

TEXAS TECH UNIVERSITY

2004-05 CATALOG



INFINITE OPPORTUNITIES



INFINITE POSSIBILITIES

Texas Tech University
Undergraduate / Graduate

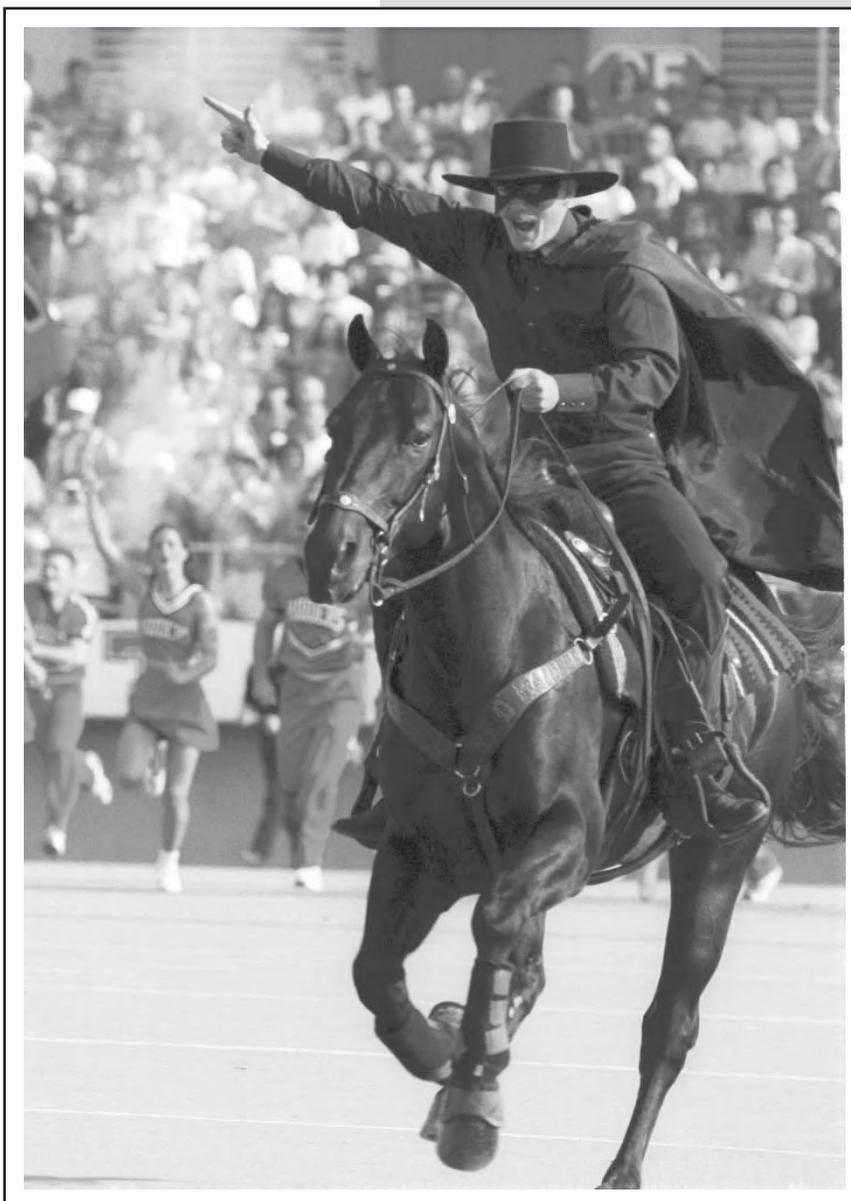
Catalog

2004 – 2005

The *Undergraduate and Graduate Catalog* provides the procedures and policies in effect at the time of printing. Although the information is subject to change, the published program requirements for students who enter Texas Tech University during the 2004-2005 academic year must be satisfied by the student for the successful completion of any program.

This catalog should be retained permanently by incoming students because future program revisions generally will not apply to students who are already enrolled. Furthermore, the course descriptions provided in this catalog may be valuable to potential employers reviewing a student's completed course work.

While every attempt has been made to ensure accuracy in reporting programs, policies, fees, and other statements within this publication, the university reserves the right to make changes at any time without notice.



Published annually by the
Office of Official Publications
Texas Tech University
Lubbock, Texas

Volume LXXXI
June 2004

Mission Statement

As a comprehensive public research university, Texas Tech University is committed to teaching and the advancement of knowledge by providing the highest standards of excellence in higher education, fostering intellectual and personal development, and stimulating meaningful research and service to humankind.

Catalog Expiration and Requirements Policies

This catalog is an official publication of Texas Tech University and contains the policies, regulations, procedures, and fees in effect as the document went to press. Published in May, each catalog goes into effect at the beginning of the fall term the academic year of issue. It expires at the end of summer session the seventh academic year after publication.

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 after initial enrollment. The university reserves the right to make changes at any time to reflect board policies, administrative regulations and procedures, state law, and fee changes.

Students should study the contents of this catalog carefully. Each student is responsible for knowing and following the academic rules, regulations, guidelines, and timelines of the university and the appropriate academic degree. Faculty, academic advisors, and staff members assist students with this responsibility.

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 online class schedules. The class schedules and the online catalog can be found at www.depts.ttu.edu/officialpublications.

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 Affairs Handbook*. Students are expected to become thoroughly familiar with and abide by these standards. The *Code of Student Conduct* and *Student Affairs Handbook* may be obtained from the Office of Student Judicial Programs, 250 West Hall, (806) 742-1714, or online at www.studentaffairs.ttu.edu or www.depts.ttu.edu/studentjudicialprograms.

Equal Opportunity Policy

Texas Tech University is open to all persons eligible for admission as students regardless of race, color, religion, sex, age, national origin, or disability. All students admitted to the university are treated without discrimination in regard to their participation in university educational programs or activities. The university is an equal opportunity employer and no applicant or employee will be discriminated against because of race, color, religion, sex, age, national origin, or disability in regard to employment or during the course of employment in the institution. The university does not discriminate on the basis of sex or disability in its educational programs. Any student with inquiries or complaints concerning Section 504 of the Rehabilitation Act of 1973 (504) or the Americans with Disabilities Act (ADA) of 1990 should contact the ACCESS TECH Office, 335 West Hall, (806) 742-3674, or the Center for Campus Life, 201 Student Union, (806) 742-2192.

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 ACCESS TECH: An Academic Accommodation and Disability Support Program.

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

Prospective and current students interested in receiving more information regarding programs for students with disabilities should contact ACCESS TECH, 335 West Hall, (806) 742-2405.

Texas Commission for the Blind

The state office of the Texas Commission for the Blind is located on the Texas Tech campus. In those instances in which the disability constitutes a substantial handicap to employment, several vocational rehabilitation programs are available to provide educational assistance for blind and visually impaired students. For detailed information concerning these programs, contact TCB counselor Sue Ann Hansford, 3rd floor, TTU Library, 806-742-2253.

Accrediting Organizations

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

Welcome

Jon Whitmore, PhD
President



All of us who are members of the Texas Tech family wish to extend to you a cordial invitation to join us on our beautiful campus in Lubbock, Texas. An exciting and rewarding educational experience awaits you.

Texas Tech has long been able to boast of its outstanding faculty, many of whom are world-renowned scholars. We take great pride in our recruiting efforts. Among our students are some of the country's highest academic achievers.

Texas Tech is a fully accredited institution with a wonderful complement of degree offerings and research initiatives. Degree programs are available at the baccalaureate, master's, doctoral, and professional levels.

If you have already chosen to attend Texas Tech to continue your education, then you are to be congratulated for your judgment and insight. If you are still considering Texas Tech, then I encourage you to look more closely at our program offerings and other information contained in this catalog. New students at Texas Tech should take time to read the policies and regulations published herein and keep the catalog as a ready reference for the future. It is designed to alert you to the common difficulties students encounter as well as introduce you to the many special services and opportunities Texas Tech offers.

The faculty, staff, students, alumni, and administration of Texas Tech share a common bond. We believe in the strength of our university community and we believe in fostering diversity and supporting access, equity, and opportunity for all members of our community. Please join our campus family at Texas Tech.

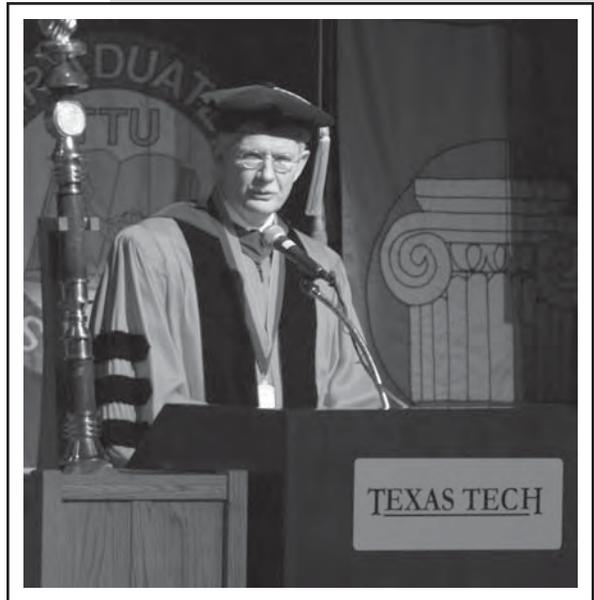


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Administration

Board of Regents

Officers

C. Robert Black, Chair
Brian C. Newby, Vice Chair
Ben W. Lock, Secretary
Lucy Lanotte, Executive Secretary

Members

Term Expires January 31, 2005

Carin Barth Houston
E.R. Brooks Granbury
Brian C. Newby Ft. Worth

Term Expires January 31, 2007

C. Robert Black Horseshoe Bay
L. Frederick Francis El Paso
Dr. Bob L. Stafford Amarillo

Term Expires January 31, 2009

J. Frank Miller, III Dallas
Windy Sitton Lubbock
F. Scott Dueser Abilene

Administrative Officers

(Date following rank indicates calendar year of initial appointment to Texas Tech.)

Office of the Chancellor

Chancellor David R. Smith, 1996.

B.A., Cornell, 1976; M.D., Cincinnati, 1980

Senior Vice Chancellor Richard

Butler, 1996. B.A., Humboldt, 1971

Senior Vice Chancellor and Chief

Financial Officer Jim Brunjes,

1991. B.A., Texas A&M, 1969;
 M.Stat., 1972

Senior Vice Chancellor Ben W. Lock,

1996. B.B.A., Texas, 1981; M.B.A.,
 1984

**Vice Chancellor for Community and
 Multicultural Affairs Cathy H.**

Allen, 1996. B.B.A., Stephen F.
 Austin State, 1981; M.Ed., 1989

**Vice Chancellor and General Coun-
 sel Pat Campbell**, 1981. B.S., Texas

Tech, 1968; J.D., 1971

Vice Chancellor for Facilities

Planning and Construction

Michael A. Ellicott, 1999. B.S.,
 Lafayette, 1968; M.S., Missouri,
 1976; Reg. Prof. Eng. (Virginia)

Vice Chancellor for Institutional

Advancement Mark Lindemood,
 2002. B.A., Albion College, 1975;
 M.Div., Methodist Theological
 School, 1980

Vice Chancellor for Policy and

Planning John Opperman, 2002.

B.A., Texas Tech, 1977; M.P.A.,
 Texas, 1982; Ph.D., 1994

Vice Chancellor for Governmental

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

Associate Vice Chancellor for

Marketing and Communications

D. Lynn Denton, 2004. B.S., Texas
 Woman's, 1977; M.A.E., Texas, 1988.

**Chief Information Officer Michael
 Phillips**, 1997. B.B.A., Baylor, 1975

Executive Secretary, Board of

Regents, Lucy Lanotte, 2000. B.A.,
 Mills College, 1966

Special Assistant to the Chancellor

Richard A. Baker, 2002. B.A., Texas,
 1999; M.P.A., Texas Tech, 2002; J.D.,
 2002

Office of the President

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

Provost William M. Marcy, Professor
 of Computer Science, 1975. B.S.,
 Texas Tech, 1964; M.S., 1966; Ph.D.,
 1972; Reg. Prof. Eng. (Texas)

**Interim Vice President for Fiscal
 Affairs Michael Wilson**, 1993.

B.A., Huston-Tillotson, 1982;
 M.P.A., Columbia, 1984

Vice President for Operations

Maximilliano Hinojosa III, 2001.
 B.S., Texas A&M, 1977; BED, 1977

Vice President for Student Affairs

Michael D. Shonrock, Associate
 Professor in Educational Psychol-
 ogy and Leadership, 1990. B.S.,
 Western Illinois, 1979; M.S., 1981;
 Ed.S., Pittsburgh State, 1987; Ph.D.,
 Kansas, 1991

Vice President for Research and

**Technology Transfer Robert M.
 Sweazy**, Professor of Civil Engi-
 neering, 1970. B.A., Wichita State,
 1962; M.S., 1966; Ph.D., Okla-
 homa, 1970; Reg. Prof. Engr. (Texas)

Official University Academic Calendar

Summer 2004

First Summer Term

May 28, Friday

Last day to make full payment of tuition and fees or make payment arrangements.

May 31, Monday

10 a.m., Residence halls open for occupancy.

June 1, Tuesday

Registration for new students. Last day to register without penalty.
First meal (breakfast) in residence halls.

June 2, Wednesday

Classes begin.

June 2-3, Wednesday-Thursday

Student-initiated drop-add on the web.

June 4, Friday

Last day for graduate degree candidates to file with the Graduate School a statement of intention to graduate.

June 7, Monday

Last day to drop a course and receive a refund. Does not apply to students who drop to 0 hours.

June 17, Thursday

Last day to declare pass-fail intentions.
Last day to drop a course and receive an automatic W.

June 18, Friday

Last day for degree candidates and faculty to order invitations and academic regalia at the bookstore.

June 29, Tuesday

Last day to drop a course, transfer between colleges, or withdraw from the university.

June 30, Wednesday

Last day for graduate degree candidates to defend theses/dissertations.

July 1, Thursday

Last day of classes.
Last day for graduate degree candidates to pay binding fee at Student Business Services.
Last day for graduate degree candidates to remove grades of I or CR and to submit final comprehensive examination and defense reports.

July 2-3, Friday-Saturday

Final examinations.
Saturday – First summer term ends.

July 4, Sunday

Students without room reservations for the second term must vacate residence hall rooms by 10 a.m.
Last meal (breakfast) in residence halls.

July 6, Tuesday

9 a.m., final grade rolls due in the Registrar's Office.

Second Summer Term

July 2, Friday

Last day to make full payment of tuition and fees or make payment arrangements.

July 5, Monday

10 a.m., residence halls open to new occupants.

July 6, Tuesday

Registration for new students. Last day to register without penalty.
Last day for graduate degree candidates to submit to the Graduate School the official version of theses and dissertations.
First meal (breakfast) in residence halls.

July 7, Wednesday

Classes begin.

July 7-8, Wednesday-Thursday

Student-initiated drop-add on the Web.

July 12, Monday

Last day to drop a course and receive a refund. Does not apply to students who drop to 0 hours.

July 22, Thursday

Last day to declare pass-fail intentions.
Last day to drop a course and receive an automatic W.

August 2, Monday

Last day to drop a course, transfer between colleges, or withdraw from the university.

August 4, Wednesday

Last day of classes.
Last day for graduate degree candidates to submit to the Graduate School final corrected copies of theses and dissertations.

August 5-6, Thursday-Friday

Final examinations for second term.
Friday – Second summer term ends.

August 7, Saturday

Commencement.
Last meal (breakfast) in residence halls.
10 a.m., Residence halls close.

August 9, Monday

9 a.m., Final grade rolls due in Registrar's Office.

Fall 2004

August 22, Sunday

10 a.m., residence halls open for occupancy.

August 23, Monday

Faculty on duty.
Last day to make full payment of tuition and fees or make payment arrangements.

August 26-27, Thursday-Friday

Registration for new students.
Thursday – First meal (breakfast) served in residence halls.
Friday – Last day to register without penalty.

August 30, Monday

Classes begin.

September 6, Monday

Labor Day. University holiday

August 30–September 2, Tuesday-Thursday

Student-initiated drop-add on the Web.

September 10, Friday

Last day for graduate degree candidates to file with the Graduate School a statement of intention to graduate.

September 15, Wednesday

Last day to drop a course and receive a refund. Does not apply to students who drop to 0 hours.

September 27, Monday

Last day to withdraw from the university and receive a partial refund.

October 6, Wednesday

Last day for graduate degree candidates to pay a binding fee at Student Business Services.

October 11, Monday

Last day to declare pass-fail intentions. Last day to drop a course and receive an automatic W.

October 25, Monday

5 p.m., midsemester grade rolls due in the Registrar's Office. Last day for degree candidates and faculty to order invitations and academic regalia at the bookstore.

November 2, Tuesday

Last day for graduate degree candidates to defend theses/dissertations.

November 3, Wednesday

Last day for graduate degree candidates to submit to the Graduate School final defense reports.

November 8, Monday

Last day for graduate degree candidates to remove grades of I or CR and for master's candidates to submit final comprehensive examination reports. Last day for graduate degree candidates to submit to the Graduate School the official version of theses and dissertations.

November 8-23

Spring semester advance registration for currently enrolled students.

November 24-28, Wednesday-Sunday

Thanksgiving holiday. No meals served in residence halls.

November 29, Monday

Classes resume. Open registration begins.

December 2-8, Thursday-Wednesday

Period of no examinations except for makeup exams or scheduled lab exams.

December 3, Friday

Last day to drop a course, transfer between colleges, or withdraw from the university.

Last day for undergraduate degree candidates to remove grades of I and PR and to complete final examinations in correspondence courses.

December 8, Wednesday

Last day of classes.

December 9, Thursday

Individual study day.

December 10-15, Friday-Saturday and Monday-Wednesday

Final examinations.

December 15, Wednesday

Last day for graduate degree candidates to submit to the Graduate School the final corrected copies of theses and dissertations. Fall semester ends.

December 16, Thursday

Last meal (breakfast) in residence halls. 10 a.m., residence halls close. Degree candidates may occupy rooms until 10 a.m. Saturday, December 18. Noon, grade rolls for graduating students due in the Registrar's Office.

December 18, Saturday

Commencement. Degree candidates may occupy rooms until 10 a.m.

December 20, Monday

Noon, final grade rolls due in the Registrar's Office.

Spring 2005**January 7, Friday**

Last day to make full payment of tuition and fees or arrange payment.

January 9, Sunday

10 a.m., residence halls open.

January 10, Monday

Faculty on duty.

January 11, Tuesday

Registration for new students. Last day to register without penalty. First meal (breakfast) in residence halls.

January 12, Wednesday

Classes begin.

January 12-18, Wednesday-Tuesday

Student-initiated drop-add on the Web.

January 17, Monday

Martin Luther King Jr. Day. Holiday.

January 28, Friday

Last day to drop a course and receive a refund. Does not apply to students who drop to 0 hours. Last day for graduate degree candidates to file with the Graduate School a statement of intention to graduate.

February 9, Wednesday

Last day to withdraw from the university and receive a partial refund.

February 21, Monday

Last day for graduate degree candidates to pay binding fee at Student Business Services.

February 23, Wednesday

Last day to declare pass-fail intentions. Last day to drop a course and receive an automatic W.

March 9, Wednesday

5 p.m., midsemester grade rolls due in the Registrar's Office. Last day for degree candidates and faculty to order invitations and academic regalia at the bookstore.

March 11, Friday

Last meal (dinner) served in residence halls until after spring vacation.

March 12, Saturday

Noon, classes dismissed for spring vacation.

March 21, Monday

Classes resume. First meal (breakfast) in residence halls.

March 28, Monday.

No classes.

March 31, Thursday

Last day for graduate degree candidates to defend theses/dissertations.

April 4-19

Summer and fall semester advanced registration for currently enrolled students.

April 1, Friday

Last day for graduate degree candidates to submit to the Graduate School final defense reports.

April 6, Wednesday

Last day for graduate degree candidates to remove grades of I or CR and for master's candidates to submit final comprehensive examination reports.

Last day for graduate degree candidates to submit to the Graduate School the official version of theses and dissertations.

April 20, Tuesday

Open registration begins.

April 27-May 3, Wednesday-Tuesday

Period of no examinations except for makeup exams or scheduled lab exams.

April 29, Friday

Last day to drop a course, transfer between colleges, or withdraw from the university.

Last day for undergraduate degree candidates to remove grades of I and PR and to complete final examinations in correspondence courses.

May 3, Tuesday

Last day of classes.

May 4, Wednesday

Individual study day.

May 5-10, Thursday-Saturday and Monday-Tuesday

Final examinations.

Tuesday – Spring semester ends.

May 11, Wednesday

Last day for graduate degree candidates to submit to the Graduate School the final corrected copies of theses and dissertations.

Last meal (breakfast) in residence halls.

Residence halls close at 10 a.m. Degree candidates may occupy rooms until 10 a.m. Saturday, May 14.

Noon, grade rolls for graduating students due in the Registrar's Office.

May 14, Saturday

Commencement.

Degree candidates may occupy rooms until 10 a.m.

May 16, Monday

Noon, final grades due in the Registrar's Office.

Summer 2005**Intersession at Junction****May 11-26**

Classes held at Junction Center campus for Intersession.

First Summer Term**May 27, Friday**

Last day to make full payment of tuition and fees or make payment arrangements.

May 30, Monday

Noon, Residence halls open for occupancy.

May 31, Tuesday

Registration for new students. Last day to register without penalty.

First meal (breakfast) in residence halls.

June 1, Wednesday

Classes begin.

June 1-2, Wednesday-Thursday

Student-initiated drop-add on the web.

June 3, Friday

Last day for graduate degree candidates to file with the Graduate School a statement of intention to graduate.

June 6, Monday

Last day to drop a course and receive a refund. Does not apply to students who drop to 0 hours.

June 16, Thursday

Last day to declare pass-fail intentions.

Last day to drop a course and receive an automatic W.

June 17, Friday

Last day for degree candidates and faculty to order invitations and academic regalia at the bookstore.

June 28, Tuesday

Last day to drop a course, transfer between colleges, or withdraw from the university.

June 30, Thursday

Last day of classes

Last day for graduate degree candidates to defend theses/dissertations.

July 1-2, Friday-Saturday

Final Examinations.

Friday – Last day for graduate degree candidates to pay binding fee at Student Business Services.

Friday – Last day for graduate degree candidates to remove grades of I or CR and to submit final comprehensive examination and defense reports.

Saturday -- First summer term ends.

July 3, Sunday

Students without room reservations for the second term must vacate residence hall rooms by 10 a.m.

Last meal (breakfast) in residence halls.

July 6, Wednesday

9 a.m., final grade rolls due in the Registrar's Office.

Second Summer Term**July 1, Friday**

Last day to make full payment of tuition and fees or make payment arrangements.

July 4, Monday

10 a.m., residence halls open to new occupants.

July 5, Tuesday

Registration for new students. Last day to register without penalty.

Last day for graduate degree candidates to submit to the Graduate School the official version of theses and dissertations.

First meal (breakfast) in residence halls.

July 6, Wednesday

Classes begin.

July 6-7, Wednesday-Thursday

Student-initiated drop-add on the Web.

July 11, Monday

Last day to drop a course and receive a refund. Does not apply to students who drop to 0 hours.

July 21, Thursday

Last day to declare pass-fail intentions.

Last day to drop a course and receive an automatic W.

August 1, Monday

Last day to drop a course, transfer between colleges, or withdraw from the university.

August 3, Wednesday

Last day of classes.

Last day for graduate degree candidates to submit to the Graduate School final corrected copies of theses and dissertations.

August 4-5, Thursday-Friday

Final examinations for second term.

Friday -- Second summer term ends.

August 6, Saturday

Commencement.

Last meal (breakfast) in residence halls. 10 a.m., Residence halls close.

August 8, Monday

9 a.m., Final grade rolls due in Registrar's Office.

Reader's Guide to Catalog

Definitions

The academic terms defined below are used throughout the catalog.

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

Competency. A specific skill in a specific area.

Core Curriculum. The curriculum in the liberal arts; humanities; sciences; and political, social, and cultural history that all undergraduates are required to complete before receiving an academic undergraduate degree.

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

Course. A subject or an instructional subdivision of 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.

Curriculum. An organized program of study arranged to provide integrated cultural or professional education.

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

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

Grade Point Average (GPA). The *current* GPA is determined by dividing the total number of grade points acquired during that semester by the total number of semester hours taken that 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.

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

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

Minor. A secondary undergraduate or graduate field of specialized study.

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.

Option. A subarea of specialized study within an undergraduate or graduate major or minor.

Preparatory programs. Undergraduate courses of study taken in preparation for professional or graduate degrees.

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.

Semester. One-half of the academic year.

Semester hour. Unit of measure for credit purposes. One semester credit hour means a student is expected to spend about two hours in preparation for each hour of lecture or recitation per week.

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.

Sequence. Two or more closely related courses that must be taken in specified order.

Subject prefix. An abbreviation used with a course number to indicate an academic subject area. Subject prefixes are listed on the next page.

Texas Common Course Numbering System (TCCNS). A course numbering system for lower-division courses that assigns common course numbers to facilitate transferring courses among institutions of higher education by promoting consistency in course designation and identification. See page 20.

To waive. To set aside without credit certain requirements for a degree or major.

How to Read Course Descriptions

Texas Tech offers nearly 4,500 courses as part of its curriculum. These courses are listed alphabetically by subject prefix (see 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 the courses listed in this catalog are offered every year. An online class schedule published before each registration period indicates courses that will be available that term or semester and when each class will meet. The

university reserves the right to cancel any scheduled course or withdraw any program from the list of offerings when the best interests of the institution require such action.

Courses are designated by a subject prefix and number along with a descriptive title.

Example: GEOG 2351

2351. Regional Geography of the World (3:3:0) [GEOG 1303]. Prerequisite: GEOL 1300. An introduction to the geography of world regions. F, S

First digit in course number – Indicates the academic level of the course. The course in the above example is a sophomore-level course. First digits of 1, 2, 3, or 4 indicate that the course is primarily designed for the freshman, sophomore, junior, or senior year, respectively. A number of 5 or above designates a graduate-level course. Graduate standing is a prerequisite for enrollment in all courses numbered in the 5000 series or above and are intended only for graduate students (except for seniors who are within 12 hours of graduation and whose enrollment has been authorized by the Graduate Dean). Although graduate students occasionally enroll in undergraduate courses to fill out deficiencies in their preparation for graduate work, course work credited toward a graduate degree must, except in rare instances, be of graduate level (5000 series or above).

Second digit in course number – Indicates the semester-hour credit of the course. This course example will earn the student 3 semester hours of credit.

Last two digits of course number – The distinguishing numbers of the course. Thus, GEOG 2351 is a sophomore-level course carrying 3 semester hours of credit. Developmental courses begin with "0" (e.g., MATH 0301).

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

Numbers in brackets – Identify this course as part of the Texas Common Course Numbering System that facilitates transfer between Texas colleges and universities (see page 20).

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

Prerequisites – Some courses have specific prerequisites that must be met before the student can enroll.

Subject Prefixes

The following index may be helpful in interpreting the subject prefixes used in the curriculum sections of this catalog.

AAEC	Agricultural and Applied Economics	EDLD	Educational Leadership	LAW	Law
ACCT	Accounting	EDLL	Language Literacy Education	LIBR	Library Research
ACOM	Agricultural Communications	EDSE	Secondary Education	LING	Linguistics
ADM	Apparel Design and Manufacturing	EDSP	Special Education	LPMD	Land-Use Planning, Management, and Design
ADPR	Advertising and Public Relations	EET	Electrical-Electronics Engineering Technology	ME	Mechanical Engineering
ADV	Advertising	EM&C	Electronic Media and Communications	MATH	Mathematics
AERS	Aerospace Studies	ENGL	English	MBIO	Microbiology
AGED	Agricultural Education	ENGR	Engineering	MCOM	Mass Communications
AGSC	Agricultural Science	ENTX	Environmental Toxicology	MFT	Marriage and Family Therapy
AGSM	Agricultural Systems Management	ENVE	Environmental Engineering	MGT	Management
AHAT	Athletic Training	EPCE	Counselor Education	MILS	Military Science
AHCD	Audiology	EPSY	Educational Psychology	MKT	Marketing
AHCD	Speech-Language Pathology	ESL	English as a Second Language	MSE	Manufacturing and Systems Engineering
AHMP	Molecular Pathology	ESS	Exercise and Sports Science	MTEC	Mechanical Engineering Technology
AHOT	Occupational Therapy	F A	Fine Arts	MUAL	Music Student Teaching – All-Levels
AHPA	Physician Assistant	F&N	Food and Nutrition	MUAP	Music, Applied
AHPT	Physical Therapy	FCSE	Family and Consumer Sciences Education	MUCP	Music Composition
AHRS	Rehabilitation Sciences	FD T	Food Technology	MUED	Music Education
AHVR	Rehabilitation Counseling	FIN	Finance	MUEN	Music Ensemble
ANSC	Animal Science	FREN	French	MUHL	Music History and Literature
ANTH	Anthropology	G CH	Geochemistry	MUMT	Music Technology
ARCH	Architecture	G PH	Geophysics	MUSE	Music Student Teaching – Secondary
ART	Art	G ST	General Studies	MUSI	Music
ASTR	Astronomy	GANM	Cell and Molecular Biology	MUSM	Museum Science
ATMO	Atmospheric Science	GBCH	Biochemistry	MUTH	Music Theory
B A	Business Administration	GBTC	Biotechnology	NHH	Natural History and Humanities
BINF	Biological Informatics	GEOG	Geography	NURS	Nursing
BIOL	Biology	GEOL	Geology	P R	Public Relations
BLAW	Business Law	GERM	German	PETR	Petroleum Engineering
BOT	Botany	GHSR	Health Services Research	PF&W	Personal Fitness and Wellness
BTEC	Biological Technology	GIDN	Neuroscience	PFP	Personal Financial Planning
C E	Civil Engineering	GIHC	Health Communications	PHIL	Philosophy
C LT	Comparative Literature	GIHM	Health Organization Management	PHOT	Photography
C S	Computer Science	GIPM	Preventive Medicine	PHYS	Physics
CEED	Consumer Economics and Environmental Design	GMB	Microbiology	POLS	Political Science
CH E	Chemical Engineering	GPHM	Pharmacology	PORT	Portuguese
CHEM	Chemistry	GPHY	Physiology	PRAG	Pragmatism
CHIN	Chinese	GPSC	Pharmaceutical Sciences	PSS	Plant and Soil Science
CLAS	Classics	GRK	Greek	PSY	Psychology
CMLL	Classical and Modern Languages and Literatures	GSBS	Graduate School of Biomedical Sciences	PUAD	Public Administration
COIN	Cooperative Internship	GTEC	General Engineering Technology	RHIM	Restaurant, Hotel, and Institutional Management
COMS	Communication Studies	HDFS	Human Development and Family Studies	RTL	Retailing
CTEC	Construction Technology	HIST	History	RUSN	Russian
DAN	Dance	HLTH	Health	RWFM	Range, Wildlife, and Fisheries Management
E E	Electrical Engineering	HMGT	Heritage Management	S E	Systems Engineering
E GR	Engineering Graphics	HONS	Honors	S W	Social Work
ECO	Economics	HUM	Humanities	SLAV	Slavistics
EDBL	Bilingual Education	HUSC	Human Sciences	SOC	Sociology
EDCI	Educational Curriculum and Instruction	I B	International Business	SPAN	Spanish
EDEC	Early Childhood Education	I D	Interior Design	STAT	Statistics
EDEL	Elementary Education	I E	Industrial Engineering	TELE	Telecommunications
EDHE	Higher Education	I S	Interdisciplinary Studies	TH A	Theatre Arts
EDIT	Educational Instructional Technology	ISQS	Information Systems and Quantitative Sciences	TOX	Toxicology
		ITAL	Italian	VIET	Vietnamese
		JAPN	Japanese	VPA	Visual and Performing Arts
		JOUR	Journalism	W S	Women's Studies
		LAIS	Latin American and Iberian Studies	XL	Strategies for Learning
		LARC	Landscape Architecture	ZOOL	Zoology
		LAT	Latin		

About the University

Campuses

Nearly 29,000 students attend classes in Lubbock on the 1,839-acre university campus. The Texas Tech University Health Sciences Center functions as a separate institution that includes the School of Medicine, School of Nursing, School of Allied Health, Graduate School of Biomedical Sciences, and the School of Pharmacy. The university also operates the Research Center–East Campus (Lubbock); Texas Tech University Farm at Pantex (agricultural research farm of about 16,000 acres in the Texas Panhandle); research facilities at Reese Center; agricultural field laboratories at New Deal; satellite medical facilities in Amarillo, El Paso, and Midland-Odessa; Texas Tech University Center at Junction (411-acre educational facility in the Texas Hill Country); and off-campus educational sites at Amarillo, Abilene, Highland Lakes, and Fredericksburg.

Location

With a population of more than 200,000, Lubbock is located in the heart of the vast Southern Plains of West Texas and Eastern New Mexico. It is a major medical center for the entire area within a 300-mile radius of Lubbock and a major regional center for business and industry. The climate is excellent, with over 3,550 hours of sunshine every year. Winters are dry and moderate (average annual rainfall is 18 inches) while the summer heat is tempered by very little humidity. An average annual temperature of 60 degrees coupled with the average noon humidity of 46 percent combine to make Lubbock comfortable year round. The city lies 320 miles west of Dallas and 320 miles southeast of Albuquerque. Several airlines and an interstate bus line serve the city, as well as an interstate highway and three additional U.S. highways.

History

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

Originally named Texas Technological College, the college opened in the fall of 1925 with six buildings and an enrollment of 910. Graduate instruction did not begin until the fall of 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 the fall of 1998, and the College of Visual and Performing Arts opened in the fall of 2002. Mass Communications became a college in 2004.

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

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

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

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

Financial Support

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

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

Organizational Structure

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

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

Facilities and Services

National Ranching Heritage Center

The National Ranching Heritage Center is a 16-acre museum and historical park of 36 ranch structures that have been moved to the site from locations throughout the state. The structures—a bunk house, one-room school house, half-dugout, train depot, blacksmith shop, barns, windmills, and more—date from the late 1780s to the early 1930s and have been authentically restored. They illustrate the development of the ranching industry in the Southwest. Dedicated on July 4, 1976, the NRHC hosts Ranch Day each fall and Candlelight at the Ranch in December. Community and student volunteers who comprise the Ranch Hosts organization help with these events and others at the National Ranching Heritage Center, which is open to the public free of charge from 10 a.m. to 5 p.m. Monday through Friday and 1 to 5 p.m. Sunday.

Museum of Texas Tech

The Museum of Texas Tech University is located on the campus at Fourth Street and Indiana. Its mission is to collect, preserve, interpret, and disseminate knowledge about natural and cultural material from Texas, the Southwest, and other regions related by natural history, heritage, and climate.

The building, completed in 1970, contains over 206,000 square feet of galleries, research facilities, classrooms, work areas, and storage space. The museum complex includes the main museum building, Moody Planetarium, Natural Science Research Laboratory, Diamond M Fine Art Gallery, Helen DeVitt Jones Auditorium and Sculpture Court, Lubbock Lake Landmark facilities, and a 92-acre natural science and archaeological site in Val Verde County. A 40-foot mural, created in India ink by Peter Rogers, dominates the lobby. Exhibits include permanent and temporary displays drawn from the museum's own collections and traveling exhibits.

The Moody Planetarium, an 78-seat auditorium with a Spitz 1024 and a laser projector, has daily programs for the public. These programs are at 3:30 p.m. Tuesday through Friday, 7:30 p.m. Thursday evening, and 2 p.m. and 3:30 p.m. Saturday and Sunday.

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

Although the chief source of funding for the museum staff and facilities is legislative appropriation, additional support for programs and exhibitions comes from the Museum of Texas Tech University Association and granting agencies. Membership in the support association is open to all persons interested in the



Museum of Texas Tech

Museum. The education division of the museum conducts tours and programs throughout the year, including curriculum-based tours for public schools, public workshops and lectures, special events, and opening activities for major exhibitions. Volunteers from the community and Texas Tech are always needed and welcome.

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

Landmark Arts Galleries

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

The galleries of Landmark Arts are Landmark Gallery, Studio Gallery, Folio, South Gallery, SRO-Photo, and Sculpture Alternative. The Landmark Gallery exhibits contemporary art by professional artists. Typically, exhibitions will feature residencies by artists with national and international reputations. The gallery hosts programs that engage campus and Lubbock community participation.

Folio Gallery is an intimate venue that displays prints, photographs, and drawings by visiting

professional artists. The Studio Gallery and South Gallery offer student-driven exhibitions such as the capstone exhibitions of the M.F.A., B.F.A., and Art Teachers Certificate programs, the annual undergraduate juried competition, as well as work by alumni.

SRO-Photo Gallery presents the viewer with wide-ranging exhibitions of fine art photography by professional artists. Sculpture Alternative functions as an experimental art laboratory for projects in sculpture and electronic media. Exhibitions are experimental installations produced by students and visiting artists.

The galleries are open from 10 a.m. to 5 p.m. weekdays and 10 a.m. to 5 p.m. on Saturday.

Lubbock Lake Landmark

The Lubbock Lake Landmark, a renowned archaeological and natural history preserve, contains a complete cultural record from the Clovis Period (12,000 years ago) through historic times, making Lubbock one of the oldest communities in the world. The Landmark is a unit of the Museum of Texas Tech University and offers tours, outreach, and programs related to the on-going archaeological and natural history research at the preserve. Community and student volunteers assist in much of the research conducted and educational programming offered at the site. The Landmark is closed on Monday but open from 9 a.m. to 5 p.m. Tuesday through Saturday and 1 to 5 p.m. Sunday.

Libraries

The latest technology is integrated into library search and retrieval systems to strengthen both undergraduate and graduate programs. In addition to providing on and off-campus access to many full-text, bibliographic, and electronic journals and databases covering a range of subjects, the library Web site (<http://library.ttu.edu/ul/>) offers information about library services and provides access not only to library catalogs of libraries on campus, including the Health Sciences Center library, Vietnam Archive, and Southwest Collection, but also catalogs of research libraries worldwide.

The 2.3 million volumes in the collection provide rich and timely support for the humanities, social sciences, and science-technology programs of the university. Nearly 2.2 million microforms hold images of many specialized collections such as Western Americana, Wright's American Fiction, and Early American Imprints. Periodicals and other serial formats total over 30,000 titles, including those in electronic format. In addition, the University Library is a Patent and Trademark depository and is one of two regional depositories for U.S. government documents in Texas.

The document delivery service can obtain books and journal articles not owned by the Texas Tech libraries, with the exception of rare books, reference materials, textbooks, and some dissertations from other libraries. Public services are located on most floors of the University Library, and librarians and trained staff provide a supportive environment for students, including a 1-credit hour course on how to do effective library research. The course covers a wide range of information literacy strategies such as using abstracts, indexes, encyclopedias, and other library research tools to find books and articles in journals, newspapers, and magazines for a research paper or class project.

TexShare reciprocal borrowing agreements allow Texas Tech students to use libraries at other Texas public colleges and universities, as well as some private institutions. The University Library is open more than 100 hours a week during each semester and provides extended hours during final exam periods.

Archive of Turkish Oral Narrative

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

For additional information concerning the Archive, please contact the Southwest Collection/Special Collections Library at 742-3749.

Southwest Collection

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

The Southwest Collection is the regional repository for historical information pertaining to West Texas and the Southwest. It has collected and makes available for research more than 1,700 collections of personal papers and more than 4,000 hours of oral history interviews, noncurrent business and institutional records, as well as a noncirculating library of Texana, Western Americana, maps, periodicals, photographs, newspapers, taped interviews, films, videotapes, and microfilm.

The Southwest Collection also houses one of the nation's most important collections on the Literature of Place—the James Sowell Family Collection in Literature, Community, and the Natural World.

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

International Textile Center

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

ITC occupies 110,000 square feet of space allowing the center to perform research, testing, and evaluation from raw fibers through the finished textile products. ITC facilities include a classroom, conference room and library, Materials Evaluation Laboratory, Short Staple Spinning Laboratory, Long Staple Spinning Laboratory, Weaving and Knitting Laboratory, Nonwoven Laboratory, Chemical Finishing Laboratory, Chemical Processing Laboratory, Chemical Properties Laboratory, and Fabric Care Laboratory.

The ITC is an integral part of the university's academic programs. It is used by the colleges of Engineering, Agricultural Sciences and Natural Resources, and Human Sciences for advanced degree programs and special problems courses as well as for augmenting course curricula. In addition, scholars from throughout the world conduct post-graduate research at the center.

More than 4,000 persons visit the ITC annually. Activities include the Texas International

Cotton School, which is sponsored twice a year by the Lubbock Cotton Exchange. Companies, organizations, and associations can schedule short courses, conferences, and seminars at the facilities, and special tours may be arranged by appointment.

Office of Community, Multicultural Affairs

The mission of the Office of Community and Multicultural Affairs, a division of the Texas Tech University System, is to promote and foster an inclusive climate that values and respects students, faculty and staff, and the communities that they serve.

Short and long-range plans include collaborating and partnering with the institutions in creating a campus climate that values diversity; partnering with and/or assisting the university to recruit and retain diverse students, faculty, and staff across all levels and areas; assisting the institutions in promoting a user-friendly campus in which all campus citizens—students as well as employees—feel welcome and appreciated; assisting with student support activities that facilitate an environment of success; promoting and enhancing community involvement whereby students, faculty, and staff are encouraged to participate in community activities; and providing training or professional development opportunities that assist personnel, students, and local communities in understanding their own and other cultures.

Contact information: Office of Community and Multicultural Affairs, (806) 742-8671.

Office of International Affairs

The Office of International Affairs is composed of the following units:

- International Student and Scholar Services
- Internationally Sponsored Student Programs and Alumni Development
- K-12 International Education Outreach
- International Cultural Center Operations
- Study Abroad
- International Center for Arid and Semiarid Land Studies
- Administrative support services

The Office of International Affairs (OIA) advocates and facilitates initiatives that bring an international dimension to the university's roles in teaching, research, and outreach. OIA, working with and through the colleges, coordinates international activities at Texas Tech.

International Student and Scholar Services (ISSS) operates the university's foreign student and exchange visitor immigration programs and provides employment-based immigration services to the university. ISSS assists with the university's compliance programs for nonresident tax and employment authorization. Counselors advise and assist international students and scholars concerning immigration rules, financial responsibilities, and cross-cultural issues. The office also facilitates cross-cultural programming and other extracurricular activities with campus and community-based organizations to enhance mutual understanding.

Internationally Sponsored Student Programs and Alumni Development has two priorities: (1) customize services to sponsoring agencies and students and (2) establish alumni-abroad chapters and regional contacts to keep alumni outside the United States involved in the programs of the university. Services to sponsors include special program design, student placement, monitoring academic studies, developing customized billing procedures, and providing periodic progress reports. An administrative fee of \$250 per semester and \$125 per summer term enrolled is charged for sponsored international students.

The K-12 International Education Outreach, funded through the university with support of external organizations, provides an outreach program of an international dimension for K-12 students.

The International Cultural Center houses all units of the Office of International Affairs, including an international film library with more than 2,400 theatrical films and documentaries. The library also offers language dictionaries, atlases, CD-ROMs, 22 networked computers, and the CNN World Report Television Archive. In addition to offering attractive facilities for all types of meeting, conferences, and special events, the center hosts changing art exhibits and periodic lectures. The center represents the commitment of Texas Tech to internationalization.

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

The International Center for Arid and Semiarid Land Studies (ICASALS) was created in 1966 to promote the university's special mission—the interdisciplinary study of arid and semiarid environments and the human relationships and problems of those areas, which encompass about one-third of the earth's land surface.

The purpose of ICASALS is to stimulate, coordinate, and implement teaching, research, and public service activities related to all aspects of the world's arid and semiarid areas. In regions where low productivity and low rainfall significantly affect the inhabitants and economies, ICASALS brings together the sciences, technologies, humanities, and arts. ICASALS serves as a contracting unit of the university for international sustainable development programs.

A special emphasis on arid and semiarid environments is available in the interdisciplinary doctoral program in Land-Use Planning, Management, and Design. Students also may take a master's degree in interdisciplinary studies of arid lands.

Approximately 85 Texas Tech faculty have been designated "ICASALS Associates" and provide a broad base of expertise for the numerous and varied functions of the center. ICASALS disseminates information about arid lands research and development and publishes a newsletter with international readership. In addition to supporting and facilitating publications resulting from symposia, research, and professional meetings, ICASALS operates an

international data exchange and coordinates research and consultations for international scholars, government officials, and students coming to Texas Tech for scholarly purposes.

Computing Services

The Information Technology (IT) Division (www.infotech.ttu.edu) provides a wide range of computing resources, services, and support for students, faculty, and staff. Some of the key services are student labs; free short courses; Web hosting; personal Web pages; e-mail; dial-up (RAS) access; Help Desk; desktop support; videoconference facilities; and server hosting, administration, and consulting. The most recent addition to these services is the student portal "RaiderLink" available at www.raiderlink.ttu.edu. Most online services will be accessible via the use of an eRaider account provided by the IT Division.

Technology Support (www.itts.ttu.edu) provides quality user services and operates the Advanced Technology Learning Center (ATLC) in the west basement of the Texas Tech Library. The 25,000-square-foot ATLC facility provides leading-edge computing technology to the university community. The Technology Support staff provides such services as free short courses, Web hosting, consulting, documentation, and computing labs at the ATLC and several remote locations.

IT Help Desk (www.helpdesk.ttu.edu) is an excellent service that provides students, faculty, and staff with a friendly "front line" to meet their technology support needs. It is the primary point of contact for those needing assistance regarding a technology issue. Help Desk services are structured to escalate questions, problems, and concerns from the user community to the proper IT staff member and track the incident until it is resolved. The 742-HELP phone number is easy to remember.

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

Technology Operations and Systems Management (www.tosm.ttu.edu) staff members are available to answer these questions: Do you have server administration, management, or support? Are you confident the data on your server is being backed up properly? Do you have questions about distributed mainframe print? TOSM also hosts the IBM 9672-R26 mainframe system supporting administrative, instructional, and research activities and offers such services as general purpose computation, optical scanning, and large-scale laser printing.

High Performance Computing Center (www.hpcc.ttu.edu) houses an SGI/Cray Origin 2000 supercomputer containing 56 R12000 processors with 56GB of common memory in a single-image system. The supercomputer has .8TB RAID storage with

8.8TB of robotic tape storage. These engines can drive a 3 Megapixel display, which provides an immersive experience. A 32-node Beowulf cluster based on dial IA32 architecture is available. Two smaller clusters are also available. TechGrid, a grid of over 300 CPUs is also ready for use. Faculty and researchers are welcome to take advantage of these services.

Communication Services (www.itcs.ttu.edu) assists in the following areas. Need a new telephone (office or cellular), additional telephone line, or voice mail? Is your telephone not working? Do you need a telephone number for someone on campus? Contact Communications Services at 742-2000.

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

Information Systems (www.depts.ttu.edu/itis/ismain.htm) develops and supports legacy and intranet systems for Texas Tech University and Texas Tech University Health Sciences Center. Major systems supported by Information Systems are student information, human resources, payroll, accounting, and budget.

High Tech Computer Store

The campus computer store is located in the west basement of the Student Union. High Tech offers hardware, software, and peripherals at educational prices and is open to all students, faculty, and staff of Texas Tech and the Health Sciences Center. High Tech houses a factory authorized service department as well as professional staff to assist in selecting computers and software. Microsoft Campus Agreement software is now available. Student software starts at \$5. Faculty and staff software starts at \$10. Some restrictions apply. High Tech is open from 8 a.m. to 5:30 p.m. weekdays. Summer and semester break hours are 8 a.m. to 5 p.m. weekdays.

Contact information: hightech.sales@sub.ttu.edu, www.hightech.sub.ttu.edu

Texas Tech University Theatre

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

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

Radio and TV Stations

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

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

KTXT-TV. A noncommercial educational television station, KTXT-TV (Channel 5/Digital 39) is licensed by the Federal Communications Commission (FCC) to the university's Board of

Regents and operates as a division within the Office of the Provost. The broadcast operation has a multi-terminal telecommunications receive-only earth station.

Channel 5/Digital 39's office, studio, production, master-control, transmitters and engineering facilities, and 817-foot antenna-tower are located on the southwestern campus triangle west of Indiana Avenue. From this location the station broadcasts approximately 115 hours of diverse programming each week. The signal coverage zone encompasses Lubbock and the surrounding area within a 60-mile radius for Channel 5 and a 75-mile radius for Channel 39, serving a population of approximately 380,000.

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

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

Celebrating its 40th broadcasting year in 2002, KTXT-TV continued its FCC-required transition to a digital broadcasting signal, complet-

ing Phase 1 in 2003. When all phases are completed, KTXT-TV will consider a 24-hour seven days a week broadcast schedule and many new educational options, including a high-definition broadcast picture, multicasting of several dedicated-content channels, broadcasting of instructional interactive programming, and datacasting of media-rich educational materials for university and community entities.

Athletic Facilities, NCAA Programs

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

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

Women athletes compete in intercollegiate volleyball, soccer, cross country, basketball, golf, tennis, softball, and track and field. The women's program has grown rapidly since



United Spirit Arena

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 SBC 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. The recent renovation added a new west side building, complete with 47 luxury suites, a club level, and press and camera levels.

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

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

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

During inclement weather, Texas Tech athletes can practice in the spacious Athletic Training Center, located just south of Jones 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.

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 Speech–Language and Hearing Clinic Office at 743-5678.

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. These laboratories provide varied opportunities for university students to acquire information and skills regarding the development and guidance of young children.

The CDRC research components include investigations of child behavior and family interactions as well as generation of innovative strategies for promoting human development and family studies across the life span.

The CDRC also operates an Early Head Start Center in the Parkway Cherry Point neighbor-

hood. The center serves low-income children from birth to three years of age and also serves as a lab site for university students.

Enrollment at either center is open to children of any race, creed, or nationality. Applications should be made through the Child Development Research Center Office, 742-3016.

Texas Tech Police Department

This branch of the university system operations is supervised by the Chief Financial Officer. The department provides police and security services for the entire Texas Tech community, an area much larger and more populated than many towns in Texas. In addition, the police department handles campus traffic and parking problems when the Traffic and Parking Services Office is closed.

Texas Tech University Farm at Pantex

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

Psychology Clinic

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

Admission to the University

Undergraduate Admission

Office of Admissions
Texas Tech University
Box 45005
Lubbock, TX 79409-5005
(806) 742-1480
FAX (806) 742-0062
www.admissions.ttu.edu
Email: admissions@ttu.edu

Graduate School Admission

Graduate Admissions
Texas Tech University
Box 41030
Lubbock, TX 79409-1030
(806) 742-2787
www.gradschool.ttu.edu
Email: gradschool@ttu.edu

Undergraduate Admission

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

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

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

Admission Requirements

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

First-Time Freshman Admission

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

1. File a freshman application and pay an application fee of \$50. The fee may be paid by check, money order, or one of the following credit cards: Visa, MasterCard, American Express, or Discover. If payment of the fee creates financial hardship, please submit verification or documentation of need for a fee waiver along with your application and supporting documents for admission. Applications will not be complete without either the application fee or fee waiver documentation. No waiver of the international application fee is available.

2. Have an official high school transcript showing class rank sent directly to the Office of Admissions. Senior courses in progress must be provided on the transcript, a grade report, or listed on the State of Texas Common Application form. A final official high school transcript showing graduation date will be required following graduation and will become part of the student's permanent record. A student with a GED must submit their official GED scores as well as a partial high school transcript.

3. Have college entrance test scores, either the SAT or the ACT, sent from the testing agency at the time the test is taken.

The Office of Admissions recommends that applications be filed by February 1 for summer or fall admission and November 1 for spring admission. Final dates for completing the application are June 1 for fall and December 1 for spring. Falsification or omission of application information will void admission to Texas Tech University.

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

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

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

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

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

Assured Admission

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

High School Class Rank

Minimum Test Scores for Assured Admission

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

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

Admission Review

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

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

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

Graduate Admission

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

Gateway Program

Freshman applicants who have been denied admission for the summer or fall 2004 semester are eligible to participate in the Gateway Program. For details about this program, visit www.southplainscollege.edu/gateway.

Transfer Admission

Undergraduate students who have attended another accredited college **beyond high school graduation** may be accepted for admission to Texas Tech provided they meet certain requirements.

The Office of Admissions recommends that applications be on file by March 1 for summer or fall admission and November 1 for spring admission. Completed applications must be on file by June 1 for fall admission and December 1 for spring admission. Falsification or omission of application information will void admission to Texas Tech University. Applicants must complete the following:

1. File a transfer application and pay an application fee of \$50. The State of Texas Common Application is available at www.applytexas.org.
2. Provide official transcript(s) of their *entire* academic record from *all* institutions in which they have been or are currently enrolled. Admission will be determined by transferable work only. (Official transcripts on paper must be sent by the sending institution in a sealed envelope. The transcript will not be considered official if the student has had access to the actual transcript.) Applicants must be eligible to return to the institution most recently attended.
3. Provide a final high school transcript indicating date of graduation for use in advisement and placement.

Transfer applicants may be admitted in one of the following ways:

1. Complete 12 to 23 semester hours of transferable college work beyond high school graduation at another institution and have a cumulative 2.5 GPA.
2. Complete 24 or more semester hours of transferable college work beyond high school graduation at another institution and have a cumulative 2.25 GPA.
3. If transferring with fewer than 12 hours, students 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.
4. Transfer applicants with 45 or more transferable hours must choose a major.

The university reserves the right to modify its admission requirements to manage enrollment in high demand areas. Transfer students choosing the College of Business Administration must have a cumulative 2.75 GPA; College of Architecture, cumulative 3.0 GPA; and Interior Design, cumulative 3.0 GPA. These requirements are subject to change.

Admission Review. Students who do not meet assured admission requirements but have at least a 2.0 transferable GPA will be reviewed.

The student's major, types of courses taken, and pattern of progress, as well as high school records and standardized test scores may be considered in the admissions process.

Transfer of Credit From Other Colleges and Universities

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

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

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

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

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

The following guidelines apply to the transfer of college credit:

- Original copies of official college transcripts will be reviewed and course work 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 neces-

sarily be accepted by Texas Tech.

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

Texas Common Course Numbering System

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

For information on how your credit will transfer, visit www.reg.ttu.edu. The following lower division courses have been evaluated by academic departments and determined to be the equivalent of the Texas Tech courses listed.

TCCNS TTU Equivalent

ACCT 2301	ACCT 2300
ACCT 2302	ACCT 2301
AGRI 1307	PSS 1321
AGRI 1309	AGSC 2300
AGRI 1329	FD T 2300
AGRI 1407	PSS 1321
AGRI 1413	PSS 2401
AGRI 1415	PSS 1411
AGRI 1419	ANSC 1401
AGRI 2317	AAEC 2305
AGRI 2322	ANSC 2301
AGRI 2322	RWFM 2301
ANTH 2301	ANTH 2300
ANTH 2302	ANTH 2301
ANTH 2351	ANTH 2302
ARTS 1301	ART 1309
ARTS 1303	ART 1310
ARTS 1304	ART 2311
ARTS 1311	ART 1302
ARTS 1312	ART 2303
ARTS 1316	ART 1303
ARTS 1317	ART 2304
BCIS 1301	C S 1300
BCIS 1405	ISQS 2340
BIOL 1322	F&N 1325
BIOL 1406	BIOL 1403
BIOL 1407	BIOL 1404
BIOL 1411	BIOL 1401
BIOL 1413	BIOL 1402
BIOL 2106	BIOL 1113
BIOL 2306	BIOL 1305
BIOL 2401	ZOOL 2403
BIOL 2402	ZOOL 2404
BIOL 2406	BIOL 1305 + 1113
BUSI 1301	I S 1300
BUSI 1307	FIN 1307
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

TCCNS TTU Equivalent

CHEM 1419	CHEM 2303 + 2103
CHIN 1411	CHIN 1401
CHIN 1412	CHIN1402
CHIN 2311	CHIN 2301
CHIN 2312	CHIN 2302
COMM 1307	MCOM 1300
COMM 1318	PHOT 2310
COMM 2311	JOUR 2310
COMM 2327	ADV 2310
COSC 1301	C S 1300
COSC 1315	C S 1405
COSC 1319	C S 2350
COSC 1320	C S 1412
COSC 1334	C S 2350
COSC 1401	ISQS 2340
COSC 1415	C S 1405
COSC 1419	C S 2350
COSC 1420	C S 1405
COSC 1430	C S 1405
COSC 1434	C S 2350
COSC 2325	C S 2350
COSC 2425	C S 2350
DANC 1145	DAN 1204
DANC 1146	DAN 1204
DANC 1147	DAN 1103
DANC 1148	DAN 1103
DANC 1245	DAN 1204
DANC 1246	DAN 1204
DANC 1247	DAN 1103
DANC 1248	DAN 1103
DANC 1341	DAN 1304
DANC 1342	DAN 1304
DANC 1345	DAN 1204
DANC 1346	DAN 1204
DANC 1347	DAN 1103
DANC 1348	DAN 1103
DANC 2145	DAN 1204
DANC 2146	DAN 1204
DANC 2147	DAN 1103
DANC 2148	DAN 1103
DANC 2245	DAN 1204
DANC 2246	DAN 1204
DANC 2247	DAN 1103
DANC 2248	DAN 1103
DANC 2301	DAN 2100
DANC 2341	DAN 1304
DANC 2342	DAN 1304
DANC 2345	DAN 1204
DANC 2346	DAN 1204
DANC 2347	DAN 1103
DANC 2348	DAN 1103
DRAM 1120	TH A 1101
DRAM 1121	TH A 1102
DRAM 1141	TH A 2101
DRAM 1220	TH A 1101
DRAM 1241	TH A 2101
DRAM 1310	TH A 2303
DRAM 1322	TH A 1302
DRAM 1341	TH A 2101
DRAM 1351	TH A 2301
DRAM 1352	TH A 2312
DRAM 2336	TH A 1301
DRAM 2366	TH A 2304
DRAM 2367	TH A 2304
ECON 2301	ECO 2302
ECON 2302	ECO 2301
ENGL 1301	ENGL 1301
ENGL 1302	ENGL 1302
ENGL 2307	ENGL 2351
ENGL 2308	ENGL 2351
ENGL 2311	ENGL 2311
ENGR 1305	E GR 1306
ENGR 1307	CTEC 2301
ENGR 1407	CTEC 2301
ENGR 2301	C E 2301
FREN 1411	FREN 1501

TCCNS TTU Equivalent

FREN 1412	FREN 1502
FREN 2311	FREN 2301
FREN 2312	FREN 2302
GEOG 1301	GEOG 1401
GEOG 1303	GEOG 2351
GERM 1411	GERM 1501
GERM 1412	GERM 1502
GERM 2311	GERM 2301
GERM 2312	GERM 2302
GOVT 2301	POLS 1301
GOVT 2302	POLS 2302
GOVT 2305	POLS 1301
GOVT 2306	POLS 2302
GREE 1311	GRK 1301
GREE 1312	GRK 1302
GREE 2311	GRK 2301
GREE 2312	GRK 2302
HECO 1315	F&N 2310
HECO 1320	ADM 2311
HECO 1322	F&N 1325
HECO 1325	I D 1380
HECO 1326	I D 1380
HECO 1328	ADM 1303
HECO 1329	ADM 1304
HIST 1301	HIST 2300
HIST 1302	HIST 2301
HIST 2311	HIST 1300
HIST 2312	HIST 1301
HIST 2321	HIST 2322
HIST 2322	HIST 2323
HIST 2380	HIST 1325
HORT 1401	PSS 1411
ITAL 1411	ITAL 1301
ITAL 1412	ITAL 1302
ITAL 2311	ITAL 2301
ITAL 2312	ITAL 2302
JAPN 1411	JAPN 1501
JAPN 1412	JAPN 1502
JAPN 2311	JAPN 2301
JAPN 2312	JAPN 2302
LATI 1411	LAT 1501
LATI 1412	LAT 1502
LATI 2311	LAT 2301
LATI 2312	LAT 2302
MATH 1314	MATH 1320
MATH 1316	MATH 1321
MATH 1324	MATH 1330
MATH 1325	MATH 1331
MATH 1332	MATH 1300
MATH 1342	MATH 2300
MATH 1348	MATH 1350
MATH 1350	MATH 2370
MATH 1414	MATH 1420
MATH 1425	MATH 1331
MATH 1442	MATH 2300
MATH 2312	MATH 1350
MATH 2313	MATH 1351
MATH 2314	MATH 1352
MATH 2315	MATH 2350
MATH 2318	MATH 2360
MATH 2342	MATH 2300
MATH 2412	MATH 1350
MATH 2413	MATH 1351
MATH 2414	MATH 1352
MATH 2415	MATH 2350
MATH 2417	MATH 1351
MATH 2418	MATH 2360
MATH 2419	MATH 1352
MATH 2442	MATH 2300
MATH 2513	MATH 1351
MATH 2517	MATH 1352
MATH 2519	MATH 2350
MUSI 1114	MUAP 1123
MUSI 1115	MUAP 1124
MUSI 1116	MUTH 1103
MUSI 1117	MUTH 1104

TCCNS	TTU Equivalent
MUSI 1181	MUAP 1123
MUSI 1182	MUAP 1124
MUSI 1183	MUAP 1113
MUSI 1184	MUAP 1114
MUSI 1188	MUAP 1103
MUSI 1189	MUAP 2103
MUSI 1192	MUAP 2133
MUSI 1193	MUAP 2134
MUSI 1216	MUTH 1103
MUSI 1217	MUTH 1104
MUSI 1286	MUCP 1201
MUSI 1287	MUCP 1202
MUSI 1301	MUTH 1301
MUSI 1303	MUTH 1300
MUSI 1304	MUSI 2301
MUSI 1306	MUHL 1308
MUSI 1307	MUHL 1308
MUSI 1308	MUHL 2308
MUSI 1309	MUHL 2309
MUSI 1311	MUTH 1303
MUSI 1312	MUTH 1304
MUSI 1316	MUTH 1103
MUSI 1317	MUTH 1104
MUSI 1386	MUCP 2301
MUSI 2114	MUAP 2123
MUSI 2115	MUAP 2124
MUSI 2116	MUTH 2103
MUSI 2117	MUTH 2104
MUSI 2181	MUAP 2123
MUSI 2182	MUAP 2124
MUSI 2188	MUAP 1104
MUSI 2189	MUAP 2104
MUSI 2216	MUTH 2103
MUSI 2217	MUTH 2104
MUSI 2311	MUTH 2303
MUSI 2312	MUTH 2304
MUSI 2386	MUCP 2302
PHED 1151	PF&W 1141
PHED 1152	PF&W 1141
PHED 1153	PF&W 1140
PHED 1164	ESS 1301
PHED 1238	ESS 1301
PHED 1251	PF&W 1141
PHED 1252	PF&W 1141
PHED 1301	ESS 1301
PHED 1304	HLTH 1300
PHED 2155	PF&W 2142
PHIL 1301	PHIL 2300
PHIL 1304	PHIL 2350
PHIL 2303	PHIL 1310
PHIL 2306	PHIL 2320
PHYS 1101	PHYS 1103
PHYS 1102	PHYS 1104
PHYS 1105	PHYS 1101
PHYS 1310	PHYS 1304
PHYS 1401	PHYS 1403
PHYS 1402	PHYS 1404
PHYS 1410	PHYS 1401
PHYS 1411	ASTR 1400
PHYS 1412	ASTR 1401
PHYS 2425	PHYS 1408
PHYS 2426	PHYS 2401
PHYS 2427	PHYS 2402
PORT 1411	PORT 1501
PORT 1412	PORT 1502
PORT 2311	PORT 2301
PORT 2312	PORT 2302
PSYC 2301	PSY 1300
PSYC 2307	PSY 2305
PSYC 2308	PSY 2301
PSYC 2309	PSY 2301
PSYC 2310	PSY 2301
PSYC 2311	HDFS 2303
PSYC 2312	HDFS 2305
PSYC 2313	PSY 2305
PSYC 2314	HDFS 2303

TCCNS	TTU Equivalent
RUSN 1411	RUSN 1501
RUSN 1412	RUSN 1502
RUSS 2311	RUSN 2301
RUSS 2312	RUSN 2302
SGNL 1401	CMLL 1301
SGNL 1402	CMLL 1302
SGNL 2301	CMLL 2301
SGNL 2302	CMLL 2302
SOCI 1301	SOC 1301
SOCI 1306	SOC 1320
SOCI 2301	HDFS 2322
SOCI 2301	SOC 2331
SOCI 2306	HLTH 1305
SOCW 2361	S W 2301
SPAN 1305	SPAN 1507
SPAN 1411	SPAN 1501
SPAN 1412	SPAN 1502
SPAN 2311	SPAN 2301
SPAN 2312	SPAN 2302
SPCH 1311	COMS 1300
SPCH 1315	COMS 2300
SPCH 1318	COMS 1301
TECA 1311	HDFS 2311
TECA 1354	HDFS 2305

Transfer Disputes for Lower-Division Courses

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

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

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

If a receiving institution has cause to believe that a course being presented by a student for transfer from another school is not of an ac-

ceptable 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.

