqueline, Professor of English, 2000.

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- Li, Changzhi**, Associate Professor of Electrical and Computer Engineering, 2009.
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- Lin, Jingyu**, Horn Professor and Linda F. Whitacre Endowed Chair, 2008.
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- Liu, Hongchao**, Professor of Civil, Environmental and Construction Engineering, 2004.
B.S.C.E., *Hebei U. of Tech. (China)*, 1990; M.S.C.E., *Tsinghua (China)*, 1996; Ph.D., *Tokyo (Japan)*, 2000.
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- Lock, Robin H.**, Associate Dean for Graduate Education and Research, College of Education; Professor of Educational Psychology and Leadership, 1996.
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B.S., *Hons. Karachi (Pakistan)*, 1952; M.S., *D.I.C., Imperial Coll. (England)*, 1960; Ph.D., *London (England)*, 1963.
- Loewy, Arnold H.**, George R. Killam Jr. Chair of Criminal Law, 2006.
B.S., *Boston*, 1961; J.D., *Boston*, 1963; LL.M., *Harvard*, 1964.
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- Longing, Scott**, Assistant Professor of Plant and Soil Science, 2012.
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- Lopez, Frank R.**, Associate Professor of Law, 2001.
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B.A., Kyiv State Linguistics U. (Ukraine), 1988; M.S., Texas Tech, 2002.

Venhuizen, Von, Associate Professor of Art, 2002.
B.A., Central U. of Iowa, 1990; M.F.A., Indiana (Bloomington), 1996.

Verble-Pearson, Robin, Assistant Professor of Natural Resources Management, 2012.
B.S., Southern Indiana, 2006; M.S., Arkansas, 2008; Ph.D., Arkansas (Little Rock), 2012.