Concurrent Attendance at TTU, Other Institutions

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

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

Completing Core Requirements at Another Texas Public 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)

Educational Experience 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.

International Student Admission Requirements

International students may apply for admission to Texas Tech electronically at www.applytexas.org or by requesting an application from the Office of Admissions. With the official application, international applicants must furnish original documents or official certified copies indicat-

ing the nature and scope of their educational program and meet admission requirements stated in the catalog.

Applicants with foreign academic credentials must provide academic records in the original language with certified English translation. Applicants who have attended school outside the United States need to provide official results of secondary external examinations on examination board letterhead, (such as GCE "Ordinary" level exams); certificates of completion of a state secondary school examination; and official transcripts from any university-level studies already completed in the United States or elsewhere. Failure to provide complete information regarding post-secondary level study could result in cancellation of admission. Entering freshman students who have completed secondary school in the United States must also take and submit scores from the SAT or ACT.

Students whose native language is not English must also present a score of at least 550 (paper exam) or 213 (computer exam) on the Test of English as a Foreign Language (TOEFL). The TOEFL requirement may be waived if the student has attended a U.S. high school or a college for at least two years or if the student is a citizen of a country where English is the native language. Countries Texas Tech University considers to have English as the native language include Australia, Canada (except the Province of Quebec), Commonwealth Caribbean Countries (Anguilla, Antigua, the Bahamas, Barbados, Belize, British Virgin Islands, Bermuda, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent, Trinidad and Tobago, and Turks and Caicos Islands), Ireland, Liberia, New Zealand, United Kingdom (England, Northern Ireland, Scotland, Wales), and the United States.

Information concerning the TOEFL may be obtained from the Educational Testing Service, P.O. Box 899, Princeton, New Jersey 08540, U.S.A. or online at www.toefl.org. Further testing will be given once the student arrives on campus to verify competency. Students lacking adequate English proficiency will be required to enroll in basic English courses.

International students not living in the United States are encouraged to apply a year in advance and must verify their ability to support themselves financially (a required minimum of \$22,625 for the academic year in addition to travel money is necessary; this is subject to change if tuition, fees, or room and board charges are modified). The tuition rate for international students is \$338 per semester credit hour during summer 2004 and \$382 per semester credit hour beginning fall 2004. An administrative fee of at least \$250 per semester and \$125 per summer term also will be charged for certain sponsored international students.

A nonrefundable processing fee is required for all applicants. Those applying for either undergraduate or graduate programs will not be considered unless their applications are accompanied by an International Money Order in the

amount of \$60 (U.S.), or U.S. Postal Money Order for applicants in the U.S., payable to Texas Tech University. Completed applications must be on file by May 1.

Permanent residents need to refer to first-time freshman or transfer admission requirements.

HB 1403 provides Texas residence status for Texas high school students who meet the following criteria:

- Attend a Texas high school for 3 consecutive years and graduate or receive a GED.
- Not enrolled, including concurrent enrollment, in an institution of higher education before the fall semester of 2001.
- Live with parent, legal guardian, or conservator during part of the 3-year period.
- Sign an affidavit stating that you meet the above qualifications and will apply for U.S. permanent residency upon first availability to do so.

Students who are eligible to apply under HB 1403 need to refer to first-time freshman or transfer admission requirements.

Admission of Former Texas Tech Students

Former Texas Tech students applying for readmission to the university must do so at www.depts.ttu.edu/formertech. Students returning in good academic standing to the university must complete the former Tech student application at least 60 days prior to open registration. Students returning from probation, first suspension, second or additional suspension must complete the application at least 60 days prior to open registration for the semester the student plans to attend. Official transcripts from all institutions attended subsequent to Texas Tech enrollment must be submitted. For admission criteria refer to the "Scholastic Probation and Suspension" policy listed in the Undergraduate Academics section of this catalog.

Academic Fresh Start

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

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

Texas Success Initiative

The Texas Success Initiative (TSI) has replaced the Texas Academic Skills Program (TASP). Under the Texas Success Initiative, any student who is not exempt is required to take one of the following tests to assess basic skills in the areas of reading, writing, and mathematics: THEA (formerly the TASP test), Accuplacer, Compass, or Asset. Students may be exempt if they have high ACT, SAT, or TAAS test scores or have earned an associate's or baccalaureate degree (www.reg.ttu.edu gives other exemptions). THEA test registration booklets are available in the TSI Compliance Office, 116 West Hall. Students who have tested but not attained the minimum scores on all three sections of the test are required to obtain TSI advising before registration and enroll continuously in formal skills development. Contact the TSI Compliance Office at (806) 742-1183, ext. 248, if you have any question about your status with respect to the Texas Success Initiative.

New Student Orientation

New Student Orientation serves as an introduction to Texas Tech University and is held in June, July, August, and January for incoming freshmen and transfer students. New freshmen and transfer students are required to attend a new student orientation conference. Students will have the opportunity to meet with their academic advisor, register for classes, reserve parking and books, and meet current and future Red Raiders. Students and parents will also have the chance to experience campus life by staying in a residence hall during orientation. For information, call (806) 742-0048 or visit www.admissions.ttu.edu/nso.

Special Programs

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

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

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

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

Undergraduate Credit by Examination

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

Students may achieve a high level of proficiency in certain subject areas through advanced work in high school, participation in advanced placement programs, or independent study. The university strongly encourages such superior attainment, recognizes it for academic purposes, and permits students who have done such work to obtain course credit through examination. A grade of Credit (CR) will be given on the examination to those earning credit, but the grade will not be considered in determining grade point averages. Course credit earned by examination is recorded by the Registrar on the student's transcript as "(Number) hours of credit via credit by examination program in (course equivalent)," and no grade points are awarded. Course credit by examination may not be used to satisfy the 30-hour minimum residence credit requirement for graduation. Any current or former Texas Tech student (or prospective student) may attempt to earn credit by examination for any undergraduate course that CLEP offers provided the student has neither passed nor failed that course at Texas Tech. 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 242 West Hall, (806) 742-3671. Like the SAT and ACT scores, CLEP scores have been recentered nationally. Scaled scores for the computer-based CLEP are different from the old paper and pencil version but the level of competency remains the same.
2. The student is responsible for having test scores sent to the Registrar's Office unless tests are taken at Texas Tech University. Score reports sent from other university test centers must be requested from Academic Testing Services, 242 West Hall. The student is responsible for completing tests for lower

level courses in sufficient time to qualify for registering for higher level courses.

3. After the 12th day of classes, credit by examination may be attempted for a course one is enrolled in only upon written approval of the appropriate academic dean's office.
4. In cooperation with and in compliance with federal nondiscrimination laws and policies, credit by examination is open to all persons. Students with mostly A and B grades who have higher admission test scores are encouraged to consider attempting credit by examination.
5. College Level Examination Program (CLEP) tests **cannot** be repeated before six months have passed.
6. Accommodations for nonstandard testing must be submitted in writing (before the test date) and supported by documentation from a professional who is licensed and certified to diagnose the disability. All requests are subject to approval and must be scheduled with Academic Testing Services, 242 West Hall, (806) 742-3671.

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

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

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

1. Credit for SAT II Subject Exams. Achievement Tests are part of the College Board Admissions Testing Program. Each year there are several national administrations of the SAT II Subject Exams. Students should plan to take the specified tests at national testing centers during their senior year of high school at an early testing date in order that scores may be reported to the university by June. For more information, view www.collegeboard.com; visit your high school counselor; or contact Academic Testing Services, Texas Tech University, Box 45002, Lubbock, Texas 79409-5002, (806) 742-3671.

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

3. Credit for College Level Examination Program (CLEP) Examinations. Under the College Level Examination Program, the university will award credit for only the specified examinations. 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. These examinations are offered on the Texas Tech campus during the new student orientation conferences held each summer as well as several times each month to students currently enrolled.

NOTE: Scores accepted for credit vary among universities. Students are responsible for knowing what scores are accepted at Texas Tech.

Further information concerning the CLEP tests may be obtained from your high school counselor or principal; www.collegeboard.com; or Academic Testing Services, Texas Tech University, Box 45002, Lubbock, TX 79409-5002, (806) 742-3671.

4. Credit for an International Baccalaureate (IB) Examination. The International Baccalaureate is an international program of courses and examinations offered at the high school level. Texas Tech welcomes students in the IB program and will grant 3 to 12 credit hours depending on the subject and score obtained on IB exams. Students must send an IB examination transcript to Texas Tech to receive credit.

5. Credit by Departmental Examination. Any current or former Texas Tech student (or prospective student) may attempt to earn credit by examination for any undergraduate course provided the student has neither passed nor failed that course at Texas Tech. Several departments within the university prepare, administer, score, and award credit for their own examinations. Credit for specific courses is given upon satisfactory performance of the comprehensive examinations that are administered by the departments responsible for the courses and recommended by the deans of the respective colleges. In order 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.

TTU Courses for which credit can be earned	Standardized Test(s) Used	Min. Score	Sem. Hrs.	TTU Courses for which credit can be earned	Standardized Test(s) Used	Min. Score	Sem. Hrs.
Art				FREN 3302, 3304*			
ART 1310	AP: Art History	4	3	IB: French A1 or A2 Standard or Higher Level	6, 7	6	
ART 1311	AP: Art History	4	3	FREN 3304*			
ART 1320	AP: Art General	4	3	IB: French A1 or A2 Standard or Higher Level	4, 5	3	
ART 1324	AP: Art Drawing	4	3	Geography			
Biology				GEOG 2351	IB: Geography Standard or Higher Level	5, 6, 7	3
Gen. Biol. Credit	IB: Biology Standard Level	4, 5, 6, 7	4	German			
BIOL 1401, 1402	AP: Biology	3	8	GERM 1501	CLEP-S: German Language	50	5
BIOL 1403, 1404	AP: Biology	5	8	GERM 1501, 1502	CLEP-S: German Language	55	10
BIOL 1403, 1404	IB: Biology Higher Level	5, 6, 7	8	GERM 1501, 1502, 2301	CLEP-S: German Language	59	13
BIOL 1401, 1402	CLEP-S: Biology	52	8	GERM 1501, 1502, 2301, 2302	CLEP-S: German Language	63	16
Business Administration				GERM 1501, 1502	AP: German	2	10
ACCT 2300, 2301	CLEP-S: Principles of Accounting	50	6	GERM 1501, 1502, 2301	AP: German	3	13
MGT 3370	CLEP-S: Principles of Mgmt.	52	3	GERM 1501, 1502, 2301, 2302	AP: German	4	16
MKT 3350	CLEP-S: Principles of Marketing	55	3	GERM 1507	IB: German B Standard or Higher Level	3	5
BLAW 3391	CLEP-S: Intro. Business Law	51	3	GERM 2301, 2302	IB: German B Standard or Higher Level	4	6
Chemistry				GERM 2301, 2302, 3303	IB: German B Standard or Higher Level	5	9
CHEM 1301	IB: Chemistry Standard Level	4, 5, 6, 7	3	GERM 2301, 2302, 3303, 3304	IB: German B Standard or Higher Level	6, 7	12
CHEM 1305, 1306 & 1105, 1106	AP: Chemistry	3	8	GERM 3303*	IB: German A1 or A2 Standard or Higher Level	4, 5	3
CHEM 1305, 1306 & 1105, 1106	CLEP-S: General Chemistry	52	8	GERM 3303, 3304*	IB: German A1 or A2 Standard or Higher Level	6, 7	6
CHEM 1307, 1308 & 1107, 1108	AP: Chemistry	4	8	History			
CHEM 1307, 1308 & 1107, 1108	CLEP-S: General Chemistry	65	8	Gen. History Credit	IB: History Higher Level: History of the Americas	5	3
CHEM 1307, 1308 & 1107, 1108	IB: Chemistry Higher Level	5, 6, 7	8	Gen. History Credit	IB: History Higher Level: History of the Americas	6, 7	6
Computer Science				HIST 1300	IB: History Higher Level: European	5	3
C S 1300	CLEP-S: Info. Systems and Computer Applications	55	3	HIST 1301	IB: History Higher Level: European	5	3
C S 1303	AP: Computer Science A	4	4	HIST 1300, 1301	IB: History Higher Level: European	6, 7	6
C S 1303	AP: Computer Science AB	3	4	HIST 1300, 1301	AP: European History	3	6
Economics				HIST 1300	CLEP-S: Western Civilization I: Ancient Near East to 1648	51	3
ECO 2301	CLEP-S: Principles of Microeconomics	50	3	HIST 1301	CLEP-S: Western Civilization II: 1648 to the Present	51	3
ECO 2301	IB: Economics Higher Level	5, 6, 7	3	HIST 2300	SAT II: United States History	600	3
ECO 2302	CLEP-S: Principles of Macroeconomics	50	3	HIST 2300, 2301	AP: US History	3	6
ECO 2301	AP: Microeconomics	4	3	HIST 2300, 2301	SAT II: United States History	700	6
ECO 2302	AP: Macroeconomics	4	3	HIST 2300	CLEP-S: History of the U.S. I: Early Colonizations to 1877	52	3
English				HIST 2301	CLEP-S: History of U.S. II: 1865 to the Present	52	3
ENGL 1301	SAT II: Writing	610	3	HIST 3395	IB: History Higher Level: African	5	3
ENGL 1301, 1302	SAT II: Writing	680	6	HIST 3396	IB: History Higher Level: African	5	3
ENGL 1301	AP: English Language and Composition	3	3	HIST 3395, 3396	IB: History Higher Level: African	6, 7	6
ENGL 1301, 1302	AP: English Language and Composition	4	6	Mathematics			
ENGL 1301	AP: English Literature and Composition	3	3	MATH 1320	CLEP-S: College Algebra	52	3
ENGL 1301, 1302	AP: English Literature and Composition	4	6	MATH 1320	IB: Mathematics Studies Standard Level	5, 6, 7	3
ENGL 1301, 1302	ACT: English Aptitude	28	6	MATH 1321	CLEP-S: Trigonometry	50	3
ENGL 1301, 1302	ACT: Composite Aptitude	28	6	MATH 1350	SAT II: Mathematics Level IC or IIC	670	3
ENGL 1301, 1302	SAT I: Verbal Aptitude	710	6	MATH 1351	AP: Calculus AB	4	3
ENGL 2302	IB: English A1 or A2	5, 6, 7	3	MATH 1350, 1351	CLEP-S: Calculus	50	6
ENGL 2305, 2307	CLEP-S: Analyzing and Interpreting Literature	52	6	MATH 1351, 1352	AP: Calculus BC	4	6
French				MATH 1350, 1351, 1352	CLEP-S: Calculus	56	9
FREN 1501	CLEP-S: French Language	50	5	MATH 1351	IB: Mathematics Methods Standard Level	6, 7	3
FREN 1501, 1502	CLEP-S: French Language	55	10	MATH 1351	IB: Mathematics Higher Level	5, 6, 7	3
FREN 1501, 1502, 2301	CLEP-S: French Language	62	13	MATH 1550	IB: Mathematics Methods Standard Level	4, 5	5
FREN 1501, 1502, 2301, 2302	CLEP-S: French Language	66	16	MATH 1550	IB: Mathematics Higher Level	4	5
FREN 1501, 1502	AP: French	2	10	MATH 2300	AP: Statistics	4	3
FREN 1501, 1502, 2301	AP: French	3	13	Music			
FREN 1501, 1502, 2301, 2302	AP: French	4	16	MUHL 1301**	IB: Music Standard or Higher Level	6, 7	4
FREN 1507	IB: French B Standard or Higher Level	3	5				
FREN 2301, 2302	IB: French B Standard or Higher Level	4	6				
FREN 2301, 2302, 3304	IB: French B Standard or Higher Level	5	9				
FREN 2301, 2302, 3302, 3304	IB: French B Standard or Higher Level	6, 7	12				

TTU Courses for which credit can be earned	Standardized Test(s) Used	Min. Score	Sem. Hrs.
MUTH 1303, 1103**	IB: Music Standard or Higher Level	6, 7	4
Philosophy			
Gen. Philos. Credit PHIL 2300	IB: Philosophy Standard Level	5, 6, 7	3
	IB: Philosophy Higher Level	5, 6, 7	3
Physics			
PHYS 1306, 1307 & 1103, 1104	AP: Physics B	3	8
PHYS 1306, 1307 & 1103, 1104, or 1303, 1101, or 1400***	IB: Physics Standard Level	4, 5, 6, 7	8 or 4
PHYS 1308, 1105	AP: Physics C–Mechanics	3	4
PHYS 1308, 1105 & 2301, 1106	IB: Physics Higher Level	4, 5, 6, 7	8
PHYS 2301, 1106	AP: Physics C–Electricity and Magnetism	3	4
Political Science			
POLS 1301	CLEP-S: American Government	50	3
POLS 1301	AP: Government and Politics–United States	3	3
Psychology			
PSY 1300	CLEP-S: Introductory Psychology	51	3
PSY 1300	AP: Psychology	3	3
PSY 1300	IB: Psychology Standard or Higher Level	5, 6, 7	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
SPAN 1501, 1502	AP: Spanish	2	10
SPAN 1501, 1502, 2301	AP: Spanish	3	13
SPAN 1501, 1502, 2301, 2302	AP: Spanish	4	16
SPAN 1507	IB: Spanish B Standard or Higher Level	3	5
SPAN 2301, 2302	IB: Spanish B Standard or Higher Level	4	6
SPAN 2301, 2302, 3304	IB: Spanish B Standard or Higher Level	5	9
SPAN 2301, 2302, 3302, 3304	IB: Spanish B Standard or Higher Level	6, 7	12
SPAN 3302, 3304*	IB: Spanish A1 or A2 Standard or Higher Level	6, 7	6
SPAN 3304*	IB: Spanish A1 or A2 Standard or Higher Level	4, 5	3
Theatre Arts			
TH A 2301 or 2303	IB: Theater Arts Standard or Higher Level	5	3
TH A 2301 or 2303 & TH A 3308 or 3309 or 3335 or DAN 3313	IB: Theater Arts Standard or Higher Level	6, 7	6

AP = Advanced Placement Program

CLEP-S = College Level Examination Program—Subject Exams

IB = International Baccalaureate Examinations

ETS continually revises and updates standardized testing and measurement.

Therefore, test names and scores are subject to change.

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

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

*** Students may select the course(s) that best fits their curriculum.



Admission Requirements for Specific Colleges

Every undergraduate who is accepted for admission to Texas Tech University will enroll in one of the university's 10 colleges. In addition to the admission requirements for enrollment in the university, each college/major may have admission requirements that must be met before acceptance.

Admissions requirements for each of the colleges/majors are as follows:

College of Agricultural Sciences and Natural Resources

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

College of Architecture

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

College of Arts and Sciences

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

Rawls College of Business

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

College of Education

- The admissions requirements of the college are the same as those for the university.
- Freshmen and transfer students wishing to become teachers may major in multidisciplinary studies. Degrees leading to certification in special education and bilingual education are also available. Students wishing to become science teachers (grades 8-12) may major in multidisciplinary science.
- Students who major in the college or who major in another college and wish to become teachers must apply for admission to the Teacher Education Program. Admission requirements and applications are available online at www.educ.ttu.edu.

College of Engineering

- The admissions requirements of the college are the same as those for the university. The college strongly recommends that students have a mathematics SAT score of 500 or higher because a firm foundation in mathematics is desirable for students majoring in engineering.

Honors College

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

College of Human Sciences

- Students meeting the admissions requirements of the university will be admitted to any major within the college with the exception of interior design and human development and family studies.
- For admission into interior design, freshmen must meet assured admission requirements, and transfer students must have at least a 3.0 cumulative GPA.
- Transfer students must have an adjusted cumulative 2.5 GPA for admission into human development and family studies.

College of Mass Communications

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

College of Visual and Performing Arts

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

Registration

Office of the Registrar

Texas Tech University
103 West Hall
Box 45015
Lubbock, TX 79409-5015
(806) 742-3661
FAX (806) 742-0355
www.reg.ttu.edu

Each semester and summer term opens with a registration period during which the formal process of enrollment in the university is completed. Prior to registering for each semester or summer term, every student who completes the admission process is notified of his or her admission to the university and is furnished additional materials that deal with the actual registration.

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

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

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

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

Registration of Undergraduate Students in Graduate Courses. An undergraduate student who is within 12 semester hours of graduation and who 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

Graduate Student Notice

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

academic college and the Dean of the Graduate School. This approval must be obtained on special forms at the time of registration. No course taken without this approval may be counted for graduate credit. Graduate work taken under this provision may not be used to meet undergraduate degree requirements.

Unless he or she has previously taken the Aptitude Test of the Graduate Record Examinations, an undergraduate student who is permitted to enroll for graduate credit as indicated above is required to take the test during the first semester of enrollment in graduate courses.

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

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

Change of Schedule. With proper approval, students who wish to request a change in schedule may do so. Student-initiated changes in schedule, including adding and dropping courses, must be arranged by the student in person; changes are not official until all steps in the process have been completed. The university reserves the right to make changes in a student's schedule.

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

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

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

Veterans' Exemptions From Fees Under the Hazlewood Act. The following men and women who were legal residents of Texas at the time of entry into the Armed Forces and who have been legal residents of Texas for a period of not less than twelve months immediately preceding their registration in Texas Tech University are by state law exempt from the payment of all fees except laboratory and library fees or similar deposits and fees or charges for room and board: all nurses and honorably discharged members of the Armed Forces of the United States who served during the Spanish-American War, World War I, World War II (except those who were discharged from service because they were over the age of 38 or because of a personal request on the part of the person that he or she be discharged), the National Emergency which began on June 27, 1950 (also referred to as the Korean War), and all persons who were honorably discharged after service on active military duty, excluding training, for more than 180 days during the Cold War (which began on the date of the termination of the Korean War); the Vietnam era which began on December 21, 1961, and ended on May 7, 1975; the Grenada and Lebanon era which began on August 24, 1982, and ended on July 31, 1984; the Panama era which began on December 10, 1989, and ended on January 21, 1990; and the Persian Gulf War which began on August 2, 1990, and ended on the date thereafter prescribed by Presidential proclamation or September 1, 1997, whichever occurred first; or any future national emergency declared in accordance with federal law. These exemptions also apply to the children of members of the armed forces of the United

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

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

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

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

Veterans' Certification. Each student using VA Educational Assistance is responsible for providing accurate information to the VA Coordinator, Room 115 West Hall. Because the Department of Veteran Affairs requires updated information concerning any changes, students must report all changes of status in their academic schedule or address. Undergraduate students who have accumulated 64 or more credit hours must file a copy of their official degree plan or teacher certification plan with the Veterans Coordinator or enrollment certification will be canceled. Graduate students must have taken the GRE, GMAT, or LSAT and provide a copy of their letter of acceptance from the Graduate School. Graduate students must also provide a degree plan as soon as possible after enrollment in Texas Tech.

The VA Certifying Official will immediately report grades of I (Incomplete) to the VA Regional Office (VARO) at the time the I grade is posted on the student's transcript and request an adjustment of hours certified for any persons using VA assistance through the Veterans Administration. The VARO will contact the student regarding any overpayment or additional information required. The student may repeat the course after collection of overpayment provided the VA Certifying Official approves the course. The student will be paid for taking the course a second time because the VARO will treat the original course as having been "audited" by the student. Contact the VA Certifying Official with any questions regarding VA policy.

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



Walls of Glass in Student Union Building

Finances

Student Business Services

Texas Tech University
163 Drane Hall
Box 41099
Lubbock, TX 79409-1099
(806) 742-3272, toll free (866) 774-9477
FAX (806) 742-0445
www.sbs.ttu.edu

Estimated Undergraduate Student Expenses

Based on enrollment in **30 semester credit hours (SCH) per year or 15 per semester**. Fees, books, and supplies may vary depending on the area of study. Refer to the Student Housing section of this catalog for estimated costs of residence hall room and board.

	Fall	Spring
Tuition		
Resident Tuition (\$124 per SCH)	\$ 1,860.00	\$ 1,860.00
Nonresident Tuition (\$382 per SCH)	5,730.00	5,730.00
Tuition (Adjacent County of New Mexico, Oklahoma — \$124 per SCH)	1,860.00	1,860.00
Tuition (Nonadjacent County of New Mexico, Oklahoma — \$154 per SCH)	2,310.00	2,310.00
Fees		
Academic Fees*		
Information Technology Fee	270.00	270.00
Library Fee	225.00	225.00
Cultural Activities Fee	15.00	15.00
Course Fee (varies from \$3 to \$45 per SCH)	150.00	150.00
Student-Related Fees		
Medical Services Fee	66.50	66.50
Student Services Fee	120.00	120.00
Student Union Fee	98.00	98.00
International Education Fee	4.00	4.00
Student Recreation Center Fee	60.00	60.00
Student Transportation Fee	45.00	45.00
ID Card Maintenance Fee	5.50	5.50
Other Fees		
Student Business Services Fee	105.00	105.00
Intercollegiate Athletic Fee	50.00	50.00
Additional Estimated Costs		
Books and Supplies	422.50	422.50
Room/Board (Residence Hall)	3,253.00	3,253.00
Transportation	697.00	697.00
Personal / Miscellaneous	918.00	918.00
TOTALS		
Total (Texas Resident)	\$8,364.50	\$8,364.50
Total (Nonresident)	\$12,234.50	\$12,234.50
Total (Adjacent County of New Mexico, Oklahoma)	\$8,364.50	\$8,364.50
Total (Nonadjacent County of New Mexico, Oklahoma)	\$8,814.50	\$8,814.50

* Students with majors in business and agriculture pay additional advising, retention, and placement fees.

Application Fees

Undergraduate (U.S. Citizen)	\$50
Graduate (U.S. Citizen)	\$50
International	\$60

Tuition and Fees

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

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

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

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

Payment Policy

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

Fee Payment. Payment arrangements must be made prior to the first class day:

Fall 2004	August 23, 2004
Spring 2005	January 7, 2005
1st Summer 2005	May 27, 2005
2nd Summer 2005	July 1, 2005

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

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

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

- Option 1:** Payment of the total amount due (cash, check, TechExpress, credit card, 100% financial aid).
- Option 2:** Emergency enrollment loan (tuition and fees only).
- Option 3:** Payment option plan (not available for summer terms). All charges including housing and dining.

Emergency Enrollment Loan (Option 2)

Students may request an Emergency Enrollment Loan (EEL) for 100% payment of tuition and fees. The loan must be repaid over a period not to exceed 90 days (30 days in summer) from the first cancellation date. Students may obtain the EEL form at Student Business Services in 163 Drane Hall or online at www.sbs.ttu.edu. The student may print the form, sign it, and deliver it in person to Student Business Services or mail the form to Box 41099, Lubbock, TX 79409 for immediate application to their tuition and fee account. A service charge of \$25 must accompany the loan form, which should be mailed 5 to 7 days prior to the due date.

Payment Option Plan (Option 3)

Texas State Law (Texas Education Code, Section 54.007a) allows students to pay tuition, fees, housing, and dining in three installments over the course of the semester. Students selecting this option are required to sign a Payment Option Plan Agreement (POPA) form with the university. POPA forms are available at Student Business Services in 163 Drane Hall. POPA forms are also available at www.sbs.ttu.edu. Students may print the online form, sign it, and deliver the form in person to Student Business Services or mail the form to Box 41099, Lubbock, TX 79409 for immediate application to their tuition and fee account.

The first installment of 50 percent of all tuition and fees must accompany the POPA form. The second and third installments must be made in increments of one-half of the remaining balance for each installment. During the fall semester, the second installment is due October 1 and the third installment is due November 1. In the spring semester, the second installment is due February 15 and the third installment is due March 15. A service charge of \$25 must accompany the POPA form in addition to the 50% down payment. This option is not available for summer terms.

Students who have elected the payment option plan and subsequently add or change courses must maintain a 50% or greater payment status on the 12th class day. Please check your account information via the Web to ensure compliance with the terms of the agreement.

Billings

Billings will be sent to all preregistered students one month prior to the due date. Students registering after preregistration or those making changes to their billing after the initial billing has been mailed need to check their balances online at www.techsis.admin.ttu.edu/student. Monthly billings for incidental expenses will be mailed the 10th of each month to be paid in full prior to the 1st of the following month. Billings will be mailed to the student's permanent legal address in the Student Registration System unless the student has established a special billing address. Please keep addresses current. Students are billed based on their location of residence and location of classes. Students must verify their location each term when registering and may request a location change at anytime on the TechSIS web site at www.techsis.admin.ttu.edu/student.

General Payment Information

How to Pay. Payment can be made as follows:

- **In Person.** Students can pay in cash at the Student Business Services office, 163 Drane Hall, or by personal check, cashier's check, money order, Visa, MasterCard, American Express, Discover Card, or TechExpress. Checks should be made payable to Texas Tech University. All payments made other than cash are subject to final acceptance for payment. You also may use the convenient drop box located outside the office.
- **Mail.** Cash should not be sent through the mail, and Texas Tech accepts no responsibility for cash sent by mail. Payments should be mailed to P.O. Box 6960, Lubbock, TX 79493-6960 at least 5 to 7 days prior to the due date. Express mail your payments to Student Business Services, Texas Tech University, 163 Drane Hall, Lubbock, TX 79409.
- **Web Credit Card or E-Check Payments.** Pay online at www.techsis.admin.ttu.edu/student.

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

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

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

Returned Check Charge. A \$30 charge will be assessed for each check returned from the bank unpaid. A returned check for initial payment of tuition and fees may result in cancellation of enrollment. Responsibility rests with the student regardless of the maker of the check.

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

Refund Policy

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

Automatic Deposit. Students may have their refund deposited directly into their checking or savings account at the bank of their choice or to their TechExpress account prior to the first class day. The Direct Deposit Authorization form may be obtained from Student Business Services, 163 Drane Hall. Forms are also located online at www.sbs.ttu.edu.

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

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

The selection criteria for address printing on the check will be as follows:

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

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

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

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

- **Summer Terms:**
 - 1st class day through 4th class day100%
 - After the 4th class day None

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

 - Before the 1st class day None
 - 1st, 2nd, or 3rd class day 20%
 - 4th, 5th, or 6th class day 50%
 - 7th class day or later 100%
- **Fall or Spring Semester:**
 - 1st class day through 12th class day ..100%
 - After the 12th class day None

Withdrawal—Students withdrawing at their request or those who have been withdrawn

due to university action may be eligible to receive a refund of paid tuition and fees. The student will be required to pay tuition and fees according to the following schedule:

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

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

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

Tuition Rates

- **Texas Legal Residents:** \$124 per semester credit hour (\$48 state, \$76 institutional)
- **Nonresidents:** \$382 per semester credit hour (\$306 state, \$76 institutional)
- **Nonresident Students Who Are Legal Residents of New Mexico or Oklahoma and Reside in a County Adjacent to Texas:** \$124 per semester credit hour (\$48 state, \$76 institutional)
- **Nonresident Students Who Are Legal Residents of New Mexico or Oklahoma and Reside in Counties Not Adjacent to Texas:** \$154 per semester credit hour (\$78 state, \$76 institutional)
- **School of Law—Texas Residents:** \$316 per semester credit hour
- **School of Law—Nonresidents:** \$542 per semester credit hour
- **Graduate Program Tuition:** Students enrolling in graduate level courses will be charged the current tuition and an additional charge of \$48 per semester credit hour.

General Fees

All fees are mandatory and authorized by state statute or the Board of Regents of the Texas Tech University System.

Academic Fees

- **Laboratory Fee:** Not less than \$2 per semester credit hour with a maximum charge of \$30 for each applicable course
- **Information Technology Fee:** \$18 per semester credit hour
- **Library Fee:** \$15 per semester credit hour
- **Advising, Retention, and Placement Fees:**
College of Agricultural Sciences and Natural Resources—\$1.75 per semester credit hour
Rawls College of Business—\$3.25 per semester credit hour
- **Cultural Activities Fee:** \$1 per semester credit hour
- **Course Fee:** \$3 minimum per semester credit hour, maximum \$45 per semester
- **Special Instruction Fee:** Varies

- **Field Trip Fee:** Varies
- **Off-Campus Travel Fee:** Varies
- **Auditing Fee:** Students enrolled for fewer than 12 semester credit hours in a semester (6 hours in summer) must pay a \$10 fee for the privilege of auditing a course. Written permission from the dean of the college in which the course is being taught and from the course instructor is required. No charge is assessed for enrollment of 12 or more semester credit hours. (Senior citizens 65 years of age and older are exempt from payment of this fee regardless of the number of semester credit hours.)
- **Law School Deposit:** \$200
- **Probation/Post Suspension Assistance Fee (XL-Strategies):** \$150
- **Library Fines:** \$1 to \$225

Student-Related Fees

- **Student Services Fee:** \$10 per semester credit hour with a maximum of \$120
- **Student Union Fee:** \$98 per semester if enrolled in 4 or more credit hours and \$49 for summer terms or \$98 for summer trimester. During the fall and spring semesters, students enrolled in less than 4 semester credit hours will be charged \$40.
- **Medical Services Fee:** \$66.50 per semester if enrolled in 4 or more credit hours and \$33.25 for summer terms or \$66.50 for summer trimester. Students enrolled in less than 4 hours may opt to pay this fee in Student Business Services.
- **International Education Fee:** \$4 per semester or summer term
- **Student Recreation Center Fee:** \$60 per semester if enrolled in 4 or more credit hours and \$30 for summer terms or \$60 for summer trimester. Students enrolled in less than 4 semester credit hours will be charged \$35.
- **Student Transportation Fee:** \$3 per semester credit hour
- **Identification Card Maintenance Fee:** \$5.50
- **Identification Card Replacement Fee:** \$12
- **Identification Card Revalidation Fee:** \$5

Other Fees

- **Intercollegiate Athletic Fee:** \$50 per fall and spring semester if enrolled in 4 or more credit hours. Students enrolled in less than 4 hours may purchase tickets in the Athletic Ticket Office.
- **Student Business Services Fee:** \$7 per semester credit hour
- **Application Fee:** \$50, International \$60
- **Honors College Application Fee:** \$25
- **New Student Orientation Fee:** \$55
- **Diploma Replacement Fee:** \$16 for printing and mailing a replacement diploma
- **Diploma Insertion Fee:** \$2 (reapplication for graduation).
- **Duplicate Copy of Registration Fee Receipt:** \$50
- **Fee for Binding Theses and Dissertations:** The charge for 3 official copies of theses is \$55; 3 official copies of dissertations and microfilming is \$110; personal copies are \$17; packets for enclosure are \$5; domestic mailing is \$5; international mailing is \$8.

- **Sponsored International Student Administrative Fee:** \$250
- **Education Abroad Fee:** \$500
- **International Student Fee:** \$50 each semester charged to each nonimmigrant international student, \$25 each summer session
- **Option Fee for Installment Payment of Tuition/Fees:** \$25
- **Late Charges on Emergency Loans:** \$25
- **Late Payment Fee:** \$50
- **Late Registration Fee:** \$50
- **Reinstatement Fee:** \$200
- **Returned Check Charge:** \$30
- **Facilities Fee:** \$8 per student credit hour—applies only to those students enrolled in courses at any of the TTU Hill Country Campuses.
- **Parking Fee:** A fee is required for all vehicles parked on campus. A schedule of these fees may be obtained from Traffic and Parking.
- **Distance Learning/Electronic Instruction Fee:** For nonresident students residing out of state, the fee rate may be an amount not to exceed twice the amount of nonresident tuition. Contact the department offering the course to determine the exact fee.

General Information

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

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

Tuition Rebate for Certain Undergraduates. A qualified student is eligible for a rebate of a portion of the undergraduate tuition the student has paid if the student is awarded a baccalaureate degree and has attempted no more than 3 hours in excess of the minimum number of semester credit hours required to complete the degree, including transfer credits and course credit earned exclusively by examination. The amount of tuition rebated is \$1,000 unless the total amount of undergraduate tuition paid by the student awarded the degree was less than \$1,000, in which event the amount of tuition rebated is an amount equal to the amount of undergraduate tuition paid by the student. To qualify, the student must have been a resident of Texas and entitled to pay tuition required of a resident student at all times while pursuing the degree and submit application prior to graduation. Student Business Services should be contacted for information regarding outstanding student loans and how the rebate will be applied toward them. If the student has an outstanding student loan, including an emergency loan, owed or guaran-

ted by this state, including the Texas Guaranteed Student Loan Corporation, the amount of the rebate shall be applied to the student's loan. If a student has more than one outstanding loan, the institution shall apply the amount of the rebate to the loans as directed by the student. If the student fails to provide timely instructions on the application of the amount, the institution shall apply the amount of the rebate to the loans according to priorities established by the coordinating board.

Exemptions and Waivers

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

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

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

- **Academic Common Market:** Exempts nonresident tuition over and above Texas resident tuition rate. Certification by Academic Common Market Coordinator is required.
- **Blind Students:** Exempts a student from payment of all tuition and fees excluding charges for room and board. Certification by the Texas Rehabilitation Commission or the Texas Commission for the Blind is required.
- **Biomedical Research Program—Scholarship Student:** Exempts nonresident tuition. Documentation is required through the Office of International Affairs.
- **Children of Disabled Firemen:** Exempts a student from payment of tuition and required fees. Certification by Texas Higher Education Coordinating Board is required.
- **Children of Disabled Peace Officers:** Exempts a student from payment of tuition and required fees. Certification by Texas Higher Education Coordinating Board is required.
- **Children of Prisoners of War or Persons Missing in Action:** Exempts a student from payment of Texas resident tuition and required fees. Certification by Texas Higher Education Coordinating Board is required.
- **Competitive Scholarship:** Exempts a student from payment of nonresident tuition over and above resident tuition. Student must be awarded a competitive scholarship of at least \$1,000 for the academic year or summer of their enrollment and be either a nonresident or citizen of a country other than the United States. Student must compete with other students including Texas residents and the award must be made through a duly recognized scholarship committee. Certification is sent to Student Business Services from the Financial Aid Office.
- **Deaf Students:** Exempts a student from payment of all tuition and fees excluding charges for room and board. Certification by Texas Rehabilitation Commission or the Texas Commission for the Deaf and Hard of Hearing.
- **Early High School Graduate:** A student receives a credit up to and not to exceed a cumulative total of \$1,000. Certification from the Texas Higher Education Coordinating Board.
- **Economic Development and Diversification Employees, Spouses, and Dependents:** Exempts a student from payment of nonresident tuition. The Texas Higher Education Coordinating Board provides a listing of eligible companies. Students must provide employment certification accordingly.
- **Educational Aide Exemption:** Exempts a student from payment of all tuition and fees except charges for class and laboratory fees. Student must apply for this exemption through the Financial Aid Office with certification provided by the Texas Higher Education Coordinating Board.
- **Faculty Exemption (Teacher or Professor):** Exempts a student from payment of nonresident tuition. Certification by employing department is required.
- **Faculty Dependent (Nonresident Dependent of Teacher or Professor):** Exempts a student from payment of nonresident tuition. Certification by employing department is required.
- **Foster Care:** Exempts a student from payment of tuition and fees. Must be a Texas resident. Certification from Department of Protective and Regulatory Services is required.
- **Good Neighbor (Students from other Nations of the Western Hemisphere):** Exempts a limited number of students from payment of 100% of tuition. Certification through the Office of International Affairs is required.
- **Mexico and Canada Exchange Program:** Exempts a student from payment of nonresident tuition. Certification by the Office of International Affairs is required.
- **Military Personnel and Dependents:** Exempts a student from payment of nonresident tuition. Application must be made through Admissions and Records. Certification by Unit Commander or Unit Personnel Officer is required. A separate certification is required, in original form with original signature, for each semester or term of enrollment.
- **Prisoner of War:** Exempts a student from payment of tuition and required fees. The U.S. Department of Defense must have classified student as a prisoner of war on or after January 1, 1999.
- **Senior Citizens (55 Years of Age and Older):** Exempts a student from payment of up to 6 semester or term credit hours of resident or nonresident tuition. Student must be 55 years

of age or older by the first class day. Notification should be given to Student Business Services at time of enrollment.

- **Senior Citizens (65 Years of Age and Older):** Exempts a student from payment of up to 6 semester or term credit hours of resident tuition. Student must be 65 years of age or older by the first class day. Notification should be given to Student Business Services at time of enrollment.
- **TANF Students:** Exempts a student from payment of tuition and fees for the first academic year of enrollment. Certification is required from the Department of Protective and Regulatory Services.
- **Valedictorian (Highest Ranking High School Graduate):** Exempts a Texas resident student from payment of 100% of tuition during both semesters of the first regular session immediately following his or her graduation from high school. Documentation must be provided to Student Business Services.
- **Veterans and Dependents (Hazlewood):** Exempts a student from payment of tuition and fees except the Student Services Fee and Medical Services Fee and charges for class materials paid directly to the department as a reimbursement for materials used in a laboratory setting. Requires Registrar's certification.
- **Veterans and Dependents (Partial Hazlewood):** Certification by the Registrar's Office is required. The amount exempted will be that amount calculated after the application of federal aid, which the student must utilize first.
- **Graduate Student Tuition/Fee Assistance Program: Teaching Assistant, Research Assistant, Graduate Assistant, Graduate Part-Time Instructor.** Exempts, by Board of Regents action, the student from payment of certain fees. By Board of Regents mandate, appointment must be on or before the 12th class day of the fall or spring semester (4th class day of a summer term) as a benefits-eligible employee with employment of at least one-half time as a TA, RA, GA, or GPTI. For more information see www.gradschool.ttu.edu.
- **Graduate Student Tuition/Fee Assistance Program: Nonresident State Tuition Exemption—Teaching Assistant, Research Assistant, Graduate Assistant, Graduate Part-Time Instructor.** Exempts a student from payment of certain fees and nonresident tuition over and above the state resident rate. By Texas Education Code and Texas Tech Board of Regents mandate, appointment must be on or before the 12th class day of the fall or spring semester (4th class day of a summer term) in a position that meets the definition of the Texas Tech Pay Plan in work related to the student's degree program. For more information see www.gradschool.ttu.edu.
- **Benefits-Eligible Medical Services Waiver:** Waives the student from payment of the Medical Services Fee. By Board of Regents mandate, appointment must be on or before the 12th class day of the fall or spring semester (4th class day of a summer term) in a position eligible for state benefits as defined in the Texas Civil Statutes and the Teacher Retirement System of Texas.

- **Teaching Assistant, Research Assistant, Graduate Assistant, Graduate Part-Time Instructor Dependents:** Exempts a student from payment of nonresident tuition over and above state resident rate. Certification from the employing department is required.

Student Financial Assistance

Contact Information: Office of Student Financial Aid, Box 45011, Texas Tech University, Lubbock, Texas 79409-5011.

The objective of the student financial aid program at Texas Tech is to provide financial assistance to students who, without such aid, would not be able to pursue higher education. The financial assistance offered at Texas Tech is in various forms, including loans, scholarships, grants, and employment, and is awarded to students on the basis of financial need and other qualifications required by the donors of the funds. Need is defined as the difference between a reasonable expected expense to attend Texas Tech and the amount of money reasonably available to the student from all sources.

No student or prospective student shall be excluded from participating in or be denied the benefits of any financial aid program at Texas Tech on the grounds of race, color, national origin, religion, or sex. Although qualifications required for each financial aid program may differ, the general requirements for financial assistance at Texas Tech are that the student must be enrolled for at least one-half the normal academic load, be in good academic standing with the university, and be in need of financial assistance.

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

- Federal Work-Study Program
- Hinson-Hazlewood College Student Loan
- LEAP
- Parent Loans for Undergraduate Students
- Pell Grants
- Perkins Student Loan
- SLEAP
- Stafford Loans
- State Student Incentive Grant
- Student Part-Time Employment
- Supplemental Educational Opportunity Grants
- Texas B-On-Time Loan
- TEXAS Grant
- Texas Public Education Grants
- Texas Public Education-State Student Incentive Grants

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

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

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

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

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

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

Details on work opportunities available on campus and additional economic assistance can be found in the *Scholarships and Financial Aid* handbook available at www.fina.ttu.edu.

Academic Requirements for Assistance.

Federal regulations require that all financial aid recipients maintain satisfactory academic progress. The following guidelines will be applied in determining satisfactory progress. Progress is measured at the end of each spring term and eligibility re-evaluated after summer grades have been posted, with the exception of students already on contract. Students who become ineligible for aid after the spring term and wish to take courses at another institution during the summer must appeal and provide proof of satisfactory completion of course work.

1. All undergraduate and law student aid recipients must have a 2.00 cumulative GPA and graduate students must have a 3.00. A transfer GPA is not included in GPA evaluation of satisfactory academic progress.
2. If the student's cumulative GPA falls below 2.00 (Graduate 3.00) in more than one semester without the student bringing the cumulative GPA above a 2.00, the student will not receive future financial aid until the student is maintaining satisfactory academic progress as outlined in these guidelines or until the student is reinstated through the appeal process. Satisfactory academic progress is reviewed at a minimum of once yearly.
3. In addition to maintaining the overall GPA requirement, a student must also progress toward graduation. A student must have earned at least 70% of all hours attempted at Texas Tech (transfer hours excluded). Hours and GPA are checked a minimum of once yearly. Students who register in courses through graduate admissions must earn 70% of all hours attempted. Grades of W, X, PR, I, and F are included in the calculation and are not considered satisfactory completion. Credit by Exam or CLEP hours are not included in earned hours.

Students in the External Bachelor of General Studies (XBGS or XGST) program will be required to maintain satisfactory academic progress as measured in accordance with the university's policy and the following addition: A student who is enrolled in the XGBS program and has been awarded a Pell Grant must complete each course satisfactorily (generally a 2.0 or better in each term) before consideration of a future Pell Grant can be determined. An F, D, I, W, PR, or X is not considered satisfactory completion for a future Pell Grant award.
4. Incompletes taken in course work should be graded within one year from initial date of the course. Students may be asked to obtain a letter from their department indicating the time frame within which the "I" will be completed. This does not apply to students who are enrolled in the XBGS program as stated above.
5. Students are expected to complete their program of study within 150% of the number of hours required (no more than 180 hours toward first bachelor's degree, 36 hours toward second bachelor's degree, 54 hours toward a master's degree, 54 hours toward a second master's degree, 135 hours for a Doctor of Jurisprudence, and 150 hours for a doctoral degree). All hours attempted, including transfer hours, are included in this calculation; however, when students change their program of study, special consideration may be given. Please see a financial aid advisor for more information.

Students admitted into a temporary or non-degree program or into a graduate certification program may be eligible to receive financial aid for one 12-month period. However, if their admission status is conditional, they may not be eligible for Title IV funding (e.g., pending

GMAT or GRE scores). A student enrolled in the graduate certification program must be working toward a teaching certification. A provisional or visiting student is not eligible to receive Title IV funding.

Appeals for Loss of Aid. Students who wish to appeal their loss of aid may do so in writing to the Financial Aid Appeal Committee. Forms are available in the Office of Financial Aid or online at www.financialaid.ttu.edu. Appeals may be made under hardship based on (1) the death of a relative, (2) personal injury or illness, or (3) special circumstances as determined by the institution. **Documentation is required (e.g., death certificate, medical documentation, police report, letter from counseling center).** Students who have maintained progress and are on appeal are reviewed each semester until minimum satisfactory academic progress has been met.

Financial aid recipients/applicants whose aid has been cancelled/denied as a result of failure to meet the required standards may be reinstated under the following conditions (excluding temporary and non-degree students): Student has regained a 2.00 cumulative GPA (Graduate 3.00), student is earning 70% of hours attempted (see #3 on previous page), and student has appealed and signed a contract to receive financial aid.

Students already on appeal contract are reviewed after each term or until they have met standards of satisfactory academic progress. For students under an appeal contract, each summer session is reviewed separately. Students who file an appeal and are denied should contact the Office of Financial Aid to determine their alternatives.

Departments may impose other standards for meeting academic progress.



Southwest Collection / Special Collections Library (left)
Agricultural Pavilion (right)

Student Housing

Housing and Residence Life

Texas Tech University
Doak Hall
Box 41141
Lubbock, TX 79409-1141
(806) 742-2661
FAX (806) 742-2696
www.housing.ttu.edu
Email: housing@ttu.edu

Residence hall living is a key component to the success of all students. National research indicates that students living in residence halls maintain higher grade point averages and are more likely to complete their degree plan within five years than students who live off campus. Additionally, the university feels that students will have their best opportunity for a well-rounded educational experience while living in a residence hall designed for student living.

Freshman Policy

The residence hall policy requires students having fewer than 30 hours of academic credit prior to the beginning of their first semester to live on campus unless exempted by the Department of Housing and Residence Life. The on-campus residency policy applies when a student is registered for two or more courses.

Requests for exemption to the residence hall policy must be submitted to the Department of Housing and Residence Life no later than May 1 for fall enrollment, November 1 for spring enrollment, or May 1 for summer enrollment. Registration for classes may be delayed pending verification of housing. Because of unforeseen changes in a student's circumstances due to illness or other reasons, some petitions are considered after the above dates. Students are encouraged to discuss such developments with the department but should not expect to be relieved of their academic-year residence hall obligations unless it is clearly established that illness or personal reasons not known prior to the above dates have arisen to necessitate living off campus.

Subject to verification and authorization by the Department of Housing and Residence Life, students will be given permission to live off campus provided:

1. The student resides and will continue to reside in the established household of his or her parent or legal guardian.
2. The student presents evidence of financial hardship conditions and is living in the established household of a brother, sister, grandparent, uncle, or aunt. In the event the individual with whom the student lives changes residence, the student shall promptly notify the Department of Housing and Residence Life.
3. The student is married or a single parent with dependent child(ren) living with the student.
4. The student is 21 years of age or older on or before the first day of class of the initial semester of enrollment.
5. The student has successfully completed 30 or more semester hours of academic credit before the beginning of the initial semester of enrollment or has lived in university residence halls for two regular semesters.
6. The student has served in the military service as verified by a discharge certificate (DD214).
7. The student has a physician-verified health problem that precludes living in the residence halls.
8. The student presents evidence of an extreme hardship that will be intensified by living in the residence halls.

Any one of the eight exemption categories will be sufficient. Evidence of deliberate falsification of information, data, or any materials submitted or providing false or erroneous information in connection with an application for on-campus housing exemption will be grounds for taking disciplinary action against the student in accordance with the Code of Student Conduct.

Any student wishing to move from the residence halls should consult the Residence Hall Contract for the provisions applicable to cancellation of the contract. Authorization for off-campus housing does not relieve the student of contractual obligations that may have been assumed with the university for housing in the residence halls.

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

Housing Reservations

Residence halls, like all other services and facilities of Texas Tech, are available to all students regardless of race, creed, national origin, age, sex, or disability. Application for admission to the university and application for residence hall accommodations are separate transactions. *Effective for fall 2004 enrollment, students should apply for housing after being admitted to the university.*

To receive a higher priority for room assignment, all students are encouraged to submit the Residence Hall Application specifying their

preferred hall choices as early as possible. The date the application is completed determines the priority for room assignment. Space in the university residence halls is reserved on a first-come, first-served basis. All students who apply for accommodations in the residence halls and are accepted sign a Residence Hall Contract for the full academic year. Students and parents are urged to read the Residence Hall Contract carefully and retain a copy for their files.

Fall semester room and roommate assignments for new students are made in June after the continuing students in the residence halls have completed reassignments for the following year. Assignments for spring applicants are completed in December. Roommate requests are granted when space is available, if the request is mutual and if both applications are received at or about the same time. Other specific requests (building, type of room, etc.) will be considered when space is available.

Students should notify the Department of Housing and Residence Life in writing if cancellation of the application becomes necessary. Information relating to cancellation is included with the housing application and is outlined in the Residence Hall Contract.

All unclaimed rooms in the residence halls will be declared vacant at 8 a.m. on the first day of classes. Students who enroll at the university but fail to claim their assigned residence hall room will be subject to the cancellation provisions stated in the section "Termination of Contract During Occupancy" of the Residence Hall Contract.

Residence Hall Facilities and Services

The Texas Tech residence hall system includes a variety of living options and provides convenient and affordable housing for approximately 6,000 students. Special interest housing (Honors, Intensive Study, Substance-Free, and Learning Communities as well as upperclass-graduate areas) provides students with the opportunity to live with others of similar interests. The Carpenter/Wells Complex, which is arranged in three-bedroom townhouses or four-bedroom flats, offers private bedrooms in an apartment setting. Gaston Hall and Apartments offers upperclass students separate living areas. Gordon Hall, a suite-style

residence, is designated as the Honors College Residence Hall.

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

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

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

Meal Plans

Hospitality Services provides a wide variety of dining choices for on-campus residents. Students may dine in any of the conveniently located dining halls, in the food court, or at The Market at Stangel/Murdough. Twenty meals are served each week. The evening meal on Sunday is not provided, nor are meals served during the following vacation periods: Thanksgiving, semester break, and spring break. Residents may choose from several meal plans. Regular and theme (Mexican, Italian, Asian, etc.) menus are offered in all-you-care-to-eat dining halls. Sam's Place mini-markets and The Market at Stangel/Murdough provide late or after-hours dine-in or carry-out options.

Students who live off campus may purchase a meal plan and eat in the conveniently located dining halls, Sam's Place mini-markets, or The Market at Stangel/Murdough. The Masked Rider Plan provides a set number of meals and is accepted in the all-you-care-to-eat dining halls. The Red Raider Plan provides a predeter-

mined amount of Dining Bucks to make purchases at discounted rates in cash operations, including Sam's Place mini-markets and The Market at Stangel/Murdough.

Room and Board Rates

Room and board fees are billed on a semester basis and are included on the same billing account as tuition and fees. Payments must be made in accordance with the established payment due dates and amounts provided on the billing. If payments are not made by the established due date, a late fee will be assessed. For assistance with your account, contact Student Business Services at (806) 742-3272. For questions about specific charges for room and board, contact Housing and Residence Life at (806) 742-2661.

Rates for room and board are based on a per-person charge and are established by the University Board of Regents in February of each year. For reference purposes, the rates for the

2004-2005 academic year are listed below. Rates are for a double room and the Diamond Dining Bucks Meal Plan (excluding state and local taxes):

Non-Air-Conditioned Halls

Bledsoe, Doak, Gaston,* Sneed \$5,414

Air-Conditioned Halls

Chitwood, Clement, Coleman, Gaston,* Gates, Horn, Hulen, Knapp, Murdough, Stangel, Wall, Weymouth \$6,238

Air-Conditioned Suites

Gordon (2-bedroom) \$6,425

Carpenter/Wells Complex**

3-Bedroom townhouse \$7,147
4-Bedroom flat \$6,885

* Gaston residents add \$40 for continuous housing between fall and spring semesters.

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



Student Services

Alumni Association

Started in 1927 by the first graduating class, the Texas Tech Alumni Association has grown to a membership of 25,000 alumni, current students, and friends of Texas Tech.

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

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

For more information about the Texas Tech Alumni Association, visit www.techsan.org.

Bookstore

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

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

The bookstore accepts personal checks, major credit cards, and TechExpress. Store hours are 7:30 a.m. to 6 p.m. Monday through Thursday; 7:30 a.m. to 5 p.m. Friday; and noon to 5 p.m. Saturday (summer hours vary). **Contact information:** (806) 742-3816 or www.bkstore.com/texastech.

Campus Bus System

The campus bus system, funded by the Student Services 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 7:10 a.m. until 8 p.m. A Citibus van provides shuttle service from 8 p.m. until 3 a.m. Students can also ride any Citibus route in Lubbock with their Texas Tech ID.

Career Center

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

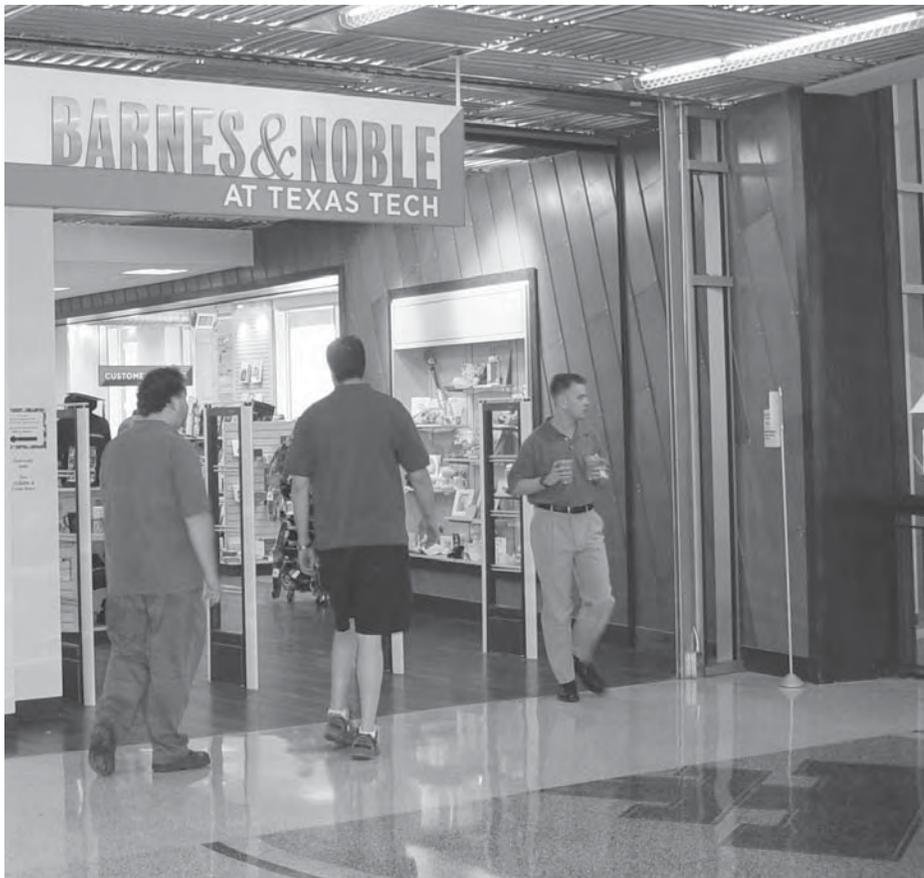
The Career Center also sponsors various job fairs that include graduate and professional schools, school districts, summer camps, and two large career expos. Resources at the Career Center include videos and job listings as well as a computer program to help students find a major, occupation, or graduate school. Counselors are available to meet individually with students to discuss job-related topics (resumes, cover letters, etc.). The Career Center is located in the Wiggins Complex, Room 150.

Center for Campus Life

This office provides programs and services to enhance the "Red Raider Experience." Services related to the following areas are offered:

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

Some of the specific programs that the center provides are Red Raider Camp, RaiderGate, Homecoming, Arbor Day, Red Raider Nights, spirit activities, Texas Tech-Lubbock Community Day, Greek life, and multicultural programs. The center also provides services to over 400 registered student organizations. Additional services available are grounds use and solicitation requests, publication of the *Student Handbook*, student grievances, and the Assessment Response Team that works with students during emergencies and crisis situations. The center is located in 201 Student Union, (806) 742-5433.



Bookstore Entrance in New Addition to Student Union

Check Cashing Services

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.

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

Cocurricular Activities

Students attending Texas Tech have an endless array of experiential opportunities. The campus boasts approximately 400 registered student organizations ranging from academic, professional, honorary, graduate, and multicultural to Greek, religious, service, sports clubs, and special interest groups. Through the Center for Campus Life, students can enroll in leadership programs, join the Homecoming Coordinating Committee, take advantage of the new area of Multicultural Programs, and participate in committee work. The value of these experiences is immeasurable. Students can enjoy the luxury of having a practical forum in which to cultivate leadership skills and develop peer and faculty/staff networks. All of their involvement may also be systematically tracked through the Campus and Community Involvement Record (CCIR), which is an official cocurricular involvement transcript. Student participation in an off-campus activity is strictly voluntary. Students are responsible

for their own safety and welfare. Participation in off-campus activities is at the student's own risk and the university assumes no responsibility. Students are responsible for making their own individual arrangements with instructors for classwork missed while participating in an on-campus or off-campus activity. For students involved in Big 12 sports, eligibility rules for the Big 12 Conference are administered by the Texas Tech Athletics Council. **Contact information:** Center for Campus Life, 201 Student Union, (806) 742-5433.

Grievance Procedures

Opportunities are available to students for redress of grievances. Generally, students wishing to review the action of a faculty or staff member or a department should direct their questions to the supervisor responsible for the department in the university organizational structure. Procedures for handling specific problems have been established to expedite the filing and hearing of student concerns. Questions involving academic matters should first be directed to the appropriate academic college or department office. Grievance procedures are described in the *Student Handbook* and questions may be directed to the Center for Campus Life, 201 Student Union, (806) 742-5433.

Intercollegiate Speech, Debate

Students who meet general eligibility requirements may participate in intramural and intercollegiate debate and the full range of individual events, both public address and oral interpretation. Both contest and noncontest events are held on campus and at other colleges. The Forensics Union (administered in the Communication Studies Department) and

Delta Sigma Rho are active in sponsoring campus-wide speech activities.

The Red Raider speech and debate team ranks among the top teams nationally and has won four national titles in recent years. They actively compete in both debate and individual event competitions across the country. Contact the Director of Forensics for more information at (806) 742-3911.

Learning Center

Under direction of Programs for Academic Support Services (PASS), the Learning Center provides students with a wide variety of services designed to increase their study strategy effectiveness and enable them to get the most out of their education. In-house and online peer tutoring, a self-help computer lab, and individual academic skills counseling provide learning assistance. In addition, the Learning Center offers supplemental instruction in selecting subjects, targeting historically difficult courses, and providing regularly scheduled modified forms of discussion sessions.

Computer software, printed materials, and video/audio tapes are available in mathematics, English, study skills, and other specific subject areas. Test preparation guides are available for the GRE, GMAT, TOEFL, LSAT, and MCAT. Additionally, study skills and other academic topic presentations are available to faculty and campus organizations.

Located in 205 West Hall, the Learning Center is free to all Texas Tech students and open during the fall and spring semesters from 8 a.m. to 8 p.m. Monday through Thursday and 8 a.m. to 5 p.m. Friday. Summer hours are 8 a.m. to 5 p.m. Monday through Friday. Departmental information is available at www.pass.ttu.edu.

Marsha Sharp Center for Student Athletes

The new Marsha Sharp Center for Student Athletes opened in 2004 to fulfill the university's commitment to student athletes, provide a hall of honor to recognize the academic performance of student athletes, and serve as a strong recruiting tool for the university. Funding for the center originated in 1998 with a \$100,000 donation from head women's basketball coach Marsha Sharp, whose athletic teams have a graduation rate of more than 99 percent.

The \$2.9 million, 15,500-square-foot facility has two classrooms, two computer labs, tutoring rooms, a study lounge, and administrative offices. In addition to enhancing academic performance, the center will provide career planning and placement services for student athletes.

The Wick and Janna Alexander Academic Hall of Honor will recognize student athletes who perform well in the classroom. Wick Alexander, a former Texas Tech football and baseball player, contributed \$500,000 to the building.



McNair Scholars Program

The Texas Tech McNair Scholars Program was established to prepare first-generation college undergraduate students from low-income families for doctoral study. Twenty outstanding Texas Tech University students participate in the program. Students are chosen in their sophomore year and continue to participate in the program until they graduate with a baccalaureate degree.

The program provides preparation for doctoral study by supplying information, learning assessments, research, academic and cultural experiences, graduate student mentoring, faculty mentoring, and financial assistance. McNair Scholars participate in the program for approximately six semesters based on satisfactory progress.

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 Chorus, Men's Glee Club, Lubbock Chorale, Court Jesters, Concert Band, Jazz Bands and Combos, Brass Choir, Chamber Ensembles, Chamber Orchestra, Woodwind Ensemble, Guitar Ensemble, String Ensemble, Harp Ensemble, Flute Ensemble, Clarinet Choir, Horn Ensemble, Trombone Ensemble, Trumpet Choir, Tuba Ensemble, Percussion Ensemble, Steel Drum Bands, New Music Ensemble, Early Music Ensemble, two university bands, and piano accompanying. Each organization is under the direction of a faculty member of the School of Music and is open to any student who is officially enrolled in the university and meets academic and audition requirements. Each group studies a broad repertoire and gives a number of public performances annually.

Ombudsman's Office

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

Contact information: 202 Student Union, (806) 742-4791, www.ttu.edu/ombudsman.

Parent Relations Office and the Texas Tech Association of Parents

The mission of the Parent Relations Office is to provide programs and services designed to enhance support and retention of students by meeting the educational, informational, and involvement needs of their parents and families. The office is also home to the Texas Tech Association of Parents, serving all parents and families of Texas Tech students.

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

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

Contact information: 244 West Hall, (806) 742-3630, toll free (888) 888-7409, fax (806) 742-0330, e-mail parent@ttu.edu, www.parent.ttu.edu.

Part-Time Employment

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. It is preferable for students seeking employment through this service to wait until they come to the campus to check on openings. See also the section entitled "Student Financial Assistance" in the Finances section.

RaiderGate

Sponsored by the Student Government Association and the Center for Campus Life, RaiderGate is the university's premier student tailgating event and the most exciting on-campus activity for Texas Tech football's pregame entertainment.

Recreational Sports

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

Through the intramural program, competition is offered in many coed, men's, and women's sports activities. These competitive activities include individual, dual, and team competition organized for residence halls, clubs, fraternities, sororities, and for unaffiliated students in an "open" division. A campus community (CC) program has also been developed to provide competition for graduate students, faculty, and staff.

Open recreation provides an opportunity for informal, nonscheduled activities for students, faculty, and staff at the various campus recreational facilities. The Robert H. Ewalt Student Recreation Center has 242,000 square feet of activity and recreational space, making it one of the largest student recreation centers in the nation. The building includes seven basketball/volleyball courts; an indoor soccer arena; a 6,500-square-foot Olympic weight room; more than 10,000 square feet of cardiovascular machines and selectorized weight machines; and a four-lane, 1/8 mile elevated jogging track. Also available are two aerobic/dance studios, a 52 foot high climbing center, 12 racquetball courts, a fitness/wellness center, locker rooms, an outdoor pursuits center, and an indoor/outdoor Olympic-size swimming pool. The program also provides equipment checkout for a variety of sports and reservation opportunities for tennis courts, fitness equipment, and racquetball courts.

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

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

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

The special event program includes weekend tournaments, fun runs, triathlons, mud volleyball, and various other wild and zany recre-



Robert H. Ewalt Student Recreation Center

ational activities. Information on special rules and dates of activities can be obtained from the office on the upper level of the Student Recreation Center.

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

Red to Black Program

Every semester some students find themselves in financial trouble and even lose job offers because of negative credit reports. Red to Black is a service for Texas Tech students that provides free and confidential financial counseling and workshops to help students develop positive financial behaviors and maintain good credit. Peer counselors are trained to provide help with financial questions and concerns, paying off debt, creating a budget, financial planning services, choosing a credit card, comparing job offer benefits, or reading a credit report. The program also provides premarital financial counseling and many useful online financial tools (www.r2b.ttu.edu). To make an appointment or obtain more information, email redtoblack@ttu.edu or call (806) 742-9781.

Student Counseling Center

The Student Counseling Center provides professional psychological services to address the variety of concerns affecting a college student's personal life and academic performance. Most staff members are licensed psychologists.

Counseling focuses on the developmental issues of early adulthood that many college students experience and the particular concerns of graduate and nontraditional students. This can involve relationship loss, coping with grief, body image concerns, depression, sexual assault, stress and anxiety, time management, alcohol or other substance abuse, gay/lesbian/bisexual identity issues, communication skills, or simply help in understanding oneself better.

Counseling can be conducted on an individual or group basis. Group therapy is often the treatment of choice for student concerns. The Student Counseling Center offers a variety of topic-specific groups to meet the needs of Texas Tech students.

The Relationship Enhancement Center (REC), part of the Student Counseling Center, provides couples counseling for students and their partners. REC services are available during evening hours as well as the daytime. Student Counseling Center therapists also address mental health and prevention concerns through outreach presentations to classes, residence halls, and on-campus organizations. Student Counseling Center services are avail-

able to enrolled students and on a consultation/referral basis to faculty and staff. All information is confidential within the limits of the law. The office hours are 8 a.m. to 5 p.m. Monday through Friday.

Contact information: 214 West Hall, (806) 742-3674, www.depts.ttu.edu/SCC.

Student Government

The Student Government Association (SGA) provides students with opportunities to excel through involvement with general, presidential, and external committees; Freshmen Council; Freshmen Advisory Board; Student Senate; and executive offices. The SGA also provides many services to students, including student insurance information packets, housing guides, the *WORD* magazine, new student guide, information maps about Citibus routes, Moment's Notice, 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 individual groups. The three executive officers—President, Internal Vice President, and External Vice President—work to represent the views and needs of students to the administration and local and state government. The SGA is always receptive to new programs and practices that can benefit students.

Contact information: 230 Student Union, (806) 742-3631, www.sga.ttu.edu.

Student Health Insurance

All registered undergraduate students taking 6 or more credit hours may subscribe to a supplemental student health insurance plan that provides 24-hour coverage on or off campus while in any hospital or under the care of any qualified physician (according to the policy provisions). The 12-month plan covers all vacations and remains in force even though the student graduates or drops out of school. The policy is effective for the academic year or can be purchased by term (see policy for details). Students may include their spouse and children for an additional premium. New spring students may enroll at a prorated premium with coverage terminating at the end of that academic year. Complete information on the insurance program is mailed to each new student. Information is also available in the Student Government Association office in the Student Union and the Office of Campus Life, 250 West Hall.

Contact information: 213 Administration Building, (806) 742-2131.

Student Health Services

Student Health Services is a primary care clinic staffed with licensed physicians, nurses, nurse practitioners, health educators, and support staff that provide care for illnesses and injuries, as well as mental health issues. Student Health Services is located in Thompson Hall at Drive of Champions and Flint Avenue on the north end of the campus. Services are available by appointment by calling (806) 743-2848. Ap-

pointment hours are 8 a.m. to 5:30 p.m. weekdays. Summer and interim hours vary.

Students generally pay a medical services fee that entitles them to access clinic and pharmacy services. A valid Texas Tech ID is required to access the clinic services. More than 200 primary care appointments are available each day. Care is provided at Student Health Services in Thompson Hall and physicians do not make residence hall or house calls. A student who is unsure about a medical issue or problem may call (806) 743-2860 and speak confidentially to the triage nurse. If all appointments are filled for the day, the triage nurse will advise on care until the student can be seen. Students are not given excuses for missed classes or exams due to a clinic visit. Students experiencing a lengthy illness that may affect their academic performance may consult their Student Health Services physician about obtaining a letter explaining the situation.

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

Pharmacy services are also conveniently located in Thompson Hall and can be contacted at (806) 743-2636. The pharmacy can fill most prescriptions, including those written by an outside physician or transferred from another pharmacy. Over-the-counter medications are available at reduced prices. Pharmacy purchases may be charged to major credit cards, Tech Express, and prescription insurance cards.

The medical services fee does not cover after-hours care, hospital emergency room visits, hospitalization, and referrals to providers outside of Student Health Services. Students who are between semesters in the summer and want to continue to use Student Health Services may do so by paying a bridge fee. Please contact Student Health Services at (806) 743-2860 for more information and eligibility.

Student Health Services is not a substitute for major medical insurance. Students should have their own insurance policies or coverage on their parents' insurance. Students who are thus covered should carry an insurance card in case they need medical care not covered by the medical services fee. Students who do not have insurance or who are not covered by a family policy may purchase student injury and sickness insurance through a plan offered by the TTU Student Association. Contact Student Health Services at (806) 743-2860 for enrollment information.

The university requires that all students born after December 31, 1956, provide proof of two MMR immunizations in their lifetime. The first immunization must have been received on or after the first birthday. The two immunizations

must have been received at least 30 days apart. Students must meet this requirement by providing documentation of the immunization by the fifth week of the first semester of enrollment. Failure to comply with this requirement will result in a block being placed on the student's records. Documentation may be mailed to Student Health Services, Medical Records, 3601 4th Street, Lubbock TX 79430 or faxed to (806) 743-2122. Include your social security number or ID number on all documentation. Students may obtain the immunization by appointment at Student Health Services in Thompson Hall. Questions regarding MMR status should be directed to Student Health Services at (806) 743-2860 ext. 276.

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

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

The 77th Texas legislature passed a law requiring that all public institutions of higher education in Texas provide information to new students about bacterial meningitis. The university is extending this requirement and notifying ALL Texas Tech students of this information. Please review the information at www.techsis.admin.ttu.edu/health.htm. Once you have read and confirmed that you have received this information, your student record will be updated.

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

see if the cost of this vaccine is covered. If you have any questions or would like to receive the vaccination for bacterial meningitis, please contact Student Health Services at (806) 743-2860.

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

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

Contact information: (806) 743-2860, www.depts.ttu.edu/studenthealth.

Student Media

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

Student Mediation Center

The Student Mediation Center is comprised of two offices: Student Legal Services and Student Judicial Programs.

Mediation Services. This program is offered at Texas Tech as part of the Voluntary Alternative Dispute Resolution (ADR) Program to increase student options in addressing interpersonal and university-related disputes. Mediation creates and explores many alternatives to a dispute, thus opening more avenues for settlement. It is an informal and confidential alternative to the existing grievance and complaint procedures; however, using this service does not forfeit an individual's right to access the traditional processes.

Student Legal Services. A program designed to bring legal advice and guidance within the reach of students was inaugurated at Texas Tech in 1973. The office is staffed by two licensed attorneys, a legal secretary, a clerical specialist, law clerks, and student interns from the Texas Tech School of Law. The legal office is located in 250 West Hall; appointments are encouraged.

The primary objectives of the program are to afford the students confidential legal advice on individual problems and to establish an educational office designed to inform the students of their obligations and duties as well as their

rights as defined by a system of law. Informal lectures on legal topics of concern are conducted on request.

The attorneys for students are able to represent students in court under limited circumstances; however, most cases are resolved through negotiation, advice, and proper direction. The office is dedicated to the concept of preventive law. **Contact information:** 250 West Hall, (806) 742-3289.

Student Judicial Programs. This program implements student judicial procedures because it is the responsibility of the university to consider any referral alleging a code of conduct violation. Some of the programs provided are background checks, Raider Assistance Program (RAP), Web-based alcohol program, and Clery Act reporting for the university.

Contact information: 250 West Hall, (806) 742-1714.

Student Organization Advisory Congress (SOAC)

The SOAC is a melting pot of all registered student organizations on campus. It allows students to have a fair and equal say in university-related matters, to promote the events of their organization, to educate and diversify the campus, and to promote events sponsored by the Student Government Association and the Center for Campus Life.

Student Union

The Student Union is one of the few buildings on campus specifically constructed and operated for the out-of-class activities of the campus community. The first phase of an ambitious addition and renovation project has been completed, adding more than 90,000 square feet of floor space. The addition includes a Barnes and Noble superstore, the Tech Bistro, the High Tech Computer Store, offices for the Union, a 100-seat theater, Center for Campus Life, Student Government Organization, and more than 60 student organizations.

When the full renovation is complete in spring 2005, the finished facility will feature 25 technologically capable meeting rooms, eight reflection rooms where students can spend quiet time, and a retail corridor that will house a variety of businesses and service providers whose specialty is serving the campus community.

The fast food area will include at least seven new food concepts and an expanded seating area. A rotunda also will be attached to the fast food seating area where students can eat and enjoy a panorama of the surrounding campus. When the renovations are complete, the Student Union will be one of the preeminent facilities in the United States.

The Student Union Ticket Booth serves as the major outlet for advance ticket sales for many campus functions. The service is provided free of charge to any registered student organization. The ticket booth is also a location for Select-A-Seat, the computerized ticketing ser-

vice that allows campus access to events at venues in Lubbock and across the region, including major concerts and shows. It is open from 8:30 a.m. to 4:30 p.m. Monday through Friday in the Information Center on the first floor.

The Student Union is open from 7 a.m. to 10:30 p.m. weekdays, 8 a.m. to 10:30 p.m. Saturday, and 2 to 10:30 p.m. Sunday.

Study Abroad Office

In today's globalized job market, students who participate in a study abroad program are more marketable and competitive in almost every field. An overseas education allows students to gain an international perspective that helps them to function objectively in the global marketplace.

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

The TTU Center Seville offers students the opportunity to take TTU catalog classes and receive direct TTU credit since the center functions as a satellite campus. Students may choose to take some general education courses as well as language courses during the semester. Students live with host families and are immersed in the language and culture.

Texas Tech students may also choose to participate in either an affiliated program or reciprocal program ranging from two weeks to a full year. Many TTU departments as well as the foreign language departments offer their own faculty-led programs during the summer. The Study Abroad staff assists students with choosing a program that will fit their needs and provides guidance during the application and orientation process.

Students participating in any TTU study abroad program are qualified to apply for the



Student Union

International Education Fee Scholarship and are still eligible for TTU financial aid to help finance the curriculum. In addition, the Office of International Affairs maintains a reference library containing information about work abroad, internships, and volunteer programs.

For complete information regarding any study abroad program, students should contact the Study Abroad office in the International Cultural Center, (806) 742-3667.

TECHniques Center

The TECHniques Center is a fee-for-service academic enhancement program that is the only one of its kind in Texas. The program provides supplemental academic support services to meet the needs of 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, encouragement, assistance, and guidance. Tutors provide interactive study skills and content tutoring and are trained to work with each student's individual learning style.

Contact information: www.techniques.ttu.edu, techniques.center@ttu.edu, 143 Wiggins Hall, (806) 742-1822.

Traffic and Parking

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

Transcript Service

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

Undergraduate Academics

Overview

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

Requirements for undergraduate degrees are established at three different levels:

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

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

Uniform Undergraduate Degree Requirements

Residence Credit. The minimum actual residence required of each student is two consecutive semesters or the equivalent, and the minimum amount of residence work required is one-fourth of the total hours applicable toward the degree sought. In addition, the last 30 hours of course work must be from Texas Tech. A Texas Tech resident student may apply course work completed at a distance through the university's Extended Studies office toward a bachelor's degree with prior approval of his or her academic dean. A student who has failed a course taken in residence may take that course or a degree-plan alternative through Extended Studies with prior approval of the academic dean.

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

Graduation Under a Particular Catalog.

A student is expected to complete the degree requirements set forth in a particular university catalog. Normally this will be the catalog in effect at the time the student enters a post-secondary school program, assuming that it has not changed from the original degree ob-

jective. For the student who changes a degree objective after beginning a college career, the degree requirements in effect when the student is officially admitted to the college from which the degree is to be received will be applicable. Only with the specific approval of the academic dean may a different catalog be selected. In no case may a student complete the requirements set forth in a catalog more than seven years old. When necessary, a catalog issued later than the student's first registration may be selected by the academic dean in conference with the student.

The annual catalog is published each summer, and its provisions apply during the following school year, September through August. However, a student who registers for the first time in the university during a summer session is subject to the degree requirements set forth in the catalog effective for the fall semester immediately following the initial enrollment.

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

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

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

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

Second Bachelor's Degree. No second bachelor's degree is conferred until the candidate has completed at least 24 semester hours—exclusive of credit by examination—in addition to the courses counted toward the first bachelor's degree.

Foreign Language Requirement

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

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

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

Any foreign language courses not used to satisfy the foreign language requirement or other Core Curriculum requirements may be used to satisfy the humanities requirement in the Core Curriculum and, in some cases, the multicultural requirement.

Multicultural Requirement

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

Multicultural Requirement

The following courses fulfill the university's multicultural requirement.

TTU Course		TCCNS*	TTU Course		TCCNS*
ADM 3312	History and Philosophy of Dress		HIST 3384	History of Brazil	
AGED 2300	Introduction to Agricultural Education		HIST 3389	The British Empire, 1783 to Present	
ANTH 1301	Understanding Multicultural America		HIST 3395	Africa: Empires and Civilizations	
ANTH 2302	Cultural Anthropology	ANTH 2351	HIST 3396	Africa: Revolution and Nationalism Since 1800	
ANTH 3325	Anthropological Folklore		HIST 3398	The Modern Middle East, 1800 to the Present	
ANTH 3331	Indians of North America		HIST 4327	Gender, Race, and Class in United States Law	
ANTH 3332	Peoples of Latin America		HIST 4381	Colonial Mexico and the Spanish Borderlands	
ANTH 3346	Ancient Civilizations of Middle and South America		HIST 4391	Modern South Africa	
ANTH 4372	Society and Culture of Mexico		HIST 4393	Modern China	
ARCH 2311	History of World Architecture 3000 B.C. to 1600 A.D.		HIST 4394	Modern Japan	
ARCH 2315	History of 18th, 19th, and 20th Century Architecture		HIST 4395	Modern Vietnam	
ARCH 4311	Architecture in Nonwestern Societies		I D 3382	Period Furnishings I	
ART 1309	Art Appreciation	ARTS 1301	LAIS 2300	Latin America and Iberia: An Interdisciplinary Introduction	
ART 1310	Art History Survey I	ARTS 1303	LAIS 3300	Topics in Latin American and Iberian Studies	
ART 2311	Art History Survey II	ARTS 1304	LAIS 4300	Seminar in Latin American and Iberian Studies	
ART 3310	Greek and Roman Art		LARC 3302	Development of Landscape Architecture	
ART 3311	Native American Arts		MGT 4375	International Management	
ART 3315	Ancient Near Eastern and Egyptian Art		MKT 4358	International Marketing	
ART 3317	Baroque Art		MUHL 2301	History of Music	
ART 3318	The Art of the Renaissance		MUHL 2302	History of Music	
ART 4315	The Arts of Pre-Columbian America		PHIL 2350	World Religions and Philosophy	
CLAS 3303	Sports and Public Spectacles in the Ancient World		PHIL 3301	Classical Greek Philosophy	
CLAS 3320	The World of Greece		PHIL 3302	Asian Philosophy	
CLAS 3330	The World of Rome		POLS 3330	Ancient and Medieval Political Theory	
CLAS 3350	Comparative Mythology		POLS 3361	International Politics	
C LT 4305	Contemporary Theories of Cultural Meaning		POLS 3364	Comparative Foreign Policy	
COMS 3311	Rhetoric in Western Thought		POLS 3371	Comparative Politics	
COMS 3332	Intercultural Communication		POLS 3372	Government of Russia and the Commonwealth of Independent States	
EDEL 2300	Schools, Society, and Diversity		POLS 3373	Government of Western Europe	
EDSE 2300	Schools, Society, and Diversity		POLS 3374	Government of Mexico and the Caribbean	
ENGL 2371	Language in a Multicultural America		POLS 3375	South American Governments	
ENGL 3335	Ancient and Medieval World Literature		POLS 3376	Asian Governments and Politics	
ENGL 3336	Early Modern World Literature		POLS 3378	Middle Eastern Governments and Politics	
ENGL 3337	Modern and Contemporary World Literature		PSY 3398	Ethnic Minority Psychology	
ENGL 3387	Literature of Diverse Americans		RHIM 3350	Travel and Tourism	
ENGL 3390	Literatures of the Southwest		RTL 3340	International Retailing	
ESS 3354	Sport in World Cultures		RUSN 2303	An Introduction to Russian Culture	
FIN 4328	International Finance		RUSN 3301	Russian Civilization Through Literature in the 19th Century	
F&N 4380	Cultural Aspects of Food		RUSN 3302	20th Century Russian Civilization Through Literature in Translation	
FREN 3390	French Culture		RUSN 4301	The Great Russian Realists: Tolstoy and Dostoevsky	
FREN 4322	Civilisation Française: French Civilization		RUSN 4302	Contemporary Russian Literature in Translation	
GEOG 2351	Regional Geography of the World	GEOG 1303	SLAV 2301	The Vampire in East European and Western Culture	
GEOG 3360	Technology and the Human Landscape		SOC 3324	American Minority Problems	
GEOG 3363	Geography of South America		SOC 3348	Sociology of China and Japan	
GEOG 3364	Geography of Middle America		SPAN 3306	Intro. to Hispanic Life and Culture	
GERM 3301	German Culture and Society		SPAN 3344	Mexican Life and Culture	
GERM 3306	Contemporary German		SPAN 3390	Hispanic Culture and Civilization	
GERM 3312	Literature of the Holocaust		SPAN 4332	Civilización Hispánica: Hispanic Civilization	
GERM 4305	Readings in German Language and Literature		SPAN 4344	Contemporary Mexico	
HDFS 3350	Development in Cross-Cultural Perspectives		SPAN 4360	Mexican American Literature	
HIST 2322	World History to 1500	HIST 2321	SPAN 4361	Spanish for the Southwest	
HIST 3306	African American History to 1877		SPAN 4335	Internship in Spanish	
HIST 3307	African American History From 1877 to Present		TH A 3308	History of Theatre I	
HIST 3311	Social and Cultural History of the Southwest		TH A 3309	History of Theatre II	
HIST 3312	Spanish-Speaking Peoples in the U.S. . . .		W S 4327	Gender, Race, and Class in U.S. Law (HIST 4327)	
HIST 3318	The Plains Indians				
HIST 3325	History of Mexican Americans in the U.S.				
HIST 3326	History of Native Americans in the U.S.				
HIST 3381	Colonial Latin America				
HIST 3382	Modern Latin America				

* For an explanation of TCCNS (Texas Common Course Numbering System), see page 20.

Undergraduate Majors

Students who are undecided about a major may enroll as an undeclared student in the College of Arts and Sciences. Undecided students with a general interest in a particular area (e.g., agriculture, business) may enroll as an undecided major in one of four other colleges within the university. Choosing a major immediately is not critical for freshmen.

Prelaw and preprofessional health careers (e.g., predentistry, premedicine) are non-degree granting designations. Texas Tech cooperates with the Texas Tech University Health Sciences Center to offer undergraduate courses in selected areas related to the health sciences but does not offer majors in prehealth areas. Most professional health career schools do not specify particular majors as part of their admission requirements and students are advised to choose a major offered within any college in the university. The Preprofessional Health Careers Office assists students with degree plans in preparation for later admission to professional health schools.

• Agricultural Sciences and Natural Resources

Agribusiness (joint)
 Agricultural and Applied Economics
 Agricultural and Applied Economics/
 General Business (dual)
 Agricultural Communications
 Agronomy
 Animal Science
 Environmental Conservation of Natural
 Resources
 Food Technology
 Horticulture
 Interdisciplinary Agriculture (Agricultural
 Education)
 Landscape Architecture
 Plant Biotechnology
 Range Management
 Wildlife and Fisheries Management

• Architecture

Architecture/Business (dual)
 Architecture (Bachelor of Science)
 Architecture/Civil Engineering (dual)

• Arts and Sciences

Anthropology
 Biochemistry
 Biology
 Cell and Molecular Biology
 Chemistry
 Classics (Classical Languages)
 Communication Studies
 Economics
 English

Exercise and Sport Sciences
 French
 General Studies
 Geography
 Geosciences with Geology, Geophysics, or
 Geochemistry specializations
 German
 Health
 History
 International Economics
 Latin American/Iberian Studies
 Mathematics/Computer Science (dual)
 Mathematics
 Microbiology
 Philosophy
 Physics
 Political Science
 Psychology
 Russian Language and Area Studies
 Social Work
 Sociology
 Spanish
 Zoology

• Business Administration

Accounting
 Agribusiness (joint)
 Agricultural and Applied Economics/
 General Business (dual)
 Architecture/Business (dual)
 Business Economics
 Finance
 General Business
 International Business
 Management
 Management Information Systems
 Marketing
 Petroleum Land Management

• Education

Multidisciplinary Studies
 Multidisciplinary Science
 Majors using the term "Education" are
 not offered (e.g., Secondary Education).
 Students are certified to teach but must
 complete noneducation majors.

• Engineering

Architecture/Civil Engineering (dual)
 Chemical Engineering
 Chemical Engineering/Computer
 Science (dual)
 Civil Engineering
 Computer Engineering
 Computer Science
 Construction Technology
 Electrical - Electronics Technology
 Electrical Engineering
 Electrical Engineering/Computer
 Science (dual)
 Engineering (Bachelor of Arts)
 Engineering Physics

Environmental Engineering
 Industrial Engineering
 Mathematics/Computer Science (dual)
 Mechanical Engineering
 Mechanical Technology
 Petroleum Engineering

• Honors College

Students accepted into the Honors
 Program are concurrently enrolled in
 the college that houses their major area
 of study. Honors College opportunities
 and diploma designations are available
 within all of the colleges. The Honors
 College offers an interdisciplinary
 major in:

Natural History and Humanities
 (Bachelor of Arts)

• Human Sciences

Apparel Design and Manufacturing
 Early Childhood
 Family and Consumer Sciences
 Food and Nutrition
 Human Development and Family
 Studies
 Interior Design
 Personal Financial Planning
 Restaurant, Hotel, and Institutional
 Management
 Retailing

• Mass Communications

Advertising
 Journalism with News Editorial or
 Broadcast specializations
 Photocommunications
 Public Relations
 Telecommunications

• Visual and Performing Arts

Art History
 Dance
 Design Communication (Art)
 General Studies
 Music (Bachelor of Arts)
 Music (Teacher Certification)
 Music Composition
 Music Performance
 Music Theory
 Studio Art
 Theatre Arts (Bachelor of Arts)
 Theatre Arts with specializations in
 either Acting or Design/Technology
 Visual Studies (Art)

Core Curriculum

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

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

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

A. Communication

1. Written: English rhetoric, composition: 6 hours

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

TTU Course

ENGL 1301 Essentials of College Rhetoric
ENGL 1302 Advanced College Rhetoric

In addition to the 6 hours of composition and rhetoric, a writing-across-the-curriculum requirement includes 6 hours of writing-intensive courses in the major.

TCCNS**

ENGL 1301
ENGL 1302

2. Oral: Speech: 3 hours

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

TTU Course

CH E 2306 Exposition of Technical Information
COMS 1300 Introduction to Communication Studies
COMS 2300 Public Speaking
COMS 3358 Business and Professional Communication
MGT 3373 Managerial Communication
PETR 3308 Engineering Communications

TCCNS**

SPCH 1311
SPCH 1315

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

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

TTU Course

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

TCCNS**

MATH 1314

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

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

TTU Course

ANSC 3404 Consumer Selection and Utilization of Meat Products
ANTH 2300 Physical Anthropology
ANTH 2100 Physical Anthropology Laboratory
ASTR 1400 Solar System Astronomy
ASTR 1401 Stellar Astronomy
ATMO 1300 Introduction to Atmospheric Science
ATMO 1100 Atmospheric Science Laboratory
BIOL 1305 Ecology and Environmental Problems
BIOL 1113 Environmental Problems Laboratory
BIOL 1401 Biology of Plants
BIOL 1402 Biology of Animals
BIOL 1403 Biology I
BIOL 1404 Biology II
CHEM 1305 Chemistry and Society I
CHEM 1105 Experimental General Chemistry I (Laboratory)
CHEM 1306 Chemistry and Society II
CHEM 1106 Experimental General Chemistry II (Laboratory)
CHEM 1307 Principles of Chemistry I
CHEM 1107 Principles of Chemistry I (Laboratory)
CHEM 1308 Principles of Chemistry II
CHEM 1108 Principles of Chemistry II (Laboratory)
F&N 1410 Science of Nutrition
GEOG 1401 Physical Geography
GEOL 1303 Physical Geology
GEOL 1101 Physical Geology Laboratory
GEOL 1304 Historical Geology
GEOL 1102 Historical Geology Laboratory
GEOL 1350 History of Life
GEOL 1105 History of Life Laboratory
HONS 2305 Honors Integrated Science I
HONS 2115 Honors Integrated Science (Lab I)
HONS 2306 Honors Integrated Science II
HONS 2116 Honors Integrated Science (Lab II)
PHYS 1401 Physics for Nonscience Majors
PHYS 1403 General Physics I
PHYS 1404 General Physics II
PHYS 1408 Principles of Physics I
PHYS 1406 Physics of Sound and Music
PHYS 2401 Principles of Physics II
PSS 1411 Principles of Horticulture
PSS 2330 Urban Soils
PSS 2130 Urban Soils Laboratory
PSS 2401 Introductory Entomology
ZOOL 2403 Human Anatomy and Physiology I

TCCNS**

ANTH 2301*
PHYS 1411
PHYS 1412
BIOL 2306
BIOL 2106
BIOL 1411
BIOL 1413
BIOL 1406
BIOL 1407
CHEM 1305
CHEM 1105
CHEM 1307
CHEM 1107
CHEM 1311
CHEM 1111
CHEM 1312
CHEM 1112
GEOG 1301*
PHYS 1410
PHYS 1310 (or 1401)
PHYS 1402
PHYS 2425
PHYS 2426
HORT 1401
AGRI 1413
BIOL 2401

* Does not include lab course

**See page 20 for an explanation of TCCNS (Texas Common Course Numbering System).

D. Technology and Applied Science: 3 hours

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

TTU Course

TTU Course		TCCNS
ADM 3305	Computer Applications in Apparel Design	
AGED 4302	Transfer of Agricultural Technology	
AGSM 2302	Agricultural Surveying and Land Conservation	
AGSM 3303	Internal Combustion Engine Theory and Operation	
AGSM 4302	Agricultural Buildings and Environmental Control	
ANSC 1401	General Animal Science	AGRI 1419
ANSC 2303	Care and Management of Companion Animals	
ANSC 3402	Animal Breeding and Genetics	
ARCH 2351	Building Systems	
ARCH 3350	Building Technology	
ART 3362	Technology in the Visual Arts	
ATMO 2301	Weather, Climate, and Human Activities	
ATMO 3301	General Meteorology	
C E 1130	Civil Engineering Seminar I	
CH E 1305	Engineering Analysis I	
CHEM 3305	Organic Chemistry I	
C S 1300	Computers and Modern Society	COSC 1301
C S 1412	Programming Principles II	COSC 1320
C S 3368	Introduction to Artificial Intelligence	
CTEC 1312	Construction Methods	
CTEC 2301	Surveying and Surveys	ENGR 1307
E E 1305	Introduction to Engineering and Computer Programming	
EDIT 2318	Computing and Information Technology	
EDIT 3318	Applications of Technology in Elementary Education	
EM&C 3300	Electronic Media and Society	
EM&C 3310	Introduction to Electronic Media and Communications	
F&N 2310	Principles of Food Preparation	HECO 1315
FD T 2300	Principles of Food Technology	AGRI 1329
FD T 2302	Elementary Analysis of Foods	
FD T 3301	Food Microbiology	
FD T 3303	Food Sanitation	
GEOG 3353	Man, Resources, and Environment	
GEOG 3360	Technology and the Human Landscape	
GEOG 4301	Geomorphology in Environmental Management	
GEOL 3323	Environmental Geology	
GEOL 3428	GIS in Nat. Science and Engineering	
GTEC 1312	Alternating and Direct Current Technology	
HONS 1302	Honors First-Year Seminar in Science	
HONS 3302	Honors Seminar in Sciences	
ID 4383	Computer-Aided Drafting for Interior Designers II	
I E 1305	Engineering Analysis	
I E 3351	Manufacturing Engineering I	
I E 4363	Work and Product Safety Engineering	
ISQS 2340	Introduction to Computer Systems in Business	
ISQS 3344	Introduction to Production and Operations Management	
MATH 3430	Computational Techniques for Science and Mathematics	

MBIO 4307	Industrial Microbiology	
M E 1315	Intro to Mechanical Engineering	
M E 2322	Engineering Thermodynamics I	
MTEC 1312	Mechanical Engineering Projects in Electronic and Experimental Music	
MUCP 3001		
MUSI 3341	Introduction to Technology for Musicians	
PETR 1305	Engineering Analysis I	
PFP 2310	Technological Application in Personal Financial Planning	
PHIL 3330	Philosophy of Science	
PHYS 1305	Engineering Physics Analysis I	AGRI 1307
PSS 1321	Agronomic Plant Science	
PSS 2311	Vegetable Crops	
PSS 2312	Propagation Methods	
PSS 2432	Principles and Practices in Soils	
PSS 3323	Crop Growth and Culture	
RHIM 3303	Computers in the Hospitality Industry	
RWFM 2301	Introductory Wildlife	AGRI 2322
RWFM 2302	The Ecology and Conservation of Natural Resources	
RWFM 2305	Freshwater Ecology and Fisheries	
RWFM 2307	The Diversity of Life	
RWFM 4314	Watershed Planning	
SOC 3352	Technology and Society	
TH A 3304	Principles of Theatrical Lighting	

E. Humanities: 3 hours

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

TTU Course

TTU Course		TCCNS
ADM 3312	History and Philosophy of Dress	
ANTH 3323	Religion of Culture	
ANTH 3325	Anthropological Folklore	
ANTH 3346	Ancient Civilizations of Middle and South America	
ANTH 3351	Language and Culture	
ARCH – All architecture	architecture history courses	
CLAS 3302	Classical Mythology	
CLAS 3303	Sports and Public Spectacles in the Ancient World	
CLAS 3320	The World of Greece	
CLAS 3330	The World of Rome	
CLAS 3350	Comparative Mythology	
C LT 4305	Contemporary Theories of Cultural Meaning	
COMS 3311	Rhetoric in Western Thought	
COMS 3318	Persuasion and Social Movements	
ENGL – All English courses	in literature or linguistics. Excludes courses in technical writing.	
HIST – Any history courses	not used to fulfill Core Curriculum American history requirement	
HONS 1301	Honors First-Year Sem. in Humanities	
HONS 3301	Honors Seminar in Humanities	
HUM 2301	Introduction to Humanities	
HUM 2302	Introduction to Humanities	
JOUR 3350	History of American Journalism	
LAIS 2300	Latin America and Iberia: An Interdisciplinary Introduction	
LAIS 3300	Topics in Latin American and Iberian Studies	

LAIS 4300	Seminar in Latin American and Iberian Studies
LARC 3302	Dev. of Landscape Architecture
NHH 1301	Nat. History and Humanities Seminar
PHIL 2300	Beginning Philosophy
PHIL 2320	Introduction to Ethics
PHIL 2350	World Religions and Philosophy
PHIL 3301	Classical Greek Philosophy
PHIL 3302	Asian Philosophy
PHIL 3303	Modern European Philosophy
PHIL 3304	Existentialism and Phenomenology
PHIL 3320	Introduction to Political Philosophy (POLS 3331)*
PHIL 3322	Biomedical Ethics
PHIL 3324	Philosophy of Religion
PHIL 3332	Feminism and Philosophy
PHIL 4320	Ethics
PHIL 4323	Aesthetics
PHIL 4330	Epistemology
PHIL 4331	Philosophy of Language
PHIL 4340	Metaphysics
POLS 3330	Ancient and Medieval Political Theory
POLS 3331	Introduction to Political Philosophy (PHIL 3320)*
POLS 3332	Modern Political Theory
POLS 3333	Contemporary Political Theory
VPA 3301	Critical Issues in Arts and Culture
W S 2300	Introduction to Women's Studies
W S 3341	Women in European Civilization (HIST 3341)*
W S 4327	Gender, Race, and Class in U.S. Law (HIST 4327)*
W S 4374	Love, Death, and Magic in Europe 1500-1800 (HIST 4374)*

PHIL 1301
PHIL 2306

MUAP 3205	Jazz Improvisation	
MUCP 1201	Introduction to Contemporary Music	MUSI 1286
MUCP 1202	Introduction to Contemporary Music	MUSI 1287
MUEN – All courses except 1103	Marching Band	
MUHL 1308	Music Appreciation	MUSI 1306
MUHL 2301	History of Music (music majors)	
MUHL 2302	History of Music (music majors)	
MUHL 2308	Heritage of Music	MUSI 1308
MUHL 2309	Heritage of Music	MUSI 1309
MUHL 3304	History of Jazz	
MUHL 3308	Masterpieces in Music	
MUHL 3310	History of Rock and Roll	
MUSI 2301	Essential Elements of Music	MUSI 1304
MUTH 1300	Songwriting	MUSI 1303
MUTH 1301	Introduction to Music Theory	MUSI 1301
MUTH 1101	Developmental Aural Skills	
MUTH 1303	Elementary Music Theory I	MUSI 1311
MUTH 1103	Elementary Aural Skills I	MUSI 1216
MUTH 1304	Elementary Music Theory II	MUSI 1312
MUTH 1104	Elementary Aural Skills II	MUSI 1217
SPAN 4392	The Play in Spanish	
TH A 2301	Introduction to Acting	DRAM 1351
TH A 2303	Theatre Appreciation	DRAM 1310
TH A 2304	Introduction to Cinema	DRAM 2366
TH A 3308	History of Theatre I	
TH A 3309	History of Theatre II	
TH A 4303	Theory and Practice of Playwriting	

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

F. Visual and Performing Arts: 3 hours

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

TTU Course

ARCH 1412	Architectonics Studio
ARCH 1441	Architectural Delineation I
ARCH 1442	Architectural Delineation II
ART – All art history courses except 3311 and 4315	
ART 1309	Art Appreciation
ART – All studio courses	
DAN 3313	History of the Dance
HONS 1304	Honors First-Year Sem. in Fine Arts
HONS 3304	Honors Seminar in Fine Arts
LARC 1401	Landscape Architecture Drawing and Drafting
MUAP 1001	Applied Music Instrument or Voice
MUAP 1002	Applied Music Instrument or Voice
MUAP 2001	Applied Music Instrument or Voice
MUAP 2002	Applied Music Instrument or Voice
MUAP 3001	Applied Music Instrument or Voice
MUAP 3002	Applied Music Instrument or Voice
MUAP 4001	Applied Music Instrument or Voice
MUAP 4002	Applied Music Instrument or Voice
MUAP 1123	Group Keyboard Instruction I
MUAP 1124	Group Keyboard Instruction II
MUAP 2123	Group Keyboard Instruction III
MUAP 2124	Group Keyboard Instruction IV
MUAP 2133	Class Guitar
MUAP 2134	Class Guitar

TCCNS

ARTS 1301

MUSI 1181
MUSI 1182

MUSI 1192
MUSI 1193

G. Social and Behavioral Sciences: 15 hours

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

1. U.S. History: 6 hours

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

TTU Course

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

TCCNS

HIST 1301
HIST 1302

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

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

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

TTU Course

POLS 1301	American Government, Organization
POLS 2302	American Public Policy

TCCNS

GOVT 2301
GOVT 2302

3. Individual or Group Behavior: 3 hours

TTU Course

TTU Course		TCCNS
AAEC 2305	Fundamentals of Agricultural and Applied Economics	AGRI 2317
ADV 4313	International Advertising	
ANTH 1301	Understanding Multicultural America	
ANTH 2301	Introduction to Archeology	ANTH 2302
ANTH 2302	Cultural Anthropology	ANTH 2351
ANTH 3305	Anthropological Linguistics	
ANTH 3306	Women in Culture and Society	
ANTH 3315	Health, Medicine, and Culture	
ANTH 3331	Indians of North America	
ANTH 3332	Peoples of Latin America	
ANTH 3345	North American Archeology	
ANTH 3371	Peoples of the Southwest	
ANTH 4372	Society and Culture of Mexico	
ARCH 1311	Design, Environment, and Society	
ART 3311	Native American Arts	
ART 4315	Arts of Pre-Columbian America	
COMS 1301	Interpersonal Communication	SPCH 1318
COMS 2350	Intro. to Communication Disorders	
COMS 3313	Persuasion	
COMS 3331	Nonverbal Communication	
COMS 3332	Intercultural Communication	
COMS 3334	Gender and Communication	
COMS 3353	Small Group Communication	
COMS 3355	Communication in Organizations	
COMS 3356	Leadership and Communication	
ECO 2301	Principles of Economics I	ECON 2302
ECO 2302	Principles of Economics II	ECON 2301
ECO 2305	Principles of Economics	
EDEL 2300	Schools, Society, and Diversity	
EDSE 2300	Schools, Society, and Diversity	
ESS 3352	Gender Issues in Sports	
ESS 3354	Sport in World Cultures	
F&N 4380	Cultural Aspects of Food	
GEOG 2351	Regional Geography of the World	
GEOG 3337	Man's Economic Environment	
HDFS 2303	Life Span Human Development	PSYC 2314
HDFS 2322	Courtship and Marriage	SOCI 2301
HDFS 3301	Theories of Human Development and the Family	
HDFS 3321	Human Sexuality Through Family Life Cycle	
HDFS 3322	The Family in the Community	
HDFS 3325	Family Dynamics of Addiction	
HDFS 3331	Parenting	
HDFS 3332	Aging in the Family	
HLTH 1305	Human Sexuality	SOCI 2306
HLTH 2302	Environmental Health and Awareness	
HLTH 3325	Health Concerns in Chemical Dependencies	
HONS 1303	Honors First-Year Seminar in Social Studies	
HONS 3303	Honors Seminar in Social Sciences	
I E 3301	Engineering Economic Analysis	
I E 4361	Engineering Design for People	
JOUR 4330	Public Opinion and Propaganda	
MCOM 1300	Intro. to Mass Communication	COMM 1307
PFP 3301	Financial Planning for Young Adults	
PHIL 3321	Philosophy of Law	
PHIL 3331	Philosophy of Social and Human Sciences	
POLS 3326	Women in Politics	
POLS 3341	The Administrative Process	
POLS 3351	The Judicial Process	
POLS 3361	International Politics	
POLS 3371	Comparative Politics	
PSY 1300	General Psychology	PSYC 2301
PSY 2301	Child Psychology	PSYC 2307

PSY 3398	Ethnic Minority Psychology	
PSY 4300	Psych. of Human Sexual Behavior	
PSY 4325	Drugs, Alcohol, and Behavior	
PSY 4330	Psychology of Life Span Development and Aging	
SOC 1301	Introduction to Sociology	SOCI 1301
SOC 1320	Current Social Problems	SOCI 1306
SOC 2331	The Sociology of Marriage	SOCI 2301
SOC – All sociology advanced courses except SOC 3391 and 4391		
S W 2301	Introduction to the Social Welfare Institution	SOCW 2361
S W 3311	Human Behavior and the Social Environment I	
W S 1305	Human Sexuality (HLTH 1305)*	
W S 2331	Sociology of Marriage (SOC 2331)*	
W S 3306	Women in Culture and Society (ANTH 3306)*	
W S 3312	Gender and Communication (COMS 3334)*	
W S 3321	Human Sexuality Through Family Life Cycle (HDFS 3321)*	
W S 3325	Gendered Lives (SOC 3325)*	
W S 3326	Women in Politics (POLS 3326)*	
W S 3331	Sociology of the Family (SOC 3331)*	
W S 3337	Inequality in America (SOC 3337)*	
W S 4302	Psychology of Human Sexual Behavior (PSY 4300)*	
W S 4399	Women's Studies Seminar	

*Cross-listed courses: student cannot receive credit for both courses



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

Participating in GOT Contract Benefits First-Year Freshmen

The Graduate-On-Time (GOT) Contract is a partnership between students and the university. Students who sign the contract agree to numerous conditions that guide their studies and their progress toward a degree. The university's colleges and departments also agree to certain remedies to prevent a delay in graduation whenever a student has met the conditions of the contract and may be facing a delay due to an unavailable course or courses.

While participation in the contract is not mandatory, partnering with the university to graduate on time places the student in a position to receive numerous financial benefits. The state mandates and the university pays a \$1,000 tuition rebate if a student completes a degree within 3 attempted hours of a specific degree plan (9 hours of AP credit allowed). In addition, the Texas B-On-Time Loan program offers interest-free loans for qualified students. If a student graduates with at least a 3.0 GPA and either finishes within the specified time period or has no more than 6 hours beyond what is required to complete the degree, the loan will be forgiven.

Only students who enter the university directly from high school are eligible to sign the agreement and participate in the GOT Contract. The contracts can be signed at the office of the student's academic advisor after a course of study has been planned and the student has selected a major. Although most degrees can be completed in four years, some require more time. The majors that qualify for the GOT contract and the wording of the contract are provided here. Contact your academic advisor or refer online to www.graduateontime.ttu.edu for more information.

Sample Contract

Embark on your college career in a timely manner and catapult into a career or graduate/professional school as soon as possible. The GOT Contract program encourages and enables you to complete your degree in a timely manner and signals to employers and post-graduate programs that you are organized, hardworking, and committed to academic success. The GOT Contract is a two-party agreement signed by you and the Provost of Texas Tech University. Although it is not required and no penalties exist for not participating, planning ahead for a timely graduation in the face of rising education costs can save you at least \$8,000 for every semester you remain in college.

The GOT Contract program is offered to you as a first-year freshman student beginning in the fall of 2004. When you sign a GOT Contract, you agree to work in concert with your academic program advisor to chart a course for timely graduation. You and your advisor will develop an educational plan to assist you in graduating within the specified time period. The plan will include, but is not limited to:

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

STUDENT COMMITMENT

By signing the GOT Contract, I agree to the following conditions:

- Sign this agreement prior to advanced registration during my second long semester of classes.
- Choose a major that qualifies for the GOT Contract.
- Be admitted to a major (or change majors) in time to meet the sequence of required courses in the contract period.
- Stay on track by earning a minimum of 30 credit hours per academic year (September to August).
- Avoid being placed on academic suspension.
- Maintain a current email address, local mailing address, and other contact information. Make changes to these addresses at any time on the TechSIS "Web for Students" (www.techsis.admin.ttu.edu/students).
- Meet with my academic program advisor at least once each semester to discuss progress toward graduation and identify courses needed the next semester.
- Register during the advanced registration period.
- Enroll in and successfully complete the courses needed for my 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 my own academic progress so that I stay on schedule for graduating on time. This includes filing my degree plan and applying for graduation by the stipulated deadlines.
- Keep documentation to prove that all these requirements were satisfied.
- Meet all payment obligations to Texas Tech to avoid cancellation of my advanced course registration schedule.
- Accept responsibility for timely annual application for all necessary financial assistance.
- If graduation may be delayed, notify my academic program advisor immediately.

TEXAS TECH COMMITMENT

Texas Tech University assures GOT Contract participants that they will be able to enroll in courses that permit graduation with a single major in the specified and mutually agreed upon time period. The plan does not apply to second majors or certificates. Texas Tech will ensure the availability of courses.

In the event the university does not satisfy the commitments made herein and you 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 procedures as the exclusive remedy for GOT Contract signers:

- Allow you 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 your major.
- Allow you to graduate on time by waiving the requirement to be met by the department or college offering your major.
- Allow the unavailability of a course(s) to delay you from graduating on time, in which case the university will pay the institutional tuition and fees for you to take the unavailable course(s) at Texas Tech University in a later term.

GOT Contract Undergraduate Majors

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

MAJOR*	YEARS TO COMPLETE DEGREE
• Agricultural Sciences and Natural Resources	
Agribusiness (joint)	4
Agricultural and Applied Economics	4
Agricultural and Applied Economics/ General Business (dual)	5 (144 hrs.)
Agricultural Communications	4
Agronomy	4
Animal Science	4.5 (134 hrs.)
Environmental Conservation of Natural Resources	4
Food Technology	4.5 (134 hrs.)
Horticulture	4
Interdisciplinary Agriculture (Agricultural Education)	4
Landscape Architecture	5 (148 hrs.)
Plant Biotechnology	4
Range Management	4
Wildlife and Fisheries Management	4
• Architecture	
Architecture/Business (dual)	5.5 (161 hrs.)
Architecture (Bachelor of Science)	4.5 (131 hrs.)
Architecture/Civil Engineering (dual)	5.5 (184 hrs.)
• Arts and Sciences	
Anthropology	4
Biochemistry	4
Biology	4
Cell and Molecular Biology	4
Chemistry	4
Classics (Classical Languages)	4
Communication Studies	4
Economics	4
English	4
Exercise and Sport Sciences	4
French	4
General Studies	4
Geography	4
Geosciences with Geology, Geophysics, or Geochemistry specializations	4
German	4
Health	4
History	4
International Economics	4
Latin American/Iberian Studies	4
Mathematics/Computer Science (dual)	5.5 (157 hrs.)
Mathematics	4
Microbiology	4
Philosophy	4
Physics	4.5 (133 hrs.)
Political Science	4
Psychology	4
Russian Language and Area Studies	4
Social Work	4
Sociology	4
Spanish	4
Zoology	4
• Business Administration	
Accounting	4
Agribusiness (joint)	4
Agricultural and Applied Economics/ General Business (dual)	5 (144 hrs.)
Architecture/Business (dual)	5.5 (161 hrs.)
Business Economics	4
Finance	4
General Business	4
International Business	4
Management	4
Management Information Systems	4
Marketing	4
Petroleum Land Management	4
• Education	
Multidisciplinary Studies	4.5 (133-139)
Multidisciplinary Science	4
• Engineering	
Architecture/Civil Engineering (dual)	5.5 (184 hrs.)
Chemical Engineering	4
Chemical Engineering/Computer Science (dual)	5.5 (168 hrs.)
Civil Engineering	4.5 (136 hrs.)
Computer Engineering	4.5 (129 hrs.)
Computer Science	4
Construction Technology	4.5 (129 hrs.)
Electrical - Electronics Technology	4.5 (129 hrs.)
Electrical Engineering	4.5 (129 hrs.)
Electrical Engineering/Computer Science (dual)	5.5 (149 hrs.)
Engineering (Bachelor of Arts)	4
Engineering Physics	4.5 (127-137)
Industrial Engineering	4.5 (129 hrs.)
Mathematics/Computer Science (dual)	5.5 (157 hrs.)
Mechanical Engineering	4
Mechanical Technology	4
Petroleum Engineering	4.5 (129 hrs.)
• Honors College	
Natural History and Humanities	4
• Human Sciences	
Apparel Design and Manufacturing	4
Early Childhood	4
Family and Consumer Sciences	4
Food and Nutrition	4
Human Development and Family Studies	4
Interior Design	4
Personal Financial Planning	4
Restaurant, Hotel, and Institutional Management	4
Retailing	4
• Mass Communications	
Advertising	4
Journalism with News Editorial and Broadcast specializations	4
Photocommunications	4
Public Relations	4
Telecommunications	4
• Visual and Performing Arts	
Art History	4
Dance	4
Design Communication (Art)	4
General Studies	4
Music (Bachelor of Arts)	4
Music (Teacher Certification)	4.5 (137-138)
Music Composition	4.5 (137 hrs.)
Music Performance	4.5 (129-137)
Music Theory	4.5 (134 hrs.)
Studio Art	4
Theatre Arts (Bachelor of Arts)	4
Theatre Arts with specializations in either Acting or Design/Technology	4.5 (131-136)
Visual Studies (Art)	4.5 (135 hrs.)

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

Academic Regulations

Classification of Students. An undergraduate student is classified according to the following: freshman, 0–29 hours completed; sophomore, 30–59; junior, 60–89; senior, 90–completion of degree requirements. The two ranks, junior and senior, are often referred to as “upperclass” and “advanced.” A student who is enrolled for 12 or more credit hours per semester is considered a full-time student; one enrolled for fewer than 12 hours is considered a part-time student. A freshman may have remedial courses (numbered 0301 or 0302) counted as part of a full course load although these courses do not count toward a degree.

All baccalaureate degrees conferred by Texas Tech University are based on the satisfactory completion of specific authorized degree programs comprised of a minimum of 120 semester hours. A student is considered to be making satisfactory progress toward a degree objective when he or she completes at least 12 credit hours in each semester, achieves a GPA of 2.00 or higher in each semester, and maintains an overall GPA of 2.00 or higher.

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

The maximum number of semester hours a student may take without specific permission of the academic dean is as follows: 19 hours per long semester, 16 hours per long semester for students on scholastic probation, and 8 hours per summer term. In determining a greater load, the dean considers the quality of scholastic work performed by the student, the types of courses involved, the student’s health, and extracurricular interests and activities.

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

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

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

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

Dropping a Course. The procedure for dropping a course varies according to the following:

• Students Entering Before Fall 2004

Students who entered Texas Tech before fall 2004 may officially drop a course through the 30th class day of a long semester or the 12th class day of a summer term and receive the grade of W regardless of their progress in the class. After the 30th class day (12th for summer), the grade of W or WF will be given by the instructor, depending on the student’s progress. Students cannot drop courses within 5 days before the first day of the final examination period during the long semester or 3 days in the summer. A student should continue to attend a class until authorized by the academic dean to drop a course. A grade of WF will be given when the student is required by the dean to drop a course for failure to attend the class or for other reasons.

• First-Time Freshmen and Transfer Students Entering Fall 2004

Because dropping courses delays graduation, first-year freshmen entering Texas Tech in the fall of 2004 will be allowed only four Ws to be used at any time during their college career to drop a course up to five days before the beginning of final examinations for long terms or three days for short summer terms. Transfer students will receive three Ws. When these Ws have been used, the student must complete all courses. Students who find it necessary to withdraw from the university before the end of the semester will not have to use their Ws for withdrawal. If a student who started with four Ws does not drop any course during the pursuit of a degree, that student may take one course without paying institutional tuition (as opposed to state tuition) during the last semester of that degree program.

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 make sure that they can meet all enrollment requirements. The student then completes an academic transfer form in the receiving dean’s office. The last day to change college is the last day to drop a course or withdraw from the university.

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

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

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

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

In the event of excessive absences, the student must visit the instructor to discuss his or her status in the course. If it is decided that the student should drop the course, the instructor will then assign a grade of W or WF (see sections on dropping a course and on withdrawal). 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. The instructor so notified must not penalize the student, although the student is responsible for material missed. Students absent because of university business must be given the same privileges as other students (e.g., if other students are given the choice of dropping one of four tests, then students with excused absences must be given the same privilege).

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

Absence Due to Religious Observance. A student who is absent from classes for the observance of a religious holy day, according to the legal definition, will be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence if, not later than the 15th day after the first day of the semester, the student has notified the instructor of each scheduled class that the student will be absent for a religious holy day.

This notification will be in writing and will be delivered by the student personally to the instructor of each class, with receipt of the notification acknowledged and dated by the instructor, or by certified mail, return receipt requested, addressed to the instructor of each class.

A student who is excused under this policy must not be penalized for the absence, but the instructor may appropriately respond if the student fails to satisfactorily complete the assignment.

Academic Integrity. It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and a high standard of integrity. The attempt of students to present as their own any work that they have not honestly performed is regarded by the faculty and administration as a serious offense and renders the offenders liable to serious consequences, possibly suspension.

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

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

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

1. Copying from another student's test paper.
2. Using materials during a test that have not been authorized by the person giving the test.
3. Failing to comply with instructions given by the person administering the test.
4. Possessing materials during a test that are not authorized by the person giving the test, such as class notes or specifically designed "crib notes." The presence of textbooks constitutes a violation only if they have been specifically prohibited by the person administering the test.
5. Using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program.
6. Collaborating with or seeking aid or receiving assistance from another student or individual during a test or in conjunction with an assignment without authority.
7. Discussing the contents of an examination with another student who will take the examination.
8. Divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructor has designated that the examination is not to be removed from the examination room or not to be returned to or kept by the student.
9. Substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment.
10. Paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program.
11. Falsifying research data, laboratory reports, and/or other academic work offered for credit.
12. Taking, keeping, misplacing, or damaging the property of the university, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct.

"Plagiarism" includes, but is not limited to, the appropriation of, buying, receiving as a gift, or obtaining by any means material that is attributable in whole or in part to another source, including words, ideas, illustrations, structure, computer code, other expression and media, and presenting that material as one's own academic work being offered for credit.

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

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

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

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

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

The instructor of record determines all grades for a course. The method of determining a grade will be included in the course syllabus that is to be presented to the 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; W, withdrawal; WF, withdrawal failing. 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. The instructor assigning the grade will stipulate, in writing, at the time the grade is given the conditions under which the I may be removed. The I will remain on record until the faculty member submits a new grade. The I may be replaced by an R if the course is repeated. The appropriate grade will be given for the second registration.

For students who entered Texas Tech prior to fall 2004, a grade of W will be given for a course officially dropped during the first six weeks of a term. A student should continue to attend a class until authorized by the academic dean to drop a course. A grade of WF will be given when the student drops a course after the first 30 days of a term (12 days in summer) if the student is not passing the course at the time of the drop. A grade of WF will be given when the student is required by the dean to drop a course for failure to attend the class or for other reasons.

First-year freshmen entering Texas Tech in the fall of 2004 will be allowed only four Ws to be used at any time during their college career to drop a course up to five days before the beginning of final examinations for long terms or three days for short summer terms. **Transfer students entering in the fall of 2004** will be allowed only three Ws. Regardless of a student's grade status at the time a course is dropped, only a W will appear on the student's records. After a student has used all allotted Ws, the student must complete every course taken and receive a grade.

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

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

Grade Appeals. A student who wishes to appeal a final course grade should first consult with the course instructor, then with the department chairperson, and then, if the matter has not been resolved, with the dean of the college in which the course is offered. A grade appeal must be filed in the office of the dean of the college in which the course is offered within 45 days of the start of the next long semester after the term in which the disputed grade was received. Copies of the grade appeals policy can be obtained from any academic dean's office or from the Center for Campus Life.

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

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

Grade Point Averages. Only courses taken and grades received at this university are used

in calculating grade point averages. The current grade point average is determined by dividing the total number of grade points acquired during that semester by the total number of semester hours of all courses in which the student was registered in that semester, exclusive of courses in which grades such as W, I, P, CR, and PR are received. In the same manner, the cumulative grade point average is obtained by dividing the total number of grade points earned in all courses for which the student has registered at this university, including hours of F and WF, by the total number of semester hours.

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

Grade Replacement Policy. The procedure for repeating a course and replacing a grade varies according to the following guidelines:

• **Students Entering Before Fall 2004**

After a course has been retaken at Texas Tech, a student may apply to the registrar for grade replacement. This policy applies to students enrolled at the university during spring 1993 or thereafter and applies only to those who have not received a baccalaureate degree at the time of the request.

The grade replacement is for the purpose of providing an adjusted grade point average. The most recent passing grade will replace all previous grades in that course. The cumulative adjusted GPA will be posted on the bottom of the student's transcript. A notation will indicate the original course that is being replaced. The original grade and original cumulative GPA will remain. The cumulative (not the adjusted) GPA will be used for honors.

An application may be obtained and initiated by the student in the Office of the Registrar after the current semester academic procedures have been completed. The four parts of the form are for the dean's office, the student's academic home department, the student, and the original for the registrar. Students may apply after the passing grade is received in the replacing course. Students wanting to replace a grade received before fall 1983 should contact their academic dean's office.

• **First-Time Freshmen and Transfer Students Entering Fall 2004**

First-time freshmen and transfer students who enter Texas Tech in the fall of 2004 will not be allowed to repeat a course in which they have earned a grade of C or above. When students repeat a course after having received a grade of D or F, they can repeat the course for credit only one time at the normal tuition rate. Students repeating a course more than once after having received a grade of D or F must pay nonresident tuition and fees.

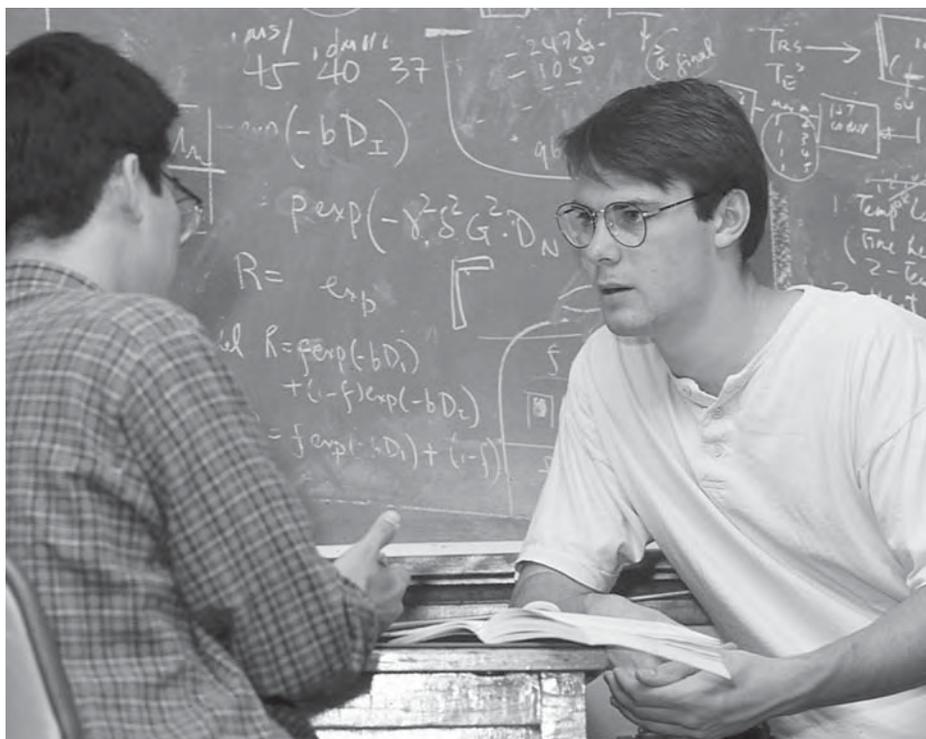
A student placed on scholastic suspension or probation at the end of the semester will not be removed from suspension on the basis of grade replacements that can be or are made after the semester grades are reported. However, a suspended student who attains an adjusted GPA of 2.0 or higher after official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

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

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

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

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



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

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

Credit by Examination for Matriculated Students. With the approval of their academic dean, matriculated students in the university may attempt examinations on courses in which they think they have acquired the basic knowledge. Certain CEEB nationally standardized tests and departmental examinations are available for matriculated students to attempt credit by examination in undergraduate courses (see "Undergraduate Credit by Examination" in Admissions section).

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

Students taking between 7 and 11 hours and otherwise qualifying for the President's or Dean's lists for academic recognition, and who are enrolled in the South Plains College Spanish courses taught on the TTU campus (SPCS 1501, 1502), may count those hours to accumulate enough hours to qualify for those academic lists. The SPC grades are not sufficient to advance one to qualify for the President's or Dean's list; the courses can be used to acquire the necessary number of hours (minimum of 12) to qualify, with TTU grades and SPC grades sufficient to *keep* the student eligible.

Graduation With Honors. Members of a graduating class who complete their work with a cumulative grade point average of 3.9 or above are graduated *Summa Cum Laude*; those who complete their work with a GPA of 3.7 to 3.89 are graduated *Magna Cum Laude*; and those who complete their work with a GPA of 3.5 to 3.69 are graduated *Cum Laude*. Appropriate designation of the honor is made on the diploma and on the commencement program. No person is

considered for graduation honors unless at least one-half of the degree credit has been completed at this institution, and the half must include the senior year. Only grades earned at Texas Tech are counted, and only the cumulative GPA is used to calculate honors.

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

Academic Status. Students are expected to maintain cumulative and current semester grade point averages or adjusted grade point averages of 2.0 or above. Some academic programs have requirements over and above the cumulative GPA of 2.0. A student whose cumulative GPA is above 2.0 but whose current semester GPA is below 2.0 should seek advice and counsel from his or her academic dean.

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

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

Withdrawal From the University. Students who find it necessary to withdraw from the university before the end of a semester or summer term must apply to the Office of the Registrar in 103 West Hall no later than five class days before the first day of the final examination period. Students under the age of 18 should first consult their parents and should secure from them a written statement that they have their permission to withdraw. The grades of W or WF are recorded in keeping with the regulations set forth in the section on Grading Practices and are based on the student's standing on the last day of enrollment in each course in which he or she is registered.

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

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

Scholastic Probation, Suspension Policy

Scholastic Probation. A student whose adjusted GPA is below 2.0 will be placed on "scholastic probation." Such a student may not enroll for more than 16 hours without prior approval of the academic dean. In addition, the student must continue to seek regularly scheduled advice and counsel from an academic advisor or the dean. Any freshman whose fall semester GPA is below 2.0 must complete XL 0201 Strategies for Learning (see next page for course description) successfully the next semester and pay a nonrefundable fee of \$150 for this course.

Continued Scholastic Probation. A probationary student whose current GPA is 2.0 or higher but whose adjusted GPA is below 2.0 will be placed on "continued scholastic probation" until the adjusted GPA is 2.0 or higher.

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

Students on scholastic 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 have received more than one suspension may seek reinstatement after two semesters. Reinstatement granted after suspension will be probationary.