- Vernooij, D. Andrew**, Professor and Dean, College of Architecture, 2002.
B.S., Princeton, 1970; M.Arch., Texas, 1978; M.S.E., 1990; M.Des.S., Harvard, 1991; Reg. Arch. (Texas).
- 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.
- Villalobos, Carlos**, Associate Professor of Natural Resources Management, 1996.
B.S., Chihuahua (Mexico), 1980; M.S., 1988; Ph.D., Texas Tech, 1995.
- Volobouev, Igor**, Associate 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.
- ## W
- Wade, Darrick**, Instructor in Architecture, 2013.
B.Arch., Texas Tech, 1987; M.Arch., Texas, 2013.
- Waggoner, David K.**, Adjunct Faculty in Animal and Food Sciences, 2009.
B.S., Texas Tech, 1983; M.S., Virginia Tech, 1987; M.B.A., George Washington, 1991; J.D., Texas Tech, 1998.
- 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.
- Walker, Christine M.**, Assistant Professor of History, 2015.
B.A., Yale, 2000; M.A., Connecticut, 2007; Ph.D., Michigan, 2014.
- Walker, Gordon**, Professor, Chair of Commercial Law (La Trobe Law School); Adjunct Professor of Law (Texas Tech), 2013.
B.A., LL.B., U. of Otago (New Zealand); Dip. Ed., LL.M. Adel., M.B.A., Australia Graduate School of Management; S.J.D., Duke.
- Walker, Trenia**, Associate Professor of Curriculum and Instruction, 2009.
B.A., Houston, 1988; M.A., 1992; Ed.D., 2000.
- Wallace, Mark C.**, Chairperson and 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., California 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.
- 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**, Associate Professor of Agricultural and Applied Economics, 2007.
B.E., Northeast Univ. (China), 1996; Ph.D., Oregon State, 2007.
- Wang, Eugene**, Associate Professor of Educational Psychology and Leadership, 2005.
B.S., East Texas State, 1987; M.S., 1993; Ph.D., Texas A&M (Commerce), 1998.
- Wang, Jian**, Helen DeVitt Jones Endowed Chair in Teacher Education, Professor of Curriculum and Instruction, 2013.
B.A., Nanchang Vocational and Technical Teacher's Coll. (China), 1983; M.A., Northeast Normal (China), 1988; Ph.D., Michigan State, 1998.
- 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, John D.**, Adjunct Faculty in Plant and Soil Science, 2013.
B.S., Texas A&M, 2002; B.S., 2005; M.S., 2005; Ph.D., 2008.
- Warren-Crow, Seth E.**, Assistant Professor of Theatre and Dance, 2013.
B.A., Lawrence, 1998; M.F.A. Mills Coll., 2005.
- Wass, Kevin**, Professor of Music, 2001.
B.S., Dana Coll., 1993; M.M., Indiana, 1995; D.M.A., Michigan, 2002.
- Watkins, James C.**, Horn Professor, 1983.
B.F.A., Kansas City Art Inst., 1974; M.F.A., Indiana, 1977.
- Watson, Marshall C.**, Chairperson and Associate Professor of Petroleum Engineering, 2005.
B.S., Cornell, 1981; M.S., Texas Tech, 2005; Ph.D., 2008; Licensed 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, John L.**, Professor of Law, 2008.
B.A., Maryland, 1992; J.D., Harvard, 1996.
- Weaver, Justin E.**, Instructor in Geosciences, 2013.
B.S., Central Michigan, 1988; M.S., Texas Tech, 1992.
- Webb, Mark O.**, Chairperson and Professor of Philosophy, 1994.
B.A., Texas Tech, 1982; M.A., 1985; M.A., 1986; Ph.D., Syracuse, 1991.
- Weber, Joachim**, Interim Chairperson and Associate Professor of Chemistry and Biochemistry, 2004.
M.S., Technical U. of Hannover (Germany), 1980; Ph.D., Medical U. of Lübeck (Germany), 1990.
- Weeks, Brandon L.**, Professor of Chemical Engineering and Joint Faculty in Chemistry and Biochemistry, 2004.
B.S., California (Riverside), 1993; Ph.D., Cambridge (England), 2000.
- Weinberg, David A.**, Associate Professor of Mathematics and Statistics, 1980.
B.S., Chicago, 1974; Ph.D., Wisconsin, 1980.
- Weindorf, David**, B.L. Allen Endowed Chair of Pedology and Associate Professor of Plant and Soil Science, 2013.
B.S., Texas Tech, 1995; M.S., 1997; Ph.D., 2002.
- Weiser, Dana A.**, Assistant Professor of Human Development and Family Studies, 2013.
B.A., Claremont McKenna Coll., 2005; M.A., California State Los Angeles, 2007; Ph.D., Nevada, 2012.
- Weiss, Christopher C.**, Associate Professor of Geosciences, 2004.
B.S., Michigan, 1997; M.S., Oklahoma, 2000; Ph.D., 2004.
- Weninger, Robert A.**, J. Hadley Edgar Professor of Law, 1974.
B.B.A., Wisconsin, 1955; LL.B., 1960; LL.M., Chicago, 1964.
- Wenthe, William J.**, Professor of English, 1992.
B.A., Holy Cross, 1979; M.A., Virginia, 1985; Ph.D., 1992.
- Wesley, Nicole**, Associate Professor of Theatre and Dance, 2012.
B.F.A., Texas; M.F.A., Texas Women's, 2003.
- West, Charles P.**, Thornton Distinguished Chair in Plant and Soil Science, 2012.
B.S., Minnesota, 1974; M.S., 1978; Ph.D., Iowa State, 1981.
- West, Glenn**, Adjunct Professor of Law, 2012.
B.A., Tarleton State, 1975; J.D., Texas Tech, 1978.
- Wester, David**, Adjunct Faculty in Natural Resources Management, 2011.
B.S., Colorado State, 1976; M.S., Texas Tech, 1979; Ph.D., 1984.
- Westergaard, Carsten**, Professor of Practice of Mechanical Engineering, 2013.
M.Sc., Technical U. of Denmark, 1991; Ph.D., 1994.
- Westfall, Peter**, Horn Professor, 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, 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, Bond**, Instructor in Information Systems and Quantitative Sciences, 2010.
M.B.A., Southern Mississippi, 1977.
- 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, 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.
- White, David**, Instructor in Educational Psychology and Leadership, 1998.
B.S.E.E., Texas Tech, 1984; M.Ed., 1992; Ed.D., 1999.
- White, Dustin**, Instructor in Architecture, 2010.
B.S., Texas Tech, 2007; M.Arch., Clemson, 2009.
- 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.**, Professor of Marriage and Family Therapy, 2007.
B.S., Brigham Young, 1995; M.S., 1997; Ph.D., Michigan State, 2001.
- Whitney, Allison**, Associate Professor of English, 2009.
B.A., Toronto, 1997; M.A., McGill, 1999; Ph.D., Chicago, 2005.
- 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 Kinesiology and Sport Management, 2007.
B.S., Nebraska, 1990; M.A., Nebraska (Omaha), 1994; M.S.Ed., Toledo, 1999.
- 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 Chair in Physics, 1992.
B.S., Vrije (Netherlands), 1968; M.S., 1971; Ph.D., 1975.
- Wilde, Gene R.**, Professor of Biological Sciences, 1995.
B.S., Nevada (Las Vegas), 1978; M.S., 1984; Ph.D., Oklahoma State, 1994.
- Wilkinson, Kenton**, Professor of Journalism and Electronic Media, Regents Professor in International and Hispanic Communication, 2006.
B.A. Colorado, 1986; M.A., California (Berkeley), 1991; Ph.D., Texas, 1995.
- Willett, Julie A.**, Associate Professor of History, 1997.
A.B., Missouri (Columbia), 1989; M.A., 1992; Ph.D., 1996.
- Williams, Amanda S.**, Instructor in Educational Psychology and Leadership, 2001.
B.S., Texas Tech, 1996; M.Ed., 1998; Ed.D., 2000.
- Williams, George Brock**, Professor of Mathematics and Statistics, 2001.
B.S., Mississippi State, 1993; Ph.D., Tennessee, 1999.
- Williams, Jeffrey P.**, Professor of Anthropology, 2006.
B.A., Texas, 1980; M.A., 1984; Ph.D., 1987.
- Williams, Keira V.**, Assistant Professor of Honors, 2013.
B.A., North Carolina, 1998; M.A. Tulane, 2001; Ph.D., Georgia, 2007.
- Williams, Ryan B.**, Assistant Professor of Agricultural and Applied Economics, 2011.
B.A., Emory, 1999; M.E., North Carolina State, 2005; Ph.D., Texas Tech, 2009.
- Wilson, Gary**, Instructor in Architecture, 2010.
B.Arch., Texas Tech, 1972.
- Wilson, Greg**, Assistant Professor of English, 2014.
B.A., Emory, 1989; M.A.P.W., Carnegie Mellon, 1991; Ph.D., New Mexico State, 2001.
- Wilson, Kris**, Adjunct Faculty in Animal and Food Sciences, 2014.
M.S., Texas A&M, 2003; Ph.D., Texas Tech, 2006.