Students who apply for readmission after suspension will be required to undergo such testing and counseling as the academic dean considers necessary. Students who are readmitted after first suspension will be required to complete XL 0201 Strategies for Learning (see next page for course description) successfully during their first semester of readmission and pay a nonrefundable course fee of \$150. **Attendance in XL 0201 is mandatory from the first day of classes. Absences accumulate from the beginning of the semester.** Three absences will result in a student being withdrawn from the university.

Readmission, Reactivation From Probation or Suspension. Students wishing to return to the university will be treated as a former student for readmission purposes but must provide copies of transcripts for all academic work completed at institutions other than Texas Tech. Students must apply at least 60 days prior to open registration for the anticipated semester of enrollment using the web site at www.depts.ttu.edu/formertech.

Conditions of Return From a First Scholastic Suspension. Students returning from a first suspension may reactivate their admission to the college from which they were suspended or to another college if they have decided upon a different major or career goal.

Subsequent Suspensions and Conditions of Return. A student's academic dean must approve a student's readmission following suspension for a second or subsequent time. Readmission of a student who has been suspended for a second or subsequent time is rare and solely at the discretion of the student's academic dean. Permission to change colleges following a second or subsequent suspension is granted infrequently only when good cause has been shown, and then by agreement of the deans of both affected colleges.

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

Course Descriptions for Strategies for Learning (XL)

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

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



Academic Advising

Academic advising services at Texas Tech University are offered through the Advising Center at Texas Tech (ACTT) and also within each academic college and/or major. While students are responsible for their academic progress, academic advisors assist them with educational plans and timely matriculation to graduation. The role of academic advisors is to develop dialog through which students can gain insight and explore academic, career, and life goals. A part of academic advising is a decision-making process in which students are guided toward making informed choices that lead to graduation. Advisors advocate for students in the university system, help students thrive in a large university setting, and serve as resource brokers for the university community and beyond. Helping to plan a class schedule is only one function of the advising process.

Advisors' Responsibilities. Advisors are responsible for providing a process through which students can explore educational and career opportunities offered by the university. Advising responsibilities include the following:

- Provide students with accurate information concerning academic policies and procedures.
- Provide an opportunity for students to discuss educational and career goals.
- Assist students in developing a degree plan.
- Help students develop a long-term program for satisfying the requirements of the degree plan.
- Assist students in selecting and sequencing course work.
- Heighten awareness of campus resources that may be used to help students achieve success in college.
- Use developmental advising as a tool in the retention process.
- Provide students with a caring person who may serve as a role model throughout their college experience.
- Encourage scheduled appointments prior to registration and throughout the semester in order to promote thoughtful planning.
- Orient students to college life and inspire them to achieve excellence.
- Help students understand the need to acquire an education versus a credential.
- Keep an accurate, well-documented file relative to advising activities for each student.
- Maintain confidentiality in accordance with the Family Educational Rights and Privacy Act of 1974.

Students' Responsibilities. Students are expected to be an active and responsible participant in the advising process with the following behavior:

- Make and keep appointments.
- Become familiar with applicable undergraduate sections of the catalog.
- Use various student services provided to enhance success.
- Complete all required paperwork and adhere to university deadlines.
- Keep advisors informed about any circumstances that could influence academic perfor-

mance such as work schedules, illness, family, or other personal situations.

- Take an active role in decision-making concerning academic progress.
- Create a class schedule based on the selection of courses decided upon during the advising session.
- Notify advisors as soon as is practical when a course grade of D or F is received so that the impact on future schedules can be evaluated.
- Consult with advisors prior to dropping any course.
- Thoroughly read the undergraduate sections of the catalog and other official documents.
- Keep a record of all contacts with the university.

Academic advisors at ACTT assist the following student populations: Arts and Sciences undecided (ASUD) students with up to 60 earned hours, prelaw students with up to 30 earned hours; all first-generation college students; and future Texas Tech students. ACTT advisors answer questions about the university and assist students in the decision-making process that leads to choosing an appropriate major or career and making course selections.

ACTT's *DISCOVERY!* program is designed to assist undecided, undeclared, or uncertain students. The program guides students through various campus resources that will empower them to discover their own learning style, personality type, strengths, and interests. After learning more about themselves, they can align this information with an appropriate choice for an academic major and/or career. This cultivates development of independent decision-making skills necessary for successful transitions from a stage in which others have made the majority of life decisions to the stage in which students become the primary decision-makers.

Contact information: 79 Holden Hall, phone (806) 742-2189, fax (806) 742-2200, advising@ttu.edu, www.actt.ttu.edu

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: Accuplacer, ACT, GMAT, GRE, LSAT, MAT, MCAT, MPRE, NICET, OATP, OKAP, PCAT, PRAXIS, TeXeS/EXCET, THEA, TOEFL, TSE.

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

Contact information: Pat McConnel, Director; 242 West Hall; (806) 742-3671; testing@ttu.edu; www.depts.ttu.edu/testing

Off-Campus Educational Sites, Distance Learning, Extended Studies

Off-Campus Sites

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

• *Texas Tech University at Abilene*

Texas Tech University established an off-campus educational site in Abilene in 2002 for the purpose of delivering master's level engineering education. TTU at Abilene became a recognized higher education teaching site in 2003 with master's level computer science and engineering degree programs. Partnerships are being developed to provide faculty and graduate students with research and financial support opportunities that would otherwise not be available.

TTU at Abilene is located at 302 Pine Street and is a 26,000-square-foot, three-story facility with a mezzanine between the first and second floors. The second and third floors are the primary location of the Abilene educational site.

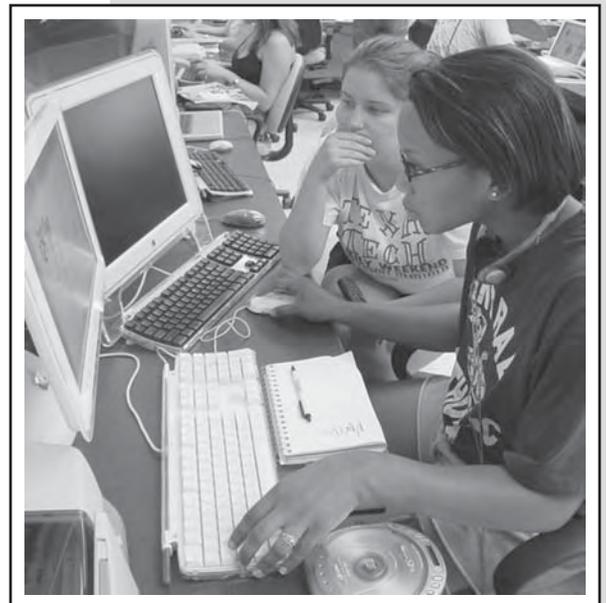
Contact information: To contact TTU at Abilene, call (325) 677-1112 or visit <http://aln.coe.ttu.edu/abilene>. Dr. Dan Cooke, the chairman of the Department of Computer Science at Texas Tech, supervises TTU engineering programs at Abilene. Dr. Jack Barnes is the assistant chairperson and academic director.

• *Texas Tech University at Amarillo*

Texas Tech University established an off-campus educational site in Amarillo in 2002 for the purpose of delivering master's level engineering education. TTU at Amarillo became a recognized higher education teaching site in 2003 with graduate engineering degree programs.

TTU at Amarillo is located at 1616 Kentucky Avenue in the Wellington Square office building. The area is on the first floor and is approximately 5,000 square feet. It is partitioned into six offices, a reception area, a conference room, a kitchen area, and two classrooms. The large classroom has been equipped with video conferencing equipment, and a smaller area has been dedicated as a computer lab for student use.

Contact information: To contact TTU at Amarillo, call (806) 356-4701, or visit <http://aln.coe.ttu.edu/amarillo>. Dr. Milton Smith, the chairman of the Department of Industrial Engineering at Texas Tech, supervises TTU engineering programs at Amarillo. Wallace Johnston manages the educational site.



• **Texas Tech University at Fredericksburg**

Texas Tech established a recognized higher education teaching site in Fredericksburg in 2002 for the purposes of delivering undergraduate and graduate programs to the region. Academic programs from both TTU and the Texas Tech University Health Sciences Center are offered at TTU at Fredericksburg.

Administrative offices are located at 102 E. San Antonio St. and classrooms are in dedicated buildings near the Fredericksburg Primary School at 1110 S. Adams St. Two interactive video classrooms, a traditional classroom, and an Internet lab are used for classroom instruction. Austin Community College is the partner offering first- and second-year core curriculum courses in the Fredericksburg area.

Contact information: To contact TTU at Fredericksburg, call (830) 990-2717 or (806) 742-6440 or visit www.hillcountry.ttu.edu. Dr. James Morris is the academic director.

• **Texas Tech University at Highland Lakes**

Texas Tech established a recognized higher education teaching site in Marble Falls in 2002 for the purposes of delivering undergraduate and graduate programs to the region. Academic programs from both TTU and the Texas Tech University Health Sciences Center are offered at TTU at Highland Lakes.

The administrative and classroom facilities are located at 608 Gateway Central, directly off Highway 281 on the south side of Marble Falls. Two interactive video rooms (one classroom and one conference room), as well as an Internet lab, are available for classroom instruction. Central Texas College is the community college partner offering first- and second-year core curriculum courses in the Highland Lakes area.

Contact information: To contact TTU at Highland Lakes, call (830) 798-9548 or (806) 742-6450, or visit www.hillcountry.ttu.edu. Dr. Bobbie Walker is the academic director.

• **Texas Tech University Center at Junction**

Texas Tech University Center at Junction is an educational center that encompasses 411 acres on the South Llano River in the Texas Hill Country two miles south of Junction on FM 2169. In addition to degree programs and continuing education opportunities, undergraduate and graduate courses are offered in an intensive three-week format during May (Intersession) and early summer. Classes are also available during the fall and spring semesters. The community college partner for Junction is Howard College.

The facilities at Junction include both an interactive video conferencing classroom and traditional classrooms, a lecture hall, offices, laboratories, a library, a darkroom, Mac and

PC computer labs with T1 Internet connections, and specialized art facilities.

In 2002, TTU opened a Field Research Station at Junction to support a research focus on aquatic and watershed management. A wide range of housing accommodations and full meal service are available year round for groups from 20 to 200 people.

Texas Tech University Center at Junction is available for workshops, retreats, and other special activities to Texas Tech student organizations, faculty groups, researchers, and other groups. The Junction facility is home to Red Raider Camp, a freshman spirit and orientation camp, operating from mid to late summer. Recreational opportunities include river activities, hiking and nature trails, a sand volleyball court, and a large swimming pool.

Contact information: To contact the Texas Tech University Center at Junction, call (325) 446-2301 or (806) 742-6434, or visit online at www.junction.ttu.edu. To contact Academic Director Ashton Thornhill, call (806) 742-2184. Director of Programs Martha Richardson can be contacted at (806) 742-6434.

Distance Learning

Texas Tech University offers college credit courses and degree programs as well as K-12 options, a high school diploma program, and non-credit programs at a distance. Offering flexibility and convenience, distance learning opportunities are available in several formats, including web-based independent study (print and, in some cases, online), CD-ROM, two-way interactive television, video, e-mail and audio. These options enable students to take both credit and non-credit courses at their convenience, choosing the appropriate time and place to meet their needs. All college credit courses meet the same academic standards as campus-based courses, and, in many cases, are taught by the same faculty.

Texas Tech University offers the following distance learning degree programs and has other programs under development:

- Bachelor of General Studies
- Master of Arts in Technical Communication
- Master of Education in Instructional Technology
- Master of Education in Special Education
- Master of Engineering
- Master of Science in Petroleum Engineering
- Master of Science in Systems and Engineering Management
- Master of Science in Software Engineering
- Master of Science in Restaurant, Hotel, and Institutional Management
- Doctor of Education in Agricultural Education (joint program with Texas A&M)

The College of Education also offers four college credit distance learning programs leading to state and national certifications. For additional information on distance learning programs, visit www.de.ttu.edu or call (800) 692-6877, ext. 276.

Extended Studies

Extended Studies administers (1) print and web-based distance learning college courses, including a Bachelor of General Studies distance learning degree; (2) Texas Tech University Independent School District (TTUISD); and (3) noncredit professional development and community outreach offerings, conference management services, Institute for the Development and Enrichment of Advanced Learners, and the TTU Ropes Course. Interested students may request information about any of these programs by contacting Extended Studies toll-free at (800) 692-6877, locally at 742-7200, or online at www.dce.ttu.edu. The on-campus offices of Extended Studies are located on the third floor of West Hall and the third floor of the Administration Building. The off-campus office is at 6901 Quaker Ave.

The Bachelor of General Studies degree is offered by the College of Arts and Sciences through Extended Studies. A highly flexible program, the B.G.S. degree features three core areas of concentration (in lieu of a "major") tailored to students' interests or professional goals. Each concentration area consists of courses consistent with the "minor" in various subject disciplines (e.g., English, psychology).

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

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

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

To enroll in an Extended Studies distance education course, the enrollment form located in the back of the *Extended Studies Catalog* or on the web site (www.dce.ttu.edu) must be completed. All Texas Tech students must have the signature of their academic dean on the enrollment form. An Extended Studies college-level course is \$124 per semester hour for both print-based and online courses. In addition, students must pay a \$30 administrative fee for each course and the cost of any textbooks or materials. Students taking college courses will also pay a \$15 per credit hour library services fee and, for online courses, an \$18 per credit hour information technology fee.

University students may take elective courses through Extended Studies on a pass-fail basis

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

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

College of Agricultural Sciences and Natural Resources

Agricultural Science (AGSC)

1111. The Agricultural Industry

Agricultural and Applied Economics (AAEC)

3303. Cooperatives in Agriculture

Plant and Soil Science (PSS)

1411. Principles of Horticulture

4331. Soil and Water Conservation

4335. Soil Fertility Management

College of Arts and Sciences

Communication Studies (COMS)

2300. Public Speaking

Economics (ECO)

2301, 2302. Principles of Economics I, II

English (ENGL)

1301. Essentials of College Rhetoric

1302. Advanced College Rhetoric

2305. Introduction to Poetry

2307. Introduction to Fiction

2311. Technical Writing

3325. Modern and Contemporary American Literature

3389. Short Story

Geography (GEOG)

2351. Regional Geography of the World

History (HIST)

1300, 1301. Western Civilization I, II

2300. History of the United States to 1877

2301. History of the United States Since 1877

3310. Texas History

3328. History of Religion in America

3338. History of Sports and Recreation in the United States

3339. The History of Baseball: A Mirror on America

Interdisciplinary Studies (I S)

1300. Professional Enterprise

Mathematics (MATH)

0302. Intermediate Algebra

1320. College Algebra

1330, 1331. Introductory Mathematical Analysis

1351, 1352. Calculus I, II

2300. Statistical Methods

2345. Introduction to Business Statistics

2350. Calculus III

Political Science (POLS)

1301. American Government, Organization

2302. American Public Policy

3325. Political Parties

3351. The Judicial Process

Psychology (PSY)

1300. General Psychology

3304. Introduction to Social Psychology

3306. Personality

4300. Psychology of Human Sexual Behavior

4305. Abnormal Psychology

4325. Drugs, Alcohol, and Behavior

Sociology (SOC)

1301. Introduction to Sociology

1320. Current Social Problems

Spanish (SPAN)

1501. A Beginning Course in Spanish I

1502. A Beginning Course in Spanish II

1507. Comprehensive Spanish Review-First Year

College of Business Administration

Business Law (BLAW)

3391. Business Law I

Marketing (MKT)

3350. Introduction to Marketing

College of Education

Educational Instructional Technology (EDIT)

2318. Computing and Information Technology

College of Engineering

Engineering (ENGR)

4092. Professionalism and Ethics in Engineering

College of Human Sciences

Food and Nutrition (F&N)

1325. Nutrition, Foods, and Healthy Living

1410. Science of Nutrition

Human Development and Family Studies (HDFS)

2303. Life Span Human Development

2322. Courtship and Marriage

3301. Theories of Human Development and the Family

3320. The Contemporary Family

Restaurant, Hotel, and Institutional Management (RHIM)

2312. Introduction to Beverage Management

3321. Hospitality Control I

3322. Hospitality Control II

3350. Travel and Tourism I

3460. Food Systems Management

College of Mass Communications

Journalism (JOUR)

3350. History of American Journalism

Mass Communications (MCOM)

1300. Introduction to Mass Communications

3300. Mass Media Theories and Society

Telecommunications (TELE)

3310. Introduction to Telecommunications

College of Visual and Performing Arts

Music History and Literature (MUHL)

2309. Heritage of Music

Music Theory (MUTH)

1300. Songwriting

Theatre Arts (THA)

2304. Introduction to Cinema

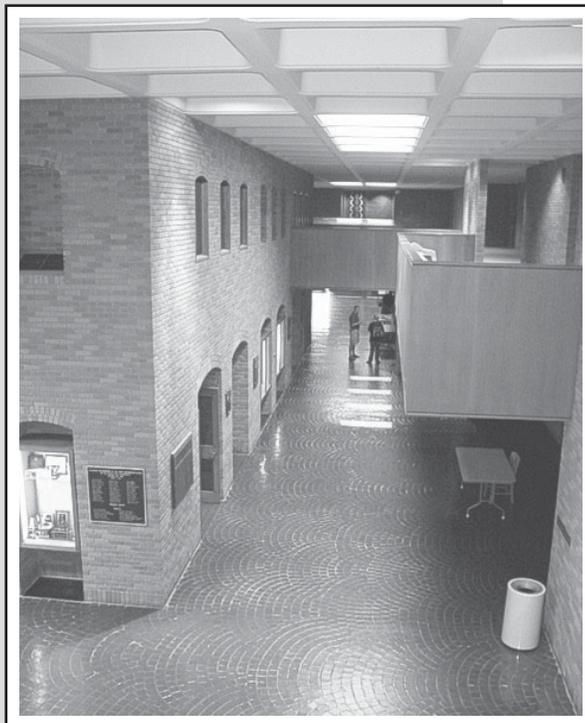
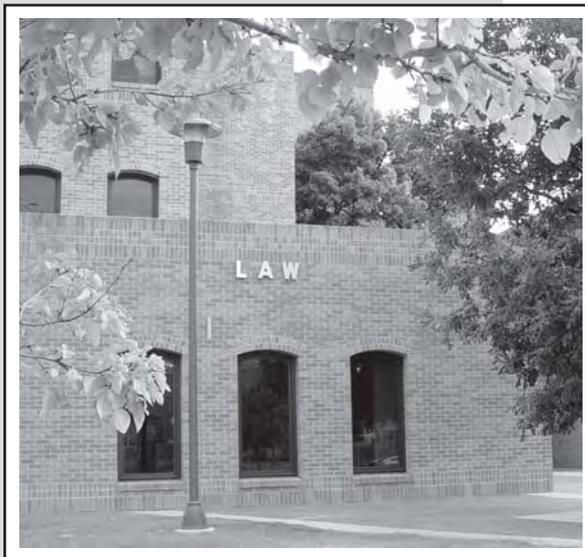
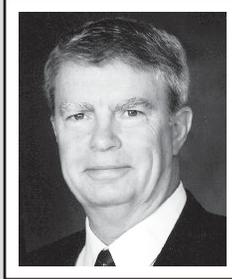
To check the availability of these courses, please contact the Extended Studies office (6901 S. Quaker or West Hall on campus) or visit the Extended Studies web site (www.dce.ttu.edu).



School of Law

Walter B. Huffman, J.D.
Dean

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Lubbock, TX 79409-0004
(806) 742-3791
FAX (806) 742-1629
www.law.ttu.edu



About the School of Law

With a 12-year average pass rate of 90 percent on the State Bar Exam, the School of Law at Texas Tech University has always been a leader among Texas law schools. A small student body, a diverse faculty, and a low student-faculty ratio (19:1) are only a few of the factors that promote learning and encourage interaction between students and professors at the law school.

Because Texas Tech is the only campus in the state that is home to a major university, law school, and medical school, students benefit from this unique combination by not only being able to obtain a Doctor of Jurisprudence (J.D.) but also by being allowed to pursue one of the following joint degree programs:

- J.D./Master of Business Administration
- J.D./Master of Public Administration
- J.D./Master of Science in Agriculture and Applied Economics
- J.D./Master of Science in Accounting (Taxation)
- J.D./Master of Science in Environmental Toxicology
- J.D./Master of Science in Personal Financial Planning
- J.D./Master of Science in Biotechnology
- J.D./Master of Science in Crop Science/Horticulture/Soil Science/Entomology

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 work at the School of Law (unless enrolled under the "3+3" program described below). An applicant's record must be of sufficiently high quality to demonstrate that the applicant is qualified for the study of law.

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

The School of Law cooperates with the Texas Tech University Honors College and the College of Arts and Sciences to provide an Early Decision Plan and a "3+3" Early Admission Program for exceptional undergraduates. For information, consult the Honors College section of this catalog or view www.honr.ttu.edu.

The School of Law does not prescribe a specific prelegal curriculum for its applicants. The wide range of lawyer tasks and the difference in offerings from school to school preclude such an approach. However, all students should strive toward the following goals when planning their college program: acquire the ability to read, write, and speak the English language well; gain a critical understanding of human values and institutions – political, economic, and social; and develop the power to think creatively.

Applications should be submitted to the School of Law at the earliest opportunity after October 1 and no later than February 1 prior to the fall semester.

Administration and Faculty

Dean: Huffman; *Associate Deans:* Fortney, Rosen, Shannon, Torres; *Assistant Deans:* Cook, Fletcher; *Director of International Program:* Ramirez; *Director of the Legal Practice Program:* Soonpaa; *Director of Clinical Programs,* Spain.

George Herman Mahon Professor: Fortney; *Alvin R. Allison Professor:* Casto; *Foundation Professor of Commercial Law,* Krahmer; *Maddox Professor of Law:* Kramer; *Robert H. Bean Professor:* Phelan; *Charles Thornton Professor:* Shannon; *Professors:* Camp, Cochran, Eissinger, Huffman, James, Myhra, Pawlowic, Ramirez, Soonpaa, Spain, Sutton, Torres, Van Cleave, Weninger; *Associate Professors:* Bard, Eckstein, Graham, Laughlin, Lewis, Lopez; *Assistant Professors:* Cunningham, Gonzalez; *Visiting Assistant Professor:* Garza; *Legal Practice Professor:* Holloway; *Legal Practice Associate Professor:* Jones; *Legal Practice Assistant Professor:* Phillips; *Adjunct Faculty:* Baker, Bubany, Conboy, Hensley, Hunt, Terrell.

Graduate School

About the Graduate School

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

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

Mission Statement

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

Academic Diversity

Established in 1923, Texas Tech is one of the youngest major research universities in the country. Consistent dedication to quality and research has earned numerous graduate programs national and international respect. From toxic waste research to archaeology, from land-use programs to nationally known laser fingerprint detection studies, the Texas Tech Graduate School offers unlimited opportunity for the aspiring scholar.

The Graduate School is remarkable for its diversity, offering 103 master's programs and 60 doctoral programs, outnumbering those available at most other multipurpose universities. The number of doctorates awarded during the last five years averaged more than 124, placing Texas Tech in close degree-granting competition with many of the nation's other major research universities. Last year the university conferred 976 master's degrees and 166 doctoral degrees.

The Graduate School strives to maintain flexibility through a combination of options from traditional degree programs to progressive interdisciplinary and multidisciplinary choices. The Graduate School values the student's interests, personal research aims, and career goals. In keeping with that spirit, many outstanding facilities for interdisciplinary research are located at Texas Tech, including 50 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, linguistics, museum science, neuroscience, plant physiology, public administration, sports health, women's studies, and many more.



**John Borrelli, PhD
Dean**

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gradschool@ttu.edu
www.gradschool.ttu.edu



Graduate Degrees

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

• Agricultural Sciences and Natural Resources

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

• Architecture

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

• Arts and Sciences

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

• Business Administration

Accounting, M.S.A.
 Business Administration, M.B.A.
 Business Administration, M.S., Ph.D.
 International Business, I.M.B.A.

• Education

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

• Engineering

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

• Health Sciences

Anatomy, M.S., Ph.D.
 Athletic Training, M.A.T.
 Audiology, Ph.D.
 Cell and Molecular Biology, M.S., Ph.D.
 Communications Sciences and Disorders, Ph.D.
 Health Services Research, M.S.
 Medical Biochemistry, M.S., Ph.D.
 Medical Microbiology, M.S., Ph.D.
 Medicine, M.D.
 Molecular Pathology, M.S.
 Nursing, M.S.N., Ph.D.
 Occupational Therapy, M.O.T.
 Pharmaceutical Sciences, M.S., Ph.D.
 Pharmacology, M.S., Ph.D.
 Pharmacy, Pharm.D.
 Physical Therapy, M.P.T., D.Sci.
 Physician Assistant, M.P.A.S.
 Physiology, M.S., Ph.D.
 Rehabilitation Counseling, M.R.C.
 Rehabilitation Sciences, M.S.
 Speech-Language Pathology, M.S.
 Vocational Rehabilitation, M.V.R.

• Human Sciences

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

• Mass Communications

Mass Communications, M.A.

• Visual and Performing Arts

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

• Interdisciplinary Programs

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

• Joint Programs

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

Administrative Staff

• Graduate School

William M. Marcy, Ph.D., Provost and Professor of Computer Science
John Borrelli, Ph.D., Dean and Professor of Civil Engineering
Wendell Aycok, Ph.D., Associate Dean and Professor of English
Allan D. Headley, Ph.D., Associate Dean and Professor of Chemistry and Biochemistry
Ralph Ferguson, Ph.D., Assistant Dean
Katy F. Henderson, Manager of Financial and Administrative Services
Cindy L. Shepherd, Executive Assistant to the Dean
Gloria McNeme, Senior Administrative Assistant

• Graduate Admissions

Ann McGlynn, Ph.D., Assistant Dean
Peggy R. Duffey, Senior Administrative Assistant

Graduate Council

The Graduate Council is composed of 13 members. Ten of those members are elected by the graduate faculty, two are appointed by the dean, and one is elected by the Faculty Senate from its graduate faculty membership. All 13 are voting members of the Graduate Council. The dean is *ex officio* chairperson of the council; associate deans, the provost (or a designated representative), and others appointed by the dean are *ex officio* and nonvoting members of the council.

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

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

- **Cynthia Akers (2004)**, Ed.D., Member-at-Large
- **Roger Barnard (2005)**, Ph.D., Science and Mathematics
- **Nancy Bell (2006)**, Ph.D., Human Sciences
- **Cary Green (2004)**, Ph.D., Agricultural Sciences
- **Fred Hartmeister (2004)**, J.D., Ed.D., Education

- **Karlene Hoo (2004)**, Ph.D., Engineering
- **Alon Kvashny (2004)**, Ed.D., Faculty Senate Representative
- **Richard McGlynn (2006)**, Ph.D., Social Sciences
- **Bill Pasewark (2005)**, Ph.D., Business Administration
- **Michael Peters (2004)**, Ph.D., Architecture
- **Becky Rickly (2005)**, Ph.D., Humanities
- **Thomas Steinmeier (2004)**, Ph.D., Member-at-Large
- **Michael Stoune (2006)**, D.M.A., Visual and Performing Arts

Graduate Faculty

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

Research Opportunities

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

The multidisciplinary High-Performance Computing Center (HPCC) located at Reese Center uses a state-of-the-art SGI/CRAY system and related virtual reality lab. The HPCC facilitates research within departments as well as multidisciplinary research across the university. It also provides classes in the use of high-performance platforms and in techniques and theory of parallelization of code. These courses can be specialized to meet the needs of individual departments, centers, or research teams.

The Natural Science Research Laboratory, an archive of representative recent fauna of the American Southwest and other areas, functions

as a natural history library for studies of biodiversity, biogeography, ecology, evolution, genetics, molecular biology, parasitology, systematics, and virology. The collections, extensively used for investigations worldwide, include specimens of 72,000 mammals; 4,500 birds; more than 15,000 reptiles, amphibians, and fish; 250,000 insects; and 75,000 cryogenically preserved tissue samples, providing hands-on training for graduate students in biology and museum sciences.

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

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

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

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

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

Special study and research opportunities in Arts and Sciences include the Center for Public

Service and the Institute for Communications Research. Many such programs have their own specialized libraries or collections and nearly all are linked to the professional achievements and scholarly contributions of a distinguished faculty.

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

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

Other centers of international scope at Texas Tech include the Latin American and Iberian Studies program and the College of Architecture's Institute for Urban Studies International. The Vietnam Archives have made Texas Tech a major center for studies of that country, with Texas Tech having become a focus for doctoral dissertations and Vietnam studies.

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

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

The Graduate School is justifiably proud of the many outstanding teachers, honored scholars, and internationally known experts who are part of the graduate faculty at Texas Tech. Graduate students in every college have the opportunity to work with a distinguished group of professors; interact with present and future leaders of their respective disciplines; and, most importantly, enjoy the rapport that comes from mutual enthusiasm for learning, research, and shared interests. Comments from present and former students indicate their deep appreciation for faculty whose doors are always open and who are easily accessible for consultation and assistance despite research and editorial involvements, activities in professional organizations, and the daily demands of an expanding curriculum. The quality of graduate faculty-student interaction is enhanced by a small class size that allows a professor to devote personal attention to each student. Standards for graduate students are

continually rising and many programs have admissions requirements that exceed the university-wide standard. At the same time, the Graduate School has expanded admissions criteria to include numerous factors besides test scores and grades, allowing consideration of a broad range of indicators of full individual potential.

Research Centers and Institutes

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

Agricultural Sciences and Natural Resources

Center for Agricultural Technology Transfer
Center for Excellence in Cryobiology
Center for Feed and Industry Research and Education
Center for Natural Resource Management and Agricultural Security
Cotton Economics Research Institute
Fire Ecology Center
International Center for Food Industry Excellence
International Textile Center
Pork Industry Institute for Research and Education
Thornton Agricultural Finance Institute
Wildlife and Fisheries Management Institute

Architecture

Architecture Research Center

Arts and Sciences

Center for Forensic Studies
Center for Historic Preservation and Technology
Center for Integration of Science Education and Research (joint with College of Education)
Center for Environmental Radiation Studies
Center for Public Service
Center for the Interaction of the Arts and Sciences
Center for the Study of the Vietnam Conflict
Institute for Communications Research
Institute for the Mathematics of the Life Sciences
Institute for Studies in Pragmatism
Leather Research Institute
Southwest Center for German Studies

Business Administration

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

Education

Virginia Murray Sowell Center for Research and Education in Visual Impairment
Center for Integration of Science Education and Research (joint with Arts and Sciences)

Engineering

Center for Advanced Intelligence Systems
Center for Applied Petrophysical Studies and Reservoir Studies
Center for Applied Research in Advanced Manufacturing
Center for Dispersive Processes
Center for Mechanochemistry and Synthesis of New Materials
Center for Multidisciplinary Research in Transportation
Center for Partnerships in Science and Technology
Center for Pulsed Power and Power Electronics
Center for Systems Solutions
Institute for Design and Advanced Technology
Institute for Ergonomics Research
MRI Petrophysical Applications Center
Murdough Center for Engineering Professionalism
Nano Tech Center (Sensor Systems)
National Institute for Engineering Ethics
Software Engineering Research, Training, and Education Center
Space Science Research Institute
Water Resources Center

Human Sciences

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

Law

Center for Law, Policy, and Biodefense

Other

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

Academic Common Market Program

Texas Tech participates with 12 other Southern states in the Academic Common Market, which is a reciprocal agreement for sharing uncommon curricula. Students from these states who are admitted into approved out-of-state programs qualify for resident tuition. Two steps are necessary to qualify: (1) applicants must be accepted into a program for which an interstate agreement has been arranged, and (2) applicants must submit proof of legal residency in a member state to the university where he or she

has been accepted. Residency documentation is provided by the ACM coordinator in the home state of the student. A list of state coordinators is available from the Southern Regional Education Board, 1340 Spring Street, N.W., Atlanta, Georgia 30309.

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

- **Master of Architecture** (Alabama, Kentucky)
- **Master of Science, Doctor of Philosophy – Range Science** (Arkansas, Louisiana)
- **Doctor of Philosophy – Fine Arts** (Arkansas, Louisiana, Tennessee, Virginia)
- **Doctor of Philosophy – Home Economics Education** (Kentucky)
- **Doctor of Philosophy – Land-Use Planning, Management, and Design** (Alabama, Arkansas, Kentucky, Louisiana, Virginia)
- **Doctor of Philosophy – Marriage and Family Therapy** (Kentucky)
- **Doctor of Philosophy – Technical Communication and Rhetoric** (Tennessee)

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.

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: Students enrolling in graduate level courses will be charged **\$48 per semester credit hour in addition to the current university tuition** as described below:

- **Texas Legal Residents:** \$124 per semester credit hour (\$48 state, \$76 institutional)
- **Nonresidents:** \$382 per semester credit hour (\$306 state, \$76 institutional)
- **Nonresident Students Who Are Legal Residents of New Mexico or Oklahoma and Reside in a County Adjacent to Texas:** \$124 per semester credit hour (\$48 state, \$76 institutional)
- **Nonresident Students Who Are Legal Residents of New Mexico or Oklahoma and Reside in Counties Not Adjacent to Texas:** \$154 per semester credit hour (\$78 state, \$76 institutional)

For a complete discussion of graduate study costs, general fees, and financial assistance, please refer to the Finances section of this catalog.

Graduate Admission

A \$50 nonrefundable application fee is required of all U.S. citizens and permanent residents seeking admission to the Graduate School for the first time. The application processing fee for international applicants is \$60 (see "International Student Admission" on the following pages). Once this fee is paid, it is not required when reapplying. Full-time Texas Tech employees, their spouses, and dependents under age 25 are exempt from this fee, and an exemption form may be obtained in the Office of Graduate Admissions. All materials submitted become the property of Texas Tech and are not returnable or refundable.

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. Applications will not be evaluated until all admission requirements have been met.

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 (e.g., last 60 hours, total, major, post-baccalaureate).
- 2. Test Scores** – Scores on the General Test of the Graduate Record Examination (GRE) or, for programs in the College of Business Administration, the Graduate Management Admission Test (GMAT) should be no more than five years old. Each score is considered separately with percentile scores viewed by broad major. In accordance with Texas House Bill 1641, the applicant's performance on a standardized test

may not be used in the admissions or competitive scholarship process as the sole criterion for consideration of the applicant or as the primary criterion to end consideration of the applicant. International students must also submit an official Test of English as a Foreign Language (TOEFL) score when minimum acceptable scores apply.

3. Individual Profiles – Profiles may include recommendations, research background, motivation, multilingual proficiency, undergraduate institution, presentations, portfolios, interviews, work experience, demonstrated commitment to a particular field of study, community involvement, and family and socioeconomic background.

The department to which the student applies may have additional requirements, including a separate application form.

Applicants desiring information concerning services for students with disabilities should contact the AccessTECH Office, 214 West Hall or Box 45008, Texas Tech University, Lubbock, TX 79409-5008, (806) 742-2405.

Master's or Doctoral Admission Procedures

Admission to any graduate degree program is granted by the dean of the Graduate School upon the recommendation of the department of proposed study. The applicant must have been in good standing in the school last attended.

Applying for Admission. Submit the following information to the Office of Graduate Admissions:

- 1. A formal application** (preferably at least three months prior to date of intended enrollment). The forms may be obtained from



the Office of Graduate Admissions, Texas Tech University, P.O. Box 41030, Lubbock, TX 79409-1030, (806) 742-2787. Students also may apply at www.gradschool.ttu.edu or through the online Texas common application (www.applytexas.com). Students should include their social security numbers when requesting an application.

- 2. Official transcript showing the awarding of a bachelor's degree.** The bachelor's degree must be substantially equivalent to one from Texas Tech. A student who, because of current enrollment, cannot provide final transcripts at the time of application must submit transcripts of all completed study, as well as incomplete transcripts from the current institution. Consideration may then be given for tentative admission upon the condition that final transcripts are provided within the initial semester of enrollment at Texas Tech.
- 3. Official GRE (or GMAT for College of Business Administration and other select programs) score report** no more than five years old. This is a requirement of most degree programs. Check with the individual program if you are not certain if the GRE/GMAT is required. Programs may also occasionally allow other standardized tests to substitute for the GRE/GMAT. Information about the GRE or GMAT may be obtained from the Educational Testing Service, P.O. Box 6000, Princeton, NJ 08541-6000, (609) 771-7670, www.gre.org (GRE), (609) 771-7330, www.gmat.org (GMAT).
- 4. Official transcripts in good standing from all higher education institutions attended.**
- 5. Application fee as specified.**

Contact Your Department. Prospective students must also contact the department in which they are planning to study to obtain information regarding any special admission requirements, such as additional tests, applications, or letters of recommendation. You may do so by calling the main university switchboard number (806-742-2011) and asking for the department in which you are interested. You may also find online applications at the Web sites of each department by viewing the main Texas Tech web site (www.ttu.edu) and clicking on "Academics."

Evaluating Applications. Application files will not be evaluated until all of the above requirements have been met. Applicants will be notified by the director of graduate admissions when an admissions decision has been made. Some departments, operating with a limited number of spaces for students each year, make final decisions for the fall semester in early spring.

Deadlines. Deadlines for all applicants, including international students in the United States, are as follows:

- March 1 for fall semester
- September 1 for spring semester
- February 1 for summer session

U.S. or permanent resident applicants who, for whatever reason, cannot provide all documents

required for admission to a degree program by the time of planned initial enrollment may request permission to register for graduate courses through temporary nondegree admission (GTMP).

Falsification of application information will void admission to Texas Tech University.

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

Nondegree Student Admission Procedures

Four categories of nondegree admission are available only to U.S. citizens and permanent residents:

- 1. PGRD** — This category is for students who have earned an undergraduate degree and desire to take only undergraduate courses. In this status, a student may register indefinitely as a nondegree graduate student but may not be appointed to teaching assistantships or research assistantships. **Students in this category may not register for graduate courses.**
- 2. GTMP** — A student in this category is considered a temporary nondegree student and may enroll for only 12 hours before completing credentials to be admitted to a degree program. After this time, the student must be either admitted and enrolled in a degree program, accepted into the certification category (CERT, GHEC), or switch to all undergraduate course work (PGRD).
- 3. CERT, GHEC** — A student who desires to earn certification through the College of Education or the College of Human Sciences may apply for this type of nondegree status. Graduate courses may be taken, but if the student wishes to pursue a degree at a later time, only 12 graduate hours completed before admission to a degree program can be counted toward a degree. The student must also apply through the College of Education or the College of Human Sciences, in addition to Graduate Admissions. For information on teacher certification, contact the Teacher Certification Office, College of Education, P.O. Box 41071, Lubbock, TX 79409-1071, (806) 742-2377.
- 4. CPED** — This is designed to meet the needs of professionals such as engineers, certified public accountants, architects, social workers, teachers, and others who require continuing professional educational development. In addition to applying to Graduate Admissions, students must request permission for this nondegree status from the graduate advisor or faculty administering the program in their department. The GRE will be waived as long as a GPA of 3.0 or

greater is maintained as a nondegree student.

Any exceptions to the above must be approved in advance by the graduate dean.

Applicants seeking nondegree admission in any category must:

1. Submit a formal application as far in advance of intended enrollment as possible. The application is available through the Office of Graduate Admissions, Texas Tech University, P.O. Box 41030, Lubbock, TX 79409-1030, (806) 742-2787, or online at www.gradschool.ttu.edu.
2. Submit an official transcript showing the awarding of a bachelor's or higher degree. The degree must be substantially equivalent to one from Texas Tech. Transcripts for all other college level study must also be submitted. The applicant must have been in good standing in the school last attended.

The GRE is not required for this type of admission; however, nondegree students who wish to enroll in a graduate course in the College of Business Administration must submit scores on the GMAT and potentially be admissible to a degree program in business. Those students should also contact the Graduate Services Center, College of Business Administration, P.O. Box 42101, Lubbock, TX 79409-2101, phone (806) 742-3184, as far in advance of intended registration as possible.

If a student in a graduate degree program has been awarded that degree and wishes to continue taking course work, the student must then request further admission as a nondegree student in one of the nondegree categories by contacting the Office of Graduate Admissions. Students who are in nondegree status have no assurance that credits earned while in this status will apply toward degree requirements should admission to a degree program be granted later. Prospective students should be aware that some departments give preference for course enrollments to students in degree programs.

Falsification of application information will void admission to Texas Tech University.

Graduate School Readmission/Deferment

Students who fail to register or who leave school during a spring or fall semester and do not have an official leave of absence must, prior to returning, fill out and submit the Returning Student Application, which may be found at the Graduate School web site under "Forms." Student should check the box labeled "Request to Re-Admit." Payment of the application fee is not required for readmission. The department will reconsider the student, and the Graduate School will notify the student of the department's readmission decision.

International and domestic students who defer admission to a semester for which they did not originally apply must fill out and submit the Returning Student Application and check the box labeled "Request to Change Initial Entry Date." This form may be found on the Graduate School web site. No additional application

fee is required. The department will reconsider the student who defers admission. The Graduate School will notify the student of the department's decision.

International Admission

Over the years, Texas Tech has been fortunate to attract numbers of highly qualified and talented international students. Recognizing the difficulties involved in moving from their home countries and home schools to a new environment and new scholarly procedures and expectations, Graduate Admissions is committed to helping international students in this important transition. Its staff recommends that applicants pay special attention to the following information and requirements.

A \$60 nonrefundable application processing fee is required of all international applicants seeking admission to the Graduate School for the first time. This fee cannot be waived or deferred. Once this fee is paid, it is not required when reapplying. Applications will not be considered unless they are accompanied by an application fee in the form of an international money order, a cashier's check, a traveler's check, a U.S. postal money order, or a U.S. credit card.

Applications and other admission information may be obtained from the Graduate Admission Office, Box 41030, Texas Tech University, Lubbock, TX 79409-1030. The e-mail address is gradschool@ttu.edu. The web address is www.gradschool.ttu.edu. Applications, fees, transcripts, and other credentials should be returned to the above mailing address. Applications can also be submitted by completing the online application at the above web address or the Texas Common Application at www.applytexas.org.

Applicants desiring information concerning services for students with disabilities should contact the AccessTECH Office, 214 West Hall or Box 45008, Texas Tech University, Lubbock, TX 79409-5008, (806) 742-2405.

The following procedures should be followed carefully in order for non-U.S. citizens to be admitted to a master's or doctoral degree program at Texas Tech University.

1. Submit the application fee and application. Please fill out the form carefully. The applicant's name must be the same as it appears on the passport.
2. Submit official Test of English as a Foreign Language (TOEFL) score. The score must be received directly from the Educational Testing Service. Photocopies are not accepted. The minimum score required is 550 on the paper and pencil test or 213 on the computer-based test. The TOEFL is not waived unless an applicant has a degree from a U.S. university or from a university in a country where English is the official language. All test scores are received by Graduate Admissions, not the department. Our institution code is 6827. Further evaluation of English proficiency will be given once the student arrives on campus. A student found lacking adequate command

of English will be required to enroll in basic English courses before carrying a full load of graduate course work.

3. Submit official Graduate Record Exam (GRE) general test scores or Graduate Management Admission Test (GMAT) scores. The GMAT is required for business administration majors. These scores must also be received directly from the Educational Testing Service. The GRE or GMAT requirement will not be waived unless specified by the department.
4. Submit original or certified copies of all college and university records (marksheets, examination results, etc.). An official English translation is required. Certification of the translation must be made by an official government translator with the original signature and/or the university issuing the transcript or marksheets with original signature and seal. Uncertified photocopies without an original signature are not acceptable. Graduate Admissions will not accept a public notary certification. Graduate Admissions also requires a degree that is equivalent to a U.S. undergraduate degree. This requirement excludes most three-year degrees and degrees that are attained at a second-class level.
5. Submit the original or certified photocopies of the degree certificate, diploma, or official statement that the degree has been granted. The same rules apply for diploma certification as for transcripts and marksheets.
6. If the degree is not complete when the application is made, 6 semesters or 3 years of course work are required. After the degree is completed, a final transcript showing the degree awarded must be submitted.
7. A bank statement converted to U.S. currency should be included with the application. This statement should not be sent to the department. A statement of support from the sponsor must accompany the bank statement. Students should check with Graduate Admissions about the current amounts needed in the bank account. These amounts include tuition, books, living expenses, etc. Amounts will vary depending upon the financial assistance awarded by the department.
8. If a student is accepted by a department, 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 Graduate Admissions and mailed to the student.

The application process takes time. After an application is received, it may take as long as two months for processing the application and making a decision. Students should contact the prospective department to learn about its individual requirements. Department information is available on the Texas Tech web site.

International students are not allowed to change majors upon arrival. They must remain in the program to which they are admitted for one year.

Send the application fee, application, and all official documents to the following address:

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

Students should be certain to give their full names on the envelope return address. Correspondence should include the full name and birth date. All entries into the records system are made by family name (last name), first name, middle name.

Applications will be judged on the same general criteria as specified earlier under the heading "Master's or Doctoral Admission Procedures."

Requirements listed under continuation in the Graduate School, academic probation and suspension, enrollment, and general information apply also to international students.

Students who have been accepted into a degree program and fail to enroll must follow the Graduate School deferment policy as specified above. Current financial information is required.

If an international student has attended another U.S. university and wishes to transfer to Texas Tech, an official transcript from that university is required. The student must have maintained a grade point average of at least 3.0 at that university.

Enrollment

Students who have been granted admission to the Graduate School are expected to register for course work whether or not they contemplate degree work. Failure to register in the term for which admission is granted requires the student to reapply for admission. The details of registration are under the jurisdiction of the registrar's office, which furnishes each enrollee complete instructions for all steps in the procedure. Students should follow carefully such instructions and those found in this section of the catalog. Graduate students are permitted to register at any time beginning with the first day of advance registration. Advance registration usually begins in April for the summer and fall sessions and in November for the spring semester. Online registration is available to all admitted students. Instructions for web registration and add-drop can be found at www.techsis.admin.ttu.edu/student.

Departmental Approval of Courses. Students should have a schedule of courses approved by an official representative of their major department at the time of registration. It is the student's responsibility to see that the registrar's printout corresponds exactly to the courses for which the student has registered.

Enrollment of a graduate student in any course that carries graduate credit is automatically considered to be for graduate credit and affects relevant grade point averages accordingly.

Full-Time Study. Normal full-time enrollment varies between 9 and 13 hours for doctoral students and 9 and 16 hours for other graduate

students in the regular semester. The minimum enrollment for full-time graduate status is 9 hours in the regular semester. Full-time enrollment in a summer term is from 3 to 6 hours. Students on fellowships, assistantships, or other appointments designed for the support of graduate study should enroll for 9 hours in each regular semester and at least 3 hours in a summer term.

If a student is devoting full time to research, using university facilities and faculty time, the schedule should reflect at least 9 hours enrollment (6 hours in each summer term).

Normally, the maximum allowable hours per semester is 13 for doctoral students, 16 for other graduate students, and 6 in a six-week summer term. The general rule is that a student may not earn more than 1 hour of credit for each week of the enrollment period. Any exceptions to this rule *must* have the prior approval of the graduate dean.

Registration in an individual study, research, or similar course implies an expected level of effort on the part of the student comparable to that associated with an organized class with the same credit value.

A doctoral student shall not be required to register for more than 9 credit hours during any long semester or 6 credit hours during a summer term and may not register for more than 13 and 6 hours, respectively, without the prior permission of the dean of the Graduate School.

A doctoral student who is required to register solely for the purpose of satisfying a continuous enrollment requirement need not register for more than 1 credit hour during each term. However, a doctoral student who is involved in internship, research, or another type of academic study should register for credit hours in proportion to the teaching effort required of the program faculty.

Leave of Absence. Any student who fails to register during a fall or spring semester and who does not have an official leave of absence from study is subject to review for readmission by the standards in effect at the time of reconsideration. Official leave of absence, which is granted by the dean of the Graduate School upon departmental recommendation, may be requested only in case of serious medical conditions and other exceptional reasons. Normally, leaves of absence will not exceed one year. Leaves of absence do not extend the maximum time allowed for completion of the degree.

Continuous Enrollment. Students who have begun thesis or dissertation research must register for 6000 or 8000 courses in each regular semester and at least once each summer until all degree requirements have been completed, unless granted an official leave of absence from the program for medical or other exceptional reasons. Off-campus students may register for 1 hour of 6000 or 8000 with departmental approval until their final semester, at which time they must enroll for at least 3 hours. Students receiving financial assistance must register for the number of hours required by Financial Aid. Approval of a leave of absence

will not extend the allowed time for completion of the degree.

Registration for Thesis or Dissertation Hours. Registration for at least 6 hours is required for the master's thesis and at least 12 hours for a doctoral dissertation. Once the project is begun, a student must be enrolled in such courses every semester until completion. A student should enroll under the committee chairperson; however, in those instances in which other professors on the committee are making substantial contribution to the student's research, it is permissible for the student to enroll proportionally under those professors. Students certified as off-campus may enroll for as little as 1 hour until their final semester, at which time 3 hours minimum are required.

Students may not enroll in thesis or dissertation courses before formal admission to a degree program by the graduate dean.

Enrollment for thesis or dissertation courses is permitted only during a regular registration period. Students away from the campus may, however, register for such courses by mail, provided arrangements are made with the registrar's office by telephone or electronically prior to the beginning of a registration period.

Students are required to register for appropriate courses in every semester or summer term in which they expect to receive assistance, use the facilities of the university, or take comprehensive examinations.

The number of hours for which students must enroll in each semester depends on their level of involvement in research and their use of university facilities and faculty time. Students in residence who are devoting full time to research should enroll for 9 to 12 hours.

Residence. Study leading to a graduate degree involves sustained residence as well as the successful completion of course work. Residence is credited for work done on the campus of Texas Tech University and for certain types of courses (theses, field courses, practica, extended learning, internships, individual study, or any other such course) when offered by Texas Tech faculty at a place and under circumstances specifically established by the university in advance of the offering of the course. The minimum residence requirements for various graduate degrees can be found in the appropriate sections of this catalog.

Each student fulfilling the doctoral residence requirement will normally enroll for 24 hours within a 12-month period. The requirement may be fulfilled in several ways, such as 12 hours in each of two consecutive semesters, 9 hours in two consecutive semesters and 6 in the summer, or another approved pattern as authorized by the graduate dean. Residence consists of accumulation of 24 hours within the approved time. Also, please consult the statements relevant to residence under "General Information," "Master's Program," and "Doctoral Program."

Off-campus students who are devoting less time to thesis or dissertation research may enroll for fewer hours, depending on the level of activity and the judgment of the committee

chair or the department. However, in the semester in which students expect to complete their work and hold the defense, enrollment should be well above the minimum because of the time required for more intense reading and processing.

Registration in Session of Graduation.

There are three official graduation dates: December, May, and August. Every candidate for a graduate degree must be registered in the Graduate School in the session of graduation for at least 3 hours of 6000/8000, if all requirements are not met, or 1 hour of 7000 individual study for nonthesis, if all requirements are met. Failure to graduate at the expected time requires such additional registrations as may be necessary until graduation.

Maximum Allowable Doctoral Hours. Students not making timely progress toward completion of the doctoral degree are subject to termination by the graduate dean. The Texas Legislature has capped fundable graduate study at 99 doctoral hours for most programs and may impose sanctions upon universities permitting registration for excess hours. 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. Any exceptions or extensions must be approved in advance by the graduate dean.

Maximum Allowable Graduate Hours. Students who are in programs other than doctoral programs and are not making timely progress toward completion of their degree are subject to termination by the graduate dean. Graduate students beyond the maximum allowable graduate hours as determined by the Texas Legislature may be required to pay out-of-state tuition, regardless of residence status. The maximum time allowed for completing a master's degree is six years. The graduate dean must approve exceptions or extensions in advance.

Changes in Schedule and Withdrawal. A graduate student who wishes to add or drop a course must initiate such action with the graduate advisor for his or her program. A student who quits a course without official withdrawal is likely to receive an F in that course.

Enrollment by Faculty and Staff. Full-time members of the faculty and staff of Texas Tech University may enroll for courses by permission of the department chairperson concerned. In registering for graduate work, they become subject to the regulations of the Graduate School. However, no member of the faculty who has held rank higher than instructor at Texas Tech is eligible to pursue a graduate degree program at this institution unless prior approval of the graduate dean is given.

Enrollment by Undergraduates. An undergraduate student who is within 12 hours of graduation and who has at least a B average in the major subject may enroll for courses carrying graduate credit, subject to the approval and certification of an acceptable grade point average by the dean of the instructional college and the approval of the dean of the Graduate School. This approval must be obtained on

special forms available in the Graduate School at the time of registration. No course taken without this approval may be counted for graduate credit. With the approval of the dean of the instructional college and the dean of the Graduate School, students may take graduate courses for undergraduate credit. Students may not, however, receive both graduate and undergraduate credit for the same course, except for up to 9 hours for an approved joint undergraduate and graduate degree program.

An undergraduate who is permitted to enroll for graduate work as indicated above is required to take the Aptitude Test of the Graduate Record Examinations (or Graduate Management Admissions Test for business applicants) in the first semester of enrollment in graduate courses if the test has not been taken during the previous five years.

The maximum amount of work that may be scheduled by an undergraduate taking courses for graduate credit is 16 hours in a semester or 6 hours in a summer term, including graduate and undergraduate work. Undergraduates permitted to enroll for graduate work are expected to receive their bachelor's degree within a year of their first graduate enrollment.

An undergraduate may not receive credit for more than 12 semester hours of graduate work completed prior to admission to the Graduate School as an applicant for a graduate degree.

Students not attending Texas Tech University must be admitted to the undergraduate program prior to being allowed to enroll in graduate classes. No one should apply to graduate school who does not anticipate undergraduate graduation prior to beginning graduate classes.

Continuation in the Graduate School

Every student enrolled in the Graduate School, whether working toward a degree or not, is required to maintain a high level of performance and to comply fully with policies of the institution. The Graduate School reserves the right to place on probation or to suspend any post-baccalaureate or graduate student who does not maintain satisfactory academic standing or who fails to conform to the regulations of the university.

Students who are admitted to the Graduate School or to a degree program on condition of maintaining a required GPA are automatically admitted on a probational basis. Failure to fulfill the conditions stipulated at the time of admission will result in termination from the Graduate School.

Academic Probation and Suspension

If a student's graduate GPA for a particular semester falls below 3.0, the student will be placed on academic probation. (A 3.0 average is the minimum requirement of the Graduate School; individual academic areas may, and often do, impose a higher grade point average for continuation in their academic programs.) A student must make a 3.0 GPA or better in the

next semester in which he or she is enrolled. Failure to do so, or to maintain a 3.0 current GPA in each succeeding semester, will result in academic suspension from further enrollment as a graduate student or in graduate courses at Texas Tech. Regulations governing scholastic probation are based on semester grade point averages and will be applied regardless of overall grade point average. Any student who has been suspended must appeal to the Graduate School if reinstatement is desired. Appeal of suspension may be made in writing to the dean of the Graduate School. If the student's appeal is rejected by the graduate dean, the student may request a hearing before the Student Affairs Committee of the Graduate Council. This committee will render a decision as to whether or when the student may be readmitted to graduate study.

A student may be suspended for unprofessional conduct such as cheating or plagiarism. Any appeal is subject to the provisions of the Code of Student Conduct. See the *Student Affairs Handbook* for further information.

General Information

The Graduate School, like other colleges and schools of Texas Tech, reserves the right to institute, after due notice and during the course of a student's work toward a degree, any new ruling that may be necessary for the good of the university and therefore, ultimately, of its degree recipients. Normally a student may graduate under the provisions of the catalog in effect the semester of admission into the degree program.

Responsibility of Students. Each graduate student is expected to become thoroughly familiar with both departmental and Graduate School regulations and with the requirements for degrees. Failure to follow the regulations and requirements almost inevitably results in complications for which the Graduate School cannot assume responsibility.

To facilitate communications, graduate students should promptly notify the Graduate School of changes of address.

Graduate Advisors. The dean of the Graduate School is the general advisor for all graduate students, but, insofar as the particular courses are concerned, students are counseled by the chairpersons of their major and minor departments or by other professors designated for such counseling. Advisement in matters pertaining to teachers' certificates is the responsibility of the director of teacher certification in the College of Education.

Extracurricular Activities. Graduate students may participate in extracurricular activities within university policies. They are encouraged to participate in honor societies for which they may be qualified and in the Graduate and Professional Student Government, an organization devoted to supporting the interests of students at Texas Tech.

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 Learning.

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 is not granted for courses taken by extension or distance learning at another university. Distance learning completed through Texas Tech's Division of Outreach and Extended Studies may be considered if the student had been officially admitted to the Graduate School prior to enrolling for the courses (see discussion of distance learning in master's program requirements). Graduate credit is **not** granted for courses taken by correspondence.

Grades. The grades used in the Graduate School are the same as those used in undergraduate work (A, B, C, D, and F), but graduate credit is allowed only for courses completed with grades of A, B, and C, although grades of D and F are used in computing grade point averages. Instructors may choose to add a plus or a minus to the grade. These will be entered on the transcript but will not be used in calculating the grade point average.

Departments have the option to use pass-fail grades (P and F) for individually arranged courses, professional seminars, and certain other courses. No more than one-fourth of a student's program course work may be graded pass-fail, however.

No final grade assigned for a graduate-level course may be raised unless an error has been made. Substituting another course for one completed with a low grade is not permitted.

Work completed at another graduate school with a grade less than B will not be accepted, nor will grades of pass or satisfactory. Grades on transferred work will not raise the grade average on courses completed at Texas Tech.

Symbols CR, NC, I, W, and WF. The symbol CR (credit) or NC (no credit) normally is assigned for every enrollment for a master's thesis or doctor's dissertation until the completed document has been approved by the student's committee and accepted by the Dean of the Graduate School. At that time a grade of A or B will be entered for the final enrollment.

CR may be given by a professor when a student's work in other individual research courses is not finished but is satisfactorily in progress at the end of a semester. When the research is completed, a standard letter grade should be entered for the final semester. PR is not an appropriate grade for any graduate course.

The symbol I (incomplete) may be given by a

professor when a student's work in a course has not been completed at the end of a semester and when failure to complete the work has been due to causes beyond the student's control. It is not used as a substitute for F. When the I is given, the instructor should file a form with the Graduate Office specifying the reasons for the grade and the work remaining to be done. When there is no action on the part of the student for a year, the I may become an F.

When a student officially withdraws from a course by the specified date early in the term, a grade of W will be assigned. A withdrawal after the specified date will result in a grade of W or WF, according to the assessment of the student's work in the course up to the time of the official withdrawal.

Proficiency in English. A student found deficient in English may be required to complete certain specified courses in English usage (without graduate credit) satisfactorily before being considered for admission to candidacy for a graduate degree.

Statement of Intention to Graduate. A student planning to graduate must file in the Graduate School's office a "Statement of Intention to Graduate" at the beginning of the semester of intended graduation. A list of deadlines will be sent to all students who indicate a current-semester graduation date on their program forms. No candidate's name will be placed on the "Tentative List of Graduates" for any graduation date unless this statement has been received at the Graduate Office by the specified deadline.

A candidate who fails to graduate at the expected time is required to file a new "Statement of Intention to Graduate" for any subsequent graduation.

Teacher Certification. Prospective students should understand that the material in this catalog applies only to requirements for graduate degrees and has no direct relation to certificates for public school teachers. The Graduate School gives no assurance that a program for a graduate degree and a program for a certificate will coincide. Students interested in certificates should confer with the director of teacher certification in the appropriate program at the outset of their work.

Master's Program

General Requirements

The degree requirements set forth here are in addition to those listed on previous pages of the graduate studies section of the catalog.

Prerequisites. Admission to a master's degree program is dependent upon the applicant's undergraduate record; scores on the Aptitude Test of the Graduate Record Examination or, for business applicants, the Graduate Management Admissions Test (except in programs in which either test has been waived); other relevant information; and the recommendation of the proposed major department.

A substantial body of undergraduate work in the major subject and considerable breadth of

background are essential for graduate study. Therefore, students whose undergraduate programs are considered deficient in breadth or depth may be required to complete additional preparatory work without degree credit. Such undergraduate "leveling" courses must be completed with a grade of C or better.

Major Subject. Every program for a master's degree not granted special exception must embody a major comprising at least 18 semester hours of graduate work (which may include a thesis) in a subject that has been approved for major work and for which the student has, or completes without degree credit, the necessary prerequisites for a graduate major.

Minor. Programs for a master's degree may include two or three courses outside the major area. Departments offering master's programs may permit students to take all of their work for the degree within the department. A minor may be completed in a single department or in several departments, but the courses comprising the minor are subject to the following limitations: (1) must carry graduate credit, (2) must be acceptable to the student's major department, and (3) must be approved for the student by the department offering the course. This approval is indicated in the degree plan by the signature of the department chairperson (or graduate advisor). The purpose of this process is to make sure that a student is properly prepared for a course prior to enrollment.

Basic Plans for the Master's Degree. There are two basic plans for master's degree work:

1. A minimum of 24 hours of graduate course work plus 6 hours of thesis research.
2. A minimum of 36 hours of graduate course work without a thesis. (Some degrees have a greater minimum hour requirement. An example is the Master of Fine Arts degree program, which requires 60 hours of graduate course work and a thesis or an exhibition.)

The option to offer thesis or nonthesis programs is a departmental decision. In addition, no more than 6 hours of individual study courses (aside from the thesis) ordinarily will be permitted in the master's program.

Filing the Official Degree Program. During the first semester of enrollment, the student should submit to the dean of the Graduate School a "Program for the Master's Degree" as prepared by an official representative of the proposed major department and of other departments as indicated under "Minor" in the preceding section. Delay in submission of a degree program may result in postponement of admission to candidacy and graduation. The forms for the "Program" are available at the Graduate Office.

When the student receives an approved copy of the "Program" from the Graduate Office, he or she is expected to follow it as the basis of all subsequent enrollments. Substitution of courses can be made only on the written recommendation of the department or departments concerned and approval of the graduate dean.

Approval of a "Program for the Master's Degree" does not, however, constitute admission to candidacy for a master's degree. It

merely signifies that the proposed program will be acceptable if the student satisfies all Graduate School regulations and all of requirements connected with the degree program.

Annual Review. The Graduate School strongly encourages faculty of master's programs to conduct a formal review of the progress of their students at least once a year. Any student not making satisfactory progress toward the degree may be placed on probation and given conditions to stay in the program. Continued unsatisfactory progress in any area of graduate work will be cause for dismissal.

Minimum Residence. The minimum residence for any master's degree is ordinarily a full academic year or its equivalent of graduate work carrying residence credit. Part-time enrollment is evaluated on an individual basis.

Transferred Work. There is no automatic transfer of credit toward a master's degree, but, in general, work completed in residence at another accredited graduate school may, on the recommendation of the departments concerned, be accepted for as much as 6 semester hours toward a master's degree. Exceptions to this rule are granted in the case of the Master of Engineering degree and in certain other instances upon agreement between the college or department concerned and the Graduate School. Work completed at another graduate school with a grade less than B will not be accepted. Transfer credit will not alter a student's grade point average at Texas Tech.

Extension. A maximum of 6 semester hours of extension work completed through Extended Studies at Texas Tech may be credited on the course work for a master's degree (or a maximum of 9 hours on a 36-hour program) if the student had been officially admitted to the Graduate School prior to enrolling for the extension work. Graduate credit is not granted for courses taken by extension at another university.

Not more than 9 semester hours (or 12 hours on a 36-hour program) of any combination of distance learning classes and courses completed elsewhere may ordinarily be credited toward a master's degree.

Graduate credit is **not** granted for courses taken by correspondence.

Grade Requirement for Graduation. For the master's degree, the minimum requirement for graduation is an average of 3.0 in the major subject and an overall average of 3.0 on all courses, exclusive of the thesis, comprising the official program for the degree. Individual departments or colleges may have higher standards.

Admission to Candidacy. Every applicant for a master's degree is required to make formal application for admission to candidacy for the master's degree as soon as 9 to 12 semester hours of the master's degree work, excluding leveling courses, have been completed. This application is submitted to the dean of the Graduate School on the form entitled "Program for the Master's Degree and Application for Admission to Candidacy."

Admission to candidacy will be granted at such time as all of the following requirements have been met.

1. All conditions relating to admission to the program have been met.
2. At least 9 semester hours of the graduate work required for the master's degree have been completed (exclusive of transfer and extension courses).
3. All required leveling work has been completed with C or better grades.
4. An average grade of 3.0 or better has been maintained in all courses comprising the official program exclusive of leveling work.
5. Proficiency in a foreign language or tool subject required for the particular degree has been acceptably demonstrated.
6. The general field of the thesis has been stated and approved.
7. Work to date is acceptable to the departments concerned, as attested by their approval of the application for admission to candidacy.
8. The entire program conforms with the general requirements of the Graduate School and with the requirements of the particular degree.

Time Limit. With the exception of certain specially approved programs, work credited toward a master's degree must be completed within six years. Students whose graduate study at Texas Tech is interrupted by military service will be granted an extension of time for the period of their military duty, not exceeding five years.

Language, Tool Subject Requirements for Master's

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, see the appropriate departmental section in this catalog for further information. Where this provision is satisfied by 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 is expected to represent independent work by the student, conducted under the supervision of the committee, and to be written clearly and concisely in good English (or whatever other language may be appropriate). As soon as the student's area for thesis research has been determined, an advisory committee will be appointed by the graduate dean upon the recommendation of the major department. The committee must consist of at least two members of the graduate faculty, one of which must be from the department in which the student will receive the degree. All members of the committee must approve and sign the thesis. The student must earn a grade of B or better on thesis work to qualify for graduation.

A manual entitled *Instructions for Preparing and Submitting Theses and Dissertations* is available at CopyTech in West Hall or on E-Reserve at the Texas Tech University Library (see www.gradschool.ttu.edu and click on "Current Students"). All manuscripts must conform to the published policies. Three copies of the thesis are required by the university. Additional copies may be required by the academic unit in which the student pursues the degree.

Early in the semester of graduation, the candidate will pay Student Business Services a thesis fee to cover the cost of binding and processing the official copies of the thesis. This fee is paid only once. A receipt for this fee should be brought to the Graduate School. Fees for Health Sciences Center students are slightly higher because four copies of the thesis are required. Students may have additional copies bound at the prevailing rate if they wish.

Final Comprehensive Evaluation for Master's

The Graduate School requires a final comprehensive evaluation for all students in each program. The comprehensive evaluation is administered in the semester of intended graduation and, if graded, requires a grade of B or above. This should be in a format most appropriate to the major field. At departmental discretion, the evaluation format may differ for thesis and nonthesis or professional and predoctoral students. The final evaluation should require a synthesis and application of knowledge acquired during the course of study and research leading to the master's degree; no student should expect the evaluation to be based solely on performance in the classroom.

A student is eligible to undergo evaluation only after having been admitted to candidacy by the graduate dean. As soon as possible after the evaluation, a written report of the outcome should be sent to the graduate dean. A student who does not receive a satisfactory evaluation may be assessed once again after an interval of three months or more. At the discretion of the program concerned, a student who receives a satisfactory evaluation but who does not graduate within 12 months may be required to repeat the assessment.

Doctoral Program

General Requirements

The degree requirements set forth here are in addition to those listed on previous pages of the graduate studies section of the catalog.

Admission to Doctoral Study. Admission to doctoral study is restricted to applicants whose backgrounds show definite promise of success on this, the highest level of academic endeavor. Each doctoral department has its own requirements which applicants must satisfy for admission. It is essential that the student communicate with departmental advisors on this matter.

Years of Study. A minimum of three years of graduate study beyond the bachelor's degree is required for the doctorate. Work completed for the master's degree may be considered as a part of this period if it forms a logical sequence in the entire program. Credit ordinarily will not be given for work completed more than seven years prior to admission to the doctoral program at Texas Tech University. Exceptions to this policy will require written justification through the student's department and approval by the graduate dean.

Work completed in the doctoral program of another recognized graduate school will be considered on the recommendation of the departments concerned, but no assurance can be given that such work will reduce the course or residence requirements here. In no case can transferred credit reduce the minimum residence (see "Residence Requirement").

Doctoral study cannot be calculated solely in terms of credit hours, but the program for the

doctorate normally requires the completion of 60 or more semester hours of work beyond the bachelor's degree, exclusive of credit for the dissertation.

Grade Requirement. For the doctor's degree, the minimum requirement for graduation is an average of 3.0 in the major subject, exclusive of credits for the doctoral dissertation, and an average of 3.0 in all other courses taken for graduate credit outside the major. Individual departments and colleges may have higher standards than this minimum, school-wide requirement.

Major and Minor. The 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 section on "Filing a Doctoral Degree Plan"). If a minor is taken, the major requires a minimum of 45 semester hours.

Courses listed for the major will be primarily in one academic program. However, courses from other academic programs may be included (other than courses for a minor, if one is declared) if they provide coherent support for the program courses in the major.

If a formal minor is declared, it must be represented on the student's doctoral committee (see section on Advisory Committee) and must be covered on the qualifying examination (see section on "Qualifying Examination"). Programs at variance with this description may be approved in exceptional circumstances. Such proposed exceptions must be approved by the advisory committee and the program faculty before they are submitted to the Graduate School for consideration.

Residence Requirement. Regardless of the amount of graduate work that may have been completed elsewhere, every candidate for the doctorate is required to complete at least one year of graduate study beyond the master's degree (or beyond the first 30 hours if the student proceeds directly to the doctorate from a bachelor's degree). The aim of this requirement is to ensure that every doctoral candidate devotes a substantial period of time to the doctoral program.

The residence requirement is fulfilled by the completion of a full schedule (at least 12 semester hours) of graduate course work in each of two consecutive terms. Students holding half-time graduate assistantships may satisfy the requirement by taking at least 9 hours of course work 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 submitted to the Graduate School in the first year of doctoral study and must be approved in advance of the beginning of the residence year. (For any program variations in this requirement, see the college or department sections in this catalog.)

Filing a Doctoral Degree Plan. Early in a student's doctoral studies a formal evaluation will be made of his or her background preparation in the major field. This evaluation may vary according to the academic unit involved; in some cases it may consist of a formal written or oral exam, in others, a review meeting with a committee or graduate advisor, in still another, the successful passing of a key course or courses. On the basis of this evaluation, whatever form it takes, the student's course of study will be projected and submitted to the Graduate School on the appropriate form. This evaluation will occur during the student's first year of doctoral study and the "Program for the Doctoral Degree" will be submitted to the Graduate School before the second year of work has begun. Revisions of the plan are permitted as needed.

Advisory Committee. As soon as the course of study for an applicant has been determined, an advisory committee of at least three members of the graduate faculty (including the minor area, if a minor is declared) will be appointed by the graduate dean on the recommendation of the advisor concerned. This committee will meet as often as necessary with the applicant and will direct his or her work at all stages. Either the chair or the co-chair of a student's committee must be a regular member of the department or program faculty from which the student will receive the doctorate.

Annual Review. The Graduate School strongly encourages faculty in each doctoral program to conduct a formal review of their students' progress at least once each year. From the third year onward, such review is required. Any student not making satisfactory progress may be placed on probation and given conditions to meet to stay in the program. Continued unsatisfactory progress in any area of a student's work will be cause for dismissal.

Time Limit. All requirements for the doctoral degree must be completed within a period of eight consecutive calendar years or four years from admission to candidacy, whichever comes first. Graduate credit for course work taken at Texas Tech more than eight calendar years old at the time of the final oral examination may not be used to satisfy degree requirements. Absent an extension, the student may be permitted to retake the qualifying examination, and, upon passing that examination, be readmitted to candidacy by the Graduate Council for some period of time not to exceed four years.

Final corrected copies of the dissertation must be received in the Graduate School no later than one year after the final examination or within the eight-year or four-year time limit, whichever occurs first. Failure to complete this step will result in the degree not being awarded.

Admission to Candidacy. Authority for admitting an applicant to candidacy for a doctor's degree is vested in the Graduate Council. Upon receipt of a recommendation from the advisory committee, the graduate dean will submit it to the Graduate Council for approval.

By written communication, the graduate dean will transmit the results of the council's action to the applicant, to the chairperson of the

advisory committee, and to the chairperson of the department concerned.

A student must be admitted to candidacy for the doctorate at least four months prior to the proposed graduation date.

Language, Tool Subject Requirements for Doctorate

• **Doctor of Philosophy.** Each department offering a doctoral program determines its language requirements, subject to the approval of the Graduate Council. Language requirements, if any, are described in the sections of this catalog devoted to instructional departments. To qualify for admission to candidacy in those programs that have a language requirement, applicants must demonstrate their competence in one of the following ways:

1. Students may fulfill the reading knowledge requirement by passing with a C- or better the second course of the sophomore sequence of the required language. Those seeking to present a high level of competency will pass with a B- or better any literature course at the third-year level or beyond.
2. Students may satisfy the standard competency level by enrolling in one of the special 6-hour programs for graduate students offered in French, German, and Spanish by the Department of Classical and Modern Languages and Literatures. The second half of such a program must be passed with a grade of B- or better.
3. The third method of fulfilling the language proficiency requirement is by passing a standardized examination in French, German, Spanish, or Latin given in the Department of Classical and Modern Languages and Literatures or by passing one of the examinations in French, German, or Spanish, furnished by the Educational Testing Service and administered by the university's Testing Center. Arrangements for these examinations should be made in the applicable unit. The Department of Classical and Modern Languages and Literatures will administer the examinations in any other foreign language in which instruction is offered by the department. Arrangements for testing for other foreign languages will be approved by the graduate dean.

Students majoring or minoring in foreign languages in the Department of Classical and Modern Languages and Literatures are subject to higher performance levels in satisfying the doctoral requirement. Students should consult the graduate advisor of the appropriate language for guidelines.

Some departments require a tool subject in lieu of or in addition to the language requirement. When this requirement exists, see the appropriate departmental section in this catalog for further information. If this provision is satisfied by formal courses, a grade of B or better is required either in a single course or in the last of a sequence of such courses passed not more than seven years prior to the student's approval for doctoral work.

• **Doctor of Education.** To qualify for admission to candidacy, applicants for the Ed.D. degree are required to show competency in educational research methods and educational statistics as well as a foreign language if their research requires such competency.

Qualifying Examination, Final Examination

Qualifying Examination. The Qualifying Examination for Admission to Candidacy for the doctor's degree is one of the major features of the doctoral program and will be administered in both the major and minor areas of study (if a formal minor has been declared). The examination requires a synthesis and application of knowledge acquired during the course of study for the doctoral degree; consequently, satisfactory performance in course work 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 and completing all language and tool requirements and most of the course work prescribed by the approved plan. Students must take this examination within one calendar year of completing all requirements listed on the degree plan. Failure to do so will be cause for dismissal from the program.

The qualifying examination normally is prepared and administered by the candidate's advisory committee and any other professors the committee or the graduate dean may consider necessary. In some instances the examination may be administered by the department or college concerned. 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 states 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 possible after all the above requirements have been met.

Unsatisfactory Examination. If the qualifying examination is not satisfactory, the chairperson of the advisory committee will relay this information in writing to the graduate dean. An applicant who does not pass the qualifying examination may be permitted to repeat it once after a time lapse of at least four months and not more than 12 months from the date of the unsatisfactory examination. Failure to pass the qualifying examination within the specified time will result in dismissal from the program

irrespective of performance in other aspects of doctoral study.

Final Examination. At least four months must intervene between the qualifying examination and the final examination. A final public oral examination, usually over the general field of the dissertation, is required of every candidate for the doctorate. It may be scheduled a suitable time after the dissertation (not necessarily the final copy) has been read by the advisory committee. The examination may not be administered until at least three weeks have elapsed following the candidate's submission to the Graduate School of the notification form giving the time, place, and other information pertaining to the examination. This form is available from the Graduate School or on the Graduate School web site.

The examination is conducted by the advisory committee and the graduate dean or a professor designated to act in place of the graduate dean. All members of the committee participate fully in the examination and cast a vote. Professors other than members of the committee, including the graduate dean's representative, may participate in the examination but have no vote in determining the outcome. At the conclusion of the examination, the chairperson of the advisory committee will send a written notice to the Graduate School giving the result of the examination.

Dissertation

Except for the Doctor of Musical Arts, a dissertation is required of every candidate for a doctoral degree. This requirement is separate and apart from other requirements in doctoral programs; consequently, successful performance in other areas does not necessarily guarantee acceptance of a dissertation. The dissertation work must earn a grade of at least B to qualify the student for graduation. The Graduate School strongly recommends that each student be required to present and defend a dissertation proposal before his or her committee early in the course of the research.

The subject of the dissertation must be approved by the advisory committee and the graduate dean 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.

A manual entitled *Instructions for Preparing and Submitting Theses and Dissertations* is available at CopyTech in West Hall or on E-Reserve at the Texas Tech University Library (see www.gradschool.ttu.edu and click on "Current Students"). All manuscripts must conform to the published policies.

Three copies of the dissertation are required by the university. Additional copies may be required by the specific academic unit involved. They must be accompanied by an abstract of no more than 350 words.

Dissertation Fees. Early in the semester of graduation, the candidate will pay Student Business Services the appropriate dissertation fee. This fee covers microfilming of the dissertation and abstract as well as binding costs for the three required copies. This fee should be paid only once. A receipt for this fee should be brought to the Graduate School. Fees for Health Sciences Center students are slightly higher because four copies of the dissertation are required. Students may have additional copies of their dissertations bound at the prevailing rate.

Publication of Student Work. Research is an integral facet of graduate study, and students are encouraged to seek publication of work done in pursuit of advanced degrees. Many theses and dissertations completed at Texas Tech are eventually published. In research involving close collaboration with faculty advisors, it is appropriate in some disciplines for publications to be co-authored. In disciplines in which authorship order is not always alphabetical, the student will generally be first author in publications resulting from a thesis or dissertation. In cases of considerable revision or addition of other data, order of authorship should be subject to mutual agreement and based on the nature and extent of contribution by the parties concerned and in accordance with accepted practice in the discipline.

The faculty member may choose to use the data in pursuing publication when the student was supported in full or in part by the university or through a faculty grant to do the research involved or when the faculty member contributed to the work in a way that was substantially above and beyond that normally expected of a major advisor and the student elects not to pursue publication within a reasonable time. The faculty member must list the student as co-author according to the conventions of the discipline involved and the relative extent of contribution or additional work required.

Opportunities for Interdisciplinary Master's Degrees

The Graduate School of Texas Tech encourages interdisciplinary study and research, believing that our nation's complex society and the world's rich cultural heritage can be understood best from the perspective of many academic disciplines. Few settings offer a better opportunity for such study than the university with its graduate programs, libraries, laboratories, and diversely trained faculty. Although academic specialization is the common pattern in such an environment, the Graduate School is committed to building bridges and facilitating movement across the disciplines for those who are interested. As a result, opportunities for interdisciplinary work have increased through the years as a testimony to the university's commitment academic diversity.

Several formal interdisciplinary options appear on the following pages. However, students should be aware of innumerable informal options that exist because the programs have been designed by individual students in conjunction with their advisors for the Interdisciplinary Studies degree programs. Such flexibility in custom-designing programs affords maximum adaptability for the rapidly changing global marketplace.

Biotechnology

Co-Directors: Dr. David B. Knaff, Horn Professor of Chemistry and Biochemistry; Dr. Daniel M. Hardy, Associate Professor of Cell Biology and Biochemistry.

Texas Tech University and the Texas Tech Health Sciences Center jointly offer an interdisciplinary Master of Science in Biotechnology degree designed to prepare students for a laboratory research career in biotechnology. In addition, the School of Law and the Graduate School offer a joint program leading to the degrees of Doctor of Jurisprudence (J.D.) and Master of Science in Biotechnology.

Master of Science in Biotechnology. Students may pursue either of two tracks within the program: the biomedical track or the science and agriculture track. The Graduate School of Biomedical Sciences (GSBS) at the Health Sciences Center administers the biomedical track, and the Texas Tech Center for Biotechnology and Genomics administers the science and agriculture track.

The science and agriculture track is a two-year program, with the first two semesters consisting of required and elective course work. The second year (nine to 12 months) is devoted in its entirety to full-time laboratory research. Students may satisfy the research requirement in either of two ways. They may complete an M.S. thesis, based on research carried out in the laboratory of a participating faculty member in one of the following departments: Animal Science and Food Technology, Biological Sciences, Chemistry and Biochemistry, or Plant and Soil Science. Alternatively, students may complete a nonthesis internship in a biotechnology labora-

tory. The internship may be carried out at an industrial research laboratory, a government laboratory, or a not-for-profit foundation laboratory.

The biomedical track is a 21-month program consisting of two semesters (nine months) of course work and 12 months of full-time laboratory research. It is anticipated that students in this track will complete all of their course work during their first year, with the second year devoted completely to the research component of the degree plan. The research component may be completed either at the HSC campus or through an internship at a biotechnology laboratory. Internship locations are similar to those described for the science and agriculture track. Students who choose to do their research at the HSC campus will work with a member of the biotechnology graduate faculty and will have the option of writing an M.S. thesis. All biotechnology graduate faculty members have active research programs that emphasize use of molecular biology methods.

First-year students in both tracks take a common core curriculum consisting of a seminar course (BTEC 6101), an introductory lecture course (BTEC 6301), an introductory lab course (BTEC 5338), a course on the ethics of research (GSBS 5101), and a bioinformatics course (BINF 5301). The biomedical track requires a series of lab rotations during the second semester of the first year, while the science and agriculture track requires a second, more advanced lab course. The remaining course work requirements for the biomedical track consist of specific HSC courses, while the remaining course work requirements for the science and agriculture track are satisfied by selections from a broad list of approved electives.

Students interested in the program should have an undergraduate science degree that provides a sound background in biological sciences, preferably from a molecular perspective. A minimum of one semester of organic chemistry is required. A second semester of organic chemistry and at least one semester of physical chemistry are highly recommended. Admission will be based on the student's undergraduate record and GRE scores and on other considerations such as previous research experience and letters of recommendation. Applications from students interested in the science and agriculture track should be submitted through the Texas Tech Office of Graduate Admissions, and applications from students interested in the biomedical track should be submitted through the Graduate School of Biomedical Sciences at the Health Sciences Center.

J.D.-M.S. in Biotechnology. The joint degree candidate must choose to pursue both degrees by the end of the third or fourth semester in law school and must meet admission requirements for the M.S. degree. Typically, if all prerequisites are met, both degree programs can be finished within four and one-half years, including summer sessions.

The joint degree program is designed principally for the student with an interest in intel-

In addition to the graduate programs listed in this section, the following interdisciplinary programs are discussed in other sections related to the college or department responsible for administering each program: **Applied Linguistics; Comparative Literature; Ethnic Studies; Fine Arts; Land-Use Planning, Management, and Design; Latin American and Iberian Studies; Public Administration; and Sports Health.**

lectual property law in the area of biotechnology. A candidate for the J.D./M.S. in Biotechnology may credit up to 12 nonlaw hours of approved courses toward the J.D. degree and 12 law hours may be credited toward the M.S. degree.

Biotechnology (BTEC)

(To interpret course descriptions, see pg. 10.)

5302. **Advanced Cell Biology (3:3:0).** Prerequisite: 8 hours of biology, 8 hours of chemistry, plus at least one semester of organic chemistry; or consent of instructor. Structure and function of cells with introduction to modern techniques for cell study. Offered to graduate students with no formal training in cell biology. (BIOL 5302)
5304. **Growth and Development (3:3:0).** A study of differentiation, development, growth, and fattening of domestic animals and hereditary and environmental influences and interactions. SS. (ANSC 5304)
5321. **Plant Breeding Theory (3:3:0).** Breeding and plant improvement presented at an advanced level. S, even years. (PSS 5321)
5325. **Transgenic and Plant Cell Genetics (3:3:0).** Genome organization in plants, interspecific hybridization, cytoplasmic male sterility, self-incompatibility, tissue culture, in-vitro screening, and transformation technologies. F, odd years. (PSS 5325)
5337. **Enzymes (3:3:0).** Prerequisite: CHEM 3311, 3312 or CHEM 4303 or equivalents. Structure, mode of action, and kinetics of enzymes. (CHEM 5337)
5338. **Biochemical Methods (3:1:6).** Prerequisite: CHEM 4303 or 3311 or equivalent. Methodology for the isolation and characterization of macromolecules and metabolites. (CHEM 5338)
5339. **Nucleic Acids (3:3:0).** prerequisite: CHEM 3312 or 4303 and BIOL 4320 or 5320. Eukaryotic and prokaryotic DNA cloning strategies, DNA sequence analysis and manipulation, recombinant DNA expression. (CHEM 5339)
5403. **Biometry (4:3:2).** Introduction to biological statistics. Observation, probability, "t"

test, analysis of variance, mean separation procedures, linear regression and correlation, and chi-square. Introduction to computerization of statistical analyses. F. (ANSC 5403)

5408. **Microbial Genetics (4:3:3)**. Prerequisite: MBIO 5301 or consent of instructor. Topics include current techniques of genetic analysis, molecular biology, molecular genetics, nucleic acid metabolism, and gene regulation in microorganisms, with emphasis on bacteria and bacteriophages. May not be taken for credit by students who have taken MBIO 4406. F. (MBIO 5408)
5414. **Advanced Agricultural Biotechnology (4:3:2)**. Prerequisite: Consent of instructor. Principles of biotechnology and genetic engineering. Genetic manipulations applied to problems in agricultural research and practice. F, odd years.
6000. Master's Thesis (V1-6). (GBTC 6000)
6001. **Biotechnology Internship (V1-9)**. Research and training in a private-sector or government laboratory. Consent of program director required. For nonthesis students.
6101. **Biotechnology Seminar (1:1:0)**. Presentation of current research topics in areas directly relevant to biotechnology. (GBTC 6101)
6301. **Introduction to Biotechnology (3:3:0)**. Prerequisite: CHEM 3311, 3312, 3313. Scientific bases of biotechnology techniques. Applications of biotechnology and ethical and social impact. (GBTC 6301)
6315. **Regulation of Gene Expression (3:3:0)**. Prerequisite: BIOL 5320 or 4320. An advanced, in-depth analysis of current research on mechanisms that regulate eukaryotic gene expression at transcriptional and post-transcriptional levels. (BIOL 6315)
6322. **Advanced Plant Breeding (3:3:0)**. Qualitative and quantitative inheritance, heterosis, selection theory and breeding methodology for crop plant improvement, genotype by environment interaction, and application of cellular and molecular techniques to plant breeding. S, odd years. (PSS 6322)
6424. **Molecular, Genetic, and Plant Genomics (3:3:0)**. Genome mapping in plants, gene structure and expression, recombinant DNA and gene cloning methods, molecular markers, QTL analysis, physical mapping, DNA chip technology, and functional genomics. S, even years. (PSS 6424)
7000. **Research in Biotechnology (V1-9)**. Full-time laboratory research under the direct supervision of a TTU or TTUHSC graduate faculty member. For thesis-option students. (GBTC 7000)

Fibers and Textiles

Managing Director: Dr. M. Dean Ethridge, Adjunct Faculty in Agricultural and Applied Economics and in Merchandising, Design, and Consumer Economics; Managing Director, International Textile Center.

The International Textile Center focuses on research, education, and technology transfer pertinent to fibers and textiles. It specializes in those natural fibers important to Texas cotton, wool, mohair, and cashmere. The center offers the opportunity for students to execute special

projects and thesis research, in collaboration with the Colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Engineering, and Human Sciences. It engages in multidisciplinary research with diverse units of Texas Tech University and the Health Sciences Center.

PSS 5376 Advanced Studies in Cotton Fibers is a specialized course offered by the International Textile Center. It is available to both students and professionals interested in plant breeding, farm production, harvesting and ginning, cotton merchandising, fiber quality control, and textile manufacturing.

The ITC is located on east Loop 289 in a 110,000-square foot facility with a multimedia classroom and an executive conference room. The center contains laboratories for materials evaluation, short staple spinning, long staple spinning, nonwovens, weaving and knitting, chemical processing and finishing, chemical analysis, and fabric care.

Contact information: www.itc.ttu.edu, (806) 747-3790, itc@ttu.edu.

Heritage Management

Coordinator: Gary F. Edson, Professor of Museum Science and Executive Director, Museum of Texas Tech University

The Master of Science in Heritage Management degree program emphasizes extensive investigation in the field of heritage management. Graduates from the program are prepared to enhance local, regional, and national sociological and scientific values; encourage preservation and stewardship of cultural and natural heritage; advocate public service; and direct educational programming designed to derive maximum advantage from innovative technology without the loss of cultural identity and biodiversity.

The program is configured to allow individual students to emphasize areas of special interests such as heritage administration, conservation, interpretation, education, and use (ecotourism). The program offers both theoretical and practical course work designed to prepare graduates to be leaders in the heritage management field.

Applicants will be considered for admission to the Heritage Management program once the following materials are received: official transcript of complete undergraduate course work, two letters of recommendation from persons knowledgeable of the student's professional abilities, GRE scores, a completed application form, and a career summary statement. Forms will be furnished on request.

Prior to being considered for admission to the program, students must complete the appropriate application forms and satisfy the requirements of the university. Once that process is concluded, program admission and competitive scholarship awards are based on three general categories of criteria.

- Academic Record: All academic records may be considered—60 hours, total, major, post-baccalaureate, etc.
- Test Scores: Scores on the General Test of the Graduate Record Examination (GRE) should

be no more than five years old. Each score is considered separately, with percentile scores viewed by broad major. No test score will be considered the sole criterion.

- Individual Profile: Profiles may include recommendations, research background, motivation, multilingual proficiency, undergraduate institution, presentations, and interviews. Other information that admission and scholarship committees may consider is work commitment, demonstrated commitment to a particular field of work or study, and community involvement.

Interested persons should contact the Museum of Texas Tech University for a comprehensive packet of information about the program. The program is administered by the Executive Director of the Museum.

The Heritage Management program uses a variety of existing courses offered by various departments within the university to address individual educational and career goals. All students must develop competency in the core courses taught by selected members of the graduate faculty. (Competency is construed to mean an understanding of professional practices.)

A student majoring in the program must take at least 12 hours from the Heritage Management core curriculum, a minimum of 15 hours prescribed elective courses, 12 of elective graduate-level courses, plus 6 hours of thesis or internship. Required core courses for the program are MUSM 5327, MUSM 5331, HMGT 5323, HMGT 5327. (Internships are to be at locations approved by the student's advisory committee.) A total of 45 credit hours of graduate-level work is required for graduation. In addition, each student must pass a qualifying exam prior to beginning either the internship or thesis and must pass comprehensive written and oral exams at the conclusion of his or her studies. Students pursuing the thesis option must write and defend the thesis.

Following the first 9 credit hours of graduate study, each student's curriculum will be formalized through consultation with a graduate faculty advisory committee that consists of at least three members and reflects the student's area of emphasis. This degree plan will be approved by the program coordinator and the Executive Director of the Museum and will then be submitted to the Graduate School. When approved, it will serve as a tool for advising and review to assure completion of degree requirements.

A minor at the master's level in heritage management consists of 9 approved credit hours in the core curriculum; a minor at the doctoral level consists of 15 hours of heritage management courses, at least 9 of which must be from the core curriculum.

Core Courses

- | | |
|------------|--|
| HMGT 5323. | Principles of Heritage Management (3:3:0) |
| HMGT 5327. | Heritage Planning (3:3:0) |
| MUSM 5327. | Museum Collection Management (3:2:3). |
| MUSM 5331. | Museum Interpretation and Communication (3:2:3). |

Prescribed Elective Courses

- HMG 5324 - Heritage Resource Management (3:3:0) *or* RWFM 5312 - Ecology of Renewable Natural Resources (3:3:0)
- MUSM 5330 - Museum Law/Ethics, and Standards (3:3:0) *or* LAW 6025 - Land-Use Planning Law (3:3:0).
- MUSM 5340 - Museum Data Management (3:1:6) *or* C S 5356 - Advanced Database Management Systems (3:3:0).
- HMG 7000 - Research (3) *or* MKT 5360 - Marketing Concepts and Strategies (3:3:0).
- MUSM 5325 - Museum Field Methods (3:1:6) *or* MUSM 5328 Museum Practicum (3:1:6)

Heritage Management (HMG)

(To interpret course descriptions, see pg. 10.)

5321. **Park Management (3:3:0).** Review of techniques and processes to instill an understanding of the legal and ethical responsibilities associated with the care, management, and operation of heritage properties.
5323. **Principles of Heritage Management (3:3:0).** Provides a theoretical framework and examines issues of evaluation, legislation, sustainability, socioeconomic impacts, and communication to foster global responsibility and present integrative approaches to managing heritage.
5324. **Heritage Resource Management (3:3:0).** Provides core knowledge in the principles, methods, laws, stewardship, and governance of heritage resources as a foundation for leadership in the heritage management field.
5327. **Heritage Planning (3:3:0).** Explores practical approaches and methods to heritage planning with emphasis on the integration of related disciplines to attain environmentally sound and socially responsible preservation, management, and development initiatives.
6000. **Master's Thesis (V1-6).**
6001. **Internship (V1-6).** Prerequisite: Advancement to candidacy status. Internship carried out under the supervision of the student's major advisor. Internship at the Lubbock Lake Landmark or similar approved location to provide practical experience for the heritage management profession.
7000. **Research (V1-12).**

Interdisciplinary Studies

Coordinators: Dr. Wendell Aycock, Professor of English and Comparative Literature, Associate Dean of the Graduate School; Dr. Allan Headley, Professor of Chemistry and Biochemistry, Associate Dean of the Graduate School

The Master of Arts or Master of Science degree program in Interdisciplinary Studies is intended for students who wish to continue education at the graduate level but do not seek specialized training concentrated in a major area. This program is not a substitute for the traditional master's degree; rather, it is designed for students with broader interests in several fields or for those whose career goals do not match fully with a single identifiable academic unit or department. Emphasis is

placed on continued intellectual and cultural development in a constantly changing society in which new career interests may extend over several traditional specializations.

Each program, exclusive of those tracks with required courses, is developed individually according to the student's interests and background. Among the few restrictions are the requirements that work be taken in at least three different subject areas and that no more than 12 hours be presented in any one area. Also, no more than 18 hours may be taken within a single college, except Arts and Sciences and Rawls College of Business. No more than 12 hours can be taken in the Rawls College of Business. Most students pursue the 36-hour, nonthesis plan, but the thesis or portfolio options may be appropriate in occasional circumstances when the student's previous work seems to qualify him or her for research.

The standard admission policy for applicants to other degree programs will apply to those seeking admission to the interdisciplinary master's program. Applicants must submit satisfactory GRE or GMAT scores and undergraduate records. Students must have a 3.0 GPA on previous graduate work. For further information, contact the coordinator of the program in the Graduate School office.

Students normally select areas of study that meet their own educational and career requirements, as described above. However, a number of study themes are identified in the following paragraphs that provide somewhat more specialized focus, while maintaining the interdisciplinary nature of the program as originally approved.

Arid-Land Studies and International Development. Students may devise a plan of study focusing on aspects of international development in various parts of the world. This theme will be oriented to applied knowledge and international issues in general. Another theme addresses specifically the problems of arid and semi-arid lands. Students may take courses in several departments to satisfy the requirements in either of these areas. For further details, contact Dr. Cliff Fedler, Director of the International Center for Arid and Semi-Arid Land Studies, or Dr. Gary S. Elbow, Director of the Center for Applied International Development Studies.

Environmental Evaluation. Students may gain a holistic view of environmental evaluation by taking courses that focus upon problems and techniques relating to natural resources and their utilization. Work in geography, geology, land and water management, atmospheric sciences, and other disciplines is tailored to each student's interests. Persons interested in this plan should contact Dr. Jeff Lee in the Department of Geography.

Fine Arts Management. Courses relating to management in the fine arts may be taken in a plan leading to the degree in Interdisciplinary Studies. Courses in public administration and business administration as well as in the arts develop management leadership for fine arts institutions and governmental agencies. The Fine Arts Doctoral Committee provides coun-

sel and supervision for this plan within the Interdisciplinary Studies program.

Applied Linguistics. Courses relating to theoretical, descriptive, historical, and applied study of language structure and use may be selected in a plan leading to the degree in Interdisciplinary Studies. Studies in anthropology, bilingual education, psychology, and speech communication as well as in various languages (American Sign Language, Arabic, Chinese, English, French, German, Japanese, Spanish) will provide a comprehensive understanding of the discipline. Interested students may contact Dr. Sharon A. Myers, Department of Classical and Modern Languages and Literatures. See also "Applied Linguistics" in this section of the catalog.

Occupational Safety and Health. This interdisciplinary course of study prepares students to identify and evaluate hazardous workplace conditions, to develop programs for accident prevention and control, and to gain ergonomic expertise related to occupational safety and health. Courses in human physiology, safety, air pollution control technology, ergonomics, analytical instrumentation, and other areas highlight the link between people and machines. Engineering background is helpful but not essential; the selection is sufficiently flexible for a diversity of interests. For further details contact Dr. M.M. Ayoub, Department of Industrial Engineering.

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 Dr. Gwen Sorell in the Department of Human Development and Family Studies.

Other Options. Studies of an interdisciplinary nature offer almost limitless combinations. Students may select from graduate offerings in almost the entire catalog and from the graduate offerings of the School of Law and Health Sciences Center. Those interested in a customized program should contact Associate Deans Allan Headley or Wendell Aycock in the Graduate School.

Interdisciplinary Studies (I S)

(To interpret course descriptions, see pg. 10.)

5000. **Graduate Directed Studies (V1-12).** Prerequisite: Consent of Coordinator. Advanced studies in developing cultural understanding. Projects to be assessed by faculty committee.
5001. **Graduate Studies Abroad (V1-12).** Prerequisite: Consent of Office of International Affairs. Advanced individual studies in interdisciplinary, international, and/or multicultural experiences.
5301. **The Nature of Science for Teachers (3:3:0).** Interdisciplinary course for teachers providing an overview of science and scientific inquiry. Special emphasis on research methods.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**

Legal Studies

Coordinator: Dr. Marilyn E. Phelan, Robert H. Bean Professor of Law, Heritage Management, and Museum Science

Through arrangement with the School of Law, graduate students may take certain courses in law to supplement their programs or, in some cases, to meet the requirements for a formal minor. Enrollment of graduate students in individual law courses is subject to the availability of space and approval of the professor in charge. Graduate students should consult their advisor before enrolling in such courses to ensure that the courses are applicable to their program. Courses that may be appropriate for a minor in legal studies also are available in such areas as political science, history, business administration, and sociology.

Texas Tech also offers joint programs of study leading not only to a master's degree but also to a Doctor of Jurisprudence (J.D.). They include the following:

- J.D./Master of Business Administration
- J.D./Master of Public Administration
- J.D./Master of Science in Agriculture and Applied Economics
- J.D./Master of Science in Accounting (Taxation)
- J.D./Master of Science in Environmental Toxicology
- J.D./Master of Science in Personal Financial Planning
- J.D./Master of Science in Biotechnology
- J.D./Master of Science in Crop Science/Horticulture/Soil Science/Entomology

These joint degree programs are of benefit to students who contemplate careers in professional management or public service or those who envision careers in such narrowly specialized areas such as tax accounting, banking, real estate, collective bargaining, or international business. The program enables students to study, compare, and relate simultaneously the special subject matter areas and the law, completing the requirements for both degrees in three years instead of the four years required if pursued separately.

Multidisciplinary Science

Coordinator: Dr. Allan Headley, Professor of Chemistry and Biochemistry and Associate Dean of the Graduate School

This interdisciplinary program leading to a Master of Science degree with a major in multidisciplinary science is administered by the Associate Dean of the Graduate School with faculty and courses drawn from participating units throughout the university. The program is designed to meet the professional needs of K-12 teachers of science. The program requires the completion of 36 semester hours of graduate courses in the sciences, mathematics, and science education culminating with the completion of a special project.

Program Courses

- ATMO 5302. Weather, Climate, and Applications (3:3:0).
- BIOL 5311. Ecology for Teachers (3:3:0).
- BIOL 5312. Cellular and Molecular Biology for Teachers (3:3:0).
- CHEM 5360. Conceptual Chemistry for Teachers I (3:3:0).
- CHEM 5361. Conceptual Chemistry for Teachers II (3:3:0).
- EDSE 5377. Science Curriculum and Instruction (3:3:0).
- GEOL 5340. Advances in Historical Geology (3:3:0).
- I S 5301. The Nature of Science for Teachers (3:3:0).
- MATH 5360. Advanced Mathematics for Teachers I (3:3:0).
- MATH 5364. Computer Literacy and Programming I (3:3:0).
- PHYS 5371. Conceptual Physics for Teachers (3:3:0).
- PHYS 5372. Astronomy for Teachers (3:3:0).

Museum Science

Coordinator: Gary F. Edson, Professor of Museum Science and Executive Director, Museum of Texas Tech University

The Master of Arts in Museum Science emphasizes thorough preparation in the broad spectrum of museum theory and practice. Graduates from the program have a comprehensive background in museum studies, preparing them as generalists. In addition, students may elect to become specialists in a number of subdisciplines, including collection management and care; exhibitions and interpretation; museology; museum management; and curatorship in anthropology, art, ethnology, history, and the natural sciences.

Applicants will be considered for admission to the museum science program after the following materials are received: official transcript of complete undergraduate course work, two letters of recommendation from persons knowledgeable of the student's professional abilities, GRE scores, a completed application form, and a career summary statement. Forms will be furnished on request. Prior to admission consideration, students must complete the appropriate application forms and satisfy the requirements of the university. Once that process is concluded, program admission and competitive scholarship awards are based on three general categories of criteria:

- Academic Record: All academic records may be considered—60 hours, total, major, post-baccalaureate, etc.
- Test Scores: Scores on the General Test of the Graduate Record Examination (GRE) should be no more than five years old. Each score is considered separately, with percentile scores viewed by broad major. No test score will be considered the sole criterion.
- Individual Profile: Profiles may include recommendations, research background, motivation, multilingual proficiency, undergraduate institution, presentations, and interviews. Other information that admission and scholarship committees may consider is work commitment, demonstrated commitment to a particular field of work or study, and community involvement.

Interested persons should contact the Museum of Texas Tech University for a comprehensive packet of information about the program.

The Museum Science program uses a variety of existing courses offered by various departments within the university to address individual educational and career goals. All students must develop competency in the core courses taught by selected members of the graduate faculty and the museum staff. (Competency is construed to mean an understanding of professional museum practices.)

A student majoring in the program must take at least 24 hours from the museum science core curriculum, a minimum of 15 hours of elective graduate-level courses, plus 6 hours of thesis or internship and special project. Required core courses for the program include MUSM 5321, 5326, 5327, 5330, 5331, 5332, 5333, and 5340. (Internships are normally at approved museums and facilities other than the Museum of Texas Tech University.) A total of 45 credit hours of graduate-level work is required for graduation. In addition, each student must pass a qualifying exam prior to beginning either the internship or thesis and must pass comprehensive written and oral exams at the conclusion of his or her studies. Students pursuing the thesis option must write and defend the thesis.

Following the first 9 credit hours of graduate study, each student's curriculum will be formalized through consultation with a graduate faculty advisory committee, consisting of at least three members, which reflects the student's area of emphasis. This degree plan will be approved by the program coordinator and the Executive Director of the Museum and will then be submitted to the Graduate School. When approved, it will serve as a tool for advising and review to assure completion of degree requirements.

A minor at the master's level in museum science consists of 9 approved credit hours in the core curriculum; a minor at the doctoral level consists of 15 hours of museum science courses of which at least 9 must be from the core curriculum.

Museum Science (MUSM)

(To interpret course descriptions, see pg. 10.)

5321. **Museology (3:3:0)**. Establishes a historical and theoretical framework for museum science, promotes a global perspective of museums, and acquaints students with the broad-based implications of museum work as a science.
5325. **Museum Field Methods (3:1:6)**. Prerequisite: Consent of instructor. Problems of collecting museum artifacts, specimens, and samples in the field and methods of handling material before it reaches the museum. Sections will allow work in anthropology, history, paleontology, and vertebrate biology.
5326. **Museum Administration (3:3:0)**. Prerequisite: MUSM 5321 or consent of instructor. Instruction and investigation in aspects of museum management and administration including policies and procedures, personnel management, budget formulation, governance, and interaction with support organizations.
5327. **Museum Collection Management (3:2:3)**. Prerequisite: MUSM 5321 or consent of instructor. Defines the roles of museum collections and focuses on general museum concepts, procedures, and issues related to the management and care of collections. Instruction in art, humanities, and natural science collections.
5328. **Museum Practicum (3:1:6)**. Prerequisite: Consent of instructor. Individual instruction course of supervised experiences involving hands-on activities in museum administration, collections, education, and exhibitions. Sections will allow work in all areas of the Museum of Texas Tech.
5329. **Material Culture (3:3:0)**. Discussion of major trends in historical, psychological, philosophical, anthropological, and art historical literature in terms of their application to the interpretation of the past through its material culture.
5330. **Museum Law, Ethics, and Standards (3:3:0)**. Prerequisite: MUSM 5321 or consent of instructor. Addresses the ethical considerations and legal obligations of museum collections, administration, and operations. Attention given to international concerns as well as to state and national issues.
5331. **Museum Interpretation and Communication (3:2:3)**. Prerequisite: MUSM 5321 or consent of instructor. Investigates the theories and methods of museum exhibitions and interpretation. Includes planning, developing, and evaluating strategies of exhibitions, publications, and interpretive programs.
5332. **Museum Preventive Conservation (3:1:6)**. Prerequisite: MUSM 5321 and 5327, or consent of instructor. A course designed to give future museum workers an awareness of the need for specialized care of artifacts. Introduction of current methods and theories pertaining to museum collection care.
5333. **Museum Education (3:3:0)**. Prerequisite: MUSM 5321, 5327, or consent of instructor. Examination of the role of education in museum, with emphasis on the theory and practice of program development, teaching strategies, and off-site resources.
5335. **Geology of National Parks (3:3:0)**. Prerequisite: MUSM 5321, 5327, or consent

of instructor. Investigation of major concepts in geology, paleontology, evolution, changing environment, history, and preservation of historical parks of the U.S.

5340. **Museum Data Management (3:1:6)**. Prerequisite: MUSM 5321 and 5327 or consent of instructor. Introduction of traditional and electronic management of museum collection data emphasizing the philosophy of data preservation and retrieval.
6000. **Master's Thesis (V1-6)**.
6001. **Museum Internship (V1-6)**. Internship at an approved museum to include a special project approved by the student's advisory committee. Written documentation of project to provide practical information for the museum profession.
7000. **Research (V1-12)**.

Neural and Behavioral Sciences

Coordinator: Dr. James A. Carr, Associate Professor of Biological Sciences and Chairperson, Neural and Behavioral Sciences Advisory Committee

Neural and Behavioral Sciences is offered as an interdisciplinary minor for graduate students who wish to broaden their knowledge of the neural and behavioral sciences while gaining a sound academic background in basic areas such as the structure and function of the nervous system.

The Neural and Behavioral Sciences Advisory Committee supervises this program and coordinates related activities on campus such as seminars, student research, and consultation for students interested in further training in the neural and behavioral sciences. The committee is composed of faculty from the College of Arts and Sciences, the College of Agricultural Sciences and Natural Resources, and the School of Medicine.

A doctoral minor normally consists of GIDN 5910 (Integrated Neurosciences: 9 semester hours) plus 9 semester hours outside the student's major field (selected from the list below). A master's minor normally consists of GIDN 5910. In special cases the committee may substitute other courses for GIDN 5910.

Program Courses

- GANM 5313. Selected Topics in Cell and Developmental Biology (3:3:0).
- GIDN 5910. Integrated Neurosciences (9:8:1).
- GPHM 5326. Pharmacology of the Autonomic Nervous System (3:3:0).
- GPHM 5337. Neuropsychopharmacology (3:3:0).
- GPHY 6314. Membrane Biophysics (3:3:0).
- PHIL 5330. Philosophy of Science (3:3:0).
- PHIL 5331. Philosophical Psychology (3:3:0).
- PSY 5309. Clinical Neuropsychology (3:3:0).
- PSY 5353. Seminar in Physiological Psychology (3:3:0).
- PSY 5385. Life Span Development: Psychobiological and Cognitive Processes in Aging (3:3:0).
- ZOOL 5304. Comparative Endocrinology (3:3:0).

- ZOOL 5312. Advanced Animal Behavior (3:3:0).
- ZOOL 6320. Comparative Neuroanatomy (3:2:3).

Risk-Taking Behavior

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

Risk-Taking Behavior is offered as an interdisciplinary minor at the master's or doctoral level. The 15-hour minor consists of an introductory course (Seminar in Risk Taking), which examines the concept of risk taking from a developmental perspective. Students then choose the additional 12 hours from courses covering substance abuse and vulnerability to chemical dependency, family problems associated with risk taking, deviance, and criminology. At least two of these courses must be outside the student's home department.

The minor is administered by the Committee for Multidisciplinary Research on Adolescent and Adult Risk-Taking Behavior. The committee is composed of faculty in Human Development and Family Studies; Psychology; Education; and Sociology, Anthropology, and Social Work. The purposes of the committee are to foster collaborative research on risk taking and to serve as a resource for Texas Tech and the community. Research interests of participants include substance abuse, codependency, decision processes associated with adolescent sexual behavior, coping and social support, gender issues in risk taking, and developmental processes associated with risk taking.

This minor should be useful for students interested in research on risk-taking behavior or for those planning to work in applied settings with adolescents and young adults or with families. Consult the program coordinator or individual departments for information on course scheduling. In addition to the courses listed below, special topics courses related to risk taking may be included with the approval of the coordinator.

Program Courses

- EPCE 5372. Addictions: An Overview for School and Community Counselors (3:3:0).
- HDFS 5341. Socialization Processes and Addiction (3:3:0).
- HDFS 6320. Seminar in Risk Taking (3:3:0).
- HDFS 6330. Family Problems (3:3:0).
- HDFS 6371. Practicum in Human Development and Family Studies (3:3:0).
- PSY 5382. Psychopharmacology of Psychoactive Drugs (3:3:0).
- SOC 5311. Seminar in Criminology (3:3:0).
- SOC 5325. Seminar in Deviant Behavior (3:3:0).

All-University Programs

Cooperative Education

The Cooperative Education program integrates classroom study with paid, practical, and supervised work training in public and private employment situations. By applying their academic training in a work setting, students not only enhance their self-confidence while earning wages, but they also gain career direction and may receive offers for future full-time employment.

Co-op programs include both the alternating and parallel patterns. The alternating option allows students to alternate semesters of work and school, working a minimum of two semesters. The parallel plan permits students to work at least 15 to 20 hours per week concurrently with their academic progression.

Students considering a Co-Op experience should consult with an advisor in the Career Center as early as possible. In addition, the student must obtain approval from his or her departmental advisor before enrolling. Ordinarily a student must have completed the sophomore year to be considered for the program.

Cooperative Internship (COIN)

(To interpret course description, see pg. 10.)

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

Institute for Studies in Pragmaticism

The Institute for Studies in Pragmaticism offers a course on methods and logical problems associated with interdisciplinary endeavors in science. The only prerequisite is approval of the instructor. Students in any branch of Texas Tech University or Texas Tech University Health Sciences Center are eligible to enroll.

Contact information: Kenneth L. Ketner, Director, Institute for Studies in Pragmaticism, Box 40002, Texas Tech University, Lubbock, TX 79409-0002, (806) 742-3128.

Pragmaticism (PRAG)

(To interpret course description, see pg. 10.)

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.

Interdisciplinary Studies (Freshman Seminar)

"Tech Transition: The Freshman Seminar" is designed to smooth the advance of students from high school to the university. The one-hour Interdisciplinary Studies course (I S 1100) is taught by regular faculty from throughout the university in a collaborative approach to major concerns of incoming students.

This is a general university course with sections composed of 20 to 25 students from the freshman class without regard to college or major. It cannot be taken pass-fail.

The course has a major focus on learning theory and application, the development of critical thinking skills as they apply to the nature of a university, the purposes and values of a university education, and a wide variety of campus issues. Practical concerns covered in the seminar include time management, essay writing, effective notetaking, choosing a major, test taking, and campus resources.

The goals of this course are to help students take charge of their education by developing a profound understanding of the philosophy and scope of higher education and to foster development of a life of learning.

Interdisciplinary Studies (I S)

(To interpret course descriptions, see pg. 10.)

1100. **Tech Transition: Freshman Seminar (1:1:0).** Introduces students to philosophy, history, and applications of higher education and critical thinking.
1200. **Life Skills for Student Athletes (2:2:0).** Prerequisite or corequisite: I S 1100. Designed to assist first-year student athletes with a variety of life-skill components, including personal, athletic, academic, and career development.

Introduction to Library Research

Introduction to Library Research is a one-hour course designed to introduce students to lifelong information literacy skills and establish tools for effective and efficient research in a university library. Because information comes in many forms, students sometimes find the multitude of printed publications, Internet resources, and microform and audiovisual materials overwhelming. They need to know how to identify, find, evaluate, and use resources that are most appropriate for their assignments.

Introduction to Library Research has four main objectives: to present the arrangement and services of the Texas Tech University Libraries;

to provide an introduction to resources and search strategies; to outline a transferable, systematic plan for critical evaluation and use of these resources in a variety of ways; and to promote the effective use of information to accomplish specific tasks.

Course content (readings, quizzes, and activities) is accessed through WebCT for onsite and distance students. Onsite students will meet for lecture and hands-on sessions. All students will prepare a portfolio throughout the semester that will count as the final project.

Contact information: Erin Ellis, (806) 742-2236.

Library Research (LIBR)

(To interpret course description, see pg. 10.)

1100. **Introduction to Library Research (1:1:0).** Designed to introduce students to lifelong information literacy skills and establish the tools for effective and efficient research in a university library.

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. Writers may bring their writing projects as either a hard copy or texts on discs. To submit texts electronically, writers may access the University Writing Center through its web site at <http://english.ttu.edu/uwc01>.

Women's Studies

The university offers an interdisciplinary minor in women's studies. Goals of the minor include helping students reinterpret traditional views of women's nature and role, training individuals for careers with a special focus on women, and encouraging research dealing with the experience of women.

The program is administered by the Women's Studies Council and the Director of Women's Studies. A minor consists of 18 hours of women's studies electives. Three of the courses must be Introduction to Women's Studies (W S 2300), Feminist Thought and Theories (W S 4310), and Women's Studies Seminar (W S 4399). Courses counted toward the major will not count toward the minor.

In addition to courses with a W S prefix, courses may be selected from the following (only class sections pertaining to women's studies qualify for the minor): ENGL 3387, ENGL 3389, HDFS 3318, and HDFS 3319.

Women's Studies (W S)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1305. **Human Sexuality (3:3:0)**. Examination of the structural and functional traits of sexuality and how they affect well-being; covers relationships, reproduction, and life-style alternatives. (HLTH 1305)
2300. **Introduction to Women's Studies (3:3:0)**. Basic survey of concepts and theories related to the study of women and to the analysis of gender roles. Fulfills Core Curriculum humanities requirement.
2301. **Gender Roles: Life Span Developmental Perspective (3:3:0)**. Introduction to gender role concepts and to the impact of gender and gender role systems on individual and family developmental processes. (HDFS 2300)
2331. **The Sociology of Marriage (3:3:0)**. History, present status, and current problems of the marriage institution. (SOC 2331)
3306. **Women in Culture and Society (3:3:0)**. A comparative study of sex and gender in human society; biological and cultural factors that influence women's roles, status, and their contributions to cultural institutions. (ANTH 3306)
3307. **Gender Issues in Sport (3:3:0)**. Examination of the ways sport experiences differ for males and females emphasizing historical, social, behavioral, and physiological dimensions. (ESS 3307)
3312. **Gender and Communication (3:3:0)**. A study of the similarities and differences of important communication variables for males and females, with practical communication applications. May be applied toward the social-behavioral science requirement for the B.A. degree. (Writing Intensive) (COMS 3334)
3321. **Human Sexuality Through the Family Life Cycle (3:3:0)**. Human sexuality from a life cycle perspective, with an emphasis on developmental, familial, and societal factors that influence individual sexuality. (HDFS 3321)
3323. **The History of Women in America (3:3:0)**. Examines the gender expectations from 1607 to the present that have produced for women and men entirely different experiences, strengths, and perceptions of American history. (HIST 3323)
3325. **Women in the Modern World (3:3:0)**. Prerequisite: SOC 1301. Course treats women as a group with unique sex role socialization, work, family, and political experience. Emphasis on women in contemporary United States. (SOC 3325)
3326. **Women in Politics (3:3:0)**. A study of female political participation in the United States, including voting, campaign activity, interest group activity, and office holding. (POLS 3326)
3331. **Sociology of the Family (3:3:0)**. Changing family life styles, mate roles, parent-child relationships, adoption, abortion, population control, technical-industrial impact on American family unit. (SOC 3331)
3332. **Feminism and Philosophy (3:3:0)**. Discussion of issues involving women in moral, political, and legal philosophy, including the ethic of care, sexual harassment and discrimination, gender neutrality, and meaning of equality. (PHIL 3332)
3337. **Inequality in America (3:3:0)**. Inequality as expressed in occupational, class, ethnic, and sexual hierarchies is examined from varying sociological perspectives. (SOC 3337)
3341. **Women in European Civilization (3:3:0)**. What women were supposed to do; what women did, from prehistory to the vote in 1920. (HIST 3341)
3382. **Women Writers (3:3:0)**. Significant works by women. (ENGL 3382)
4302. **Psychology of Human Sexual Behavior (3:3:0)**. Prerequisite: PSY 2306 and junior standing. Study of human sexual behavior from a psychological viewpoint with emphasis on contemporary research methods and findings. (PSY 4300)
4305. **Directed Studies (3:3:0)**. Prerequisite: Junior or senior standing or consent of instructor. Independent study under the guidance of the instructor.
4310. **Feminist Thought and Theories (3:3:0)**. Prerequisite: Junior standing or consent of instructor. An examination of important theoretical writings and perspectives in women's studies, including the contributions of feminist theory and analysis to traditional disciplines. (Writing Intensive)
4327. **Gender, Race, and Class in U.S. Law (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines law's treatment of gender, race, and class; legal impact of struggles of women, African-Americans, and workers; meaning of liberty, citizenship, public-private spheres. (Writing Intensive) (HIST 4327)
4355. **Let's Talk Women, Let's Talk War: Women in Conflict in the 20th Century (3:3:0)**. Prerequisite: Junior standing or consent of instructor. The course will examine the involvement and reactions of European women to situations of war and revolution in the 20th Century. (HIST 4355)
4374. **Love, Death, and Magic in Europe, 1500 - 1800 (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Topics in social and cultural history. Underside of civilization, population, social structure, family and household, economic growth, and crisis. Attitudes toward love and death, popular religion and culture, witchcraft, violence, revolt. (Writing Intensive) (HIST 4374)
4399. **Women's Studies Seminar (3:3:0)**. Prerequisite: W S 2300, junior standing, or consent of instructor. An exploration of women's experience and gender definitions from the perspective of several disciplines, including biology, psychology, anthropology, human development, communication studies, history, literature, art, sociology, political science, and economics.

Graduate Courses

5000. **Practicum in Women's Studies (V1-6)**. Practicum experience involving women-centered projects, activities, or artistic expressions that are socially and/or communally relevant.
5300. **Directed Studies (3:3:0)**. Prerequisite: Consent of instructor and the Director of Women's Studies. Content will vary to meet the needs of students. May be repeated three times for credit, as topic varies.
5310. **Feminist Thought and Theories (3:3:0)**. An examination of important theoretical writings and perspectives in Women's Studies, including the contributions of feminist theory and analysis to traditional disciplines.
5320. **Feminist Research Methodologies (3:3:0)**. Prerequisite: W S 5310 or consent of instructor. An interdisciplinary study of methods, analyses, and critiques used by feminist scholars to study feminist issues within and between a range of traditional disciplines.

Reserve Officer Training Corps

ROTC–Air Force

Air Force ROTC Det 820
Texas Tech University
Box 45009
Lubbock, TX 79409-5009
(806) 742-2143
FAX (806) 742-8048
www.ttu.edu/afrotc

ROTC–Army

Department of Military Science
Texas Tech University
Box 45003
Lubbock, TX 79409-5003
(806) 742-2141
FAX (806) 742-1144
<http://armyrotc.ba.ttu.edu>

The Department of Military Science and the Department of Aerospace Studies conduct senior division Reserve Officer Training Corps (ROTC) programs under the auspices of the College of Arts and Sciences. These programs provide students the opportunity to learn more about the United States military and its place in American society today. They also allow qualified students to pursue a program of studies and learning experiences leading to an officer's commission in either the Army or Air Force.

The first two years of courses in the Army and Air Force ROTC programs are open to all students. No military commitment or obligation is incurred with these courses unless the student has an ROTC scholarship. The courses may be substituted for the College of Arts and Sciences health and physical fitness course requirements.

Army ROTC offers a four-year and two-year commissioning program. To enter the junior and senior level Army Advanced Course, students must have completed the freshman and sophomore level basic course or have received constructive credit by having completed either a four-year JROTC program, the Army ROTC Leader's Training Course, Armed Forces Basic Training, or be an honorably discharged veteran.

Air Force ROTC offers four-year and two-year commissioning and a one-year 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 four-week field training. Qualified one- and two-year applicants without the GMC, JROTC, CAP, or active duty will attend an extended field training. Attendance at field training is contingent upon selection to the Professional Officer Course and is normally scheduled between the sophomore and junior years.

Detailed information about the alternative programs is available from the chair of the respective departments. Advanced Course, Professional Officers Course, and scholarship students receive a monthly allowance. In addition to completing the above requirements, students who wish to enroll in the ROTC commissioning program must be citizens of the United States, be not less than 17 years of age, and be able to complete work for a baccalaureate degree and all other require-

ments for commissioning prior to their 30th birthday (34th birthday with waiver for prior service). For the Air Force, students must finish their baccalaureate degree and all other requirements for commissioning by the time they are 29 1/2 years old if they are programmed for flight training; up to 34 years old with waiver if programmed for other than flight training. All ROTC program students must have a cumulative GPA of 2.0 or better, pass all military aptitude tests as required, be physically qualified, be enrolled as a full-time student, and be approved by the Professor of Military Science, or Professor of Aerospace Studies, as appropriate. Upon admission into the Advanced Course or Professional Officers Course, students sign a contract to seek a commission as a second lieutenant.

Scholarships. The departments of Army and Air Force offer competitive 4-year ROTC scholarships to selected high school seniors. Additionally, the Army offers 3- and 2-year scholarships to outstanding students selected by faculty in the program. Eligible freshmen and sophomores may be nominated for Air Force ROTC 3- or 2-year scholarships. ROTC scholarships provide textbook reimbursement, tuition, and fees as well as a monthly allowance. Starting October 1, 2002, the monthly allowance will be \$250 for freshmen, \$300 for sophomores, \$350 for juniors, and \$400 for seniors.

Commissioning. Upon receiving a commission, the Army ROTC lieutenant will enter full-time active duty service or part-time service with the U.S. Army, the Army Reserve, or the Army National Guard. Selection for active duty is competitive. For those who wish to combine a career with part-time military service, contracts are available guaranteeing that cadets can serve all of their commitments in the Army Reserve or National Guard. Cadets may also apply for educational delays for graduate training. Air Force cadets agree to serve 4 years on active duty if in a nonflying career field, 10 years upon completion of undergraduate pilot training, or 6 years upon completion of undergraduate navigator training. Air Force commissions are active duty only.

Military Studies Minor. A Military Studies minor is available in the College of Arts and Sciences and the College of Business Administration with the General Business major. It consists of 18 semester hours taken in Aerospace Studies, Military Science, Military History, or a combination of the choices.

Department of Aerospace Studies

Faculty

Col. David R. Lefforge, Chairperson

Professor: Col. Lefforge; *Assistant Professors:* Maj. Phillips, Maj. Monroe, Maj. Curoe.

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, consisting of the first two years of Air Force ROTC, examines the role of the U.S. military forces in the contemporary world with particular attention to the U.S. Air Force and its organization and mission. During the first year, students take AERS 1105 and 1106, which emphasize the organizational structure of the Air Force, missions of selected military organizations, and professionalism and officership. In the second year they study the historic development of air power (AERS 2103 and 2104).

Professional Officer Course. This course introduces the cadet in the first year to the study of Air Force leadership at the junior officer level, including its theoretical and professional aspects, and a study of military management functions, principles, and techniques. The second year is a study of national security

policy and strategy. Additional subjects cover the military profession and its relationship to American society. This program devotes attention to developing communicative skills and providing leadership experiences in officer-type activities.

Entrance to the professional officer course is limited to those who are regularly enrolled in the university as full-time students; have completed the necessary screening, testing, and physical examination; and have completed the general military course or the preenrollment field training or received credit for prior military service and were selected by HQ AFROTC through a competitive screening process.

Cadets who complete the Air Force ROTC Professional Officer Course are commissioned upon graduation and enter active duty as Air Force second lieutenants.

Awards and Recognition. A number of awards, trophies, and decorations are presented each year to outstanding Air Force ROTC cadets during a suitable military ceremony by military and civilian leaders. The awards, presented to recognize achievement and encourage competition, are given to recipients chosen by the Professor of Aerospace Studies, detachment staff, and the Cadet Staff. The President's Award is presented annually by the president of the university to the outstanding professional officer course cadet who has achieved a high academic standing and materially contributed to student life during his or her university career. The Colonel Bernard F. Fisher Leadership Awards are awarded each regular semester to the freshman, sophomore, junior, and senior cadets who have demonstrated outstanding leadership within the Cadet Corps. The recipients are rewarded with jet aircraft incentive rides.

Sabre Flight Drill Team. The Sabre Flight Drill Team is an integral part of the program, and its

basic mission is to promote interest in the Air Force ROTC. Members of the flight participate regularly in color and honor guard formations and precision drill activities.

Arnold Air Society. This professional honorary service organization of selected Air Force ROTC cadets participates in a variety of service functions for the university and the community. Its objective is to create a closer and more efficient relationship within the Air Force ROTC and to promote interest in the Air Force.

Silver Wings. The Silver Wings is a national, coed, professional organization dedicated to creating proactive, knowledgeable, and effective leaders through community service and education about national defense.

Summer Training. Air Force ROTC field training is offered during the summer months at selected Air Force bases throughout the United States. Students in the four-year program participate in four weeks of field training during the summer, usually between the sophomore and junior year. The major areas of study in the field training program include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions and Air Force environment, and physical conditioning. There are numerous program opportunities available for cadet participation on a voluntary basis within the Professional Development Training (PDT) Program. PDT is a collection of summer programs available for Air Force ROTC cadets. These programs are conducted at a variety of locations in the United States and overseas. Travel to training location is provided. Room and meals are provided during training. Cadets can expect to shadow Air Force officers to see their day-to-day responsibilities. There are numerous opportunities to interact with flying, engineering, medical, legal, and many other career fields. Flying and parachuting opportunities are available for freshman cadets.

Leadership Laboratory. Instruction is within the framework of an organized cadet corps with a progression of experiences designed to develop each student's leadership potential. Leadership Laboratory involves a study of Air Force customs and courtesies; drill and ceremonies; career opportunities in the Air Force; and the life and work of an Air Force junior officer. Students develop their leadership potential in a practical, supervised laboratory that typically includes field trips to Air Force installations and visits by Air Force officers in various job specialties. Students who enroll in aerospace studies courses must also enroll in a corresponding Leadership Laboratory section. Contact the Aerospace Studies Department for details.

Aerospace Studies (AERS)

(To interpret course descriptions, see pg. 10.)

- 1105. The Air Force Today (1:1:1.5).** 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. The Air Force Today (1:1:1.5).** A survey course that deals with the Air Force in the contemporary world through a study of the total force structure, strategic offensive and defensive forces, general purpose forces and aerospace support forces.
- 2103, 2104. Development Air Power I and II (1:1:1.5 each).** A survey course designed to examine general aspects of air and space power through a historical perspective. Historical examples are provided to analyze the development of the Air Force capabilities and missions as well as to demonstrate the evolution of today's air and space power. Students also focus on basic verbal and written communication skills and USAF core values.
- 3305. Air Force Leadership and Management (3:3:1.5).** An introductory management course emphasizing the individual as a manager in the Air Force. Individual motivation and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for the development of the junior officer's professional skills as an Air Force leader.
- 3306. Air Force Leadership and Management (3:3:1.5).** Leadership theory and management practice are amplified through study of management of forces in change, organizational power, managerial strategy and tactics, and leadership ethics.
- 4303, 4304. National Security Force for American Society (3:3:1.5 each).** Prerequisite: Acceptance into the Professional Officer Course. AS 400 examines the national security process, regional studies, advanced leadership ethics, and Air Force doctrine. Special topics of interest focus on the military as a profession, officership, military justice, civilian control of the military, preparation for active duty, and current issues affecting military professionalism. Within this structure, continued emphasis is given to the refinement of communication skills.