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.

Winters, Drew, Lucille and Raymond Pickering Chair in Finance, 2004.
B.S., Duke, 1982; M.B.A., Georgia, 1986; Ph.D., 1990.

Witmore, Christopher, Associate Professor of Classical and Modern Languages and Literatures, 2009.
B.A., North Carolina (Greensboro), 1996; M.A., Sheffield, 1998; Ph.D., Stanford, 2005.

Won, Moon C., Professor of Civil, Environmental and Construction Engineering, 2008.
B.S., Seoul National, 1984; M.S., Texas, 1987; Ph.D., 1989; Licensed Prof. Engr. (Texas).

Wong, Aliza S., Assistant Dean, Honors College; Associate Professor of History, 2001.
B.A., Amherst Coll., 1994; M.A., Colorado, 1997; Ph.D., 2001.

Woodward, Jason, Associate Professor of Plant and Soil Science, 2006.
B.S., Southwestern Oklahoma State, 1999; M.S., Oklahoma State, 2002; Ph.D., Georgia, 2006.

Wright, Geoffrey, Instructor in Architecture, 2013.
B.Arch., Texas, 1974; M.Arch., Texas A&M, 1976.

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.

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.

Wu, Yi-Sing, Assistant Professor of Accounting, 2015.
B.S., Trinity, 1999; M.S.A., 2000; Ph.D. South Carolina, 2008.

Wylie, Benjamin J., Assistant Professor of Chemistry and Biochemistry, 2014.
B.S., Coll. of William and Mary, 1998; Ph.D., Illinois, 2008.

X

Xie, Zhixin, Associate 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.

Yan, Weile, Assistant Professor of Civil, Environmental and Construction Engineering, 2011. B. Engr., National U. of Singapore, 2002; M.S. Singapore – MIT Alliance, 2003; Ph.D., Lehigh, 2011.

Yandell, Donnell W., Instructor, Caprock Regional Public Defender Office/Clinic, School of Law Clinical Program, 2010.
B.S. Wayland Baptist, 1998. J.D. Texas Tech, 2001.

Yang, Jingzhou (James), Associate Professor of Mechanical Engineering, 2008.
B.E., Jilin (China), 1989; M.E., 1992; Ph.D., Iowa, 2003.

Yeo, Chang-Dong, Associate Professor of Mechanical Engineering, 2009.
B.S., Yonsei U. (Korea), 1992; M.S., 1998; Ph.D., Illinois (Urbana-Champaign), 2008.

Yoo, Sang-Mi, Associate Professor of Art, 2004.
B.F.A., Seoul National (Korea), 1992; M.F.A., Ohio State, 2001.

Yoshinobu, Aaron, Professor of Geosciences, 1999.
B.S., San Diego State, 1992; M.S., 1994; Ph.D., Southern California, 1999.

Young, Alice McGaugh, Associate Vice President for Research, Professor of Pharmacology and Neuroscience and Psychological Sciences, 2004. B.S., Tennessee, 1971; Ph.D., Minnesota, 1976.

Young, Joey, Assistant Professor of Plant and Soil Science, 2013.
B.S. Mississippi State, 2006; M.S., 2009; Ph.D., Arkansas, 2013.

Yuan, Jingxue, Associate Professor of Hospitality and Retail Management, 2004.
B.S., Second Foreign Language Inst. (China), 1994; M.S., Texas Tech, 2000; Ph.D., Purdue, 2004.

Z

Zaier, Amani, Instructor in Classical and Modern Languages and Literatures, 2010.
B.A., Inst. of Languages and Literatures of Tunis (Tunisia), 2002; M.A., Texas Tech, 2006; Ph.D., 2011.

Zak, John C., Associate Dean for Research 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.

Zdenek, Sean, Associate Professor of English, 2003.
B.A., California (Berkeley), 1994; M.A., California State, 1998; Ph.D., Carnegie Mellon, 2001.

Zhang, Hong, Professor of Biological Sciences, 1995.
Sc.B., Sichuan (China), 1982; Ph.D., Michigan State, 1989.

Zhang, Hong-Chao, Interim Chairperson and E.L. Derr Professor of Industrial Engineering, 1990.
B.S., Tianjin U. of Science and Technology (China), 1976; M.S., U. of Aalborg (Denmark), 1986; Ph.D., Technical U. of Denmark, 1989; Licensed Prof. Engr. (Texas).

Zhang, Kai, Associate Professor of Biological Sciences, 2006.
B.S., Peking U. (China), 1996; Ph.D., Catholic U. of America, 2000.

Zhang, Weiwu, Associate Professor of Public Relations, 2007.
B.A., Nanjing Normal (China), 1989; M.A., Cleveland State, 1996; Ph.D., Wisconsin, 2000.

Zhang, Yuanlin, Associate Professor of Computer Science, 2004.
B.E., East-China Inst. of Tech., 1990; M.S., Nanjing (China), 1996; Ph.D., National U. of Singapore, 2003.