Department of Military Science

Faculty

Lt. Col. James C. Skidmore, Chairperson

Professor: Lt. Col. Skidmore; **Assistant Professors:** Maj. Beall, Capt. Payne, Capt. Dortch; **Instructors:** Master Sgt. Decavele, Sgt. 1st Class Carter.

About the Program

The Army Reserve Officer Training Corps (ROTC) program of instruction is designed to prepare university students for commissioning as officers for the active Army, the Army Reserve, and the Army National Guard. This is an integral aspect of our national security because Army ROTC provides over 70 percent of the commissioned officers serving in the Army Reserve components and the active Army. It is for this reason that Army ROTC seeks quality men and women who are willing to accept the responsibilities inherent with officership. The training program is designed to teach military skills and enhance the individual's abilities in communications, leadership, and physical aptitude.

The four-year Army ROTC program is divided into the basic course (first two years) and the advanced course (the last two years). Students who are not scholarship winners incur no military obligation during the first two years.

Basic Course. Enrollment in the basic course is open to all full-time students who are U.S. citizens or immigrant aliens. During the first two years, students are trained in military leadership and problem-solving techniques that will assist them in their adjustment to the university environment. ROTC also provides a tutorial program to assist students in making the academic transition to higher education. Course content including wilderness survival skills, land navigation with a compass and topographic map, weapons marksmanship, safety, first aid, rappelling, and physical conditioning are taught both in the classroom and in outdoor settings. It also includes the structure of the Army and its relationship to American society, the customs and courtesies of the Army, leadership, values, and interpersonal communications. Eligible students may be able to test out of basic courses (MILS 1101, 1102, 2201, and 2202) and receive credit for the courses. Eligibility requirements include prior military service, completion of the leader's training course, or similar qualifications that would illustrate mastering basic skills and content. Consent of the instructor must be obtained prior to attempting to test out of a military science course.

Advanced Course. The junior and senior level courses offer an in-depth study of leadership and individual and group behavior. During the junior year the emphasis is on individual- and small-unit combat tactics, physical training, and

basic soldier skills. This culminates with attendance at the Leadership Development and Assessment Course between the junior and senior years. During the senior year, students study ethics and leadership and prepare for becoming a lieutenant. In addition, they participate in planning and executing training for the other cadets. Students are required to develop skills in oral and written communications as well as techniques of instruction.

Military Science Organizations. This department sponsors the local chapter of Scabbard and Blade, the national military honor society. It also sponsors intramural athletic teams and the following organizations:

- **Ranger Challenge Team.** This 6-member team represents the Texas Tech Army ROTC program at competitive meets. The purpose of the Ranger Challenge Team is to test the abilities of the top cadets in small-unit competition designed to promote exciting, challenging training and the opportunity to compete with the top cadets from other schools. Team members are selected competitively based on physical fitness, endurance, and proficiency in basic soldier skills.
- **Ranger Company.** Members of the unit are afforded the opportunity to apply leadership and tactics instruction in realistic situations. In addition to weapons and tactics instruction, participation in the unit develops confidence in each member's leadership ability, teamwork, and spirit. Membership is open to all Army ROTC students who meet unit and university standards.
- **Grey Scouts.** The club offers students the opportunity to participate in a self-paced, recreational shooting sports program that recognizes and rewards skill development from a basic performance-level Marksman rating up to a nationally recognized performance-level Distinguished Expert. Membership is open to all interested students.
- **Pershing Rifles.** Students in this organization are trained to proficiency in dismounted drill and ceremonies. Members of the color guard routinely participate in opening ceremonies of sporting and formal events. Membership is open to all Army ROTC cadets who meet membership requirements.

Awards and Recognition. Awards and decorations are presented each semester to Military Science students in recognition of outstanding performance in academics, military science, athletics, and physical training. Awards range from cadet ribbons and certificates to organization decorations and scholarships.

Simultaneous Membership Program (SMP). Advanced course students who are eligible to enlist in either an Army Reserve or Army National Guard unit may serve in both ROTC and the reserve component simultaneously. The financial benefits generally exceed \$1,100 per month.

Field Training Exercises. Field Training Exercises (FTXs) are conducted during one week-end each semester. FTX includes such activities as rappelling, land navigation, marksmanship, and small-unit tactics. These weekend activi-

ties are optional for basic course students but are required for advanced course cadets and intended to reinforce skills learned in the classroom and lab environment.

Leadership Laboratory. All students enrolled in Military Science are required to enroll in the Leadership Lab 501. Students are given the opportunity during lab to practice skills learned in the classroom. Each student is assigned to a specific cadet company within the cadet battalion and is normally advanced in leadership position in accordance with class level and experience. The laboratory location will vary from the classroom to a field training area. Lab training includes such activities as rappelling, rope bridging, poncho rafting, land navigation, and first aid training. With approval of the department chairperson, those students whose schedules conflict with Leadership Lab 501 may enroll in Leadership Lab 502.

Summer Training

Leaders Training Course. Students who desire to enter the Military Science program, have no prior military service, and have only 2 to 2.5 years remaining until graduation may choose to attend a five-week ROTC Leaders Training Course at Ft. Knox, Kentucky. Satisfactory completion of this camp satisfies the requirements for the basic course. Upon completion of Leaders Training Course, students may then contract and enter the advanced course. Transportation, room and board, and an allowance are paid for the 5-week period.

Leadership Development and Assessment Course. All advanced course students must complete this five-week camp at Ft. Lewis, Washington, between their junior and senior years or immediately following completion of their senior year. Transportation, room and board, and an allowance are paid for the period. The program of instruction is designed to be the culmination of the military education up through and including the junior year.

Nurses Summer Training Program. Students seeking a B.S.N. and a commission in the Army Nurse Corps attend the regular National Advanced Leadership Camp. Students are then assigned to an Army hospital for four weeks. During this time, nursing students work one-on-one with an Army nurse putting into practice the clinical skills learned in college. Students participating in this program can receive college credit from the TTUHSC School of Nursing.

Special Schools. Army ROTC students may apply for summer training in Army Airborne, Air Assault, or Northern Warfare Schools. Junior level students also may request assignment to a Cadet Troop Leadership Training (CTLT) position for experience training with an active Army unit. CTLT training is normally for 3 weeks; however, a few positions may be available for extended training (5 weeks) overseas.

Military Science (MILS)*(To interpret course descriptions, see pg. 10.)*

- 1101. Foundations of Officership (1:1:1).** Introduction to the Army profession, the role of the Army officer, and military leadership. Instruction on time management and physical fitness, as well as general military skills. Survey of pre-commissioning program requiring no military obligation. F.
- 1102. Foundations of Officership (1:1:1).** Introduction to the Army profession, the role of the Army officer, and military leadership. Instruction on time management and physical fitness, as well as general military skills. Survey of pre-commissioning program requiring no military obligation. S.

- 2201. Individual Leadership Studies – Leadership and Teamwork (2:2:1).** Prerequisite: MILS 1101 and 1102 or consent of instructor. Introduction to decision-making and group processes relating to military leadership. Focus on character development, role of the officer, and Army values. F.
- 2202. Individual Leadership Studies – Leadership and Teamwork (2:2:1).** Prerequisite: MILS 1101 and 1102 or consent of instructor. Introduction to decision-making and group processes relating to military leadership. Focus on character development, role of the officer, and Army values. S.
- 2203. Independent Studies in Leadership and Teamwork (2).** Prerequisite: Consent of department chairman. Individualized

studies in military leadership and teamwork. Select lab and/or class participation may be required. This class may be repeated and may substitute for 2201 or 2202 credit. F and S.

- 3301. Leadership and Problem Solving (3:3:1).** Prerequisite: MILS 2201 and 2202, basic training, or consent of the instructor. Prepares student for summer completion of the Leadership Development and Assessment Course. Emphasis on small-unit tactics, troop leading procedures, field training, and basic soldiering skills such as land navigation and rifle marksmanship. F.
- 3302. Leadership and Problem Solving (3:3:1).** Prerequisite: MILS 2201 and 2202, basic training, or consent of the instructor. Prepares student for summer completion of the Leadership Development and Assessment Course. Emphasis on small-unit tactics, troop leading procedures, field training, and basic soldiering skills such as land navigation and rifle marksmanship. S.
- 3303. Independent Studies in Leadership and Problem Solving (3).** Prerequisite: Consent of Department Chairman. Individualized studies in military leadership and problem solving. Select lab and/or class participation may be required. This class may be repeated and may substitute for 3301 or 3302 credit. F and S.
- 4301. Officership (3:3:1).** Prerequisite: MILS 3301 and 3302. Focus on transition from cadet to lieutenant with an introduction to military law and ethics, leadership case studies, hands-on practice sessions, and a Senior Leadership Project. F.
- 4302. Officership (3:3:1).** Prerequisite: MILS 3301 and 3302. Focus on transition from cadet to lieutenant with an introduction to military law and ethics, leadership case studies, hands-on practice sessions, and a Senior Leadership Project. S.
- 4303. Independent Studies in Officership (3).** Prerequisite: Consent of department chairman. Individualized studies in military officership and professional development. Select lab and/or class participation may be required. This class may be repeated and may substitute for 4301 or 4302 credit. F and S.



Honors College

About the College

Texas Tech offers a special program for highly motivated and academically talented students who want to maximize their college education. Considered to be one of the best honors programs in the Southwest, the Honors College provides the personalized feeling and challenging instruction of a small private college. The curriculum is designed to provide students with a unique and broadly integrated intellectual experience that will complement virtually every academic major and career path. The ultimate goal is to assist students in developing a broad education that will enhance their critical thinking and methodological skills and engender a spirit of intellectual independence.

Students accepted into the Honors College are also enrolled concurrently in the college that houses their major area of study. In addition to providing financial support for eligible students through merit-based and special Honors scholarships, enrollment in the Honors College gives students an opportunity to interact with other similarly motivated students and access such special benefits as early registration, special-interest housing, extended library privileges, enriching co-curricular activities, and closer contact with faculty members.

Honors students are encouraged to engage in the greatest possible range of educational experiences. Some of these include the Honors Undergraduate Research program, which enables students to take part in undergraduate research with faculty in many disciplines; international study, which enhances marketability and provides opportunities for personal growth and acquisition of cultural knowledge and language skills; and competition for national scholarships (e.g., Goldwater, Truman, Udall, Marshall, Rhodes), which assists students in clarifying educational and career goals as well as potentially providing substantial scholarship assistance.

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

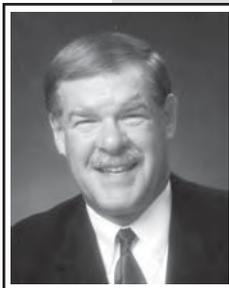
Faculty

Although Honors courses are taught by professors in departments and colleges throughout the university, the following faculty have appointments exclusively with the Honors College or have joint appointments that include the Honors College.

Professors: Bell, Davis, Haragan; **Associate Professors:** Brink; **Assistant Professors:** Bolch, Nelson, Tomlinson, Wilhelm.

Applying for Admission

Students must make special application to be considered for admission to the Honors College as either an entering freshman or as a continuing Texas Tech or transfer student. Threshold application requirements for incoming freshmen are a composite SAT score of 1200 or above, a composite ACT score of 26 or better, or graduation in the top 10 percent of the high school class.



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Dean

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For continuing Texas Tech or transfer students, eligibility to apply is based on a college cumulative GPA of 3.4 or better. The college also will consider admitting students who do not meet the above criteria but have a compelling reason why they should be part of the program. Admission is competitive and contingent upon the pool of applicants for any given year. Admission deadlines and information are posted online at www.honr.ttu.edu.

To continue participation after being accepted into the Honors College, a student must maintain a minimum 3.25 cumulative GPA while at Texas Tech. For more details, see the *Honors Student Handbook* online at www.honr.ttu.edu.

Academic Program

The Honors College encourages interdisciplinary work and presents a range of courses and programs that offer interdisciplinary opportunities. At the heart of the Honors College experience is a series of departmental classes taught by some of the university's most talented professors. These courses include those fulfilling both Core Curriculum and specific major or minor requirements. They are generally limited to 25 students and are modestly 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.

Honors College/School of Law Early Decision, Admission Plans

Early Decision Plan. The Honors College and the School of Law cooperate in an Early Decision Plan that allows exceptional Law School applicants who are Honors College students in

good standing to receive notification of their acceptance during their third year at Texas Tech. Enrollment in the School of Law would not occur until after the student receives a baccalaureate degree.

To be eligible to apply for Early Decision, applicants must meet the following criteria:

- Have an undergraduate GPA of at least 3.5.
- Have an LSAT score that places them in the top half nationwide.
- Have an SAT of at least 1300 or an ACT of at least 29.
- Be enrolled in the Honors College and be making satisfactory progress toward a baccalaureate degree with a diploma designation in Honors studies.

Students must apply during the fall semester of their third year (or during the fall semester of a year in which they are classified as juniors) 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.

"3+3" Early Admission Program. The Arts and Sciences B.A. or B.S. degree may be obtained by Honors College students in good standing with the Honors College by completing course work totaling a minimum of 100 semester hours in the College of Arts and Sciences and then completing the first year of course work at the Texas Tech School of Law. In order to be eligible to participate in this program, students must meet all of the following criteria:

- Have an undergraduate GPA of at least 3.5.
- Have an LSAT score that places them in the top half nationwide.
- Have an SAT of at least 1300 or an ACT of at least 29.

- Be enrolled in the Honors College and making satisfactory progress toward an Arts and Sciences B.A. or B.S. degree consistent with the regulations established by the College of Arts and Sciences and the Honors College as set forth below.

The following regulations apply:

Of the 100 semester hours of undergraduate work, at least the last 30 must be completed from Texas Tech. This minimum will apply to transfer students from other colleges, provided they have satisfactorily completed the work outlined in the freshman and sophomore years or its equivalent. (Note that the Honors College residency requirement generally requires a minimum of three long semesters of work from Texas Tech for Honors graduation.)

The 100 hours of work must satisfy all graduation requirements for the B.A. or B.S. degree in the College of Arts and Sciences at Texas Tech, with the exception of requirements in the minor. Honors students must complete the minimum requirements for an Honors College designation as outlined in the *Honors Student Handbook*.

The applicant for a degree under this plan must submit an official transcript from the Texas Tech School of Law following completion of the first year of course work in the School of Law in order to earn the baccalaureate degree. Evidence of the successful completion of the first year of law school course work (totaling 29 hours) will substitute for the 18 hours required for the minor and any electives needed (totaling up to 11 hours) for the baccalaureate degree.

The total number of credit hours from outside the College of Arts and Sciences (including those transferred as non-Arts and Sciences credit) and the credit hours from the School of Law applied to the baccalaureate degree cannot exceed 30 hours.

Any student selecting the "3+3" Early Admission Program option should plan carefully in consultation with the associate deans of the Honors College and the College of Arts and Sciences at least one year prior to beginning professional school. Students wishing to pursue the "3+3" program also must file a degree plan with an Arts and Sciences major and a Law minor at least one semester prior to beginning their course work in the School of Law.

For more information on the Early Decision Plan and the Early Admission Program, see the Honors College web site at www.honr.ttu.edu.

Honors Program in Management

The Honors Program in Management is an Honors specialization leading to a Bachelor of Business Administration degree and is a joint program of the Honors College and the area of management in the Rawls College of Business. Another degree program—the 150-Hour Honors Program in Management—allows students to pursue an Honors specialization and earn both a B.B.A. and an M.B.A. degree.



Bachelor of Arts Degree in Natural History and Humanities

The Honors College emphasis on breadth of education extends to a multidisciplinary Bachelor of Arts degree in Natural History and Humanities. This degree is founded upon a broadly based, multidisciplinary curriculum designed to enable students to gain a working knowledge of the natural sciences, philosophy, and the humanities. It is unique in that it emphasizes the application of science knowledge to a creative endeavor.

The knowledge and skills obtained through this degree will enable students to pursue a number of post-graduate options, including graduate school, science journalism, nature writing, nature photography, museum science, documentaries, and other careers that require a merging of science and humanities disciplines.

The natural history and humanities curriculum is a true interdisciplinary degree designed to ultimately direct each student toward an individual course of study. In the first two years of the degree plan, all students have common course work that will allow them to experience a sampling of several different creative paths and to obtain a broad understanding of the sciences (chemistry, physics, biology, geosciences) and how they integrate.

The foundation of the freshman and sophomore years is four semesters of Honors Integrated Science and three semesters of special Natural History and Humanities seminars designed to verse students in the philosophy, history, and theories and practices of natural history and the humanities. At the start of the junior year, students will work under the guidance of the program director to customize a course of study that reflects a specific career direction. This ensures that a sound working knowledge of a particular field can be obtained prior to graduation. In addition, students also will be guided toward producing a senior portfolio. This will include spending two Intersession semesters working on the portfolio under the guidance of the director and a faculty mentor in the field of the student's choice. Intersession experiences may include, but are not limited to, study under a faculty mentor at other research institutions. Students also will be encouraged to seek out summer internships in the field of their choice beginning in the summer of their junior year.

Natural History and Humanities Minor

Students may complete an 18-hour minor in Natural History and Humanities by completing NHH 1301, NHH 1302, NHH 2301, NHH 3300, NHH 3350, and 3 additional NHH-specific hours of their choosing or 3 hours of portfolio work.

Contact information: Dr. Susan Tomlinson, 201B McClellan Hall, (806) 742-1828, susan.tomlinson@ttu.edu

Humanities Minor

The purpose of the humanities minor is to provide the inquiring and curious student a flexible and interdisciplinary program to explore the creative works of human beings—literary, musical, philosophical, religious, theatrical, and artistic. The minor encourages a broad-based and overarching approach to the investigation of human accomplishment that expresses visions of life and values for living that 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 experience essay that summarizes the ways in which the courses within the selected track relate. The final course of study must be approved by the director.

Contact information: Dr. Kenneth Davis, 201A McClellan Hall, Kenneth.R.Davis@ttu.edu, (806) 742-1828.

Natural History and Humanities (NHH) (To interpret course descriptions, see pg. 10.)

1301. **Natural History and Humanities Seminar I: The Natural History and Humanities Tradition (3:3:0).** An introductory course to the natural history and humanities degree program. Includes academic objectives, opportunities, and resources but focuses primarily on the historic and literary tradition of the relationship between the sciences and humanities. Field trips are required. (Reading and Writing Intensive)
1302. **Natural History and Humanities Seminar II: Personal Development of the Natural History and Humanities Tradition (3:3:0).** Prerequisite: NHH 1301. Special emphasis on developing field skills and a personal approach to the natural history and humanities tradition. Outside assignments, field trips, and projects are required. (Reading and Writing Intensive)
2301. **Natural History and Humanities Seminar III: An Introduction to Theories and Practices in Natural History and Humanities (3:3:0).** Prerequisite: NHH 1301. Modes of combining science with the creative process with an emphasis on helping the student define a creative direction. May include guest lectures from persons working as interpreters of sci-

ence and nature. Outside assignments and projects are required.

3300. **Research Methods I (3).** An introduction to the methods of work relating to the student's planned course of study during the extramural fieldwork experience for NHH 3350. Includes instruction on research methods, including primary and secondary sources, oral history, the role of history in narrative, and narrative modes.
3350. **Field Methods/Artist in Residence I (3).** Prerequisite: NHH 3300. An introductory, individual course of intensive, directed study in professional methods designed to expose the student to various field/laboratory experiences and how the planned creative endeavor relates to that experience. Portfolio projects required.
4300. **Research Methods II (3).** Prerequisite: NHH 3300. A continuation of NHH 3300.
4350. **Field Methods/Artist in Residence II (3).** Prerequisite: NHH 3350. Individual, intensive, directed study in professional methods designed to expose the student to various field/laboratory experiences and how the planned creative endeavor relates to that experience. Portfolio projects required.

Humanities (HUM)

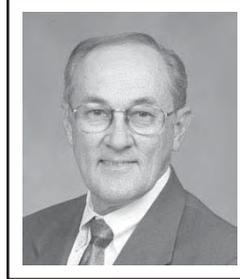
2301. **Introduction to Humanities (3:3:0).** An exploration of human values, primarily significant to western civilization, in great works of literature, philosophy, and the arts from the classical Greek and Roman eras to the Renaissance. [HUMA 1301]
2302. **Introduction to Humanities (3:3:0).** The exploration of contemporary human values through great works of literature, philosophy, and the arts from the Renaissance to the present. [HUMA 1302]
4100. **Humanities Capstone (1).** Under the guidance of the Humanities Director, independent work by the student to summarize the relationships between the courses in the student's selected Humanities Minor track (Ancient, Medieval / Renaissance, or Modern.)

Honors (HONS)

1301. **Honors First-Year Seminar in Humanities (3:3:0).** Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing in particular the development of critical thinking and oral and written communications skills through the framework of a humanities discipline. Topics vary.
1302. **Honors First-Year Seminar in Sciences (3:3:0).** Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing in particular the development of critical thinking and oral and written communications skills through the framework of a technology and applied science discipline. Topics vary.
1303. **Honors First-Year Seminar in Social Sciences (3:3:0).** Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing in particular the development of critical

- thinking and oral and written communications skills through the framework of a social and behavioral science discipline. Topics vary.
1304. **Honors First-Year Seminar in Fine Arts (3:3:0).** Prerequisite: Enrollment in the Honors College or approval of the Honors Dean. An introductory course for first-year Honors students emphasizing in particular the development of critical thinking and oral and written communications skills through the framework of a visual and performing arts discipline. Topics vary.
2115. **Honors Integrated Science Laboratory I (1:0:3).** Corequisite: HONS 2305. A lab designed to supplement HONS 2305.
2116. **Honors Integrated Science Laboratory II (1:0:3).** Corequisite: HONS 2306. A lab designed to supplement HONS 2306.
2301. **Honors Experience in Fine Arts I (3:3:0).** Corequisite: HIST 1301 and HUM 2301. Course surveys highlights of human experience in the arts from the ancient world to the middle ages. Sculpture, architecture, music, painting, music theatre and dance emphasized through “hands-on” participation experiences. No previous experience required, but an enthusiastic openness for new experiences is essential.
2302. **Honors Experience in Fine Arts II (3:3:0).** Corequisite: HIST 1302 and HUM 2302. Course surveys highlights of the human experience in the arts from the Renaissance to the 21st century. Sculpture, architecture, music, painting, music theatre and dance are emphasized through “hands-on” participation experiences.
2305. **Honors Integrated Science I (3:3:0).** Corequisite: HONS 2115. An integrated science course introducing students, in an interdisciplinary way, to physics and chemistry. Satisfies Core Curriculum natural science requirement. Not open to science majors. Part of a two-semester integrated presentation.
2306. **Honors Integrated Science II (3:3:0).** Corequisite: HONS 2116. An integrated science course introducing students in an interdisciplinary way to biology and geosciences. Satisfies Core Curriculum natural science requirement. Not open to science majors. Part of a two-semester integrated presentation.
3300. **Individual Honors Research (3).** Prerequisite: Enrollment in the Honors College and approval from the Honors Dean. Contents will vary to meet the needs of students. May be repeated once for credit. Independent work under the individual guidance of a faculty member, who must be either a member of the graduate faculty or approved by the Honors Dean.
3301. **Honors Seminar in Humanities (3:3:0).** Prerequisite: Enrollment in the Honors College or approval from the Honors Dean. An in-depth study of major literary works emphasizing the interrelationships of literature and philosophy. Satisfies the Core Curriculum humanities requirement. May be repeated once for credit with permission of the Honors Dean.
3302. **Honors Seminar in Sciences (3:3:0).** Prerequisite: Enrollment in the Honors College or approval from the Honors Dean. Considers the developments and applications of modern science as they affect living today, directed toward cultivating sound individual judgments in a technological society. Satisfies the Core Curriculum technology and applied science requirement. May be repeated once for credit with permission of the Honors Dean.
3303. **Honors Seminar in Social Sciences (3:3:0).** Prerequisite: Enrollment in the Honors College or approval from the Honors Dean. Study of techniques, principles, and methodology of the social sciences as applied to a central topic to demonstrate the interrelationships of the various disciplines. Satisfies the Core Curriculum individual or group behavior requirement. May be repeated once for credit with permission of the Honors Dean.
3304. **Honors Seminar in Fine Arts (3:3:0).** Prerequisite: Enrollment in the Honors College or approval from the Honors Dean. Study of the history, development, and terminology of the fine arts, emphasizing functional relationships between disciplines in an effort to provide bases for aesthetic evaluation of specific artistic entities. Satisfies the Core Curriculum visual and performing arts requirement. May be repeated once for credit with permission of the Honors Dean.
3305. **Honors Integrated Science III (3:3:0).** Prerequisite: HONS 2305, 2306. An integrated study of ecology includes further development of the principles of ecology introduced in HONS 2306. Topics such as composition, diversity, and structure of ecological communities as well as some emphasis on the integration of ecology with other science and with societal and historical issues will be discussed. Content will include current issues including applied environmental ethics.
3306. **Honors Integrated Science IV (3:3:0).** Prerequisite: HONS 2305, 2306. An integrated study of evolution building on the principles of evolution covered in the first year of the integrated science sequence. Topics will include current evolutionary theory, the history of life, human evolution, and genetics as well as some emphasis on the integration of theory with societal and historical issues.
4300. **Individual Honors Research (3).** Prerequisite: Enrollment in the Honors College and approval from the Honors Dean. Contents will vary to meet the needs of students. May be repeated once for credit. Independent work under the individual guidance of a faculty member, who must be either a member of the graduate faculty or approved by the Honors Dean.

College of Agricultural Sciences and Natural Resources



Marvin J. Cepica, PhD
Dean

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About the College

The College of Agricultural Sciences and Natural Resources is dedicated to providing programs of excellence in teaching, research, and public service. These educational programs are designed to qualify 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, fiber, and natural resource complex.

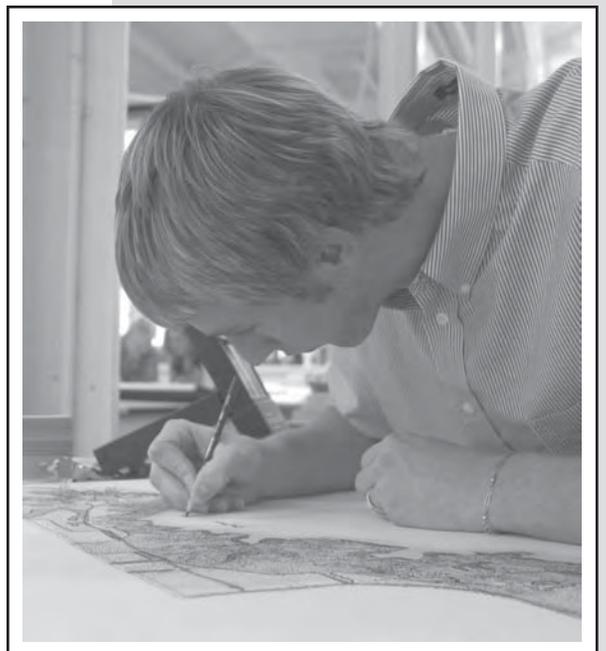
As the size and complexity of farms and ranches continue to increase, students who plan careers as producers of agricultural products need more technology and management information. Through proper selection of courses, students have the opportunity to train in the business aspects of agriculture in 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 of Agricultural Sciences and Natural Resources provides excellent teaching, research, and public service 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, and a campus greenhouse-experimental garden complex are used as teaching laboratories as well as for research in plant and soil science, animal science, integrated pest management, horticulture, and range management. The agricultural field laboratories in northeast Lubbock County include the Burnett Center for Beef Cattle Research and Instruction; a 980-acre experimental farm; and facilities for teaching and research in swine, horses, sheep, feed manufacturing, and crop production. Laboratory facilities also include a 15,822-acre unit at the Texas Tech University Center at Amarillo. Field trips and participation in intercollegiate contests are also a part of the training program.

The research program in agriculture and renewable natural resources complements the teaching mission of the college by providing the information and knowledge necessary to keep faculty members current in their respective fields. Research projects provide essential training for graduate students and advanced undergraduates as well as solutions to problems facing the industry. Various forms of public service are provided by the College of Agricultural Sciences and Natural Resources through numerous short courses, conferences, and workshops conducted throughout the year.



Undergraduate Program

Core Curriculum Requirements. The university has established Core Curriculum requirements for all students. These requirements will 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 should be selected to assist in determining or confirming the preferred area for a major. Students who enter as freshmen should select a major by the end of their fourth semester. Transfer students will be required to make a major selection within two semesters after entering Texas Tech. Some departments offer the opportunity for a dual major program. Students interested in such a program should contact the chairperson of the specific departments involved.

Selecting a Minor. Minors are available in all departments for students with majors in the College of Agricultural Sciences and Natural Resources as well as those majoring in other colleges within the university. Minors are offered in the following areas: agribusiness management, agricultural leadership, animal science, food technology, landscape studies, agronomy, horticulture, plant biotechnology, and natural resource management. A minimum of 18 hours is required for a minor. At least 9 hours in a minor must consist of upper division courses. The maximum number of transfer hours in any minor is 9. Courses in a major but outside a student's department may be used in the minor. A student must earn a grade of C or better in each course counted toward a minor. Students are encouraged to seek early advisement from the chair of the minor department to plan for courses that will best meet their educational and career objectives.

General Standards and Requirements.

Minimum standards and requirements of the College of Agricultural Sciences and Natural Resources are the same as those for the university, with certain additions. In addition to the requirements stated in the Undergraduate Academics section of this catalog, other requirements include the following:

1. Students must file an application for a senior audit with the dean's office before or during the semester in which they are enrolled for their 90th semester hour. Substi-

tution and elective sheets also must be filed prior to or during the semester the students are enrolled for their 90th semester hour.

2. Transfer students who plan to request the use of provisional elective transfer courses as a substitution for required courses must make such a request by the end of their first semester in the College of Agricultural Sciences and Natural Resources.
3. Any deviation from the approved curriculum for a particular degree must have prior approval from the chairperson of the department and the Dean of the College of Agricultural Sciences and Natural Resources.

New Students. All new students should carefully read the catalog sections entitled Undergraduate Admissions and Registration. Entering freshmen should give special attention to course credit that can be obtained by the College Level Examination Program (CLEP) examinations usually given prior to the beginning of the fall semester. Transfer students should read the paragraphs dealing with admission of transfer students and transfer of credits from other colleges and universities in the Undergraduate Admissions section of this catalog.

Undergraduate Research Program. The undergraduate research program consists of a two-course series. AGSC 4300 (Research Methodology) is offered during the fall semester, and the second course is offered during the spring semester as a Special Problems course under the guidance of a faculty mentor. This course provides opportunities to gain an understanding of and experience in applied research. Both courses are designated as honors courses and, with Honors College approval, the two-course series (6 semester hours) may be the basis for Honors College students to earn the "Highest Honors" designation from the Honors College. In addition, any undergraduate student who completes the course series and has a CASNR major may apply for competitive research grants, as well as participate in undergraduate research

presentations and awards. Course work completed will apply to individual degree programs. For more information contact a CASNR faculty advisor or the Dean's Office.

Agricultural Science (AGSC)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 2300. Computers in Agriculture (3:2:2) [AGRI 1309].** An introduction to use of computer systems and networks in agricultural applications. Includes networks, spreadsheets, word processing, and data base software. F, S, SSII.
- 2301. Computers in Agriculture II (3:2:2).** Prerequisite: AGSC 2300 or satisfactory performance on placement exam. Introduction to data base management applications, extended application of spreadsheet software, and networked systems. F, S.
- 3100. Seminar (1:1:0).** Prerequisite: Junior standing. Assigned readings, informal discussion, outside speakers, and written and oral reports on subjects relating to agricultural and applied economics. F, S.
- 3301. Agricultural Leadership Principles (3:3:0).** Leadership principles with emphasis on styles of leadership, types of management, group dynamics, managing change, and the adoption process as applied to agriculture and agribusiness.
- 4300. Research Methodology in Agricultural Sciences and Natural Resources (3:3:0).** Prerequisite: Junior or senior standing. Introduction to conceptual issues for organizing, planning, designing, and conducting research in agricultural disciplines.

Graduate Course

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



Graduate Program / Agricultural Sciences and Natural Resources

Programs available through the College of Agricultural Sciences and Natural Resources lead to the following graduate degrees:

- **Master of Science** with majors in agricultural and applied economics, agricultural education, animal science, crop science, entomology, fisheries science, food technology, horticulture, range science, soil science, and wildlife science.
- **Master of Agriculture** with a major in agriculture and specializations available through the various departments. The Master of Agriculture degree program is designed to prepare students and professionals as leaders, managers, and executives in the agricultural sciences and natural resources areas. Because the program is multidisciplinary and includes a wide choice of professional courses, it prepares graduates for diverse careers. A student may select an emphasis in the following departments: Agricultural and Applied Economics, Agricultural Education and Communications, Animal and Food Sciences, and Plant and Soil Science. Courses for the Master of Agriculture degree program may be taken from offerings in the College of Agricultural Sciences and Natural Resources and from other colleges within

the university. A minimum of 36 semester hours of graduate course work is required for this nonthesis degree. For a specific option a student would normally take 18 hours in the department concerned with the emphasis area and the balance in at least three other areas. An oral or written comprehensive exam as specified by the emphasis department is required.

- **Master of Landscape Architecture** is a terminal professional degree for students with a Bachelor of Landscape Architecture degree or equivalent and a first professional degree for students with any other professional degree.
- **Doctor of Philosophy** with majors in agricultural and applied economics, agronomy, animal science, fisheries science, range science, and wildlife science.
- **Doctor of Education** with a major in agricultural education.

A university-wide interdisciplinary program leading to the Ph.D. degree in land-use planning, management, and design is also offered. A Doctor of Education degree is available from the College of Education for students who wish to have agricultural education as a support area.

Applicants who meet the admission standards of the Graduate School also must receive

formal approval from a departmental committee. Admission standards of some departments exceed those of the Graduate School.

Advisory committees for the M.S., M.Ag., and M.L.A. degrees consist of at least three faculty members. Advisory committees for the Ph.D. degree in Agricultural and Applied Economics consist of four or five faculty members. Advisory committees for Ph.D. degrees in the Departments of Range, Wildlife, and Fisheries 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.



Department of Agricultural and Applied Economics

Faculty

Don E. Ethridge, Chairperson

Professors: D. Ethridge, Knight, Misra, and Segarra; *Associate Professors:* Elam, P. Johnson, and Mohanty; *Assistant Professors:* J. Johnson, Lansford, Lyford, Malaga, Rejesus, Suwen, and Willis; *Instructor:* Middleton; *Adjunct Faculty:* M. Dean Ethridge, Harman, Phillips, and Smith.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Agribusiness
- Bachelor of Science in Agricultural and Applied Economics
- Master of Science in Agricultural and Applied Economics
- Doctor of Philosophy in Agricultural and Applied Economics

The department also participates in the interdepartmental program leading to the Master of Agriculture degree and cooperates with the College of Business Administration in a Master of Business Administration degree with a concentration in agricultural business management. This M.B.A. program is administered by the College of Business Administration.

Agricultural and applied economics applies economic methods to contemporary problems in production, distribution, and consumption of commodities and resources. This field is concerned with decision making in the public sector and in firms that provide materials and services, credit, processing, marketing and distribution of products, as well as analysis of economic behavior in the food and fiber industries, including the effects of government policies.

The major objective of the department is to teach students to think analytically and base decisions on economic principles. Students develop skills in economics, mathematics, statistics, and communication. Training in policy, price analysis, and marketing is also provided. The department prepares graduates to manage business and financial firms, farms, ranches, and related organizations and direct land and property development and real estate activities.

Undergraduate Program

The B.S. degree in Agricultural and Applied Economics provides a strong foundation in economics and mathematics and emphasizes writing and communication skills. There is enough flexibility in the program to allow students to earn a minor in areas such as management, finance, and personal financial planning. Minors are also available in other departments in the College of Agricultural

Sciences and Natural Resources as well as in economics and other fields. The department offers a B.S. in agribusiness in conjunction with the College of Business Administration. This degree program combines the core courses in agricultural and applied economics with those in business administration to provide a strong foundation for careers in businesses related to agriculture. In addition, a dual degree is offered in combination with the College of Business Administration. This program leads to a B.S. in agricultural and applied economics and a B.B.A. in general business. Students may also prepare to study toward advanced degrees in economics, law, business administration, and other related areas.

The department's programs also emphasize international economics, particularly with respect to trade in commodities. Students completing these plans of study will be better educated for the world economy of the future and will have opportunities for a wide range of careers. Local, regional, and national processing and marketing firms offer many applied economists their first positions. Oth-

ers become self-employed business operators or managers. State Cooperative Extension Services, financial institutions, the United States Department of Agriculture, utility companies, and many state and government agencies also hire graduates.

The opportunity to participate in the Honors College is available to agricultural and applied economics students who demonstrate high academic achievement and are accepted into the Honors College. AAEC students wishing to earn an Honors College designation may take AGSC 4300 for honors credit. In addition, honors students may contract for honors credit with AAEC 4301. Admission criteria and other information about the Honors College can be found in the "Honors College" section of this catalog.

The department offers a minor in agribusiness management for nondepartmental majors. The agribusiness minor consists of 18 hours of course work, including AAEC 2305, 9 hours from 3000-level AAEC courses, and 6 hours from 4000-level AAEC courses. Students must satisfy course prerequisites before registering for courses.



Bachelor of Science in Agricultural and Applied Economics

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
Lab. Science*	4	Lab. Science*	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1330, Intro. Math. Anal. I	3	MATH 1331, Intro. Math. Anal. II	3
POLS 1301, Amer. Govt., Org.	3	AAEC 2305, Fund. of AAEC	3
Ag. Elective	3	AGSC 2301, Comp. in Agr. II	3
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ECO 2302, Prin. of Economics II	3	AAEC 3301, Agribus. Marketing	3
POLS 2302, Amer. Pub. Pol.	3	AAEC 3302, Agribus. Finance	3
ENGL 2311, Technical Writing	3	HIST 2301, Hist. U.S. Since 1877	3
HIST 2300, Hist. of U.S. to 1877	3	COMS 2300, Public Speaking	3
Hum., Multi., or Vis. & Perf. Arts†	3	Hum., Multi., or Vis. & Perf. Arts†	3
TOTAL	15	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
AAEC 3315, Ag. Price Theory	3	ACCT 2301, Elem. Acct. II	3
AAEC 3304, F. & R. Bus. Mgt.	3	ECO 3311, Int. Macro.	3
ACCT 2300, Elem. Acct. I	3	AAEC 3401, Ag. Stat.	4
Electives	6	AAEC 3100, Seminar	1
TOTAL	15	Elective	3
		TOTAL	14

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
AAEC Group 1**	6	AAEC Group 2**	6
AAEC 4312, Appl. Math. Econ. or AAEC 4302, Stat. Meth.	3	Electives	9
Electives	6	TOTAL	15
TOTAL	15		

- * Laboratory Science—8 hours must be from PSS 1411, 2401, ATMO 1300-1100, BIOL 1401, 1402, CHEM, PHYS, or any other 4-hour natural science course from the university Core Curriculum.
- † Humanities, Multicultural, and Visual and Performing Arts: There are three university Core Curriculum requirements for these subjects. The requirements may be met individually or by completing a course that satisfies more than one. A list of approved courses is available from the Dean's office.
- ** AAEC GROUPS: Select 2 courses from Group 1—AAEC 4305, 4306, 4313, and 4320; select 2 courses from Group 2—AAEC 4303, 4315, 4316, and 4317.

- Departmental CORE Policy: Includes AAEC 3315 and 3401. All students expecting to graduate on schedule are strongly advised to complete the CORE with grades of C or better before they reach 90 hours of completed course work. Students failing to do so may delay their graduation date.
- Minimum hours required for graduation—121. (Students must fulfill the university multicultural requirement.)
- Agriculture electives must be selected from PSS 1321, RWFM 2301, 2302, or ANSC 1401.
- All courses in AAEC (except required electives) and MATH must be completed with a grade of C or better.
- Electives: The degree program consists of 24 elective hours including 9 hours of required electives chosen from upper-level B A, ECO, or AAEC courses not required elsewhere (this may include AGSC 4300 and AAEC 4301 for students wanting undergraduate research experience), and 15 hours of free electives chosen from any other courses not used elsewhere in the degree program. Suggested courses for students interested in specific areas are as follows:
Agricultural Business Management: Choose electives from AAEC 3303, 4317, and appropriate upper level courses in B A or ECO, such as FIN 3320, 3323; MGT 3370; MKT 3350; BLAW; ECO 3320.
Agricultural Production (Farm or Ranch) Management: Select electives from AAEC 4317 and appropriate courses in PSS, ANSC, RWFM, and BLAW 3393.
Agricultural Finance: Choose electives from AAEC 4303, 4316, 4317 and appropriate courses in B A or ECO such as ACCT 3304, 3305, 3306, 3315; FIN 3320, 3321, 3323, 4323; MGT, BLAW.
Real Estate: Choose electives from AAEC 4303, 4313, 4316, appropriate courses in CASNR, and appropriate courses in B A such as FIN 3332, 3334, 4333, 4336.
- Students may earn a minor by using electives carefully.

Bachelor of Science in Agribusiness

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

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
Lab. Science*	4	Lab. Science*	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1330, Intro. Math. Anal. I	3	MATH 1331, Intro. Math. Anal. II	3
POLS 1301, Amer. Govt., Org.	3	AAEC 2305, Fund. of AAEC	3
Ag. Elective***	3	Ag. Elective***	3
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ECO 2302, Prin. of Eco. II	3	AGSC 2301, Computers in Ag. II	3
HIST 2300, Hist. of U.S. to 1877	3	AAEC 3401, Ag. Stat.	4
ACCT 2300, Elem. Acct. I	3	HIST 2301, Hist. of U.S. 1877	3
Sophomore English†	3	ACCT 2301, Elem. Acct. II	3
POLS 2302, Amer. Publ. Pol.	3	Visual & Performing Arts**	3
TOTAL	15	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
AAEC 3315, Ag. Price or ECO 3312, Inter. Eco.	3	AAEC 3100, Seminar	1
FIN 3320, Corp. Finance I	3	ECO 3311, Int. Macro.	3
MGT 3373, Mgt. Comm.	3	AGBS Group 2*	3
MKT 3350, Intro. to Mkt.	3	FIN 3323, Mo., Bank., and Cr.	3
BLAW 3391, Bus. Law I	3	MGT 3370, Org. and Mgt.	3
TOTAL	15	ISQS 3344, Prod. Op. Mgt.	3
		TOTAL	16

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
AGSC 4300, Res. Meth.	3	AAEC 4301, Problems	3
AGBS Group 1*	3	MGT 4380, Strategic Mgt. or	3
AAEC 4302, Stat. Meth.	3	AAEC 4315, Agribus. Mgt.	
AAEC 4316, Ag. Fin. Anal.	3	MGT 4375, Inter. Mgt.	3
MKT 4358, International Mkt.	3	FIN 4328, Inter. Finance	3
TOTAL	15	TOTAL	12

- * Laboratory Science—at least 4 of the 8 hours of natural laboratory science must be selected from PSS 2401 and 1411; the remaining hours must be selected from university Core Curriculum requirements.
- ** Choose from university Core Curriculum requirements.
- *** Ag. Electives must be selected from PSS 1321, RWFM 2301, 2302, or ANSC 1401.
- † Sophomore English—Choose one course from ENGL 2305, 2306, 2307, 2308, or 2351.
- # AGBS Curriculum Groups: Select 1 course from Group 1—AAEC 4305, 4306, or 4313; select 1 course from Group 2—AAEC 4303, or 4317.

- Departmental CORE Policy: Includes AAEC 3315 and 3401. All students expecting to graduate on schedule are strongly advised to complete the CORE with grades of C or better before they reach 90 hours of completed course work. Students failing to do so may delay their graduation date.
- All courses in AAEC, MATH, ECO, ENGL, B A and AGSC 2301 must be completed with a grade of C or better.
- Minimum hours required for graduation—121. (Students will fulfill the university multicultural requirement by completing FIN 4328, MGT 4375, or MKT 4358.)
- To advance to the upper division of the business administration program, satisfactory completion of the first and second year courses and a cumulative 2.75 GPA at Texas Tech is required.

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.

FIRST YEAR			
Fall		Spring	
Lab. Science*	4	Lab. Science*	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1330, Intro. Math. Anal. I	3	MATH 1331, Intro. Math. Anal. II	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Public Pol.	3
Ag. Elective††	3	AGSC 2301, Comp. in Agr. II	3
TOTAL	16	TOTAL	16

SECOND YEAR			
Fall		Spring	
ECO 2302, Prin. of Economics II	3	AAEC 3301, Agribus. Marketing	3
AGSC 3301, Ag. Lead. Princ.	3	AAEC 3401, Ag. Statistics	4
ENGL 2311, Technical Writing	3	HIST 2301, Hist. of U.S. 1877	3
ACCT 2300, Elementary Acct. I	3	ACCT 2301, Elem. Acct. II	3
AAEC 2305, Fund. of AAEC	3	Sophomore English**	3
HIST 2300, Hist. of U.S. to 1877	3	Electives	2
TOTAL	18	TOTAL	18

SUMMER			
FIN 3320, Corp. Finance I	3	MKT 3350, Intro. to Marketing	3
MGT 3373, Managerial Comm.	3	MGT 3370, Organ. and Mgt.	3
TOTAL	6	TOTAL	6

THIRD YEAR			
Fall		Spring	
ISQS 3344, Intro. Prod. Oper.	3	AAEC 3100, Seminar	1
AAEC 3315, Ag. Price Theory	3	AAEC 3304, Farm & Ranch Mgt.	3
BLAW 3391, Business Law I	3	ECO 3311, Int. Macroeconomics	3
FIN 3323, Prin. of Mon. Bank, Cre.	3	FIN 4328, International Fin.	3
MGT 4375, International Mgt.	3	MKT 4358, International Mkt.	3
TOTAL	15	AAEC 4316, Ag. Fin. Anal.	3
		TOTAL	16

FOURTH YEAR			
Fall		Spring	
Upper Level BA Elective	3	AAEC 4301, Prbs. Appl. Eco.	3
AGSC 4300, Research Meth.	3	AAEC 4302, Stat. Meth.	3
AGGB Group***	12	AGGB Group***	3
TOTAL	18	MGT 4380, Admin. Policy	3
		Visual & Performing Arts†	3
		TOTAL	15

* Select at least 4 hours of lab science courses from PSS and the other 4 hours from Core Curriculum requirements.

** Sophomore English must be from ENGL 2305, 2306, 2307, 2308, or 2351.

*** AGGB Curriculum Group: Select 5 courses from AAEC 4303, 4305, 4306, 4312, 4313, 4315, and 4317.

† Choose from university Core Curriculum requirements.

†† Ag. Electives must be selected from PSS 1321, RWFM 2301, 2302, or ANSC 1401.

- Departmental CORE Policy: Includes AAEC 3315 and 3401. All students expecting to graduate on schedule are strongly advised to complete the CORE with grades of C or better before they reach 90 hours of completed course work. Students failing to do so may delay their graduation date.
- Both degrees may be granted on completion of all 144 hours.
- All courses in AAEC, MATH, ECO, ENGL, B A, and AGSC 2301 must be completed with a grade of C or better.
- See the College of Business Administration section of the catalog for information on lower division requirements. Students interested in pursuing a B.B.A. degree in majors other than general business should visit with a COBA advisor about additional course requirements.
- Satisfactory completion of the first and second year courses and a cumulative 2.75 GPA at Texas Tech are required to advance to the upper division of the business administration program.

Graduate Program

Master's Programs

Master's programs in agricultural and applied economics require a minimum of 30 hours of graduate credit for the M.S. thesis option or 36 hours for the M.S. nonthesis option and for the Master of Agriculture degree. A student seeking a M.S. degree in agricultural and applied economics may choose courses to emphasize agribusiness and trade or resource policy and development. Each candidate in the M.S. program is expected to demonstrate competency by satisfactorily completing a comprehensive written examination.

Doctoral Programs

The doctoral program in agricultural and applied economics is designed to develop a broad-based competence in advanced economic theory, techniques of quantitative analysis, and public administration of agricultural and economic issues. Two options are offered for the Doctor of Philosophy degree in the agricultural and applied economics program. The first option allows graduate students to select a minor of their choice in business administration, finance, mathematics, public administration, statistics, sociology, or other possible areas of study. The program has been designed to take advantage of the strengths of the department and areas of interest to students. The second option allows graduate students to select a minor in personal financial planning, a joint Ph.D. program between the department and the College of Human Sciences. Completion of the doctoral program in agricultural and applied economics with a minor in personal financial planning qualifies graduates to take a test administered by the Certified Financial Planning Board of Standards to become Certified Financial Planners.

Each Ph.D. candidate is expected to demonstrate competency by satisfactorily completing (1) a comprehensive written examination in each specialty field chosen, (2) a dissertation research project that demonstrates original independent scholarly research, and (3) a final oral exam.

Before being recommended for admission to a degree program with a major in agricultural and applied economics, the student may be required to take (without graduate credit) undergraduate leveling courses as specified by the department.

Joint M.S.–J.D. Degree Program

The School of Law and the Graduate School of Texas Tech University offer a joint degree program that allows students to complete the requirements for the Master of Science degree in Agricultural and Applied Economics and the Doctor of Jurisprudence degree. This joint program can be completed one year sooner than when each is pursued separately. The M.S. component is administered by the Department of Agricultural and Applied Economics on behalf of the Graduate School, while the J.D. component is administered by the School of Law.

The joint degree program is of particular benefit to students who are interested in practicing law in a rural setting or who want to pursue certain types of careers in agribusiness finance or natural resource law. Students must be admitted to both programs separately but the LSAT test will suffice for both applications.

Agricultural and Applied Economics (AAEC)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

2305. **Fundamentals of Agricultural and Applied Economics (3:3:0)** [AGRI 2317]. Fundamental economic principles and their application to problems and issues in the food, fiber, and natural resource sectors of the economy. F, S, SS.
3100. **Seminar (1:1:0)**. Prerequisite: Junior standing. Assigned readings, informal discussion, outside speakers, and written and oral reports on subjects relating to agricultural and applied economics. F, S.
3301. **Agribusiness Marketing (3:2:3)** [AGRI 1325]. Prerequisite: AAEC 2305 and ENGL 1302. Marketing of raw materials and processed products from the management perspective. Market structure, conduct, performance. Marketing channels. F, S. (Writing Intensive)
3302. **Agribusiness Finance (3:3:0)**. Prerequisite: AAEC 2305 and MATH 1320 or 1330. Basic principles of finance emphasizing the mathematics of finance, credit, and financial analysis. F, S.
3303. **Cooperatives (3:3:0)**. Prerequisite: AAEC 3301. Organization and operation of agricultural and other cooperatives. S or by correspondence. (Writing Intensive)
3304. **Farm and Ranch Business Management (3:2:3)**. Prerequisite: AAEC 2305 or equivalent. Organization and management of the individual small business including farms, ranches, input suppliers, commodity processors, etc. F, S.
3305. **Introduction to Sales (3:3:0)**. Prerequisite: Sophomore standing. Principles and methods used in professional selling for the business environment. Includes concepts of human behavior and professional selling techniques. F, S.
3315. **Agricultural Price Theory (3:3:0)**. Prerequisite: AAEC 2305, MATH 1331, and junior standing. Basic economic principles with applications to agricultural pricing problems and resource allocations.
3401. **Agricultural Statistics (4:3:3)**. Prerequisite: College algebra or higher mathematics. Principles and procedures in the analysis of agricultural data including indices of central tendency and dispersion; probability; sampling; significance tests; analysis of variance; and simple linear correlation. F, S, SS.
4000. **Internship in Agricultural and Applied Economics (V1-12)**. Prerequisite: Sophomore standing and approval. Supervised study providing in-service training and practice in business and organizations. F, S, SS.
4101. **Current Problems in Agricultural and Applied Economics (1)**. Prerequisite: Senior standing. Topics may vary. May be repeated twice for credit. F, S, SS.
4301. **Special Problems in Applied Economic Analysis (3)**. Prerequisite: AGSC 4300 or approval. Individual instruction in analysis of a research problem. May be repeated with the approval of the department. S. (Writing Intensive)
4302. **Statistical Methods in Agricultural Research (3:3:0)**. Prerequisite: AAEC 3401 and MATH 1331. Advanced agricultural statistical analysis related to research methods using probability theory; tests of statistical significance; multiple correlation and regression; analysis of covariance; and experimental design. S, SS.
4303. **Property Appraisal (3:3:0)**. Prerequisite: AAEC 2305, sophomore English or ENGL 2311, and senior standing or approval. Factors governing property prices and valuation. Appraisal of property for use, sale, and other purposes. F. (Writing Intensive)
4305. **Agricultural and Public Policy (3:3:0)**. Prerequisite: AAEC 3315. Historical development and economic analysis of public programs and policies affecting the food and fiber sector and the environment. F. (Writing Intensive)
4306. **International Agricultural Trade (3:3:0)**. Prerequisite: Junior standing and AAEC 3315. Economic principles of interregional and international trade, location, and inter-area competition in products and services. S. (Writing Intensive)
4309. **Special Problems in International Agricultural Development (3)**. Prerequisite: Departmental approval. Individual instruction and independent study in international development and management in the agricultural sector in advanced and developing nations.
4312. **Applied Mathematical Economics (3:3:0)**. Prerequisite: AAEC 3315 or equivalent. Mathematical tools for analysis of economic relationships involving prices and quantities, inputs and outputs, and costs and revenues. F.
4313. **Natural Resource Economics (3:3:0)**. Prerequisite: AAEC 3315 and junior standing. Economics of natural resource use and allocation including land economics, economics of water development, and environmental economics. S. (Writing Intensive)
4315. **Agribusiness Management (3:3:0)**. Prerequisite: AAEC 3315 and 3401 or equivalents. Case studies emphasizing managerial techniques applied to decision-making problems of business firms. F. (Writing Intensive)
4316. **Agricultural Financial Analysis (3:3:0)**. Prerequisite: AAEC 3302 or FIN 3320. Principles and procedures in managing financial and credit resources; nature, purposes, and use of financial statements, budgets, and credit instruments; and criteria for decision making in borrowing and lending. S.
4317. **Commodity Futures Trading and Analysis (3:3:0)**. Prerequisite: Junior standing and AAEC 2305. History and characteristics of commodity futures markets, hedging, speculation, and use of futures as a management tool. F, S.
4320. **Agribusiness Law (3:3:0)**. Prerequisite: AAEC 2305 and junior standing. Federal regulatory programs, market orders, Packers and Stockyards Act, bankruptcy. Administrative, environmental, antitrust law, Uniform Commercial Code, in an agribusiness context. F.
5302. **Food and Agriculture Sector Public Policy (3:3:0)**. Prerequisite: AAEC 4305. Analysis of public policies affecting the food and fiber sector; commodity programs, environmental laws, and trade policy. F, SS.
5303. **Advanced Production Economics (3:3:0)**. Prerequisite: AAEC 3316. Criteria for resource use optimality and technology adoption; duality relationships; and linear programming. F.
5307. **Applied Econometrics I (3:3:0)**. Prerequisite: AAEC 4302. Advanced statistical methods, including multiple regression analysis, for applied economic problems; constructing econometric models; multicollinearity, autocorrelation, heteroscedasticity, and related problems. F.
5308. **Natural Resource Economics (3:3:0)**. Prerequisite: ECO 5312 or consent of instructor. Economic techniques employed in the efficient management, valuation, and intertemporal use of natural and environmental resources. F.
5309. **International Economic Development in Food and Fiber Sectors (3:3:0)**. Prerequisite: AAEC 3315. World food and development issues; economic development of food and fiber sectors in industrialized and developing economies. F.
5310. **Advanced Market Analysis (3:3:0)**. Theoretical and empirical approaches to market structures and market price behavior. S.
5312. **Agribusiness Analysis (3:3:0)**. Prerequisite: AAEC 3315. Application of economic theory and methods to management problems of the business firms in the food and fiber sector. F.
5313. **Microcomputer Applications in Agribusiness and Research (3:2:2)**. Use of microcomputers, software, and design of software for agricultural business and research purposes. Not open to majors. S, SS.
5315. **Property Appraisal (3:3:0)**. Factors governing land prices, valuation. Appraisal for use, sale, lending, condemnation, estate settlement, taxation. Not for students with AAEC 4303 or equivalent. F.
5316. **International Agricultural Trade (3:3:0)**. Economic theory dealing with the international movement of goods, services, and capital; welfare and distributional aspects of trade; and policy issues in international agricultural trade. S.
5317. **Financial and Commodity Futures and Options (3:3:0)**. Mechanics of futures trading, history and functions of futures market. Role of futures and options markets in managing risks. Not for students with AAEC 4317 or equivalent. F, S.
5318. **Finance and the Agribusiness Sector (3:3:0)**. Prerequisite: FIN 5320. Applications of financial theory for the agribusiness sector. Risk, capital structure, business structure, investment analysis. S.
5320. **Agribusiness Law (3:3:0)**. Federal regulatory programs, market orders, bankruptcy. Administrative, environmental, antitrust law, Uniform Commercial Code in agricultural context. Not open to students with AAEC 4320 or equivalent. F, SS.
5321. **Research Methodology in Economics (3:3:0)**. Review of philosophical and conceptual basis of economic research and

Graduate Courses

5301. **Special Study in Agricultural and Applied Economics (3)**. Individual and group study in advanced topics not covered in other graduate courses. May be repeated for credit. F, S, SS.

study of the procedural aspects of designing, planning, and conducting research in economics. S.

6000. **Master's Thesis (V1-6).**
6301. **Advanced Special Problems in Agricultural and Applied Economics (3).** Individual study in topics not covered in other graduate courses. F, S, SS.
6302. **Food, Agriculture, and Natural Resource Policy Analysis (3:3:0).** Prerequisite: AAEC 4305. Analysis of policies, programs affecting food, agricultural commodities, trade, and natural resources. Includes policies in the U.S. and other countries. F.
6305. **Economic Optimization (3:3:0).** Prerequisite: AAEC 5303. Development, use of mathematical economic models emphasizing static and stochastic linear, non-linear and dynamic processes. S.
6308. **Advanced Natural Resource Economics (3:3:0).** Prerequisite: AAEC 5308. Economic theory and analysis of environmental and natural resource issues, both domestic and global. F.
6310. **Demand and Price Analysis (3:3:0).** Prerequisite: AAEC 5311, ECO 5312. Applied price and demand analysis including complete demand systems and hedonic-characteristic price analysis. F.
6311. **Applied Econometrics II (3:3:0).** Prerequisite: AAEC 5307. Methods and applications of single and multi-equation models in agricultural economics; logit and probit models, nonstructural models and related methods. S.
7000. **Research (V1-12).**
7200. **Teaching Practicum (2:3:0).** Prerequisite: Doctoral student in the program and previous or concurrent enrollment in a higher education teaching methods course. Supervised teaching at the university level.
8000. **Doctor's Dissertation (V1-12).**

Department of Agricultural Education and Communications

Faculty

Mathew T. Baker, Chairperson

Professors: Baker, Briers, Cepica, Christiansen, Frazee, Larke, Lawver, Shinn, and Townsend;
Associate Professors: Doerfert, Dooley, Murphy, and Vestal; *Assistant Professors:* Akers, Boyd, Brashears, Cummings, Davis, Elbert, Harlin, Kistler, Lindner, Smith, and Wingenbach.

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
- Doctor of Education in Agricultural Education

The department participates in the interdepartmental program leading to the Master of Agriculture degree with an option in agricultural communications or agricultural extension education.

Undergraduate Program

Students majoring in interdisciplinary agriculture for the B.S. degree may choose from two tracks: teacher certification or agricultural leadership. The teacher certification track involves courses from many departments in the College of Agricultural Sciences and Natural Resources. Elective courses can be selected in areas of special interest. Job placement in high schools, cooperative extension, and community colleges offers a life-long career for many graduates and alternative employment opportunities for others. Students seeking teacher certification also may receive a degree in another agricultural area and, with proper planning, receive certification in agricultural education. Students seeking teacher certification also should refer to the "College of Education" section of this catalog. The agricultural leadership track prepares students to enter a broad array of careers either in the public sector (legislature assistants, agricultural agencies) or private sector (training and development, management, or sales in agricultural, food, and natural resource industries). This degree is also recommended for students interested in continued studies in professional schools such as law or business administration.

Agricultural communications allows students to specialize in both mass communications and agriculture. The communications component consists of prescribed courses in journalism, speech, telecommunications, photography, and advertising. Students must select one of three areas for specialization: electronic media, print media, or public relations/marketing. Selection of technical agriculture courses allows students to specialize in areas of interest and to reinforce their general knowledge in agriculture.

This department offers a minor in agricultural leadership for students majoring outside the department. For more information, refer to "Selecting a Minor" in the College of Agricultural Sciences and Natural Resources introductory information or contact the departmental chair.



Interdisciplinary Agriculture (Agricultural Education) Curriculum—Teacher Certification

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
BIOL 1401 or 1402	4	PSS 1321, Agronomic Plant Sc.	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, Coll. Algebra	3	HIST 2300, Hist. of U.S. to 1877	3
ANSC 1401, Gen. Animal Sci.	4	CHEM 1305, Ess. Chem. I	3
TOTAL	14	CHEM 1105, Exp. Gen. Chem. I	1
		MATH 2300, Statistical Methods	3
		TOTAL	16

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
ACOM 2302, Sci. Communications	3	COMS 2300, Public Speaking	3
AGED 2302, Tech. Use in Teaching	3	AAEC 2305, Fund. Ag. & Appl. Eco.	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Pol.	3
HIST 2301, U.S. Hist. Since 1877	3	Ag. Elective	3
AGSM 2303, Welding & Metalwork	3	Vis. & Perf. Arts and/or Multicult.†	3
TOTAL	15	TOTAL	15

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
AGED 2300, Intro. to Ag. Ed.	3	ANSC 3305, Appl. Animal Nutrition	3
PSS 2432, Prin. & Pract. Soils	4	AGSM 3303, Engine Theory	3
PSS 1411, Prin. of Hort.	4	AGED 3313, Mgt. of SAEPs	3
ANSC 3402, Animal Genetics or	4	ENGL 1307, Fiction (Humanities)	3
PSS 3421, Plant Genetics	4	Advanced Ag. Elective	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
EDSE 4322, Diversity Learn. Envir.	3	AGED 4304, Meth. of Tchg. Ag. Sci.	3
EDSE 4310, Learn. Cogn. & Instr.	3	AGED 4306, Student Tchg.	9
AGED 3331, Prin. of Ag. Leadership	3	EDSE 4311, Curr. Development	3
EDLL 4382, Read & Write Sec.	3	TOTAL	15
AGSM 4302, Ag. Bldgs.	3		
TOTAL	15		

Minimum hours required for graduation—120.
 † Choose from Core Curriculum requirements.

Interdisciplinary Agriculture Curriculum Agricultural Leadership Track

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
BIOL 1401 or 1402	4	PSS 1321, Agronomic Plant Sc.	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, Coll. Algebra	3	HIST 2300, Hist. of U.S. to 1877	3
ANSC 1401, Gen. Animal Sci.	4	CHEM 1305, Ess. Chem. I	3
TOTAL	14	CHEM 1105, Exp. Gen. Chem. I	1
		MATH 2300, Statistical Methods	3
		TOTAL	16

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
ACOM 2301, Intro. to Ag. Comm.	3	COMS 2300, Public Speaking	3
AGSC 3301, Prin. of Ag. Leadership	3	PSS 1411, Prin. of Horticulture	4
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Pol.	3
HIST 2301, U.S. Hist. Since 1877	3	AGED 2302, Tech. Use in Teaching	3
PSS 2432, Prin. and Pract. of Soils	4	AAEC 2305, Fund. Ag., Appl. Eco.	3
TOTAL	16	TOTAL	16

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
AGED 2300, Intro. to Ag. Ed.	3	ANSC 3305, Appl. Animal Nutrition	3
ACOM 2302, Sci. Communications	3	ACOM 3300, Comm. Ag. to Public	3
AGED 3315, Personal Leadership	3	AGED 3314, Team Leadership	3
Visual and Performing Arts†	3	AGED 3330, Ag. Agencies	3
Humanities	3	Ag. Elective	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
ANSC 3402, Animal Genetics or	4	AGED 4000, Internship	9
PSS 3421, Plant Genetics	4	AGED 4309, Cont. Issues in Ag. Leadership	3
AGED 4302, Transfer of Ag. Tech.	3	TOTAL	12
AGED 4308, Org. Leadership	3		
ACOM 4300, Web Design in Ag.	3		
Advanced Ag. Elective	3		
TOTAL	16		

Minimum hours required for graduation—120.
 † Choose from Core Curriculum requirements.

Agricultural Communications Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
BIOL 1401 or 1402	4	Basic Ag. Elective	3
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
MATH 1320, College Algebra	3	HIST 2300, Hist. of U.S. to 1877	3
ACOM 2301, Intro. Ag. Com.	3	AAEC 2305, Fund. Ag. & Appl. Eco.	3
ACOM 2305, Digital Comm. in Ag.	3	MATH 2300, Statistics	3
TOTAL	16	TOTAL	15

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
Basic Ag. Elective	3	JOUR 2310, News Writing**	3
CHEM 1305, Chem. & Society	3	POLS 1301, Amer. Govt. Org.	3
CHEM 1105, Exp. Gen. Chem. I	1	ADV 2310, Prin. Of Advertising	3
ACOM 2302, Sci. Communications	3	AGED 2300, Intro to Ag.	3
HIST 2301, U.S. Hist. Since 1877	3	Basic Ag. Elective	3
Humanities Elective*	3	TOTAL	15
TOTAL	16		

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
POLS 2302, Am. Public Pol.	3	ACOM 3300, Comm. Ag. to Public	3
COMS 2300, Public Speaking	3	AGSC 3301, Ag. Leadership Prin.	3
P R 2310, Prin. of Public Relations	3	Specialized Elective	6
Advanced Ag. Elective	3	PHOT 2310, Basic Photography	3
EM&C 3310, Intro. To Telecomm.	3	TOTAL	15
TOTAL	15		

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
ACOM 3301, Video Prod. In Ag.	3	Specialized Elective	3
Specialized Elective	3	Advanced Ag. Elective	6
Visual & Performing Arts Elective*	3	ACOM 4310, Dev. of Ag. Pub.	3
Advanced Ag. Elective	3	ACOM 4300, Adv. Computer	3
ACOM 4100, Sem. in Ag. Comm.	1	TOTAL	15
TOTAL	13		

Minimum hours required for graduation—120. (Students must fulfill the university multicultural requirement.)
 * Choose from Core Curriculum requirements, one from Category E and one from Category F.
 ** Must pass GSP before enrolling in JOUR 2310
 Specialization Areas: (12 Hours)
 Electronic Media – JOUR 3314, EM&C 3340, 3370 or 3360, 4320
 Print Media – JOUR 3312, 3316, 3380, 4370
 Public Relations/Marketing – PR 3312, MCOM 3380, AAEC 3301, 3305



Graduate Program

The Doctor of Education program is available as a resident program. The department also participates in a unique distance-delivered doctoral degree in agricultural education that is awarded by both Texas Tech University and Texas A&M University. Students in this program must apply for admission at both universities. Most course work associated with this joint doctoral degree is delivered via the ITV and the World Wide Web. The Master of Science degree program may be completed with 30 hours of graduate courses plus a thesis, or 36 hours of graduate courses. The Master of Agriculture degree is a 36-hour program.

Agricultural Education (AGED)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

2300. **Introduction to Agricultural Education (3:3:0)**. Prerequisite: Sophomore standing or departmental approval. History and principles of vocational education, community assessment of agricultural programs planning, and development of agricultural youth organization. (Writing Intensive)
2302. **Principles of Effective Technology Use in Teaching Agricultural Science (3:3:0)**. Computer hardware and software used in the modern teaching environment. Teaching and learning theory in relation to multimedia presentations and their effective construction.
3313. **Management of Supervised Agricultural Experience Programs (3:3:0)**. Provide students with the theory and application for working with youth in the selection, management, and record keeping procedures used with supervised agricultural experience programs and youth projects.
3314. **Team Leadership Development in Agriculture and Natural Resources (3:3:0)**. Prerequisite: AGSC 3301. Exploration of strategies and techniques for successful teams, including conflict management, facilitation, and negotiation, skill building, and experimental activities in agriculture and natural resources.
3315. **Personal Leadership Development in Agriculture Sciences and Natural Resources (3:3:0)**. Prerequisite: AGSC 3301. Principles, theories and application of interpersonal skills required to develop strong leadership in the agricultural and natural resource context.
3330. **Interrelationships of Agricultural Agency Information Systems (3:2:2)**. Prerequisite: Sophomore standing or departmental approval. Utilization of agricultural service systems to disseminate information to traditional and non-traditional agricultural clientele. Emphasis on USDA organizations.
3331. **Agricultural Youth Leadership Organizations (3:3:0)**. Principles and application of leadership skills commonly taught in youth agricultural organiza-

tions. Emphasis on youth leadership development events and seamlessly integrating activities and curriculum.

4000. **Internship (V1-12)**.
4301. **Agricultural Education Problems (3)**. Prerequisite: Senior standing and approval of department chairperson. Individual investigation. May be repeated for credit.
4302. **Transfer of Agricultural Technology (3:3:0)**. Prerequisite: Junior standing or departmental approval. Examination of processes by which professional agriculturalists influence the introduction, adoption, and diffusion of technological change. F.
4304. **Methods of Teaching Agriscience in the Secondary School (3:2:3)**. F, S.
4306. **Student Teaching (3)**. Prerequisite: Senior standing in agricultural education.
4308. **Organizational Leadership Development in Agriculture and Natural Resources (3:3:0)**. Prerequisite: AGSC 3301. Human behavior in organizations, the role of leadership in organizational performance, and the process of organizational change and improvement.
4309. **Contemporary Issues in Agricultural Leadership (3:3:0)**. Prerequisite: AGSC 3301. An evaluation of current issues pertaining to leadership in agriculture and natural resources including a historical look at leadership and its impact on producers and consumers.

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.
5301. **Special Problems (3:3:0)**. Investigation of problems in agricultural education or extension education of special interest to the student. Repeatable for credit.
5302. **Research Methods and Analyses in Agricultural and Extension Education (3:3:0)**. Application of research techniques in agricultural and extension education. Determining the correct research design, treatment of data, and dissemination of results. F.
5303. **Advanced Computer Applications in Agricultural and Extension Education (3:3:0)**. Using computers in agricultural and extension education programs. Includes word processing, presentation graphics, desk-top publishing, and integrated software. F.
5304. **Advanced Methods in Agricultural Leadership (3:3:0)**. Theory of motivation and behavior; leadership and management styles, change agents, and the adoption process. Practical application regarding agricultural occupations. SSI, SSII.
5305. **Program Development in Agricultural and Extension Education (3:3:0)**. Development of a total agricultural education program in communities and counties using all available resources. SSI, SSII.
5306. **History and Philosophy of Agricultural Education (3:3:0)**. Historical and philosophical foundations of agricultural education. Emphasis is on preparing leaders who can shape and interpret policy. S.

5307. **Methods of Technological Change (3:3:0)**. Dynamics of cultural change as theoretical framework for planned technological change; methods of planning and implementing change, its effect, and how it can be predicted. SSI, SSII.
5308. **Foundations of Adult Education (3:3:0)**. Study and investigation of adult learning theories, methods, and procedures to implement changes in adult behavior.
5309. **Evaluation of Programs in Vocational, Technical, and Extension Education (3:3:0)**. Techniques in evaluating vocational, technical, and extension education programs. Principles and procedures of evaluation with emphasis on focusing, designing, reporting, and managing evaluation. SSI, SSII.
5310. **College Teaching in Agriculture (3:3:3)**. Prerequisite: consent of instructor. Methods and techniques of teaching agriculture at the college level. Includes self-assessment, student assessment, course development, lesson planning, presentations, and evaluation. F.
5311. **Human Dimensions of International Agricultural Development (3:3:0)**. Study current issues and trends in the human dimension of international agricultural development.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
7100. **Graduate Seminar (1)**. Group study and discussion of current developments in agricultural education. May be repeated for credit.
7200. **Professional Internship (2)**. An on-the-job supervised experience program conducted in the area of the student's specialization. May be repeated for credit.
8000. **Doctor's Dissertation (V1-12)**. Initiation and completion of research for advanced degree.

Agricultural Communications (ACOM)

(To interpret course descriptions, see pg. 10.)

2301. **Introduction to Agricultural Communications (3:3:0)**. An overview of information systems and media associated with the agricultural industry.
2302. **Scientific Communications in Agriculture and Natural Resources (3:3:0)**. Improve written, visual, and oral communications. Development of press releases, scientific papers, popular press articles, poster presentations, technical presentations, and grant applications.
2305. **Digital Communications in Agriculture (3:2:1)**. Examination of the use of computers in agricultural communications with emphasis on graphic art production, photo manipulation, and elements of design.
3300. **Communicating Agriculture to the Public (3:2:2)**. Principles and procedures in communicating agricultural news and information to general and specialized audiences through presentations and various media. S.
3301. **Video Production in Agriculture (3:3:0)**. Prerequisite: JOUR 2310. Basics in producing an agricultural video. Students learn scripting, shooting, and digital video editing.
4000. **Internship in Ag Communications (V1-12)**.

4001. **Agricultural Communications Problems (VI-3).** Prerequisite: Consent of instructor. Individual study of advanced application of principles of agricultural communications.
4100. **Seminar in Agricultural Communications (1:1:0).** Prerequisite: Senior standing or departmental approval. Overview and analysis of the history, development, issues, and trends of traditional agricultural and related information outlets. May be repeated once. F.
4300. **Web Design in Agricultural Sciences and Natural Resources (3:2:1).** Prerequisite: ACOM 2305. Basic understanding of web design principles. Promote experimental learning through a project requiring students to develop a web site for a client in the agriculture industry.
4310. **Development of Agricultural Publications (3:2:2).** Prerequisite: JOUR 2310. Students integrate various skills including writing, editing, and layout in producing agricultural publications. Emphasis upon computer software applications in agricultural publishing.

Agricultural Systems Management (AGSM)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

2302. **Agricultural Surveying and Land Conservation (3:2:3).** Basics of traversing; computing of curves, land areas, construction layout and staking; and establishing grades and elevations for landscape architecture and agricultural purposes. Includes uses and care of equipment, application of stadia measurement, and the rudiments of land measurement systems. F.
2303. **Welding and Metalwork (3:2:3).** Metal fabrication and repair using hand tools, power tools, and welding equipment. Includes metallurgy pertaining to welding processes and heat treating.
3303. **Internal Combustion Engine Theory and Operation (3:2:3).** Fundamentals of internal combustion engines, principally small gasoline engines. Emphasis on adjustments, repair, and routine maintenance to include tractors and other power units. F, S.
4301. **Agricultural Mechanization Problems (3).** Prerequisite: Consent of instructor. Individual study of an advanced phase of agricultural mechanization. Research report required. F, S, SS.
4302. **Agricultural Buildings and Environmental Control (3:2:3).** Determining agricultural building requirements, materials, design, and construction. Includes construction, tools and equipment, framing, environmental control, and necessary utilities. S.
4305. **Conducting Agricultural Mechanics Programs (3:2:2).** Organizing, equipping, and managing agriscience laboratories.

Graduate Course

5301. **Investigations in Advanced Agricultural Mechanics (3).** Individual study or investigation of an advanced phase of mechanized agriculture. May be repeated for credit.

Department of Animal and Food Sciences

Faculty

Kevin Roy Pond, Chairperson

Distinguished Thornton Chair: Galyean; **Professors:** Albin, McGlone, M. Miller, Pond, and Richardson; **Associate Professors:** Brady, Brashears, Jackson, R. Miller, Prien, and Thompson; **Assistant Professors:** Alvarado, Blanton, Brooks, Kim, and Vizcarra; **Instructors:** Brock, C. Guay, and K. Guay; **Adjunct Faculty:** Brown, Cole, Dowd, Greene, Hentges, Herring, Loneragan, Neill, Pinchak, Thomson, Wheeler, Winder, and Wu.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Animal Science
- Bachelor of Science in Food Technology
- Master of Science in Animal Science
- Master of Science in Food Technology
- Doctor of Philosophy in Animal Science

Two areas of specialization in food technology are offered—science and industry. The department also participates in the interdepartmental program leading to the Master of Agriculture degree.

Undergraduate Program

Animal Science Program

Students majoring in animal science for the B.S. degree may choose from four emphases: animal business, production, science, or meat science. The business option prepares students for careers in all facets of livestock production and subsidiary support services by blending animal science with business and economics courses. The production option provides the latest scientific principles for efficient livestock production, marketing, and processing. The science option provides training in advanced basic sciences to prepare students for study towards an advanced degree. The meat science option prepares students in meat processing, science, and safety. The department also directs the preprofessional course preparation for veterinary medicine.

This department offers minors in animal science or food technology for students majoring outside the department. For more information on requirements for completing a minor, refer to “Selecting a Minor” in the introductory information about this college or contact the departmental chair.

Students must earn a grade of C or better in all animal science courses that are required for graduation. All electives are subject to departmental approval. Degree requirements are given on the next page.

Food Technology Program

Food technology provides the basic course work for a comprehensive background in the processing and preservation of foods. Food technology graduates may be employed in areas concerned with food systems management, design and development of new food products, strategies for quality assurance and food safety, or research in basic constituents of food. The increasing pressure of world popu-

lation growth on available food supply assures a stable, growing job market for food technology students. Positions in private industry, educational institutions, and governmental agencies offer excellent potential for rapid advancement. The food technology section provides course work suggested by the Institute of Food Technologists and emphasizes processing and quality control aspects. A pilot plant and associated chemical and microbiological laboratories allow the student practical experience in development, manufacture, and analysis of food products. Degree requirements appear on the following pages.

Preveterinary Medicine Option

Although Texas Tech does not offer a degree in preveterinary medicine, students may still prepare for veterinary school by completing the minimum admission requirement of 64 credit hours. The following courses are included in the minimum admission requirement: ANSC 3301; BIOL 1402; CHEM 1307, 1107, 1308, 1108, 2305, 2105, 4303; COMS 2300; ENGL 1302, 2301, 2311; MATH 2300 or 1351; MBIO 3401; PHYS 1306, 1103, 1307, 1104; PSS 3421; and at least 11 credit hours of electives. A preveterinary medicine advisor is available to assist students in selecting courses and degree programs.



Graduate Program

The Department of Animal and Food Sciences offers flexible degree programs preparing graduates for a wide array of positions in agriculture and allied fields. Students with bachelor's degrees in a variety of fields are welcome to study in the department.

Master's Programs

The nonthesis, 36-hour Master of Agriculture or Master of Science degrees are offered with specializations in agricultural product processing (meats or feeds), feedlot management, formula feed production, livestock production, and ranch management. An internship is required for the Master of Agriculture.

Master of Science degree students may pursue studies in animal breeding (physiology or genetics), animal nutrition (ruminant or monogastric), animal science, food technology, or meat science. A thesis, along with at least 24 semester hours of course work, is required.

The master's degree in food technology emphasizes the technological aspects of food handling. Knowledge of the physical and biological sciences, economics, and engineering is applied to and coordinated with food development, processing, packaging, quality control, and distribution. Research programs involve food safety and microbiology, chemistry, and commodity products.

Consumer demands for a variety of highly nutritious and convenient foods of uniformly high quality create many and varied career opportunities in the food and allied industries. These careers include management, research and development, process supervision, quality control, procurement, distribution, sales, and merchandising.

Doctoral Program

Candidates for the Doctor of Philosophy degree in Animal Science may specialize in one of several areas of interest such as animal genetics, animal nutrition, reproductive or environmental physiology, or meat science. No foreign language requirement exists, but such a requirement may be instituted at the discretion of the student's advisory committee.

Interested persons should contact the department graduate advisor. Additional general degree requirements may be found in other sections of the catalog.

Students who receive stipends have special responsibilities in research and teaching. These awards include waiver of nonresident tuition.

Bachelor of Science in Animal Science Curriculum

<i>Fall</i>		FIRST YEAR		<i>Spring</i>	
ANSC 1401, Gen. Anim. Sci.	4	AAEC 2305, Fund. Ag. & Appl. Eco.	3	CHEM 1308, Prin. Chem. II	3
CHEM 1307, Prin. of Chem. I	3	CHEM 1108, Prin. Chem. II (Lab.)	1	ENGL 1302, Adv. Coll. Rhetoric	3
CHEM 1107, Prin. Chem. I (Lab.)	1	ANSC 2301, Lvstk. & Meat Eval. I	3	MATH 1351, Calc. I (or 2300)	3
ENGL 1301, Ess. Coll. Rhetoric	3	TOTAL	16		
MATH 1350 Ana. Geometry (or 1321)	3				
PSS 1321, or AGSC 2300	3				
TOTAL	17				
		SECOND YEAR			
		<i>Fall</i>		<i>Spring</i>	
POLS 1301, Amer. Gov. Org.	3	POLS 2302, Amer. Pub. Pol.	3	HIST 2300, Hist. of U.S. to 1877	3
BIOL 1402, Biol. of Animals	4	CHEM 3306, Org. Chemistry	3	CHEM 3106, Org. Chem. Lab.	1
ENGL 2311, Patt. of Reports	3	Humanities/Multi.*	3	FD T 2300, Prin. Food Tech.	3
CHEM 3305, Org. Chem.	3	TOTAL	16		
CHEM 3105, Org. Chem. Lab.	1				
ANSC 2401, Anat. & Phys. Dom. An.	4				
TOTAL	18				
		THIRD YEAR			
		<i>Fall</i>		<i>Spring</i>	
ANSC 3401, Repro. Physiol.	4	HIST 2301, Hist. of U.S. Since 1877	3	AAEC 3401, Ag. Statistics	4
ANSC 3301, Prin. Nutr.	3	ANSC 3307, Feeds & Feeding	3	Fine Arts/Multicultural*	3
PSS 3421, Fund. Prin. Genetics	4	ANSC 3402, Animal Genetics	4	TOTAL	17
COMS 2300, Public Speaking	3				
ANSC 3403, Sel., Proc. Meats	4				
TOTAL	18				
		FOURTH YEAR			
		<i>Fall</i>		<i>Spring</i>	
Production Elective	4	Production Electives	8	Approved Elective†	3
Elective	1	Electives	6	ANSC 3100, Animal Sci. Seminar	1
Approved Electives†	11	TOTAL	18		
TOTAL	16				

Minimum hours required for graduation—134.

* Choose from Core Curriculum requirements.

† Select 16-17 hours from the following: ANSC 3306, 4000, 4201, 4202, 4203, 4301, 4303, AGSC 2300, PSS 2432, MBIO 3400, 3401, BIOL 1401, 3302, 3420, ZOOL 2405, 3401, 4304, 4306, 4312, 4409, PHYS 1403, 1404, CHEM3311, 3312, 3402, 4303, plus other approved courses.

Animal Business Curriculum

<i>Fall</i>		FIRST YEAR		<i>Spring</i>	
ANSC 1401, Gen. Anim. Sci.	4	AAEC 2305, Fund. Ag. & Appl. Eco.	3	CHEM 1306, Chem. and Soc. II	3
CHEM 1305, Chem. and Society I	3	CHEM 1106, Gen. Chem. II (Lab.)	1	ENGL 1302, Adv. Coll. Rhetoric	3
CHEM 1105, Gen. Exp. Chem. (Lab.)	1	ANSC 2301, Lvstk. & Meat Eval. I	3	MATH 1331, Intro. Math. Ana.	3
ENGL 1301, Ess. Coll. Rhetoric	3	TOTAL	16		
MATH 1330, Intro. Math. Ana.	3				
PSS 1321, or AGSC 2300	3				
TOTAL	17				
		SECOND YEAR			
		<i>Fall</i>		<i>Spring</i>	
AAEC 3301, Agribusiness Mkt.	3	POLS 1301, Amer. Gov't. Org.	3	HIST 2300, Hist. of U.S. to 1877	3
ACCT 2401, Elem. Accounting I	4	BIOL 1402, Biology of Animals	4	AAEC 3302, Ag. Finance	3
ENGL 2311, Patt. of Reports	3	FD T 2300, Prin. Food Tech.	3	TOTAL	16
CHEM 2303, Intro. Org. Chem.	3				
CHEM 2103, Intro. Org. Chem. Lab.	1				
ANSC 2401, Anat. & Phys. Dom. An.	4				
TOTAL	18				
		THIRD YEAR			
		<i>Fall</i>		<i>Spring</i>	
ANSC 3401, Repro. Physiol.	4	HIST 2301, Hist. of U.S. Since 1877	3	AAEC 3401, Ag. Statistics (or MATH 2445)	3-4
ANSC 3301, Prin. Nutr.	3	ANSC 3307, Feeds & Feeding	3	POLS 2302, American Pub. Pol.	3
AAEC 3304, Farm & Ranch Mgt.	3	ANSC 3402, Animal Genetics	4	TOTAL	16-17
COMS 2300, Public Speaking	3				
ANSC 3403, Sel., Proc. Meats	4				
TOTAL	17				
		FOURTH YEAR			
		<i>Fall</i>		<i>Spring</i>	
Production Elective	4	Production Electives	8	Fine Arts/ Multicultural	3
ANSC 3100, Animal Sci. Seminar	1	Electives	6-7	TOTAL	17-18
AAEC 3303, 3305, 4303, 4317, or 4320	3				
BLAW 3391, Business Law I	3				
Humanities/Multicultural*	3				
TOTAL	14				

Minimum hours required for graduation—134.

* Choose from Core Curriculum requirements.

Animal Production Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
ANSC 1401, Gen. Anim. Sci.	4	AAEC 2305, Fund. Ag. & Appl. Eco.	3
CHEM 1305, Chem. and Society I	3	CHEM 1306, Chem. and Soc. II	3
CHEM 1105, Gen. Chem. (Lab.)	1	CHEM 1106, Gen. Chem. II (Lab.)	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, College Algebra	3	ANSC 2301, Lvstk. & Meat Eval. I	3
PSS 1321, or AGSC 2300	3	MATH 1321 or 1331	3
TOTAL	17	TOTAL	16

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
FD T 2300, Prin. Food Tech.	3	PSS 2432, 3321, or RWFM 3303	3-4
POLS 1301, Amer. Gov't. Org.	3	HIST 2300, Hist. of U.S. to 1877	3
ENGL 2311, Patt. of Reports	3	BIOL 1402, Biology of Animals	4
CHEM 2303, Intro. Org. Chem.	3	POLS 2302, American Pub. Pol.	3
CHEM 2103, Intro. Org. Chem. Lab.	1	Fine Arts/Multicultural*	3
ANSC 2401, Anat. Phys. Dom. An.	4	TOTAL	16-17
TOTAL	17		

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
ANSC 3401, Repro. Physiol.	4	HIST 2301, Hist. U.S. Since 1877	3
ANSC 3301, Prin. Nutr.	3	ANSC 3306, Animal Diseases	3
Humanities/Multicultural*	3	ANSC 3307, Feeds & Feeding	3
COMS 2300, Public Speaking	3	MBIO 3400, Microbiology	4
ANSC 3403, Sel., Proc. Meats	4	ANSC 3402, Animal Genetics	4
TOTAL	17	TOTAL	17

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
Production Elective	4	Production Electives	8
ANSC 3100, Animal Sci. Seminar	1	Electives	7
Approved Electives†	12-13	TOTAL	15
TOTAL	17-18		

Minimum hours required for graduation—134.
 * Choose from Core Curriculum requirements.
 † Select 12-13 hours from the following: ANSC 2201, 2302, 2303, 2304, 3202, 3203, 3204, 3205, 3303, 3308, 3309, 4000, 4001, 4202, 4302, 4303, 4306, 4309, 4310, AAEC 3301, 3302, 3303, 3304, 3305, 3401, 4304, 4317, PSS 2432, 3321, 4421, or RWFM 3303.

Meat Science Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
ANSC 1401, Gen. Anim. Sci.	4	AAEC 2305, Fund. Ag. & Appl. Eco.	3
CHEM 1305, Chem. and Society I	3	CHEM 1306, Chem. and Soc. II	3
CHEM 1105, Gen. Chem. (Lab.)	1	CHEM 1106, Gen. Chem. II (Lab.)	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, College Algebra	3	ANSC 2301, Lvstk. & Meat Eval. I	3
AGED 2302, Teaching Ag. Science	3	MATH 2300, Contemporary Math.	3
TOTAL	17	TOTAL	16

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
POLS 1301, Amer. Gov't. Org.	3	HIST 2300, Hist. of U.S. to 1877	3
Humanities/Multicultural*	3	BIOL 1402, Biology of Animals	4
ENGL 2311, Patt. of Reports	3	COMS 2300, Public Speaking	3
CHEM 2303, Intro. Org. Chem.	3	FD T 2300, Prin. Food Tech.	3
CHEM 2103, Intro. Org. Chem. Lab.	1	FD T 2302, Elem. Ana. of Foods	3
ANSC 2401, Anat. Phys. Dom. An.	4	TOTAL	16
TOTAL	18		

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
ANSC 3401, Repro. Physiol.	4	HIST 2301, Hist. U.S. Since 1877	3
ANSC 3301, Prin. Nutr.	3	ANSC 4400, MEat Science	4
ANSC 3402, Animal Genetics	4	ANSC 4000, Internship	3
POLS 2302, American Pub. Pol.	3	ANSC 3100, Animal Sci. Seminar	1
ANSC 3403, Sel., Proc. Meats	4	Approved Electives†	4
TOTAL	17	MBIO 3400, Microbiology	4
		TOTAL	19

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
Production Elective	8	FD T 3301, Food Microbiology	3
(Select 2 from ANSC 4401, 4403, 4406)		FD T 4303, Food Chemistry	3
ANSC 4404, Proc. Cured Meats	4	FD T 3303 or 3309	3
Fine Arts/Multicultural*	3	FD T 4306, Dairy Products	3
TOTAL	15	Approved Electives†	3
		TOTAL	16

Minimum hours required for graduation—134.
 * Choose from Core Curriculum requirements.
 † Select 7 hours from the following: AAEC 3301, 3302, 3303, 3304, 3305, 3401, 4317, 4320, ACOM 2301, 3300, 4300, ANSC 2302, 3203, 3204, 3306, 3307, FD T 3302, 3304, 4304, 4305, PSS 2432, 3321, 3322, 4421, or RWFM 3303.

Preveterinary Medicine Curriculum

The curriculum is designed to qualify students for entrance into schools of veterinary medicine. Students who complete this curriculum may either apply for admission to a school of veterinary medicine or change to one of the four-year curricula in the university. The minimum course requirements for enrollment in a professional veterinary medicine curriculum will normally be 88 semester hours of acceptable credit. The following is a suggested sequence of courses to complete these requirements.

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
BIOL 1402, Gen. Anim. Sci.	4	BIOL 1401, Biology of Plants	4
CHEM 1307, Prin. Chem. I	3	CHEM 1308, Prin. Chem. II	3
CHEM 1107, Prin. Chem. I (Lab.)	1	CHEM 1108, Prin. Chem. II (Lab.)	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1350 or 1321	3	MATH 1351, Calculus	3
ANSC 1401, Gen. Animal Sci.	4	TOTAL	14
TOTAL	18		

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
CHEM 3305, Org. Chemistry	3	CHEM 3305, Org. Chemistry	3
CHEM 3105, Org. Chem. Lab.	1	CHEM 3105, Org. Chem. Lab.	1
ENGL 2311, Patt. of Reports	3	PHYS 1403, Gen. Physics	4
PHYS 1403, Gen. Physics	4	HIST 2300, Hist. U.S. to 1877	3
HIST 2300, Hist. U.S. to 1877	3	PSS 3421, Genetics	4
TOTAL	14	TOTAL	15

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
ANSC 3301, Prin. Nutr.	3	POLS 2302, American Pub. Pol.	3
CHEM 4303, Biol. Chem. I	3	Electives	11
MBIO 3401, Prin. Microbiology	4	English Literature	3
POLS 1301, American Govt. Org.	3	TOTAL	17
TOTAL	13		

Bachelor of Science in Food Technology Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
BIOL 1402, Biol. of Animals	4	AAEC 2305, Fund. Ag. & Appl. Eco.	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1308, Prin. Chem. II	3
MATH 1330 or 1351	3	CHEM 1108, Prin. Chem. II (Lab.)	1
(Math 1320 or 1330 req. for Ind.)		ENGL 1302, Adv. Coll. Rhetoric	3
CHEM 1307, Prin. Chem. I	3	Approved Electives**	3
CHEM 1107, Prin. Chem. I (Lab.)	1	ANSC 1401, Gen. Anim. Science	4
TOTAL	14	TOTAL	17

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
CHEM 2305, Org. Chem.	3	Approved Electives**	6
CHEM 2105, Org. Chem. Lab.	1	FD T 2302, Elem. Anal. Foods	3
(CHEM 2303, 2103 may be used for Industry Emphasis)		HIST 2301, Hist. of U.S. since 1877	3
MATH 1331 or 1352	3	Humanities and/or Multi.*	3
(MATH 1321 or 1331 req. for Ind.)		ENGL 2311, Patt. of Repts.	3
FD T 2300, Prin. Food Tech.	3	TOTAL	18
COMS 2300, Public Speaking	3		
HIST 2300, Hist. of U.S. to 1877	3		
TOTAL	16		

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
POLS 1301, Amer. Govt., Org.	3	Approved Elective**	8
F&N 3340, Human Nutrition	3	POLS 2302, Amer. Pub. Pol.	3
FD T 3100, Food Tech. Seminar	1	FD T 3301, Food Microbiology or	3
FD T 3302, Adv. Food Anal. or	3	FD T 4305	
FD T 4303		FD T 3303, Food Sanitation or	3
MBIO 3400, Microbiology	4	FD T 3309, Food Safety	
Approved Elective**	3	TOTAL	17
TOTAL	17		

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
FD T 4303, or FD T 3302	3	FD T 4306, Dairy Prod. Mfg.	3
FD T 4304, Field Studies	3	FD T 4305, Proc. Oilseed &	3
AAEC 3401, Ag. Statistics	4	Cer. Grains or FD T 3301	
Visual & Performing Arts*	3	Approved Elective**	3
Electives	4	Elective	8
TOTAL	17-18	TOTAL	17

Minimum hours required for graduation—134. (Students must fulfill the university multicultural requirement.)
 * Choose from Core Curriculum requirements.
 ** Students will select one of the emphases listed below according to their area of interest:
Science: 27 hours of the 36 hours of electives must be selected from Adv. CHEM, PHYS 1306 and 1103, CHEM 3251 and 3351, 9 hours of approved science electives, 3 hours of approved departmental electives, and 3 hours of basic agriculture courses.
Industry: 23-24 hours of the 35-36 hours of electives must be selected from ACCT 2300 or Adv. CHEM, FD T 3304; 3 hours from ANSC 3403 or PSS 2311; 6 hours of basic agriculture courses; and 9 hours of approved departmental electives.

Animal Science (ANSC)*(To interpret course descriptions, see pg. 10.)***Undergraduate Courses**

- 1401. General Animal Science (4:3:3) [AGRI 1419].** The application of basic scientific principles to the efficient production of domestic animals. Students must enroll in lecture, lab, and discussion concurrently. F, S.
- 2201. Animal Science Practicum (2:0:4).** Hands-on management practices for farm animal care. Students will develop proficiency in care, handling, and routine procedures for swine, sheep, beef cattle, and horses. F, S, SS.
- 2205. Introduction to Animal Science Industries (2:2:0).** Study of current opportunities in the animal science industry. Includes field trips, speakers, and class demonstrations.
- 2301. Livestock and Meat Evaluation I (3:2:3).** Evaluation and selection of breeding and market animals, carcass evaluation and grading, breed characteristics. Field trips to ranches and meat packing plants. S.
- 2302. Livestock and Meat Evaluation II (3:1:6).** Advanced training in evaluating, selecting, pricing, and grading of breeding and market livestock, carcasses, and wholesale cuts. Field trips to ranches and meat packing plants. Livestock and meat judging teams originate from this course. May be repeated for credit. F.
- 2303. Care and Management of Companion Animals (3:3:0).** Principles and practices of proper selection, feeding, and care of companion animals, with emphasis on the dog and cat. Nutrition, health care, behavior, training, and reproduction are discussed. F, S.
- 2304. Selection and Evaluation of Horses (3:2:3).** Prerequisite: Sophomore standing. 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.
- 2401. Anatomy and Physiology of Domestic Animals (4:3:3).** Introduction to anatomy and physiology of domestic animals. The anatomy and physiology of the nervous, skeletal, muscular, circulatory, digestive, urinary, reproductive, and endocrine systems. Students must enroll in lecture, lab, and discussion concurrently. S.
- 3100. Animal Science Seminar (1:1:0).** Information to prepare students to function in a competitive work environment or professional/graduate school.
- 3203. Livestock and Meat Judging (2:0:6).** In-depth special training in livestock and meat judging, grading, and evaluation for students who wish to become members of the livestock or meat judging teams. May be repeated for credit. S. (Writing Intensive)
- 3204. Advanced Livestock, Horse, and Meat Judging (2:0:6).** Advanced training in judging, grading, and evaluating performance for members of the senior livestock, horse, or meat judging teams. May be repeated for credit once. F. (Writing Intensive)
- 3301. Principles of Nutrition (3:3:0).** Prerequisite: ANSC 1401, CHEM 2303, 2103, or 2305, 2105. Nutritional roles of carbohydrates, proteins, lipids, minerals, vitamins, and water. Digestion, absorption, use of nutrients and metabolites. F.
- 3302. Livestock Production (3:3:0).** The application of scientific and technological advances to production practices in range beef cattle, sheep and goats, swine production, and feedlot practices. Not open to animal science majors. S.
- 3303. Introductory Horse Management (3:3:0).** An introduction to all aspects of equine management including selection, herd health, reproduction, nutrition, behavior, and marketing. F.
- 3304. Management and Training of Horses (3:0:6).** Prerequisite: ANSC 3303 or consent of instructor. Practical application of the science of equine behavior to training young ranch horses. Emphasis on training, communication, and progressive learning of ranch skills.
- 3305. Applied Animal Nutrition (3:3:0).** Prerequisite: ANSC 1401, CHEM 1305. The fundamental metabolic principles of nutrition will be developed into concepts applicable to problem solving and situation use in the field. Nutrition-disease involvement. Not open to animal science majors. Will not qualify as prerequisite to ANSC 3307. S.
- 3306. Animal Diseases (3:3:0).** Diseases of farm animals, both infectious and non-infectious, parasites, parasitic diseases, and establishing immunity through the use of biological products. S.
- 3307. Feeds and Feeding (3:2:2).** Prerequisite: ANSC 3301. Characteristics of feedstuffs used in livestock enterprises. Ration formulation and nutritional management of beef and dairy cattle, sheep, goats, swine, and horses. Methods of processing and evaluating feeds. S.
- 3308. Quality Control and Management of Feed Manufacturing (3:1:3).** Application of scientific principles and practices to quality control and management of feed manufacturing with respect to their effects on animal performance.
- 3309. Principles of Therapeutic Riding (3:2:2).** An interdisciplinary overview of therapeutic riding with primary emphasis on the horse as therapy, riders with disabilities, and the intervention process. (RLS 3309)
- 3310. Principles of Equine Sales Preparation and Marketing (3:2:2).** Prerequisite: ANSC 3303. Principles of equine management as related to fitting, presentation, and marketing of horses.
- 3311. Domestic Animal Behavior (3:2:2).** Prerequisite: ANSC 1401 or BIOL 1402. Behavioral principles and applications of behavioral concepts in domesticated animals. Course will focus on companion animals and farm animals. S.
- 3316. Animal Growth and Development (3:3:0).** A comprehensive course in the basic principles and concepts of livestock growth and development.
- 3401. Reproductive Physiology (4:3:3).** Prerequisite: ANSC 2401. Physiological approach to reproductive processes in farm animals. Study includes anatomy, endocrinology, estrous cycles, egg and sperm physiology, fertilization, gestation, parturition, and artificial insemination. F.
- 3402. Animal Breeding and Genetics (4:3:2).** Prerequisite: 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. (Writing Intensive)
- 3403. Selection, Care, Processing, and Cooking of Meats (4:3:3).** A general course in selecting, preserving, inspecting, grading, and cooking meats. F.
- 3404. Consumer Selection and Utilization of Meat Products (4:3:3).** A course for nonmajors who desire general knowledge of meat purchasing, selection, and cookery. Aspects of hazard analysis, food safety, and sanitation.
- 4000. Internship (V1-12).** Prerequisite: Consent of department chairperson. A supervised study course providing in-service training and practice in the various areas of animal science. F, S, SS.
- 4001. Special Problems in Animal Science (V1-6).** Prerequisite: Senior standing and approval of department chair. Individual investigation. May be repeated for credit. F, S, SS.
- 4202. Artificial Insemination of Livestock (2:1:3).** Prerequisite: ANSC 3401 and consent of instructor. Anatomy and physiology of reproductive organs, palpation, insemination techniques, handling frozen semen, estrous detection, synchronization of estrus and ovulation, and pregnancy determination. S.
- 4302. Beef Cattle Feedyard Management (3:3:0).** Prerequisite: Junior or senior standing. The analysis of feedyard operations design, economics, projections, bank relationships, procurement, and marketing. Customer relations and commodity hedging techniques. F.
- 4310. Contemporary Issues in Animal Agriculture (3:3:0).** In-depth discussion, lecture, and seminars on contemporary issues facing animal agriculture and the meat industry. F.
- 4400. Meat Science and Muscle Biology (4:3:3).** Prerequisite: ANSC 3403 or consent of instructor. Study of meat components, their development, and their effect on meat characteristics and processing properties. Emphasis on industry issues. S.
- 4401. Swine Production (4:3:2).** Prerequisite: ANSC 3307, 3401, 3402 (majors only) or consent of instructor; may take only one of the above concurrently. Understanding pig biology, management of the pig's environment and genetics to maximize profits. Include genetics, nutrition, reproduction, housing, herd health, and management practices. Laboratory and field trips. F. (Writing Intensive)
- 4402. Horse Production (4:3:2).** Prerequisite: ANSC 3303, 3401, or consent of instructor. An advanced study of equine anatomy, reproductive physiology, nutrition, disease, and management. S. (Writing Intensive).
- 4403. Beef Production (4:3:3).** Prerequisite: ANSC 3307, 3401, 3402 (majors only) or consent of instructor; may take only one of above concurrently. The breeding, feeding, and managing of beef herds for profitable production of slaughter cattle. Emphasis on commercial cow-calf herds. Field trips to ranches. S.

4404. **Processed and Cured Meat Science (4:3:3).** Prerequisite: ANSC 3403, 4400, or consent of instructor. Introduction to manufactured meat products and muscle ingredients, processing technologies, storage conditions, and stability of cured muscle foods. S.
4406. **Sheep and Goat Production (4:3:3).** Prerequisite: ANSC 3307, 3401, 3402 (majors only) or consent of instructor; only one may be taken concurrently. Sheep, goat, wool, and mohair production management and marketing practices. Field trips to ranches and feedlots. S.
4407. **Poultry Production (4:3:3).** Prerequisite: ANSC 3307, 3401, 3402 or consent of instructor. Poultry production including layers, broiler and turkey management.

Graduate Courses

5000. **Professional Internship (V1-6).** Prerequisite: Consent of department chairperson. Supervised study providing advanced training for Master's of Agriculture and Master's of Science (nonthesis) students. Emphasis is on creative and technical abilities.
5001. **Problems in Animal Science (V1-6).** Prerequisite: Consent of instructor. Selected problems based on the student's needs and interests not included in other courses. May be repeated for credit with approval of department.
5100. **Seminar (1:1:0).** Analysis of significant research. Oral presentations and discussions; enrollment required each semester of student's residence. F, S.
5201. **Ethical Behavior and Integrity in Scientific Research (2:2:0).** Combination of lecture presentations and student analysis of behavior in science to explore aspects of scientific integrity and conduct.
5301. **Advanced Contemporary Issues in Animal Agriculture (3:3:0).** Current society issues facing animal and meat science. F.
5302. **Advanced Beef Production (3:3:0).** Advanced study of beef production and management. Emphasis on the application of current research to improve the efficiency of beef production. SS, even years.
5303. **Advanced Beef Cattle Feedyard Management (3:3:0).** Emphasis on the application of recent research to improve the management of cattle feedyard operations. Special emphasis will be placed on risk and resource management within the feedyard.
5304. **Growth and Development (3:3:0).** A study of differentiation, development, growth, and fattening of domestic animals and hereditary and environmental influences and interactions. SS.
5305. **Advanced Livestock Production (3:3:0).** Prerequisite: ANSC 3302. Advanced study of current research and on-farm practices of livestock production. Not open to animal science majors. S, SS.
5306. **Advanced Animal Breeding (3:3:0).** Prerequisite: ANSC 3402 or equivalent. Advanced topics in selecting and mating farm animals with the objective of making genetic improvement. Emphasis on breeding value estimation and cross-breeding. S, odd years.
5307. **Research Methods in Agricultural Sciences (3:2:3).** Prerequisite: ANSC 5403. Computer programming, data inputs, and interpretation. Covers examples that relate to experimental designs in agricultural research.
5308. **Minerals and Vitamins in Animal Nutrition (3:3:0).** An in-depth study of vitamin and mineral chemistry, metabolism, interrelationships, and requirements for production. S, odd years.
5310. **Advanced Quality Control and Management in Feed Manufacturing (3:3:0).** Scientific principles and practices of quality control and management of feed manufacturing with respect to their effects on animal performance.
5311. **Ruminant Nutrition (3:3:0).** A study of the digestive physiology of ruminants. Emphasis on rumen fermentation and its relationship to practical nutrition. Individual topics and current research information. S.
5312. **Advanced Sheep and Goat Production (3:3:0).** Advanced study of sheep and goat production and management. Application of research in genetics, reproduction, nutrition, health, management, wool, mohair, and marketing. S.
5313. **Advanced Animal Nutrition (3:3:0).** Prerequisite: ANSC 3301, CHEM 3401 or 3305. The role of nutrients in the metabolism of farm animals. Nutrient use and energy efficiency in production. S.
5314. **Animal Protein and Energy Utilization (3:3:0).** An in-depth study of nitrogen, amino acid metabolism, and energy utilization in animals. Evaluation of sources and requirements for production. F.
5315. **Neuroendocrinology (3:3:0).** Prerequisite: Consent of instructor. Course will address current research on hypothalamic-pituitary regulation of physiological systems including reproduction, growth, immune function, digestion, and behavior. F.
5316. **Muscle Chemistry, Ultrastructure, and Physiology (3:3:0).** A study of muscle structure, composition, growth mechanisms of contraction, and rigor as related to livestock.
5317. **Agricultural Systems Modeling (3:3:0).** An introductory modeling course for biological and agricultural systems. No special mathematical or programming skills needed.
5400. **Advanced Meat Science and Muscle Biology (4:3:3).** Advanced study of meat components, their development, and effect on meat characteristics and processing properties. Emphasis on industry issues and the current scientific literature. Not for students who have taken ANSC 4400. S.
5401. **Experimental Techniques in Meat Chemistry and Muscle Biology (4:3:3).** Histological, chemical, and biological properties of meat. Experimental techniques in meat science and muscle biology will be studied in lecture and individual lab study. F.
5403. **Biometry (4:3:2).** Introduction to biological statistics. Observations, probability, "t" test, analysis of variance, mean separation procedures, linear regression and correlation, and chi-square. Introduction to computerization of statistical analyses. F.

5404. **Physiology of Reproduction (4:3:3).** Anatomy of reproductive systems, physiological regulations of reproductive processes, estrous cycle, gonadal functions, semen evaluation, fertilization, embryology, pregnancy, parturition, lactation, reproductive efficiency, and research techniques. S, odd years.
5405. **Advanced Processed and Cured Meat Science (4:3:3).** Prerequisite: ANSC 3101, 3201, 4400, or consent of instructor. 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, SS even years.
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 Technology (FD T)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

2300. **Principles of Food Technology (3:3:0) [AGRI 1329].** Basic information necessary to understand technological aspects of modern industrial food supply systems. A fundamental background in food classification, modern processing, and quality control. F, S, SS.
2302. **Elementary Analysis of Foods (3:2:3).** Basic laboratory practice in food product testing. Should have had a course in chemistry or other lab science. S. (Writing Intensive)
3100. **Food Technology Seminar (1:1:0).** Information to prepare students to function in a competitive work environment or professional/graduate school.
3301. **Food Microbiology (3:2:3).** Prerequisite: MBIO 3400 or permission of instructor. Microorganisms important in food spoilage and in food preservation. Study of methods for preservation of food with respect to control of microbiological growth and activity. S, even years. (Writing Intensive)
3302. **Advanced Food Analysis (3:2:3).** Prerequisite: CHEM 2305, 2105, FDT 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.
3303. **Food Sanitation (3:3:0).** Principles of sanitation in food processing and food service applications. Chemical, physical, and microbiological basis of sanitation. Equipment and food product care. F, S, and SSII.
3304. **Fruit and Vegetable Processing (3:2:3).** Practice in preserving fruits and vegetables. Suitable for nonmajors. F.
3309. **Food Safety (3:3:0).** Food safety and sanitation in food manufacturing and/or processing. Topics include FDA and USDA regulations, HACCP principles, and good manufacturing practices. F, even years.
4001. **Food Technology Problems (V1-6).** Taught on an individual basis. May be

repeated for credit with permission. F, S, SS.

- 4303. **Food Chemistry (3:2:3).** Prerequisite: CHEM 2305, 2105 or permission of instructor. Chemical and physiochemical properties of food constituents. A comprehensive study of food components, their modification, and technology applications in food. F, odd years.
- 4304. **Field Studies in Food Processing and Handling (3:1:4).** Visits to food processing and handling facilities and discussions of operations. F.
- 4305. **Processing Oilseeds and Cereal Grains for Foods (3:2:3).** Physical and chemical characteristics of oilseeds and grains and their effects on processing. Introduction to processing principles and techniques. S, odd years.
- 4306. **Dairy Products Manufacturing (3:2:3).** Physical and chemical characteristics of milk and milk products. Principles involved in processing dairy foods. S.
- 4307. **Poultry Processing and Products (3:2:3).** Poultry meat and egg processing including functional properties, meat quality and value-added products.

Graduate Courses

- 5210. **Grant Writing (2:2:0).** Prerequisite: Ph.D. program or consent of instructor. Development of grant proposals for submission to funding agencies. Agency identification, proposal development, budgets, project management and agency relations. Fall, odd years.
- 5301. **Study in Food Microbiology (3:2:3).** Isolation and identification of organisms surviving process treatment of food products. Techniques in maintaining culture and shelf-life quality for fermented foods. Organized lecture and individualized laboratories. S, even years.
- 5302. **Chemical and Instrumental Analyses of Agricultural Products (3:2:3).** Prerequisite: Consent of instructor. Application of chemical, chromatographic, and spectroscopic methods in analysis of agricultural products. F, even years.
- 5303. **Study in Food Chemistry (3:2:3).** Analysis of food components and changes in their characteristics due to processing treatments. Laboratory techniques in instrumental analysis. Organized lectures and individualized lab study. F, odd years.
- 5305. **Research and Study Related to Cereal and Oilseed Products (3:2:3).** Advanced practice in processing cereals and oilseeds. Particular emphasis on processing techniques involving new product development. S, odd years.
- 5307. **Topics in Food Technology (3).** Students work on subjects of individual interest but opportunity is given for interaction with fellow students in the course. May be repeated for credit. F, S, SS.
- 5309. **Current Topics in Food Microbiology (3:3:0).** Understand and discuss current topics in food microbiology. Focus on current scientific literature, current methodologies and data evaluation and interpretation. May be repeated for credit. S, SS
- 6000. **Master's Thesis (V1-12).**

Department of Landscape Architecture

Faculty

Alon Kvashny, Chairperson

Professor: Kvashny; *Associate Professors:* Billing, Hamed, and Kavanagh; *Assistant Professors:* Klein, Mills, and Sherrod.

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"). Offices and classroom facilities are located in the Plant Science Building and studios are in the Agriculture Pavilion.

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 environment. Students are required to intern in the offices of registered landscape architects, planners, or allied professionals' offices during at least one summer prior to their senior year.

Landscape Architecture Curriculum

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, Coll. Algebra	3	MATH 1321, Trig.*	3
HIST 2300, Hist. of U.S. to 1877	3	BIOL 1305, Eco. & Environ. Prob.	3
LARC 1401, L.A. Drawing*	4	BIOL 1113, Environmental Prob. Lab.	1
LARC 1302, Intro. to Land. Arch.	3	LARC 1402, LA Graphics*	4
TOTAL	16	TOTAL	14

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
HIST 2301, Hist. of U.S. Since 1877	3	PSS 1411, Prin. of Horticulture	4
CTEC 2301, Surveying & Surveys*	3	LARC 2402, LA Design Process*	4
PSS 2330, Urban Soils *	3	LARC, 2100, LA Portfolio Prep.*	1
LARC 2401, Basic Design Land. Arch.*	4	AAEC 2305, Fund. of Ag. & Appl. Eco. or Ind. or Group Behavior	3
LARC 2308, Comp. Aid. Des. in LA*	3	LARC 2309, Advanced CAD in LA*	3
TOTAL	16	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
LARC 3302, Development of Lands*	3	ENGL 2311, Technical Writing	3
PSS 3318, Woody Plants*	3	LARC 3402, Master Planning*	4
LARC 3401, LA Site Design*	4	LARC 3403, Planting Design*	4
LARC 2404, LA. Grading & Drainage*	4	LARC 3404, LA Site Cons. & Dev.*	4
TOTAL	14	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
GEOG 3300, Geo. Info. Systems	3	COMS 2300, Public Speaking	3
LARC 4401, Urban Design*	4	LARC 4402, Reg. Plan & Design*	4
LARC 4404, LA Materials & Details*	4	Directed Electives	6
LARC 4302, Env. Planning	3	TOTAL	13
TOTAL	14		

FIFTH YEAR

<i>Fall</i>		<i>Spring</i>	
POLS 1301, Am. Gov. Org.	3	POLS 2302, Am. Gov. Policy	3
RWFM 4403, Aerial Photo. Interp.	4	*LARC 4507, LA Sen. Project Studio*	5
LARC 4506, Collaboration Studio*	5	LARC 4100, Seminar	1
LARC 4311, Professional Practice	3	Directed Electives	6
LARC 4101, Proposal Writing in LA*	1	TOTAL	15
TOTAL	16		

Minimum hours required for graduation—148. (Students will fulfill the university multicultural requirement by completing LARC 3302.)

* Must be passed with a minimum grade of C or better.

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.

Graduate Program

The Master of Landscape Architecture degree is designed as a first professional degree for students with a baccalaureate degree in a discipline other than landscape architecture. It is an advanced professional degree for students with the Bachelor of Landscape Architecture degree or its equivalent. The advanced professional degree requires a minimum of 36 credit hours. The first professional degree requires 36 hours and in addition up to 35 hours of leveling courses.

This is a flexible program designed to meet a variety of professional interests as well as individual needs, and career objectives. Universal design, therapeutic landscape design, land use and regional planning, geographic information systems, and cultural landscape design are a few of the program offerings.

Multidisciplinary research in environmental design and management and outdoor recreation in the department has had support from federal, state, and local agencies. The National Park Service, U. S. Army Corps of Engineers, the Forest Service, the Bureau of Land Management, Texas Parks and Wildlife Department, the Office of the Governor, and southwestern cities and counties have all supported these research efforts.

All of the admission requirements established by the Graduate School must be met to enter this program. Also, the department requests a letter of intent, which should address how the program fits the applicant's career goal, and transcripts of all previous course work. A portfolio of graphic work, if available, is desirable. Nonresident tuition is waived with half-time assistantships. Students with this support have special responsibilities in research projects.

Landscape Architecture (LARC)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1302. **Introduction to Landscape Architecture (3:3:0).** An introduction to the multidisciplinary field of landscape architecture exploring its historical evolution, highlighting its interaction with arts and science, and examine its contemporary leaders.
1401. **Landscape Architecture Drawing and Drafting (3:2:1).** Prerequisite: LA majors only. Introduction to drafting equipment, drafting and drawing. Construction of one-point and two-point perspective, shade and shadow, elements of visual composition. F.
1402. **Landscape Architecture Graphics (4:1:6).** Prerequisite: LARC 1401, LA majors only. Develop knowledge and skills for effective graphic expression of design. Emphasis on scaled drawings, three-dimensional representation and color graphics. S.
2100. **Landscape Architecture Portfolio Preparation (1:1:0).** Introduction to professional portfolio development for landscape architecture and preparation of individual portfolio for faculty review. S.
2308. **Computer-Aided Design in Landscape Architecture (3:1:4).** Prerequisite: LARC 1402, LA majors only or consent of instructor. Hands-on introduction to computer-aided design technology most applicable to landscape architecture. F.
2309. **Advanced Computer-Aided Design in Landscape Architecture (3:1:4).** Prerequisite: LARC 2308, LA majors only. Exploration of contemporary applications of CAD in the profession of landscape architecture. S.
2401. **Basic Design in Landscape Architecture (4:1:6).** Prerequisite: LARC 1402. LA majors only. A basic course in landscape architecture incorporating the principles of art and landscape architecture in design. F.
2402. **Landscape Architecture Design Process (4:1:6).** Prerequisite: LARC 1402, 2401 and PSS 2330. A continuation of basic design with emphasis on site inventory, analysis, and programming in relationship to the design process. S.
2404. **Landscape Architecture Grading and Drainage (4:2:4).** Prerequisite: Surveying and LARC 2402. Introduction to site layout, grading and drainage, earthwork and runoff computations, and site implementation drawing techniques. F.
3302. **Development of Landscape Architecture (3:3:0).** History of landscape architecture. Design as expression of culture and society's relationship to nature. Geographical, historical, and cultural context of major movements in landscape architecture. F.
3401. **Landscape Architecture Site Design (4:1:6).** Prerequisite: LARC 2100 and 2402. Site analysis and design as they apply to projects of various scale, scope, and resolution. F.
3402. **Master Planning (4:1:6).** Prerequisite: LARC 3401 and LARC 2404. Comprehensive design problems integrating aspects of site design, planting design and construction. S.
3403. **Planting Design (4:1:6).** Prerequisite: LARC 3401 and PSS 3318. Theory and practice including plants in site design, planting design techniques, planting plans and technical specifications. S.
3404. **Landscape Architecture Site Construction and Development (4:2:4).** Prerequisite: LARC 2404. Complex grading and drainage, drainage structures, horizontal and vertical circulation alignment in large scale site development. S.
4000. **Internship (VI-6).** Minimum 8 weeks and prior departmental approval.
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 (1:1:0).** Prerequisite: Senior standing. Assigned readings, informal discussions, oral reports, and papers. F.
4101. **Proposal Writing in Landscape Architecture (1:1:0).** Prerequisite: LARC 4402, ENGL 2311. Comprehensive writing for landscape architecture final project thesis. The course includes program development methodology and the framework for proposal writing. F.
4302. **Environmental Planning for Sustainable Development (3:3:0).** An introduction to environmental planning issues

with emphasis on the integration of related disciplines to attain environmentally and socially sustainable development. F.

4303. **Environmental Management for Sustainable Development (3:3:0).** Prerequisite: LARC 4302. Environmental management principles and procedures. An investigation of land planning, environmental law, resource economics, and public policy to achieve sustainable development. S.
4311. **Professional Practice (3:3:0).** Prerequisite: Fifth-year standing. Methods, procedures, and ethics of professional practice of landscape architecture. F.
4401. **Urban Design (4:1:6).** Prerequisite: LARC 3402, 3403 and 3404. Public urban spaces and their surrounding built edges. Organization, form, and character of streets, parks, and plazas. F.
4402. **Regional Planning and Design (4:1:6).** Prerequisite: LARC 2309, 4401, and GEOG 3300. Regional landscape planning and design in landscape architecture based on natural and cultural resource factors. S. (Writing Intensive)
4404. **Landscape Architecture Materials and Details (4:2:4).** Prerequisite: LARC 3404. Introduction of landscape architecture construction systems, materials, irrigation, retaining walls, lighting, structures, fabrication of materials, and implementation drawings. F.
4506. **Collaboration Studio (5:1:9).** Prerequisite: LARC 2309 and 4402. An interdisciplinary studio for the design professions which address the process and skills necessary for collaboration and teamwork. F.
4507. **Landscape Architecture Senior Project (5:1:6).** Prerequisite: LARC 4101, 4402, 4506. 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. F, S.
5302. **Advanced Environmental Planning for Sustainable Development (3:3:0).** An introduction to environmental planning issues with emphasis on integrating related disciplines to attain environmentally and socially sustainable development. F.
5303. **Advanced Environmental Management for Sustainable Development (3:3:0).** Theory, principles, and strategies for public and private landscape protection. S.
5308. **Computer-Aided Design in Landscape Architecture (3:1:4).** Hands-on introduction to computer-aided design technology that is currently most applicable to the needs of the profession of landscape architecture. SS.
5309. **Advanced Computer-Aided Design in Landscape Architecture (3:1:4).** Prerequisite: LARC 5308. Advanced application of CAD in landscape architecture.
5310. **History of Landscape Architecture (3:3:0).** Investigation of the issues, work, and personalities in landscape architecture as expressed through design and their relationship to and influence on society and nature. F.

5312. **Planting Design (3:1:2)**. Prerequisite: PSS 6001. Characteristics of plants with their forms in the landscape. Special emphasis on preparation of planting plan. S.
5314. **Landscape Architecture Grading and Drainage (3:2:2)**. Introduction to site grading and drainage, earthwork and runoff computations and site implementation drawing techniques. F.
5315. **Landscape Architecture Site Construction and Development (3:2:2)**. Prerequisite: LARC 5314. Complex grading and drainage, drainage structures: storm water management, and horizontal and vertical circulation alignment in large scale site development. S.
5316. **Landscape Architecture Materials and Details (3:2:2)**. Prerequisite: LARC 5315. The study of landscape architecture site construction and materials, products and their application and fabrication to the man-made environment. F.
5401. **Landscape Architecture Principles and Process (4:1:6)**. An accelerated course emphasizing professional drafting and graphics, design principles and theory and the introduction of site analysis. F.
5402. **Site Design (4:1:6)**. Prerequisite: LARC 5401, LARC 5314. An accelerated course emphasizing landscape site analysis process, and conceptual design and theory, with a continuation of professional graphics techniques. S.
6000. **Master's Thesis (V1-6)**. Prerequisite: LARC 6203.
6100. **Landscape Architecture Seminar (1:1:0)**. Critical readings, discussion and writing on a range of disciplinary and interdisciplinary planning, design, management, and environmental issues. F.
6203. **Thesis Research, Preparation, and Organization (2:2:0)**. Prerequisite: LARC 6301. Preparation of thesis project content, selection of thesis committee, and the proposal submission to Graduate Studies Committee for approval. S.
6301. **Research Methodology for Planning and Design (3:3:0)**. Introduction to the research process and methods used in the design-planning field.
6302. **Administrative Aspects of Landscape Architecture (3:3:0)**. Critical readings, discussions, and writings on a range of planning, design, management, and environmental issues.
6306. **Special Problems (3:3:0)**. Prerequisite: Consent of instructor. Selected landscape problems based on graduate student's needs and interests not included in other courses. F, S.
6401. **Urban Design (4:1:6)**. Prerequisite: LARC 5402, LARC 5315. Analysis, planning and design of urban environments with emphasis on urban development theories, municipal regulations, and master plan development. F.
6402. **Regional Landscape Planning (4:1:6)**. Prerequisite: LARC 5308, LARC 6401. Theory of planning and design for large scale regional landscape, including an intensive geographic information system (G.I.S.) seminar. S.
6406. **Collaboration Design (4:1:9)**. Prerequisite: LARC 5308, LARC 6402. An interdisciplinary studio for landscape architects, architects, and interior designers addressing the process and skills necessary for collaboration and teamwork. S.
7000. **Research (V1-12)**.

Department of Plant and Soil Science

Faculty

Dick Auld, Chairperson

Leidigh Professor: Krieg; *Piper Professor:* Hopper; *Thornton Distinguished Professor:* V. Allen; *Professors:* Auld, Dotray, Maas, Peffley, Thorvilson, and Zartman; *Associate Professors:* Bronson, Green, Hellman, McKenney, and Xu; *Assistant Professors:* Burow, Maurer, Montague, and Parajulee; *Adjunct Faculty:* Acosta-Martinez, Baughman, Boman, Brashers, Burke, Calhoun, Gannaway, Hequet, Keeling, Lascano, Leser, Mahan, Maugey, Maunder, McMichael, Oliver, Payton, Peterson, Porter, Rosenow, Rush, Schubert, Sheetz, Stout, Trolinder, Trostle, Upchurch, Velten, Wanjura, Wheeler, and Zobeck.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Agronomy
- Bachelor of Science in Horticulture
- Bachelor of Science in Plant Biotechnology
- Master of Science in Crop Science
- Master of Science in Entomology
- Master of Science in Horticulture
- Master of Science in Soil Science
- Doctor of Philosophy in Agronomy

A minimum of 120 hours are required for a B.S. degree. The department also participates in the interdepartmental program leading to

the *Master of Agriculture* degree. Students seeking a master's or doctor's degree in the department should consult the chairperson about their programs before enrolling for any courses.

Undergraduate Program

Students in the departmental areas of agronomy, horticulture, and plant biotechnology investigate the basic biological, physical, and social sciences. More importantly, they bring such knowledge to focus on problems in pest control and plant development through genetics; plant growth through management; and plant material use for food, fiber, or the aesthetic good of humankind.

Agronomy includes the study of soil, plant genetics, breeding, biotechnology, molecular biology, physiology, biochemistry, weed and pest control, and crop management as applied to the efficient and economical production of field crops. Students study how to use and manage soils, which includes the application of biological, chemical, and physical sciences with regard to natural and man-affected environments.

Horticulture today is the application of basic scientific information to the growing and use of edible (fruits, nuts, and vegetables) and ornamental plants (annual and perennial flowers and woody plants). Today's horticulture students focus on the challenges and practices of genetics and breeding, propagation, biotechnology, pro-



duction, management, handling and storage, marketing, and use of horticultural plants.

Plant biotechnology students learn how insects, weeds, and pathogens impact plant growth in an environmentally benign manner. Increased modification of the plant genome is a focus of this discipline.

Students taught in the Department of Plant and Soil Science are educated to meet the challenges of efficiently producing plants for food, fiber, and aesthetic beauty while preserving our natural resources and environmental integrity. Graduates serve in a vast array of responsible positions in private industry, as well as with local, state, and federal agencies.

This department offers a choice of minors in agronomy, horticulture, or plant biotechnology for students majoring outside the department. For more information on requirements for completing a minor, refer to "Selecting a Minor" in the introductory information about this college or contact the departmental chair. Students must earn a grade of C or better in all departmental courses required for graduation.

Plant and Soil Science (PSS)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1321. Agronomic Plant Science (3:3:0)**[AGRI 1307, 1407]. Importance, distribution, and use of major world agronomic crops. Fundamentals of growth, structure, and improvements are stressed.
- 1411. Principles of Horticulture (4:3:2)** [AGRI 1415, HORT 1401]. Principles and practices of growth and development, structure, nomenclature, use of horticultural plants and how they are affected by the environment. Fulfills laboratory science requirement.
- 2130. Urban Soils Laboratory (1:0:2)**. Prerequisite: PSS 2330 or concurrent. Discussion and practical experience with soils in the urban environment.
- 2210. Floral Design (2:1:2)**. Floral design as a commercial enterprise. Emphasis on principles of floral design, patterns of arrangements, and elements of color composition. Field trips required.
- 2311. Vegetable Crops (3:2:3)**. Principles and practices in home vegetable gardening, with an introduction to commercial production and marketing of major vegetable crops. Fulfills science and technology requirement.
- 2312. Propagation Methods (3:2:2)**. Prerequisite: PSS 1411. Propagation techniques of commercial nurseries and greenhouse ranges; study of the physiological reaction and cutting material. (Writing Intensive)
- 2313. Herbaceous Plant Materials (3:2:2)**. Prerequisite: PSS 1411. Study of the principal herbaceous plants and plant families, palms, roses, and subtropic landscape plants.
- 2330. Urban Soils (3:3:0)**. Utilization of soils in urban environments with emphasis on nutrients, water management, and physical properties. (Credit not given for PSS 2432.)
- 2401. Introductory Entomology (4:3:2)** [AGRI 1413]. An introduction to the arthropods with major emphasis on the insects. In-

Graduate Program / Plant and Soil Science

The department offers Master of Science degrees in Crop Science, Entomology, Horticulture and Soil Science and the Doctor of Philosophy degree in Agronomy. Before being recommended for admission to a master's degree program with a major in this department, the student may be requested to provide evidence of proficiency in background for graduate work or may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the department.