Zhuang, Yu, Associate Professor of Computer Science, 2001.
B.S., Zhejiang (China), 1990; M.S., Louisiana State, 1995; M.S., 1998; Ph.D., 2000.

Ziaja, Malgorzata B., Watford Associate Professor of Petroleum Engineering, 2006.
B.S., U. of Mining and Metallurgy (Poland), 1973; M.S., 1974; Ph.D., 1982.

Ziegner, Mitzi, Instructor in Human Development and Family Studies, 2001.
B.S., Texas Tech, 1995; M. Ed., Wayland Baptist, 1998.

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., Associate Professor of Architecture, 2007.
B.A., Carnegie Mellon, 1992; A.M., Brown, 1995; Ph.D., 2004.

Zuo, Delong, Associate Professor of Civil, Environmental and Construction Engineering, 2006.
B.S.C.E., Chongqing Jiaotong (China), 1996; M.S.C.E., 1999; M.C.S.E., Johns Hopkins, 2003; Ph.D., 2005.

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.

Alayyan, Sudqi, Associate Professor of Engineering Technology, Emeritus, 1978-2010.

Albin, Robert Custer, Professor of Animal and Food Sciences, Emeritus, 1964-2002.

Allen, Vivien, Horn Professor of Plant and Soil Science, Emeritus, 1995-2012.

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 Paul, Professor of Psychology, Emeritus, 1955-1986.

Anderson, Ronald M., Professor of Mathematics and Statistics and Dean of the Graduate School, Emeritus, 1965-2004.

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.

Averill, Edward Wilson, Professor of Philosophy, Emeritus, 1980-2002.

Aycock, Wendell Marshall, Professor of English, Emeritus, 1969-2014.

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.

Barr, Alwyn, Professor of History, Emeritus, 1969-2005.

Barr, Richard Fleming, Professor of Management, Emeritus, 1967-1990.

Bartsch, Richard A., Horn Professor of Chemistry and Biochemistry, Emeritus, 1974-2011.

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, 1968-2004.

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.

Blair, John, Professor of Management, Emeritus, 1981-2012.

Bogle, James, Professor of Music, Emeritus, 1976-2005.

Borrelli, John, Professor of Civil and Environmental Engineering and Dean, Graduate School, Emeritus, 1984-2007.

Borst, Walter, Professor of Physics, Emeritus, 1984-2009.

Bowlin, Oswald, Professor of Finance, Emeritus, 1968-2005.

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.
Britton, Carlton, Professor of Natural Resources Management, Emeritus, 1980-2008.
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.
Butler, Charles Edward, Associate Professor of Economics, Emeritus, 1971-1991.
Butler, Lester G., Associate Professor of Curriculum and Instruction, Emeritus, 1974-2002.

C

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.
Chao, Kwong Shu, Professor of Electrical and Computer Engineering, Emeritus, 1968-2008.
Christian, Aubry Duane, Associate Professor of Curriculum and Instruction, Emeritus, 1971-1994.
Christiansen, Peder, Professor of Classical and Modern Languages and Literatures, Emeritus, 1963-2009.
Christoffel, Frederick B., Chairperson and Professor of Theatre and Dance, Emeritus, 1989-2014.
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, 1958-1993.
Cochran, Clarke, Professor of Political Science, Emeritus, 1970-2008.
Cogan, Dennis Clark, Professor of Psychology, Emeritus, 1968-2005.
Conrad, Bryce, Associate Professor of English, Emeritus, 1990-2010.
Cornett, Joe D., Professor of Educational Psychology and Leadership, Emeritus, 1968-1997.
Couch, Sue, Professor of Family and Consumer Sciences Education, Emeritus, 1978-2011.
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.
Curry, Zane, Associate Professor of Design, Emeritus, 1987-2011.
Cutter, Paul Frederick, Professor of Music, Emeritus, 1968-2000.

D

Davenport, Monty E., Professor of Mechanical Engineering and Vice President for Operations, Emeritus, 1956-1998.
Davidson, Claude Monroe, Professor of Geography, Emeritus, 1969-1998.
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 Communication Studies, Emeritus, 1968-1989.
Denham, Mary Alice McCreary, Professor of Curriculum and Instruction, Emeritus, 1973-2000.
Dennis, Philip A., Professor of Anthropology, Emeritus, 1974-2007.
Deslippe, Richard J., Associate Professor of Biological Sciences, Emeritus, 1996-2014.
Dietz, Donald Thaddeus, Professor of Classical and Modern Languages and Literatures, Emeritus, 1978-1993.
Dixon, Kenneth, Professor of Art, Emeritus, 1977-2005.
Dixon, Kenneth R., Professor of Environmental Toxicology, Emeritus, 1997-2010.
Dometrius, Nelson Charles, Professor of Political Science, Emeritus, 1978-2013.
Dowell, C. Dwayne, Professor of Accounting, Emeritus, 1991-2008.
Downes, John Dixon, Professor of Plant and Soil Science, Emeritus, 1970-1984.
Dukes, William, Professor of Finance, Emeritus, 1968-2013.
Dunn, Jerry R., Associate Professor in Mechanical Engineering and Engineering Physics, Emeritus, 1975-2005.
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.
Edson, Gary F., Executive Director, Texas Tech Museum, and Professor of Museum Science, Emeritus, 1984-2009.
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 and Chair 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

Fehr, Dennis, Associate Professor of Art, Emeritus, 1990-2012.
Felstehausen, Virginia, Professor of Family and Consumer Sciences Education, Emeritus, 1984-2007.
Felty, Billy Weldon, Associate Professor of Architecture, Emeritus, 1958-1994.
Filgo, Dorothy Jane, Associate Professor of Educational Psychology and Leadership, Emeritus, 1960-1986.
Fischer, Judith L., Professor of Human Development and Family Studies, Emeritus, 1979-2014.
Fish, Ernest B., Professor of Natural Resources Management, Emeritus, 1973-2013.
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 G., 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.
Gilbert, Ronald D., Associate Professor of Economics, Emeritus, 1977-2014.
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 W., 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.
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, 1987-2005.
Harp, Dennis, Professor of Mass Communications, Emeritus, 1972-2008.
Harp, Shelly, Professor of Nutrition, Hospitality, and Retail Management, Emeritus, 1982-2011.
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.
Hendrick, Clyde, Horn Professor of Psychology, Emeritus, 1984-2013.
Hendrick, Susan S., Horn Professor of Psychology, Emeritus, 1984-2013.
Henry, Robert, Associate Dean, College or Visual and Performing Arts and Professor of Music, Emeritus, 1985-2014.
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.
Hopkins, Patricia, Assistant Professor of Classical and Modern Languages and Literatures, Emeritus, 1969-2007.
Hopper, Norman, Professor of Plant and Soil Science, Emeritus, 1976-2011.
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.
Hudson, Frank Alden, Professor of Animal and Food Sciences, Emeritus, 1960-1988.
Hudson, Jerry C., Dean, College of Media and Communication and Professor of Advertising, Emeritus, 1978-2013.
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, Doyle Paul, Professor of Sociology, Emeritus, 1990-2013.
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.
Kemp, Fred, Associate Professor of English, Emeritus, 1988-2012.
King, Joe, Department Chair of Economics and Professor of History, Emeritus, 1970-2009.
Kireilis, Ramon Walter, Professor of Health, Exercise, and Sport Sciences, Emeritus, 1950-1979.
Klinker, JoAnn, Associate Professor of Educational Psychology and Leadership, Emeritus, 2003-2013.
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.
Kristiansen, Magne, Horn Professor of Computer Engineering, Emeritus, 1966-2013.
Kuhnley, Lyle Carlton, Associate Professor of Biological Sciences, Emeritus, 1959-1981.
Kuriyama, Constance, Professor of English, Emeritus, 1982-2012.
Kyre, Martin Theodore Jr., Associate Professor of Political Science, Emeritus, 1963-1990.

L

Lamb, Mina Marie Wolf, Margaret W. Weeks Professor of Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1940-1975.
Leary, Colleen, Professor of Geosciences, Emeritus, 1978-2013.
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.
Long, Robert Allen, Professor of Animal and Food Sciences, Emeritus, 1976-1991.
Lowe, George, Professor of Sociology, Emeritus, 1978-2004.

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Macy, Barry, Professor of Management, Emeritus, 1980-2007.
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, Clyde F., Horn Professor of Mathematics and Statistics, Emeritus, 1983-2013.
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.
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 of Agricultural and Applied Economics, and Director, ICASALS, Emeritus, 1985-2004.
Matthews, Jerry, Associate Professor of Social Work, Emeritus, 1972-2005.
Mattson, Bruce Douglas, Professor of Educational Psychology and Leadership, Emeritus, 1965-1983.
Maynard, Judson Dana, Professor of Music, Emeritus, 1961-1992.

McClain, Meredith, Associate Professor of Classical and Modern Languages and Literatures, Emeritus, 1976-2012.
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.
McInnes, Allen, Dean of Jerry S. Rawls College of Business, Emeritus, 2001-2012.
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.
McVay, Ted, Professor of Classical and Modern Languages and Literatures, Emeritus, 1989-2005.
Mehaffie, Shamus, Professor of Educational Psychology and Leadership, Emeritus, 1971-1990.
Miller, John David, Associate Professor of Mathematics and Statistics, Emeritus, 1968-1996.
Miller, Mary Catherine, Associate Professor of History, Emeritus, 1984-2007.
Minor, Joseph, Horn Professor of Civil Engineering, Emeritus, 1969-1988.
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.
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.
Myers, Susan, Associate Professor of Curriculum and Instruction, Emeritus, 2002-2014.

N

Nagle, Levi Marshall Jr., Professor of Educational Psychology and Leadership, Emeritus, 1959-1978.
Newcomb, Benjamin Havelock, Professor of History, Emeritus, 1964-2000.

O

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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.
Oler, James W., Associate Professor of Mechanical Engineering, Emeritus, 1980-2013.
Owens, Thomas R., 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.
Pérez, Janet W., Horn Professor of Classical and Modern Languages and Literatures, Emeritus, 1977-2014.
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.
Phelan, Marilyn, Horn Professor of Law, Emeritus, 1966-2008.
Phillips, Robert L., Associate Professor of Management, Emeritus, 1986-2006.
Phillips, Sherman Alfred Jr., Associate Professor of Plant and Soil Science, Emeritus, 1982-2002.
Pigott, Ron, Professor of Engineering Technology, Emeritus, 1991-2002.
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.

Q

Queen, John William, Associate Professor of Art, Emeritus, 1960-1991.

R

- Rainger, Ronald**, Professor of History, Emeritus, 1984-2010.
Ramsey, C. Boyd, Professor in Animal and Food Sciences, Emeritus, 1968-1998.
Ramsey, Ralph, Associate Professor of Civil and Environmental Engineering, Emeritus, 1974-2011.
Randolph, Paul, Professor of Business Administration, Emeritus, 1983-2005.
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.
Reckner, James, Director, Vietnam Center, and Professor of History, 1988-2008.
Redington, Richard, Professor of Chemistry and Biochemistry, Emeritus, 1968-2005.
Reed, Nancy, Associate Professor of Classical and Modern Languages and Literatures, Emeritus, 1975-2008.
Reeves, Jimmie L., Associate Professor of Journalism and Electronic Media, Emeritus, 1995-2014.
Reid, Maryanne, Associate Professor of Educational Psychology and Leadership, Emeritus, 1963-1995.
Reynolds, Lee, Associate Professor of Engineering Technology, Emeritus, 1982-2007.
Riggs, James, Professor of Chemical Engineering, Emeritus, 1983-2008.
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.
Ronshausen, Nina Lorraine, Associate Professor of Educational Psychology and Leadership, Emeritus, 1975-1996.
Rooze, Gene Edward, Professor of Curriculum and Instruction, Emeritus, 1969-1996.
Ross, Billy Irvan, Professor of Mass Communications, Emeritus, 1970-1988.
Rouse, Robert Lyle, Professor of Economics and Business Administration, Emeritus, 1950-1985.
Rude, Carolyn, Professor of English, Emeritus, 1982-2005.
Rude, Donald, Professor of English, Emeritus, 1972-2005.
Ruymgaart, Frits, Horn Professor of Mathematics and Statistics, Emeritus, 1990-2014.
Runnels, Mary, Professor of Educational Psychology and Leadership, Emeritus, 1985-2012.

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.
Schoenecke, Michael K., Associate Professor of English, Emeritus, 1981-2013.
Shaw, Patrick Wilbert, Professor of English, Emeritus, 1972-2002.
Shine, Henry, Horn Professor of Chemistry and Biochemistry, Emeritus, 1954-2000.
Shroyer, Joann, Professor of Design, Emeritus, 1985-2011.
Shurbet, Gerald Lynn, Associate Professor of Mathematics and Statistics, Emeritus, 1956-1987.
Simpson, Doug, Professor of Curriculum and Instruction, Emeritus, 2002-2012.
Skillern, Frank, George W. McCleskey Professor of Water Law, Emeritus, 1972-2004.
Skoog, Gerald Duane, Horn Professor of Curriculum and Instruction and Dean, College of Education, Emeritus, 1969-2004.
Smith, Philip, Professor of Mathematics and Statistics, Emeritus, 1997-2014.
Smith, Roland Edgar, Professor of Political Science, Emeritus, 1968-1986.
Smith, Rosslyn, Professor of Classical and Modern Languages and Literatures, Emeritus, 1979-2007.
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.
Steinmeier, Thomas, Professor of Economics, Emeritus, 1982-2007.
Stem, Carl Herbert, Dean of Business Administration, Emeritus, 1975-1997.
Stinespring, John, Associate Professor of Art, Emeritus, 1990-2004.
Stout, Betty Lee, Associate Professor of Restaurant, Hotel, and Institutional Management, Emeritus, 1985-2013.
Strauss, Monty, Professor of Mathematics and Statistics, Emeritus, 1971-2010.
Street, Betty Ann, Associate Professor of Art, Emeritus, 1967-1995.

T

- Tanner, Donald Ray**, Professor of Music, Emeritus, 1977-2001.
Tarwater, J. Dalton, Professor of Mathematics and Statistics, Emeritus, 1968-2002.
Temkin, Bharti, Associate Professor of Computer Science, Emeritus, 1996-2010.
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.
Thornhill, Ashton, Associate Professor of Mass Communications, Emeritus, 1980-2005.
Thorvilson, Harlan, Professor of Plant and Soil Science, Emeritus, 1984-2011.
Timmons, Myra Bounds, Associate Professor of Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1961-1995.
Tock, Richard, Professor of Chemical Engineering, Emeritus, 1974-2004.
Todd, Reese, Associate Professor of Curriculum and Instruction, Emeritus, 2003-2014.
Tolley, Richard Earl, Professor of Music, Emeritus, 1959-1991.
Taylor, 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.
Tsai, Yung-mei, Professor of Sociology, Emeritus, 1973-2012.
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.
Vann, W. Pennington, Associate Professor of Civil Engineering, Emeritus, 1972-2004.
Victory, Harold Dean, Professor of Mathematics and Statistics, Emeritus, 1974-2012.
Vines, Darrell Lee, Professor of Electrical and Computer Engineering, Emeritus, 1962-2000.

W

- Wages, Jack Douglas**, Professor of English, Emeritus, 1968-1999.
Wagner, Fred Philip Jr., Associate Professor of Engineering Technology, Emeritus, 1967-1994.
Walker, Donald, Professor of History, Emeritus, 1975-2008.
Walker, Harry Stuart, Associate Professor of Economics, Emeritus, 1953-1986.
Walkup, John Frank, Horn Professor of Electrical and Computer Engineering, Emeritus, 1971-1998.
Wampler, Karen, Professor of Human Development and Family Studies, Emeritus, 1989-2007.
Wampler, Richard, Professor of Human Development and Family Studies, Emeritus, 1989-2007.
Waters, Sara, Professor in Art, Emeritus, 1977-2013.
Watts, Elizabeth, Associate Professor of Journalism, Emeritus, 1992-2011.
Webb, Holmes Andrew, Professor of Educational Psychology and Leadership, Emeritus, 1960-1970.
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.
Whitlark, James S., Professor of English, Emeritus, 1979-2014.
Wilcox, James B., Alumni Professor of Marketing, Emeritus, 1975-2014.
Wilde, Richard Edward, Professor of Chemistry and Biochemistry, Emeritus, 1963-1995.
Wilkes, Robert, United Supermarkets Professor of Marketing, Emeritus, 1976-2007.
Williams, David, Professor of Communication Studies, Emeritus, 1991-2009.
Williams, Ira Lawson, Professor of Agricultural Engineering, Emeritus, 1952-1974.
Williamson, Horace Hampton, Associate Professor of Architecture, Emeritus, 1973-1986.
Willis-Aarnio, Peggy, Professor of Theatre and Dance, Emeritus, 1972-2003.
Wilson Jane Ann, Associate Professor of Music, Emeritus, 1970-2009.
Winer, Jane, Dean of the College of Arts and Sciences and Professor of Psychology, Emeritus, 1975-2010.
Winkler, Herald Warren, Professor of Petroleum Engineering, Emeritus, 1970-1985.
Wittman, John, Professor of Economics, Emeritus, 1960-1990.
Wood, Diane Sylvia, Professor in Classical and Modern Languages and Literatures, Emeritus, 1976-2013.
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

- Zartman, Richard E.**, Chairperson and Professor of Plant and Soil Science, Emeritus, 1974-2014.
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.

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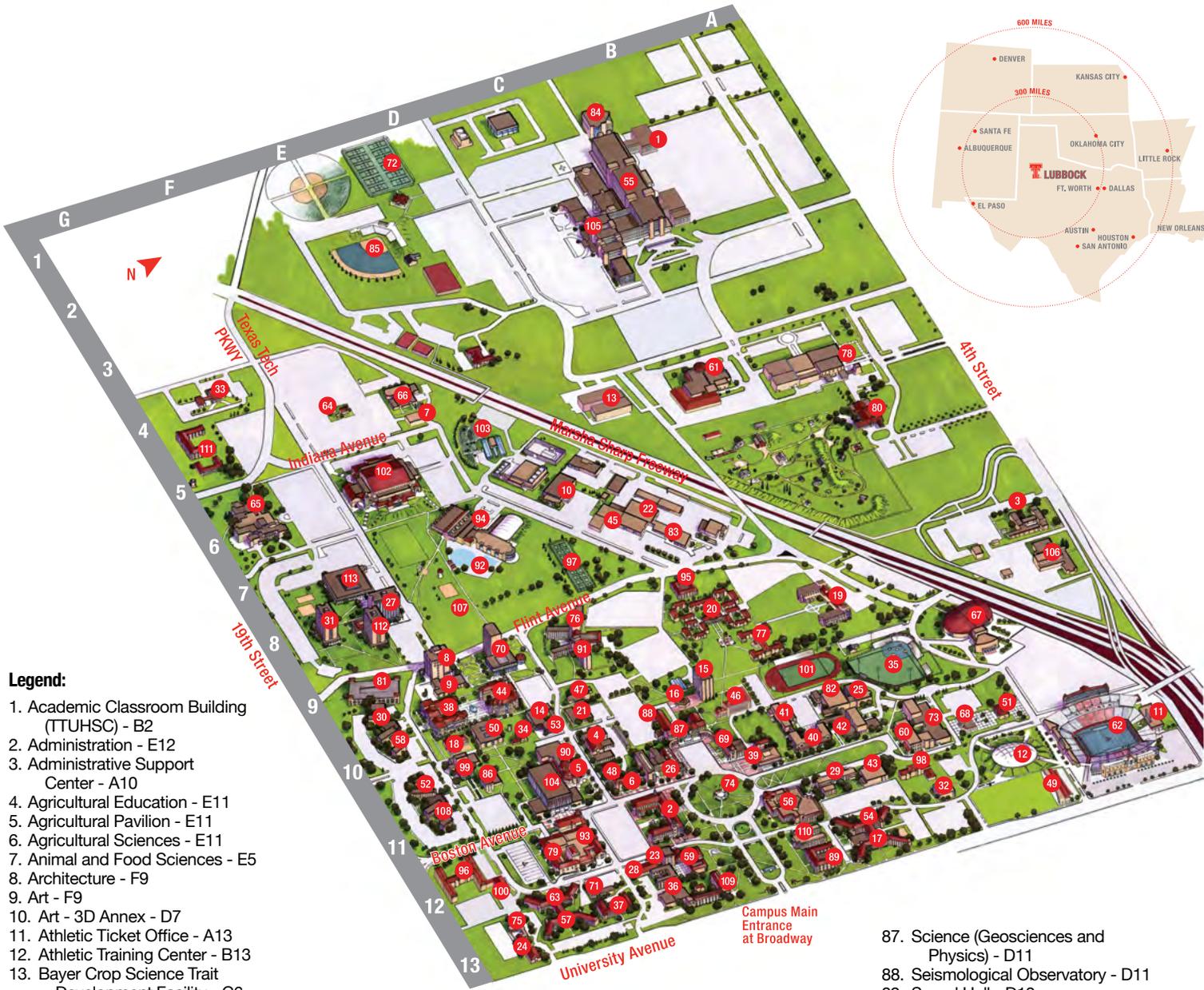
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Legend:

- 1. Academic Classroom Building (TTUHSC) - B2
- 2. Administration - E12
- 3. Administrative Support Center - A10
- 4. Agricultural Education - E11
- 5. Agricultural Pavilion - E11
- 6. Agricultural Sciences - E11
- 7. Animal and Food Sciences - E5
- 8. Architecture - F9
- 9. Art - F9
- 10. Art - 3D Annex - D7
- 11. Athletic Ticket Office - A13
- 12. Athletic Training Center - B13
- 13. Bayer Crop Science Trait Development Facility - C6
- 14. Bayer Plant Sciences - E10
- 15. Biology - D10
- 16. Biology Auditorium - D10
- 17. Bledsoe Hall - C13
- 18. Burkhardt Center for Autism - G10
- 19. Business (Rawls College of Business) - C10
- 20. Carpenter/Wells Complex - C9
- 21. CASNR Annex - E10
- 22. Central Warehouse - C8
- 23. Center for Study of Addiction and Recovery - E12
- 24. Chapel - G13
- 25. Chemical Engineering (Livermore Center) - C11
- 26. Chemistry - E11
- 27. Chitwood Hall - F8
- 28. Child Development Research Center - E12
- 29. Civil Engineering - C12
- 30. Clement Hall - G9
- 31. Coleman Hall - G8
- 32. Creative Movement Studio - C12
- 33. Credit Union - G4
- 34. Dairy Barn - F10
- 35. Dan Law Field at Rip Griffin Park - B11
- 36. Doak Hall - E13
- 37. Drane Hall - F13
- 38. Education Building - F10
- 39. Engineering and Materials Research Center - D12
- 40. Electrical Engineering - C12
- 41. Electrical Engineering (Bassett Laboratories) - C11
- 42. Engineering Center - C11
- 43. Engineering Lab - C12
- 44. English/Philosophy - E10
- 45. Exercise and Sport Sciences - D8
- 46. Experimental Sciences Research - D11
- 47. Fish and Wildlife Research - E10
- 48. Food Technology - E11
- 49. Football Training Facility - B13
- 50. Foreign Language - F10
- 51. Frazier Alumni Pavilion and Plaza - B12
- 52. Gates Hall - G10
- 53. Goddard Range, Wildlife, and Fisheries Management - E10
- 54. Gordon Hall - D13
- 55. Health Sciences Center - B3
- 56. Holden Hall - D12
- 57. Horn Hall - F13
- 58. Hulen Hall - G10
- 59. Human Sciences - E12
- 60. Industrial Engineering - C12
- 61. International Cultural Center - C6
- 62. Jones AT&T Stadium - B13
- 63. Knapp Hall - F12
- 64. KTTZ-TV/FM - F4
- 65. Law School - G6
- 66. Livestock Arena - E5
- 67. Lubbock Municipal Coliseum - B11
- 68. Marsha Sharp Center for Student Athletes - B12
- 69. Mathematics and Statistics - D11
- 70. Media and Communication - E9
- 71. McClellan Hall - F12
- 72. McLeod Tennis Center - D1
- 73. Mechanical Engineering - C12
- 74. Memorial Circle/Pfluger Fountain - D12
- 75. Merket Alumni Center - G13
- 76. Murdough Hall - E9
- 77. Murray Hall - D10
- 78. Museum of Texas Tech/Moody Planetarium - B6
- 79. Music - F12
- 80. National Ranching Heritage Center - B8
- 81. Parking Garage - G9
- 82. Petroleum Engineering - C11
- 83. Physical Plant - D9
- 84. Preston Smith Library (TTUHSC) - B2
- 85. Rocky Johnson Softball Field - E2
- 86. Psychology - F11
- 87. Science (Geosciences and Physics) - D11
- 88. Seismological Observatory - D11
- 89. Sneed Hall - D13
- 90. Southwest Collection/Special Collections Library - F11
- 91. Stangel Hall - E10
- 92. Student Leisure Pool - E7
- 93. Student Union - F12
- 94. Student Recreation Center (Robert H. Ewalt SRC) - E7
- 95. Student Wellness Center - D9
- 96. Talkington Residence Hall - G12
- 97. Tennis Courts - D8
- 98. Terry Fuller Petroleum Engineering Research - C13
- 99. Theatre (Charles E. Maedgen, Jr., Theatre) - F10
- 100. The Commons by United Supermarkets - G12
- 101. Track (Robert B. "Bob" Fuller Track) - C11
- 102. United Supermarkets Arena - F6
- 103. University Greenhouse - E6
- 104. University Library - F11
- 105. University Medical Center - C3
- 106. University Police Department - A10
- 107. Urbanovsky Park - F9
- 108. Wall Hall - G11
- 109. Weeks Hall - E13
- 110. West Hall - D13
- 111. West Village (Student Residence) - G5
- 112. Weymouth Hall - F8
- 113. Wiggins Complex - F7