Master of Science degree students may pursue either the thesis or nonthesis option. The thesis option (24 hours of graduate course work plus six hours of thesis research) is designed for students who intend to pursue a Ph.D. An oral exam over the research is required for the thesis option. The nonthesis option (36 hours of graduate course work) is considered a terminal degree. An oral exam is required during the graduating semester for the nonthesis option. The department also participates in the 36-hour Master of Agriculture program. Additionally, the department participates in joint degree programs with the Law school. These unique combinations of programs allow not only for students to pursue a Doctor of Jurisprudence (J.D.) degree, but also receive a Master of Science degree in Crop Science, Entomology, Horticulture or Soil Science.

If the preliminary examination for admission to doctoral studies reveals weaknesses in the student's subject matter background, the student may be required to take remedial courses designated by the graduate faculty of the department. The student's advisory committee will make recommendations concerning language requirements and basic work in other sciences. A Ph.D. candidate in the department is required to take written and oral comprehensive qualifying examinations prepared and conducted by the graduate committee. The purpose of these examinations is to determine whether or not a candidate possesses a depth of knowledge in their area of specialization, a breadth of knowledge in supporting areas, understanding of the scientific method, and the ability to communicate knowledge in an organized and scholarly manner.

Research, teaching, and scholarship stipends are often awarded to qualified applicants. Nonresident tuition is often waived with the award. Students having this support have special responsibilities in research and/or teaching.

- sect structure, function, identification, and relationships to man, plants, and animals will be discussed.
- 2432. Principles and Practices in Soils (4:3:2)**. Prerequisite: CHEM 1305 and 1105. Formation and composition, physical and chemical properties, hydraulic and thermal relationships of soil. Role of soil in ecosystems. (Writing Intensive)
- 3309. Turf Culture and Management (3:3:0)**. Prerequisite: PSS 1411. Study of the principal turfgrass species and their cultural management. Field trips required.
- 3317. Interior Plants (3:2:3)**. Selection and maintenance of interior plants and planting facilities.
- 3318. Woody Plants (3:2:2)**. Prerequisite: PSS 1411. Discussion and selection of woody plants used for ornamental purposes in the landscape setting. The course will be divided between deciduous and evergreen plants.
- 3321. Forage and Pasture Crops (3:3:0)**. Producing and using forage and pasture crops.
- 3322. Grain, Fiber, and Oilseed Crops (3:3:0)**. History, distribution, use, plant form, growth and development, and cultural and production practices of important agronomic crops.
- 3323. Crop Growth and Culture (3:3:0)**. Study of the growth and development sequences of crop plants as related to production. Emphasis will be placed on anatomical, morphological, and physiological characteristics.
- 3324. Seed Science (3:3:0)**. Analysis of seed for planting. Seed quality as related to production, processing, storing, and handling. Study of federal and state seed laws.
- 3421. Fundamental Principles of Genetics (4:4:0)**. Prerequisite: PSS 1321 or BIOL 1401 or consent of instructor. Mendelian genetic principles and chromosomal basis of heredity and genetic analysis based on recombinant DNA. (Writing Intensive)
- 4000. Internship (V1-3)**. Prerequisite: Approval of department chair. A supervised study course providing in-service training and practice in various areas of plant science. May be repeated for credit.
- 4001. Problems (V1-3)**. Prerequisite: Approval of instructor. An assigned problem and individual instruction in a specific area, Plant Science. May be repeated for credit with approval of department chair.
- 4100. Seminar (1:1:0)**. Prerequisite: Senior standing or approval of instructor. Using writing and oral presentation skills, Continuing to enhance education skills, and adhering to professional ethics.
- 4131. Soil Fertility Laboratory (1:0:3)**. Prerequisite: PSS 2432 and concurrent enrollment in PSS 4335. Laboratory analysis

- of soil and plant samples; interpretation of fertility management data.
4301. **Agricultural Compounds (3:3:0).** Prerequisite: PSS 2401 and CHEM 3303, 3103. Nature, mode of action, and uses of insecticides, fungicides, herbicides, and other pesticides.
4305. **Integrated Pest Management (3:3:0).** Prerequisite: An introductory course in entomology. The principles and practices of integration of all available control strategies in the management of arthropod pest populations.
4313. **Arboriculture (3:3:0).** Prerequisite: PSS 1411. The physiological principles and industry practices in the production, moving, care, and maintenance of ornamental trees, shrubs, and ground covers. Required field trips.
4314. **Garden Center Management (3:3:0).** The principles of management, marketing, structures, and distribution for retail establishments. (Writing Intensive)
4316. **Turfgrass Science (3:3:0).** Prerequisite: PSS 3309. Second course in turfgrass management including turf physiology, nutrition, weed control, insects, and diseases.
4321. **Fundamental Principles of Plant Breeding (3:3:0).** Prerequisite: PSS 3421. Practical application of genetics and biotechnology in the breeding and improvement of plants.
4325. **Crop Water Management (3:3:0).** Comprehensive evaluation of soil-plant atmosphere interactions affecting supply and demand of water for crop production.
4332. **Soil Classification (3:2:3).** Prerequisite: PSS 2432, or approval of instructor for nonagriculture majors. Soil profile morphology. Classification systems with emphasis on the taxonomic system of the United States.
4335. **Soil Fertility Management (3:3:0).** Prerequisite: PSS 2432. Nutrient availability as influenced by the properties of soils, use of fertilizers and soil amendments; methods and time of application of fertilizer.
4336. **Soil Physical Properties (3:3:0).** Prerequisite: PSS 2432 and 6 hours of mathematics. Physical properties of soils: structure and movement of water, air, and temperature.
4337. **Environmental Soil Science (3:3:0).** Prerequisite: PSS 2432. Physical, chemical, and biological properties and processes of soil as related to environmental quality.
4411. **Principles of Floriculture (4:3:3).** Prerequisite: PSS 1411. Greenhouse construction, heating and cooling, growing media, pest management, nutrition and fertility, growth regulation, irrigation, post harvest handling, and marketing of floricultural crops. Required field trips.
4415. **Agricultural Biotechnology (4:3:2).** The relationship of biotechnology and its impact on agricultural sciences. Examines the place of biotechnology in relation to society, the environment, and agriculture. (Writing Intensive)
4421. **Principles of Weed Science (4:3:2).** Fundamentals of chemical weed control. Emphasis on herbicide families, names, usage, absorption, translocation, mechanism of action, and factors influencing selectivity and soil persistence. The laboratory will emphasize labels, calculations, equipment, calibrations and usage, and methods of application.

4425. **Agricultural Plant Pathology (4:3:2).** Identification and management of diseases of agricultural and horticultural plants. Diagnostic methods used to identify basic plant pathogens.

Graduate Courses

5000. **Professional Internship (V1-6).** Prerequisite: Consent of department chairperson. Supervised study providing advanced training for master's students. Emphasis is on scientific and technical training.
5001. **Problems in Plant and Soil Science (V1-3).** Prerequisite: Consent of instructor. Selected problems based on the student's needs and interests, not included in other courses. May be repeated for credit with approval of department.
5100. **Seminar (1:1:0).** Current research in all aspects of plant and soil science, including presentations by internationally recognized scientists. May be repeated for credit.
5231. **Applied Geostatistics (2:2:0).** Application of regionalized variable theory to surface and subsurface land forms using semivariograms and kriging.
5232. **International Agronomic Development (2:2:0).** Overview of world food situation. Role of assistance programs and international and national research centers in the development of agronomic research and outreach for developing countries.

5270. **U. S. and Global Cotton Fiber-Textile Industries (2:2:0).** Examination of factors affecting cotton production, processing, marketing, and utilization as an industrial raw material for textile manufacturing. SS.
5304. **Economic Entomology (3:3:0).** Prerequisite: PSS 2401 or consent of instructor. A synthesis of the theory and practice of insect control including prediction and implementations of control strategies in agricultural systems. S, odd years.
5306. **Advanced Insect Anatomy and Physiology (3:2:3).** Prerequisite: PSS 2401. The structure and function of insect organ systems. S, even years.
5307. **Pesticides (3:3:0).** Advanced study of the registration, development, and legal use of pesticides. S.
5310. **Insect Ecology (3:3:0).** The effects of environmental factors on insect abundance, composition, complexity, and dynamics of insect community systems. S, even years.
5316. **Advanced Arboriculture (3:3:0).** Advanced principles associated with anatomical, physiological, and chemical changes in woody plants. F.
5317. **Advanced Nursery Management (3:3:0).** Principles of nursery production, cultural management, and marketing of both wholesale and retail commodities. S, odd years.
5318. **Advanced Turfgrass Science (3:3:0).** An advanced course in turfgrass science

Plant Biotechnology Curriculum

		FIRST YEAR	
		Fall	Spring
	ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric 3
	HIST 2300, Hist. of U.S. to 1877	3	HIST 2301, Hist. of U.S. 1877 3
	BIOL 1403, Biology I	4	BIOL 1404, Biology II 4
	PSS 1321, Agr. Plant Sci.	3-4	Visual & Performing Arts 3
	or PSS 1411, Princ. of Hort.		PSS 2401, Intro. Entomology 4
	TOTAL	13-14	TOTAL 17
		SECOND YEAR	
		Fall	Spring
	MATH 1330, Intro. Math. Analysis	3	MATH 1331, Intro. Math. Anal. or
	or MATH 1320, College Algebra		MATH 1330, Intro. Math. Anal.
	CHEM 1307, Prin. Chem. I	3	CHEM 1308, Prin. Chem. II 3
	CHEM 1107, Prin. Chem. I (lab.)	1	CHEM 1108, Prin. Chem. II (lab.) 1
	ENGL 2311, Technical Writing	3	COMS 3358, Bus. Comm. or
	POLS 1301, Amer. Gov., Org.	3	COMS 2300, Public Speaking 3
	Humanities/Multicultural	3	POLS 2302, Amer. Public Politics 3
	TOTAL	16	TOTAL 13
		THIRD YEAR	
		Fall	Spring
	CHEM 2303 or 3305, Intro. Org.	3	PSS 2432, Prin. & Prac of Soils 4
	CHEM 2103 or 3105, Org. Lab.	1	Group 1 Electives* 10
	MBIO 3400, Microbiology	4	TOTAL 14
	PSS 4421, Prin. Weed Science	4	
	Group 1 Electives*	3	
	TOTAL	15	
		FOURTH YEAR	
		Fall	Spring
	Group 1 Electives*	6-7	AAEC 2305, Fund. Ag. Eco. or
	PSS 4305, Integrated Pest Mgt.	3	ECO 2301, 3
	PSS 4415, Agric. Biotechnology	4	PSS 3421, Genetics 4
	PSS 4100, Seminar	1	PSS 4301, Agric. Compounds 3
	TOTAL	14-15	Group 1 Electives* 6-7
			TOTAL 16-17

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

* Students will select one of the emphases listed below according to their area of interest. Directed, required, and free electives within an emphasis are subject to approval of the academic advisor. **Biotechnology:** Group I Electives – BIOL 3320 and 3120. PSS 4425; BOT 3401 or PSS 3323; BOT 4304, CHEM 3311, 3312, 3313; directed electives – 2-4 hours from any 2000 or above PSS course. Specialization in one of the three disciplines within PSS is encouraged. **Integrated Pest Management Science:** Group I Electives – AGSC 2300, directed electives (23-24 hours from the following: PSS 2311, 2313, 3309, 3321, 3322, 3323, 3324, 3402, 4321, 4336; RWFM 3302; BIOL 3303, 3307, 4305, 4306; ZOOL 3406, 4312; ATMO 1300 and 1100; BOT 3302, 3401.

including turf physiology, nutrition, insects, diseases, and weed control. F, odd years.

- 5319. **Advanced Interiorscaping (3:2:2).** A tropical foliage plant course for graduate students with no previous training in interiorscaping. Emphasis is placed on plant identification, selection, design, lighting and maintenance.
- 5321. **Plant Breeding Theory (3:3:0).** Breeding and plant improvement presented at an advanced level. S, even years.
- 5322. **Organic Plant Metabolism (3:3:0).** Considerations of cellular organization and its relation to cellular metabolism. Bioenergetics and biochemistry of the organic constituents of living systems including their synthesis and metabolism are considered. F, even years.
- 5323. **Environmental Crop Physiology (3:3:0).** The plant-environment interaction in relation to growth and production of crop communities. Radiant energy, carbon dioxide, water, and temperature relationships in crop stands. S, odd years.
- 5324. **Mode and Mechanism of Herbicide Action (3:3:0).** Prerequisite: Consent of instructor. Herbicide classification, activity, crop selectivity, and resistant plants. S, odd years.
- 5325. **Transgenic and Plant Cell Genetics (3:3:0).** Genome organization in plants, interspecific hybridization, cytoplasmic male sterility, self-incompatibility, tissue culture, in-vitro screening, and transformation technologies. F, odd years.
- 5326. **Advanced Seed Science (3:3:0).** Study of seed and seedling anatomy, sequence of events and factors affecting germination and emergence, and characteristics of dormancy and vigor. S, odd years.
- 5327. **Soil-Plant-Animal Interrelationships in Grazing Lands (3:3:0).** Ecological and nutritional principles of livestock grazing. Min-

- eral cycling, antiquity factors, limitations to intake, and research methodology in forage-livestock systems are presented. S, even years.
- 5328. **Forages and Livestock in Pasture Ecosystems (3:3:0).** Systems of grazing management are presented from the perspective of ecosystems in pasture lands and other grazing lands with intensified management. S.
- 5329. **Precision Agriculture (3:3:0).** Introduction to site-specific management of agricultural crops emphasizing collection and use of geospatial information in performing variable-rate farming practices.
- 5331. **Soil Fertility and Fertilizers (3:3:0).** Not open to students having had PSS 4335. Evaluation and application of theory to soil fertility and fertilizers; a study of nutrient needs and nutrient reactions in soil; and predicting nutrient need and response. F.
- 5332. **Pedology (3:3:0).** Processes of rock weathering with associated soil formation. Genesis of clay minerals. Soil forming factors and their interrelationships. S, even years.
- 5333. **Soil and Plant Relationships (3:3:0).** Selected topics in soil-plant relationships. Cause and effect, management, and control of factors influencing plant growth in the soil. S, odd years.
- 5334. **Soils and Crops in Arid Lands (3:3:0).** Potentials for utilizing soils, rainfall patterns, and plant characteristics for crop production in arid lands. F, odd years.
- 5335. **Soil Physics (3:3:0).** Physical characteristics of soils and porous media and principles underlying flow and distribution of water, air, and heat in soils. S.
- 5336. **Soil Mineralogy (3:3:0).** The mineralogical makeup of sand, silt, and clay. The relation of physical and chemical soil properties to mineralogy. S, odd years.

Agronomy Curriculum

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
PSS 1321, Agr. Plant Sci.	3	AGSC 2300, Comp. in Ag.	3
MATH 1320, Coll. Algebra or	3	MATH 1321, Trigonometry or	3
MATH 1330, Intro. Math. Anal.		MATH 1331, Intro. Math. Anal.	
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. I (Lab.)	1	CHEM 1108, Prin. of Chem. II (Lab.)	1
TOTAL	13	Group 1 Elective	3
		TOTAL	16
SECOND YEAR			
Fall		Spring	
CHEM 2303, Intro. Organ. Chem.	3	HIST 2301, U.S. Since 1877	3
or CHEM 3305, Organic Chem. I		PSS 2401, Intro. Ento.	4
CHEM 2103, Intro. Chem. Lab.	1	ENGL 2311, Rpts. & Corresp.,	3
or CHEM 3105, Chem. Lab.		or ENGL 3365, Prof. Rpt. Writ.	
HIST 2300, U.S. to 1877	3	Required Elective	4
PSS 2432, Prin. & Prac. Soils	4	TOTAL	14
BIOL 1401, Biol. of Plants	4		
TOTAL	15		
THIRD YEAR			
Fall		Spring	
Group 1 Electives	6	AAEC 3401, Ag. Stats.	4
POLS 1301, Am. Gov. Org.	3	POLS 2302, Am. Pub. Pol.	3
MBIO 3400, Microbiology	4	PSS 4301, Ag. Compounds	3
AAEC 2305, Fund. AAEC or	3	Group 1 Electives	2
ECO 2301, Prin. of Econ.	4	PSS 3421, Genetics	4
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
PSS 4100, Seminar	1	COMS 2300, Public Speaking	3
PSS 4415, Ag. Biotech.	4	Visual & Performing Arts*	3
Humanities or Multicultural*	3	and/or Multicultural	
Group 1 Electives**	6	Group 1 Electives**	8
TOTAL	14	Free Elective	2
		TOTAL	16

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

* Choose from Core Curriculum requirements.
 ** Students will select one of the options listed below according to their area of interest. Directed and required electives are subject to approval of the academic advisor.
Agronomy: Group 1 electives—PSS 3421 plus 25 hours from the following: PSS 3321, 3322, 3323, 3324, 4321, 4325, 4332, 4335, 4336, 4337, or 4421; required electives (4 hours from the following)—atmospheric science, chemistry, geology, mathematics, or physics.
Environmental Soil Science: Group 1 electives—PSS 4332, 4335, 4336, 4337, and 9 hours from any other PSS courses; directed electives (9 hours from the following)—BIOL 2313, ENVE 1301, 3203, GEOL 3323, or RWFM 4314.

Horticulture Curriculum

FIRST YEAR			
Fall		Spring	
PSS 1411, Prin. of Hort.	4	AAEC 2305, Fund. of AAEC	3
CHEM 1307, Prin. Chem. I	3	or ECO 2301, Prin. Micro. Eco.	
CHEM 1107, Prin. Chem. I (lab.)	1	BIOL 1401, Biol. of Plants	4
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1308, Prin. Chem. II	3
POLS 1301, Amer. Govt., Org.	3	CHEM 1108, Prin. Chem. II (lab.)	1
TOTAL	14	ENGL 1302, Adv. Coll. Rhetoric	3
		TOTAL	14
SECOND YEAR			
Fall		Spring	
HIST 2300, Hist. of U.S. to 1877	3	HIST 2301, Hist. U.S. Since 1877	3
ENGL 2311, Pat. & Rept. Cor.	3	PSS 2312, Propagation Meth.	3
PSS 2401, Intro. Ento.	4	MATH 1330, Intro. Math. Anal.	3
PSS 2313, Herb. Plants	3	POLS 2302, Amer. Pub. Pol.	3
MATH 1320, Coll. Alg.	3	Visual and Performing Arts*	3
TOTAL	16	TOTAL	15
THIRD YEAR			
Fall		Spring	
PSS 3421, Genetics	4	PSS 3318, Woody Plants	3
PSS 4313, Arboriculture	3	COMS 2300, Public Speaking or	3
Humanities or Multicultural*	3	COMS 3358, Bus. & Prof. Comm.	
PSS 2432, Prin. & Pract. Soils	4	Directed Elective**	3
Group 1 PSS Elective**	3	Group 1 PSS Electives**	6
TOTAL	17	TOTAL	15
FOURTH YEAR			
Fall		Spring	
PSS 4425, Ag. Plant Path.	4	PSS 4301, Ag. Compounds	3
PSS 4100, Seminar	1	PSS 3323, Crop Growth	3-4
Group 1 PSS Electives**	6	or BOT 3401, Plant Physiology	
AAEC 3401, Ag. Stat.	4	Directed Elective**	8
TOTAL	15	TOTAL	14-15

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

* Choose from Core Curriculum requirements.
 ** Students will select one of the emphases listed below according to their area of interest. Directed and Group I Electives are subject to approval of the academic advisor.
Horticultural Science: Group I Electives – 15 hours from PSS 2210, 2311, 3309, 3310, 3317, 4000, 4001, 4313 with a minimum of 6 hours from PSS 4314, 4411, 4415; Directed elective – 12 hours from the following areas of study: Business Administration, AAEC, BIOL, CHEM, FS, LARC, MBIO, PSS PSY, RWFM, SOC; free electives 5-6 hours.
Turfgrass Management: Group I Electives— 13 hours from the following: PSS 3309, 4335, 4421, plus 3-4 hours from PSS 4313, 4314, 4411, 4415; Directed electives—11 hours from PSS 3317, 4000, 4001, 4305, 4325, or B A, CHEM, AAEC, BIOL, PSS, SOC, PSY, RWFM, LARC; free electives 4-6 hours.

- 5337. **Advanced Soil Classification (3:2:3).** A study of the taxonomic System of Soil Classification as used in the United States. F, even years.
- 5376. **Advanced Studies in Cotton Fibers (3:3:0).** Examination of the structure of cotton fibers, meaning and measurement of fiber properties, and issues related to increasing cotton's use-value as an industrial raw material.
- 5401. **Advanced Insect Taxonomy (4:3:3).** Taxonomy, keys, descriptions, biology, and literature for all insect orders will be discussed. Slight identification of over 200 families is stressed in laboratories. Specific taxon will be assigned for detailed study; a collection is required. F.
- 5415. **Advanced Floriculture (4:3:3).** Prerequisite: Consent of the instructor. Principles of floricultural crop production and greenhouse construction presented at an advanced level. S, odd years.
- 5425. **Advanced Agricultural Plant Pathology (4:3:2).** Prerequisite: Approval of instructor. Identification of causal agents of plant diseases (fungi, bacteria, nematodes, and viruses). Emphasis will be placed on diagnostic methods, isolation, and inoculation. F, odd years.
- 5429. **Advanced Principles of Weed Science (4:3:2).** Prerequisite: Consent of the instructor. Weeds, weed control, plant identification, and equipment presented at an advanced level. F.
- 6000. **Master's Thesis (V1-6).**
- 6001. **Selected Topics in Plant and Soil Science (V1-3).** Prerequisite: Consent of instructor. Individual study of advanced topics in plant and soil science. May be repeated in different areas for credit.
- 6301. **Quantitative Agricultural Remote Sensing (3:3:0).** A general course in the theory and application of remote sensing to quantifying soil and vegetation characteristics relevant to agriculture and natural biosystems.
- 6302. **Plant Growth Modeling (3:3:0).** Development, testing, and application of mathematical models of plant growth relevant to agriculture and natural biosystems.
- 6322. **Advanced Plant Breeding (3:3:0).** Qualitative and quantitative inheritance, heterosis, selection theory and breeding methodology for crop plant improvement, genotype by environment interaction, and application of cellular and molecular techniques to plant breeding. S, odd years.
- 6323. **Plant-Water Relations (3:3:0).** Comprehensive understanding of biophysical factors affecting water status of plant tissue and resultant physiological responses. S, even years.
- 6331. **Advanced Environmental Soil Science (3:3:0).** Prerequisite: PSS 2432 or equivalent, graduate standing, or consent of instructor. Applications of soil chemical, physical, and biological principles to environmental issues. S, odd years.
- 6424. **Molecular Genetics and Plant Genomics (4:3:2).** Genome mapping in plants, gene structure and expression, recombinant DNA and gene cloning methods, molecular markers, QTL analysis, physical mapping, DNA chip technology, and functional genomics. S, even years.
- 7000. **Research (V1-12).**
- 8000. **Doctor's Dissertation (V1-12).**

Department of Range, Wildlife, and Fisheries Management

Faculty

Ernest B. Fish, Chairperson

Professors: Ballard, Britton, Fish, Patino, Smith, Sosebee, and Wester; **Associate Professors:** Dabbert, Pope, Villalobos, Wallace, and Wilde; **Assistant Professors:** Boal, Perry, and Winslow; **Adjunct Faculty:** Bowman, Cronin, Drawe, Gipson, Haukos, Krausman, Pence, Peterson, Rhodes, and Sullivan.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Range Management
- Bachelor of Science in Wildlife and Fisheries Management
- Bachelor of Science in Environmental Conservation of Natural Resources
- Master of Science and Doctor of Philosophy in Fisheries Science
- Master of Science and Doctor of Philosophy in Range Science
- Master of Science and Doctor of Philosophy in Wildlife Science

Undergraduate Program

This department is primarily concerned with the application of basic ecological principles to the management and use of

natural resources. The range management curriculum prepares students for graduate school and meets the Civil Service requirements for positions as range conservationists for agencies such as the Natural Resource Conservation Service, Forest Service, and Bureau of Land Management. The wildlife and fisheries management curriculum prepares students for graduate school and the wildlife management option of the wildlife management track meets the minimum requirements recommended by the Wildlife Society for wildlife biologist certification whereas the fisheries management track meets the minimum certification requirements recommended by the American Fisheries Society for a fisheries professional. The wildlife and fisheries management curriculum, wildlife management track, also includes an option for those interested in conservation science.

Students may also simultaneously fulfill the requirements for a second B.S. degree in the department by completing a minimum of 24 hours of course work. Students majoring in either range, wildlife and fisheries management, or environmental conservation of natural resources

Range Management Curriculum

		FIRST YEAR	
		Fall	Spring
	ENGL 1301, Ess. Coll. Rhet.	3	ENGL 1302, Adv. Coll. Rhet. 3
	MATH 1330, Intro. Math. Anal. I or MATH 1350, Anal. Geo.	3	MATH 1331, Intro. Math. Anal. II or MATH 1351, Calculus I 3
	CHEM 1307, Prin. Chem. I	3	CHEM 1308, Prin. Chem. II 3
	CHEM 1107, Prin. Chem. I (Lab.)	1	CHEM 1108, Prin. Chem. II (Lab.) 1
	RWFM 2301, Intro. Wildlife	3	RWFM 2302, Eco. & Cons. 3
	RWFM 4100, Seminar	1	TOTAL 13
	TOTAL	14	
		SECOND YEAR	
		Fall	Spring
	BIOL 1403, Biol. I	4	BIOL 1404, Biol. II 4
	AAEC 2305, Fund. AAEC	3	RWFM 3501, Rng., For., Wet. 5
	POLS 1301, Amer. Govt., Org.	3	PSS 2432, Prin. & Pract. Soils 4
	CHEM 2303, Intro. Org. Chem.	3	BOT 3401, Plant Physiol. 4
	CHEM 2103, Chem. (Lab.)	1	TOTAL 17
	TOTAL	14	
		THIRD YEAR	
		Fall	Spring
	RWFM 3302, Range Plant Ecol.	3	RWFM 3304, Prin. Range Mgt. 3
	RWFM 3201, Veg. Invent. & Anal.	2	COMS 2300, Public Speaking 3
	HIST 2300, Hist. U.S. to 1877	3	AAEC 3401, Ag. Stat. 4
	PSS 4332, Soil Class.	3	HIST 2301, Hist. Since 1877 3
	PSS 3321, For. & Past. Crops	3	Required Elective** 3
	ANSC 3301, Prin. Nutri.	3	TOTAL 16
	TOTAL	17	
		FOURTH YEAR	
		Fall	Spring
	RWFM 4302, Range Impr.	3	RWFM 4303, Range. Anal. & Plan. 3
	RWFM 4304, Fire Ecol. & Mgt.	3	POLS 2302, American Pub. Pol. 3
	RWFM 4309, Rge-Wild. Hab. Mgt.	3	RWFM 4314, Watershed Plan. 3
	Humanities - Multicultural*	3	ANSC 4403, Beef Prod. or ANSC 4406, Sheep & Goat Prod. or ANSC 3302, Livestock Prod. 3-4
	Required Elective**	3	Visual & Performing Arts 3
	TOTAL	15	TOTAL 15-16

Minimum hours required for graduation—121. (Students must fulfill the university multicultural requirement.)

* Choose from Core Curriculum requirements.

** Select at least two courses from RWFM 4305, 4306, 4310, 4322.

Required electives are subject to approval of the academic advisor.

must make a C or better in departmental courses to be eligible for graduation.

Students are encouraged to become actively involved in the clubs sponsored by the Range, Wildlife, and Fisheries Management Department—the Range, Wildlife, and Fisheries Club and the Soil Conservation Club. These clubs promote involvement in professional societies such as the Wildlife Society, the American Fisheries Society, the Society for Range Management, and the Soil and Water Conservation Society of America. Club activities also include regularly scheduled meetings with guest speakers and social events.

This department offers a minor in natural resource management for students majoring outside the department. For more information on requirements for completing a minor, refer to “Selecting a Minor” in the introductory information about this college or contact the departmental chair.

Wildlife and Fisheries Management Curriculum

WILDLIFE MANAGEMENT TRACK

FIRST YEAR

Fall		Spring	
ENGL 1301, Ess. Coll. Rhet.	3	ENGL 1302, Adv. Coll. Rhet.	3
MATH 1330, Intro. Math. Anal. I or MATH 1350, Anal. Geo.	3	MATH 1331, Intro. Math. Anal. II or MATH 1351, Calculus I	3
CHEM 1307, Prin. Chem. I	3	CHEM 1308, Prin. Chem. II	3
CHEM 1107, Prin. Chem. I (Lab.)	1	CHEM 1108, Prin. Chem. II (Lab.)	1
RWFM 2301, Intro. Wildlife	3	RWFM 2302, Eco. Con. Nat. Res.	3
RWFM 4100, Seminar	1	or RWFM 2307, Diversity of Life	3
TOTAL	14	HIST 2300, Hist. of U.S. to 1877	3
		TOTAL	16

SECOND YEAR

Fall		Spring	
BIOL 1403, Biol. I	4	BIOL 1404, Biol. II	4
RWFM 2406, Com. Ana. Game Ani. or ZOOL 3405, Vert. Struct. & Dev.	4	RWFM 2305, Fresh Eco. and Fish	3
RWFM 3501, Rng., For., Wet.	5	BIOL 3416, Genetics or PSS 3421, Fund. Prin. Genetics	4
CHEM 2303, Intro. Org. Chem.	3	RWFM 3308, Quant. Meth. NR	3
CHEM 2103, Chem. (Lab.)	1	TOTAL	14
TOTAL	17		

THIRD YEAR

Fall		Spring	
RWFM 3302, Range Plant Ecol.	3	RWFM 3304, Prin. Range Mgt.	3-4
AAEC 2305, Fund. AAEC	3	or RWFM 4401, Fisheries Mgt.	
Required Elective**	3	or RWFM 3307 Prin. Cons. Sci.	
POLS 1301, Amer. Govt. Org.	3	RWFM 4407, Wildlife Inv. Tech.	4
PSS 2432, Prin. & Pract. Soils	4	Required Elective**	3
TOTAL	16	POLS 2302, Amer. Pub. Pol.	3
		TOTAL	13-14

FOURTH YEAR

Fall		Spring	
Required Electives**	6	RWFM 4303, Range. Anal. Plan.	3
COMS 2300, Public Speaking	3	or RWFM 4314, Watershed Plan.	
Visual & Performing Arts*	3	or RWFM 4320, Nat. Res. Policy	
Humanities - Multicultural*	3	RWFM 4408, Wild. Pop. Dynamics	4
ENGL 2311, Technical Writing	3	HIST 2301, Hist. Since 1877	3
TOTAL	18	RWFM 4100, Seminar	1
		Required Electives**	3
		TOTAL	14

Minimum hours required for graduation—122. (Students must fulfill the university multicultural requirement.)

* Choose from Core Curriculum requirements.

** Students will select one of the options listed below according to their area of interest. Required electives are subject to approval of the academic advisor.

Wildlife Management—Choose at least two courses from ZOOL 4306, 4308, 4310, or BIOL 4301; Choose at least two courses from RWFM 4305, 4306, 4310, 4322, or 4309.

Conservation Science—RWFM 3307; Choose at least two courses from BIOL 3309, 4303, 4310 or RWFM 4322; Choose at least one course from RWFM 4315, 4403, or GEOG 3300.

Suggested electives for students interested in becoming a game warden are SOC 4325 and POLS 3350. Suggested electives to enhance the wildlife management option are RWFM 3201, 3304, 3307, 4335, 4401, 4403; LARC 4302, and 4303. Suggested electives to enhance the conservation science option are RWFM 3201, 3304, 4335, 4401; LARC 4302, and 4303.

Graduate Program

Those interested in pursuing a master's or doctoral degree in the Department of Range, Wildlife, and Fisheries Management should consult with the chairperson prior to enrolling for any course.

Master's Program

The M.S. degree requires a minimum of 24 hours of graduate course work plus 6 hours of thesis. Before being recommended for candidacy to a master's degree program, the student may be requested to take a preliminary examination to determine proficiency and background for graduate work. The student may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the graduate advisory committee.

Doctoral Program

Doctoral candidates may specialize in grazing management, range improvement, range animal nutrition, fire ecology, plant ecology, plant physiology, wildlife habitat management, big game ecology, waterfowl ecology, upland game ecology, fisheries, aquaculture or wetland ecology and management.

An oral and/or written preliminary examination is required of all students seeking a Ph.D. degree. If the preliminary examination reveals weaknesses in the student's background, remedial courses may be designated by the graduate advisory committee. The student's graduate advisory committee will also recommend courses to be taken in supporting disciplines. A Qualifying Examination for admission to candidacy for the Ph.D. degree will also be conducted in accordance with the requirements of the Graduate School. This Qualifying Examination is prepared and administered by the candidate's graduate advisory committee and any other professors the committee may consider necessary.

The doctorate normally requires completion of 60 to 80, or more, semester credit hours of graduate course work 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 course work outside the department. These hours may be taken in several 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 (RWFM 5403) and one semester of teaching practicum (RWFM 7210). Additionally, range science doctoral candidates must successfully complete or have completed two semesters of calculus and either College Teaching in Agriculture (AGED 5310) or College Teaching (EDHE 5342).

Environmental Conservation of Natural Resources

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. Coll. Rhet.	3	ENGL 1302, Adv. Coll. Rhet.	3
MATH 1330, Intro. Math. Anal. I	3	POLS 1301, Amer. Govt. Org.	3
or MATH 1350, Anal. Geo.		CHEM 1308, Prin. Chem. II	3
CHEM 1307, Prin. Chem. I	3	CHEM 1108, Prin. Chem. II (Lab.)	1
CHEM 1107, Prin. Chem. I (Lab.)	1	RWFM 2302, Eco. & Cons. Res.	3
RWFM 2301, Intro. Wildlife	3	HIST 2300, Hist. of U.S. to 1877	3
RWFM 4100, Seminar	1	TOTAL	16
TOTAL	14		
SECOND YEAR			
Fall		Spring	
BIOL 1403, Biol. I	4	BIOL 1404, Biol. II	4
AAEC 2305, Fund. Ag. & Appl. Eco.	3	RWFM 2307, Diversity of Life	3
RWFM 3501, Rng., For., Wet.	5	COMS 2300, Public Speaking	3
POLS 2302, American Pub. Pol.	3	Specialized Elective††	3
TOTAL	15	Physical Science Elective*	4
		TOTAL	17
THIRD YEAR			
Fall		Spring	
RWFM 3302, Range Plant Ecol.	3	AAEC 3401, Ag. Stat.	4
Specialized Electives††	6	HIST 3327, Sur. Amer. Env. Hist.	3
RWFM 4314, Watershed Planning	3	RWFM 3304, Prin. Range Mgt.	3
Specialized Elective††	6	BIOL 3416, Genetics	4
TOTAL	15	or PSS 3421, Fun. Prin. Gen.	
		Specialized Elective††	3
		TOTAL	17
FOURTH YEAR			
Fall		Spring	
RWFM 3307, Prin. Con. Science	3	RWFM 4407, Wildlife Inv. Tech.	4
Specialized Electives††	6	RWFM 4315, Spatial Anal. NR or	3
RWFM 3201, Veg. Inven. & Anal.	2	GEOG 3300, Geog. Info Sys.	3
Humanities-Multicultural	3	RWFM 4408, Wildlife Pop. Dyn.	3-4
Visual & Performing Arts	3	or RWFM 4304, Fire Eco. & Mgt.	
TOTAL	17	or RWFM 4309, Habitat Mgt.	
		or RWFM 4401, Fisheries Mgt.	
		ENGL 2311, Technical Writing	3
		TOTAL	13-14

Minimum hours required for graduation—124. (Students must fulfill the university multicultural requirement.)

* Students will select one of the following courses to satisfy the physical science elective: PSS 2432, GEOL 1303 and 1101, GEOG 1301 and 1101, 1302 and 1102, CHEM 2303 and 2103, ATMO 1300 and 1100.

†† Students will select one of the following specializations according to their area of interest. Of the 18 hours required, at least 15 hours must come from at least three categories within the path. The other 3 may be from either specialization path.

Technical Path—Category 1 (ENGL 3365 or 3366, ACOM 2302 or 4300); Category 2 (RWFM 4403 or GEOG 3301, GEOG 4302, BIOL 4330); Category 3 (CHEM 3341 and 3141 or 3351 and 3251, second course from physical science elective group); Category 4 (AAEC 4302).

Conservation Path—Category 1 (RWFM 4303, 4304, 4305, 4306, 4310, or 4408; BIOL 3307, 4310, or 4330); Category 2 (RWFM 2305 or 4322); Category 3 (PSS 2401 or BOT 3404 or ZOOL 3406, 4306, 4308, 4310, 4321, 4407, or 4301 herpetology); Category 4 (RWFM 4324 or Summer Field Studies); Category 5 (RWFM 4320, BIOL 4305 or ZOOL 4312 or PSS 4337 or PHIL 3325).

Range, Wildlife, and Fisheries Management (RWFM)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 2301. **Introductory Wildlife (3:3:0)** [AGRI 2322]. 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 (3:3:0)**. An introduction to the ecology and conservation of renewable natural resources of native lands, including their multiple use for timber, water, range, recreation, and wildlife. F, S.
- 2305. **Freshwater Ecology and Fisheries (3:3:0)**. Survey and management of freshwater habitats: types of organisms, adaptations, and ecological interactions; and effects of solar radiation, temperature, currents, dissolved gases, chemicals, and pollution. F, S.
- 2307. **Diversity of Life (3:3:0)**. Principles of biogeography, examination of current environmental threats to biodiversity, and conservation of natural systems. Plant and animal (including invertebrate) issues are examined.
- 2406. **Comparative Anatomy of Game Animals (4:3:3)**. Prerequisite: BIOL 1402 or 1404 or equivalent. A comparative study of game and other wild animals, with emphasis on embryology, functional anatomy, and evolution. Not for major or minor credit in the biological sciences.

Wildlife and Fisheries Management Curriculum

FISHERIES MANAGEMENT TRACK

FIRST YEAR			
Fall		Spring	
ENGL 1301, Ess. Coll. Rhet.	3	ENGL 1302, Adv. Coll. Rhet.	3
MATH 1330, Intro. Math. Anal. I	3	MATH 1331, Intro. Math. Anal. II	3
or MATH 1350, Anal. Geo.		or MATH 1351, Calculus I	
CHEM 1307, Prin. Chem. I	3	CHEM 1308, Prin. Chem. II	3
CHEM 1107, Prin. Chem. I (Lab.)	1	CHEM 1108, Prin. Chem. II (Lab.)	1
RWFM 2301, Intro. Wildlife	3	RWFM 2302, Eco. & Con. or	3
RWFM 4100, Seminar	1	RWFM 2307, Diversity of Life	
TOTAL	14	HIST 2300, Hist. of U.S. to 1877	3
		TOTAL	16
SECOND YEAR			
Fall		Spring	
BIOL 1403, Biol. I	4	BIOL 1404, Biol. II	4
RWFM 2406, Anat. Game Animals	4	BIOL 3416, Genetics or	4
or PSS 2401, Intro. Entomology		PSS 3421, Fund. Prin. Gen.	
RWFM 2305, Fresh. Eco. and Fish.	3	PSS 2432, Prin. Prac. Soils or	3-4
POLS 1301, Amer. Govt. Org.	3	RWFM 4314, Watershed Pln.	
CHEM 2303, Intro. Org. Chem.	3	or PHYS 1403, Gen. Physics	
CHEM 2103, Intr. Org. (Lab.)	1	or GEOL 1303, Phy. Geology	
TOTAL	18	AAEC 2305, Fund. AAEC	3
		TOTAL	14-15
THIRD YEAR			
Fall		Spring	
RWFM 4330, Aquaculture	3	RWFM 4335, Fisheries Science	3
BOT 3401, Plant Phys. or	3-4	AAEC 3401, Ag. Stat.	4
PSS 3307, Insect Ana. & Phys.		ZOOL 4310, Intro. Ichthyology	3
or ANSC 2401, Ana. Phys. Dom.		RWFM 4320, Nat. Res. Policy or	
HIST 2301, Hist. of U.S. Since 1877	3	PHIL 3325, Environmental Ethics	3
POLS 2302, Amer. Pub. Pol.	3	or AGSC 3301, Ag. Lead. Prin.	
Elective***	2-3	Elective**	3
TOTAL	15-16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
RWFM 4407, Wildlife Inv. Tech.	3-4	*Humanities-Multicultural*	3
or ZOOL 3408, Ornithology or		RWFM 4408, Wild. Pop. Dyn.	3-4
BIOL 4301, Herpetology or		or BIOL 3309, Pop. Com. Eco.	
BIOL 4407, Nat. Hist. Verts.		or BIOL 4310, Comm. Ecology	
RWFM 4401, Fisheries Mgt.	4	or RWFM 3307, Prin. Con. Sci.	
COMS 2300, Public Speaking	3	ENGL 2311, Technical Writing	3
Visual & Performing Arts*	3	AAEC 4302, Stat. Meth. Ag. or	
Elective**	0-3	RWFM 3308, Quant. Meth. NR	3
TOTAL	13-17	RWFM 4100, Seminar	1
		TOTAL	13-14

Minimum hours required for graduation—122. (Students must fulfill the university multicultural requirement.)

* Choose from Core Curriculum requirements.

** Suggested electives for students interested in becoming a game warden are SOC 4325 and POLS 3350. Suggested electives to enhance fisheries track are C E 3371, 3171, ZOOL 3406, GEOL 3322.

*** An introductory botany course is suggested (RWFM 3501, BOT 3403, 3404, 4302).

- 3201. **Vegetation Inventory and Analysis (2:1:2)**. Techniques and methods for sampling and analyzing rangeland vegetation. F.
- 3302. **Range Plant Ecology (3:3:0)**. The basic principles of autecology and synecology and their relationship to management of the range ecosystem. F, S.
- 3303. **Range Management Principles and Practices (3:3:0)**. Prerequisite: Sophomore standing. A general course in the principles and practices of range management designed for nonrange majors who plan to enter the ranching industry. F, S. Field trips required. Not open to range or wildlife majors.
- 3304. **Principles of Range Management (3:2:3)**. Prerequisite: RWFM 3501. Application of ecological principles in the management of rangelands for sustained livestock products consistent with conservation of the range resource. Field trips required. S.
- 3307. **Principles of Conservation Science (3:3:0)**. Prerequisite: RWFM 2307. A survey of the theory and practices of conservation biology. Emphasis is placed on methods used to maintain plant and animal biodiversity.
- 3308. **Quantitative Methods in Natural Resources (3:3:0)**. Prerequisite: MATH 1331 or 1351. Survey of quantitative and statistical methods used in natural resource management, conservation biology, and in assessing biodiversity.
- 3333. **Pond Fish Management (3:2:3)**. Management of ponds for recreational fishing. Includes principles of pond construction, fish stocking, water quality and habitat management, and assessment of common problems. Field trips required.

3501. **Range, Forest, Wetland Plants, and Plant Identification (5:3:4).** Native and naturalized forage plants of the U.S.; stresses identification, distribution, ecology, plant communities, and economic value. F, S. Field trips are required.
4000. **Internship (V1-12).**
4001. **Undergraduate Research (V1-12).** Selected research problems according to the needs of the student. May be repeated.
4100. **Seminar (1:1:0).** An organized discussion of current problems and research in range, wildlife, and fisheries management. May be repeated.
4301. **Problems (3).** Prerequisite: Approval of instructor. 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 (3:2:3).** Application of principles and practices necessary to enhance the productive potential of the range resource for all potential uses. Methods for brush management, revegetation, conservation, etc. are considered. Improvement for increased domestic livestock production and for enhancing wildlife habitat is emphasized. Field trips required. F.
4303. **Rangeland Analysis and Management Planning (3:2:3).** Prerequisite: RWFM 3304 or 4302. Analysis of rangeland resource inventories for the purpose of planning appropriate use of such resources. A familiarization with the basic components of a range resource plan and their application in decision making. S. (Writing Intensive)
4304. **Fire Ecology and Management (3:3:0).** Prerequisite: RWFM 3302 and 3501. The effect of fire on major vegetation zones in North America and ecological changes of plants and animals. Physical effects of fires on soils and plants, management applications, and prescribed burning techniques. F. (Writing Intensive)
4305. **Big Game Ecology (3:2:3).** Prerequisite: BIOL 1404, RWFM 2301. Survey of distributions and life histories of North American big game species. Productivity, food habits, economic significance, and management will be examined. Field trips required. S, even years.
4306. **Upland Game Ecology (3:2:3).** Prerequisite: RWFM 2301 and ZOOL 4308, or consent of instructor. Ecological approach managing upland game populations. Stresses population mechanisms and habitat management of selected species. Field trips required. S, odd years.
4309. **Range-Wildlife Habitat Management (3:3:0).** Prerequisite: RWFM 2301, 3501, 3304, or consent of instructor. A study of wildlife habitats based on major vegetation types and the management problems involved. Emphasis on how other resource demands can be integrated with wildlife. Field trips offered. F, S. (Writing Intensive)
4310. **Principles of Waterfowl Management (3:2:3).** Prerequisite: RWFM 2301. Ecology and management of continental waterfowl resources. Life histories, population management, and habitat manipulation are stressed. Field trips required. F, even years.
4314. **Watershed Planning (3:3:0).** The watershed as a unit of resource-oriented planning and development. Principles and objectives of watershed management. Physical description of watersheds. Relationship between land-use conditions and the water delivery character of watersheds. Watershed analysis, including techniques, collection of field data, and sources of information. F, S.
4315. **Spatial Analysis in Natural Resource Management (3:2:3).** Introduction to geographic information systems and global positioning systems. Applications for inventory, planning, and management of natural resources are emphasized. S.
4320. **Natural Resource Policy (3:3:0).** Prerequisite: RWFM 2301. Emphasis on the human dimension of natural resource management. Historical, agency, and private organization roles in policy and conflict resolution. S.
4322. **Nongame Ecology and Management (3:2:2).** Prerequisite: RWFM 2301 or consent of instructor. Ecological approach to nongame wildlife population management. Public policies, socioeconomic factors, population dynamics, and species-at-risk issues are examined.
4330. **Aquaculture (3:3:0).** Prerequisite: BIOL 1404 and CHEM 1308 or consent of instructor. A global overview of aquaculture including fish, aquatic invertebrates, plants, and design and operation of production facilities. F, odd years.
4335. **Fisheries Science (3:3:0).** Prerequisite: RWFM 2301, 2302, 2305, and ZOOL 4310. Scientific study of aquatic organisms. Includes resource sampling, ecology, analysis of populations, resource conflict, and management. S, even years.
4401. **Fisheries Management (4:3:3).** Prerequisite: AAEC 3401. Theory and practice of fisheries management with emphasis on basic strategies used in effective management of aquatic renewable natural resources. Applied field problems, equipment use. F, even years. (Writing Intensive)
4403. **Aerial Photo Interpretation in Natural Resource Management (4:2:4).** Fundamentals of aerial photograph reading, interpretation, and evaluation. Introduction to remote sensing techniques and geographic information systems. F.
4407. **Wildlife Investigational Techniques (4:3:3).** Prerequisite: Junior standing and AAEC 3401. The basic methodology of practical wildlife management. This involves the routine techniques in data collection related to population maintenance, as well as ways to monitor field research. F, S. (Writing Intensive)
4408. **Wildlife Population Dynamics and Analysis (4:3:3).** Prerequisite: AAEC 3401, RWFM 2301, MATH 1331, or consent of instructor. The mechanisms of wildlife population changes and their management. Detailed examination of techniques for measuring population characteristics. S. (Writing Intensive)

Graduate Courses

5100. **Seminar (1:1:0).** An organized discussion of current problems in range, wildlife, and fisheries management. May be repeated.
5302. **Range Research Methods (3:2:3).** Prerequisite: ISQS 5346. Study plan preparation; methods of studying vegetation; sampling techniques; increasing sampling efficiency; methods of reducing experimental error; grazing studies; utilization studies; wildlife techniques; and tests of goodness of fit for binomial, poison, negative binomials, and normal distributions. F, odd years.
5303. **Synecology (3:3:0).** Prerequisite: RWFM 3302. An advanced study of terrestrial plant community ecology; mechanisms and consequences of species coexistence; diversity relations; causes and patterns of community development; community dynamics. Statistical and numerical analyses applicable to community ecology are discussed. F, odd years.
5304. **Fire Behavior and Ecology (3:2:3).** Prerequisite: RWFM 3501 and 3302. 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; prescribed burning techniques. Field trips required. F.
5305. **Plant Ecophysiology (3:3:0).** Prerequisite: RWFM 3302. Advanced study of the influences of the environmental complex on the processes, structure, and physiological functioning of an individual plant or species. S, even years.
5306. **The Physiological Basis for Grazing Management (3:2:3).** A study of the physiological processes, morphological development, nutritional qualities, and palatability of range plants as a basis for grazing management strategies for domestic and wild animals. Field trips required. F, even years.
5307. **Wetland Ecology (3:3:0).** Prerequisite: Upper-level ecology course or consent of instructor. Advanced study in the structure and functioning of wetland ecosystems. Course will also examine wetland classification. F, odd years.
5309. **Population Estimation and Dynamics (3:3:0).** Prerequisite: AAEC 3401. Principles of estimation theory. Detailed examination of modern analysis techniques; indices, line transect, capture-recapture, Jolly-Seber, survival, and life table limitations. Computer use. S.
5310. **Advanced Range Ecology (3:3:0).** An examination of the basic ecological principles affecting plant growth and development, distribution of plants, community structure and dynamics, and nutrient cycling. Field trips required. F, S.
5311. **Wildlife Conservation and Management (3:3:0).** An examination of conservation principles and management practices enhancing wildlife populations. Not open to biological science majors.
5312. **Ecology of Renewable Natural Resources (3:3:0).** An introduction to the ecology of renewable natural resources such as vegetation, wildlife, soil, and water. Not open to biological science majors.
5313. **Advanced Big Game Ecology and Management (3:3:0).** Prerequisite: RWFM 4305 or equivalent or consent of instructor. An advanced study of the ecology and management of big game resources. Field trips required. S, even years.
5314. **Advanced Upland Game Ecology and Management (3:2:3).** An advanced study of the ecology and management

- of upland game resources. Field trips are required. S, odd years.
5315. **Advanced Studies in Range-Wildlife Habitat (3:3:0)**. An ecological approach to wildlife management stressing the relationships between animals and their habitat. Focuses on rangeland habitats. Field trips required. F, S.
5316. **Waterfowl Ecology (3:2:3)**. Prerequisite: RWFM 4310. An ecological examination of waterfowl behavior, breeding biology, and habitat requirements. Field trips required. F, even years.
5317. **Watershed Management (3:3:0)**. Management concepts of watersheds as a holistic unit. Inventory techniques, information sources, analysis procedures, and economic and financial effects applicable to watershed management planning. F, S.
5318. **Range Animal Nutrition (3:3:0)**. Prerequisite: ANSC 3301 or equivalent. Study of the nutritional relationship between the range resource and grazing herbivores, including domestic livestock and wild ungulates, and techniques for range animal nutrition research. F, odd years.
5320. **Natural Resource Biopolitics (3:3:0)**. Policy, planning, and conflict resolution from a natural resource management perspective. Historical, agency, and private organization roles in natural resource management are evaluated. S.
5322. **Advanced Nongame Ecology and Management (3:2:2)**. Prerequisite: RWFM 2301 or consent of instructor. Ecological approach to nongame wildlife population management. Public policies, socioeconomic factors, population dynamics, and species-at-risk issues are examined.
5323. **Prescribed Burning (3:2:3)**. Planning, implementing, evaluating prescribed fires, and expert systems. Field trips required. S, even years.
5324. **Physiological Ecology of Aquatic Organisms (3:3:0)**. Regulatory mechanisms and adaptive significance of selected physiological processes in aquatic vertebrates. S, even years.
5330. **Advanced Aquaculture (3:3:0)**. A global overview of aquaculture including fish, aquatic invertebrates, plants, and design and operation of production facilities. F, odd years.
5335. **Advanced Fisheries Science (3:3:0)**. Scientific study of the use of aquatic organisms. Includes resources, sampling, ecology and analysis of populations, resource conflicts, and management. May not be taken for credit by students who have taken RWFM 4335. S, even years.
5337. **Fish and Wildlife Population Modeling (3:3:0)**. The development and use of models to analyze and simulate ecological processes in fish and wildlife populations and communities. S, odd years.
5401. **Advanced Fisheries Management (4:3:3)**. Theory and methodology used in managing aquatic renewable resources; applied field problems, equipment use. May not be taken for credit by students who have taken RWFM 4401. F, even years.
5402. **Fisheries Ecology (4:3:3)**. Prerequisite: Statistics and basic fisheries. An examination of population dynamics, community ecology, bioenergetics, fisheries models and other quantitative aspects of fisheries ecology. F, even years.
5403. **Experimental Design and Analysis (4:3:2)**. Prerequisite: ISQS 5346, ANSC 5403, or BIOL 6502. Principles and applications of experimental design and analysis (completely randomized designs, randomized blocks, covariance analysis, factorials, split plots, repeated measures, regression). F, even years, and S.
5404. **Aerial Terrain Analysis (4:2:4)**. Exploration of methods, the use of techniques, and evaluation of landscape using aerial photographs. An introduction to the theories, technical and practical aspects, and considerations of computer based geographic information systems in landscape planning, design, and management. F.
6000. **Master's Thesis (V1-6)**.
6001. **Selected Topics in Range Science (V1-6)**. Advanced topics selected by departmental recommendation. May be repeated for credit in different subject areas.
6002. **Selected Topics in Wildlife Science (V1-6)**. Advanced topics selected by departmental recommendation. May be repeated for credit in different subject areas.
6003. **Selected Topics in Fisheries Science (V1-6)**. Advanced topics selected by departmental recommendation. May be repeated for credit in different subject areas.
6301. **Research Methods (3:3:0)**. A review of the philosophy of science, scientific methods, research activities, and the planning and execution of research programs. F, even years.
6303. **Imagery Interpretation for Natural Resource Management (3:2:2)**. Prerequisite: RWFM 4403 or 5404. An advanced course in the applications of imagery producing systems for use in the inventory, analysis, planning, and management of natural resources. Involves the use of satellite imagery, infrared and radar scanning systems, as well as advanced work in interpreting standard aerial photography. S.
6305. **Geospatial Technologies in Natural Resource Management (3:2:2)**. Principles of geographic information systems and global positioning systems. Applications for natural resource inventory, planning, and management are emphasized.
6324. **Advanced Tropical Ecology and Conservation (3:3:0)**. Prerequisite: Consent of instructor. A survey of tropical ecology for advanced students. Both theory and practice will be covered. Field trips required.
7000. **Research (V1-12)**.
7210. **Teaching Practicum (2:0:4)**. Prerequisite: Doctoral student in range, wildlife, or fisheries science program and AGED 5310 or EDHE 5342. Supervised teaching experience at the university level.
8000. **Doctor's Dissertation (V1-12)**.



College of Architecture

About the College

Architecture bridges the sciences with the arts. Students who succeed in architecture are balanced individuals who can manage the rigor of the rational and the ambiguity of the intuitive. In addition to the degree program in architecture, the College of Architecture offers dual programs with the College of Engineering and the College of Business Administration. Students can pursue career paths in design, construction, real estate development, and construction product development and sales. The general architecture curriculum also provides an excellent portal into the university with course work that is not only specific to the field but also in line with the core curriculum of the university. Students who elect to study other disciplines after the first year of the architecture curriculum still have a solid academic base.

Mission Statement. The College of Architecture educates students for future practice and advances the knowledge of the discipline for the benefit of society.

Admission. The 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 is competitive and based on a comprehensive review of the student's portfolio, essay, and grade point average. All transfer course work taken at any other institution must receive evaluation and approval from the Placement, Programs, Advisement, and Recruitment Center within the college. The student must provide sufficient evidence of equivalency, and no course with a grade less than a C will be accepted. A grade of C or better is required for all courses included in the architecture degree plan.

Requirements for Licensure as an Architect. Becoming a licensed architect is a three-step process. Students must receive an accredited degree in architecture that has been approved by the National Architectural Accreditation Board (NAAB) (www.naab.org), successfully complete an internship with a licensed architect(s), and pass the Architect Registration Examination (ARE) (www.ncarb.org). The accredited program at Texas Tech University includes three components: general architecture, preprofessional, and professional. The general and preprofessional programs are undergraduate programs, while the accredited professional degree is the Master of Architecture.

Degree Programs

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

- Bachelor of Science in Architecture
- Master of Architecture (professional degree)
- Master of Science in Architecture
- Doctor of Philosophy in Land-Use Planning, Management, and Design

Dual-Degree/Joint Programs

- Bachelor of Science in Architecture/Bachelor of Business Administration
- Bachelor of Science in Architecture/Bachelor of Science in Civil Engineering
- Master of Architecture/Master of Business Administration



Andrew Vernooy, MDS
Dean

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Faculty

Professors: Louden, Mross, Perl, Peters, Vernooy, Watkins, James White, and John White; **Associate Professors:** Aranha, Buelinckx, Davis, Driskill, Giaccardo, Hill, Mussotter, Neiman, Shacklette, Smith, and Torres-McDonald; **Assistant Professors:** Ellis, Flueckiger, Gallegos, Galley, Jaddo, Haq, Kahera, McClain, Rex, Robertson, and Yu; **Instructors:** Akins, Anderson, Chinn, Fairbetter, Faulk, Kwun, Lindsey, Martin, Powell, Stephens, and Teitelbaum.

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. Admission to the general architecture program is open to all students admitted into the university. Admission into the preprofessional program is competitive and based on a comprehensive review of the student's portfolio, essay, and grade point average. The B.S. in Architecture degree will give students knowledge of and career opportunities in architecture, the building industry, and related fields. The college also offers dual-degree programs with civil engineering and business administration.

Transfer Courses. All transfer course work to be taken at any other institution must receive evaluation and approval from the Placement, Programs, Advisement, and Recruiting Center (P²ARC) within the College of Architecture. The student must provide sufficient evidence of equivalency. No course with a grade less than a C will be accepted.

Core Curriculum Requirements. The university has established Core Curriculum requirements for all students. A listing of these requirements appears in the Undergraduate Academics section of this catalog.

Writing Intensive Courses. Students may fulfill this course requirement with any university course identified in the catalog as "writing intensive" or with another course specifically preapproved by the P²ARC as "writing intensive."

Diversity Course. Students may fulfill this course with ARCH 4311, ARCH 4364 or other university courses listed with the P²ARC.

Electives. Students may select electives to broaden their educational experiences. Students in the fourth undergraduate year of study may not take a freshman-level elective course without approval from the associate dean. Courses for required elective hours must have an identified knowledge content, intellectual rigor and documented testing and evaluation of knowledge gained.

Computer Requirement. Students in the preprofessional program are required to have their own computer in the classroom or studio. Computer equipment and software must be compatible with college standards. Computer equipment and software requirements are posted on the college web site.

Extended Studies Courses. All correspondence and extended studies courses require approval from the P²ARC to apply to the degree program.

Grades of C. A grade of C or better is required for all courses included in the architecture degree plan. In the college, a C is equivalent to a grade of 70-79.

Student Projects. The college reserves the right to retain, exhibit, and reproduce work submitted by students. Work submitted for a grade is the property of the college and remains so until it is returned to the student.

Academic Status. The academic information section of this catalog gives specific information regarding academic status. Students on scholastic probation or scholastic suspension should familiarize themselves with these regulations. At the graduate level only one semester of probation status is allowed before academic suspension.

Counseling and Advising. Faculty members assist students in career counseling and guidance. Advisement for course registration is provided by the P²ARC staff.

Ineligible Registration. The College of Architecture reserves the right to prevent any student who is not eligible for registration from entering or dropping a course for reasons such as unapproved overloads, unapproved repeated courses, lower division-upper division rule infractions, and lack of prerequisites. Courses taken when the student was ineligible may not be used in the student's degree program.

Catalog Selection. Students will use the catalog issued for the year in which they were first officially admitted to the College of Architecture or may elect to use a more recent catalog. However, if they later transfer to another institution or another college at Texas Tech and wish to return to the College of Architecture at Texas Tech, they will follow the current catalog curricula in effect when they are readmitted. A catalog expires after seven years.

Course Load. Approval from the P²ARC is required for a course load of more than 18 semester hours (8 hours for a summer term). Correspondence courses are included in the student's course load, as are courses taken concurrently at other institutions. Students who are employed for more than 20 hours each week should limit their semester hour enrollment.

Class Attendance. Students in the college are expected to attend all scheduled class meeting times and activities. Absences in excess of those stipulated in each individual course syllabus will result in an F. Refer to the university's policy, procedures, and dates on dropping a course. See your academic advisor for additional information.

Application for Degree. The Bachelor of Science degree candidate must file an "Application for Degree" with the P²ARC at least one year before the anticipated date of graduation. Subsequently, the student will receive a list of courses and be apprised of the number of grade points that are lacking.

In making this application, students must indicate the year's catalog under which they plan to graduate since they must meet all of the requirements of a specific year's catalog. This must be a year during which the student is registered in the College of Architecture. See also "Uniform Undergraduate Degree Requirements" in this catalog.

Travel Programs. International and domestic travel programs are offered annually to enrich the student's experience. These programs are open to related majors, with prior approval. Students are encouraged to participate in one of the travel programs prior to graduation.

Internship Program. Each student is encouraged to participate in the professional internship program. The program provides opportunities for professional experience in some of the nation's leading architectural firms.



Graduate Program / Architecture

The College of Architecture awards three graduate degrees: The Master of Architecture (M.Arch.), Master of Science in Architecture (M.S.), and Doctor of Philosophy (Ph.D.) in Land-Use Planning, Management, and Design (LPMD). The Master of Architecture is a professional degree accredited by the NAAB. The college has an agreement with the College of Business Administration allowing students to seek a joint M.Arch. degree in architecture and a Master of Business Administration (M.B.A.). The Master of Science in Architecture is considered a post-professional research-based academic degree. The Ph.D. in LPMD is an interdisciplinary degree program that accepts students from diverse educational backgrounds.

Students applying to any of the three degree programs must have an appropriate bachelor's degree from any undergraduate program. All students must make application to and meet the requirements of the Texas Tech University Graduate School and the College of Architecture. The following criteria will be considered in the admission process: GRE scores, GPA, academic transcripts, portfolio of work, letters of recommendation, statement of interest, exceptional extracurricular activities, and professional work.

Students applying to the Master of Architecture program with an undergraduate degree other than the B.S. in Architecture from Texas Tech University must request an audit of their transcripts. All applicants must submit a portfolio of work to the college to determine the amount of leveling courses required to comply with the entry into the professional degree program. Students accepted into the Master of Architecture program may automatically be accepted into the Master of Business Administration program.

Transfer courses applicable to a student's degree plan at the graduate level are determined by the college administration and the Graduate School. Refer to "Transfer Courses" section on the previous page.

Off-Campus Programs. Off-campus programs are offered to enrich student experience. The college offers regional, continental, and European summer programs. The Architour Spring Break program provides opportunities for travel and study of American architecture and architects.

Attendance. Students in the college will attend all scheduled class meeting times and activities. Absences in excess of those stipulated in each individual course syllabus may result in an F in the course.

Computer Requirement. Students entering the graduate programs in architecture are required to have their own computer in the classroom and studio. Computer equipment and software must be compatible with

college standards. The computer equipment and software requirement is posted on the college web site or can be requested from the Placement, Programs, Advisement, and Recruiting Center.

Ownership of Student Work. The college reserves the right to retain, exhibit, and reproduce work submitted by students. Work submitted for a grade is the property of the college and remains such until it is returned to the student.

Research and Design Center. The RDC is the clearinghouse for scholarly work, research, and creative activity in the college. The RDC provides lab and studio space for faculty scholarship and often provides financial assistantship for students through research and graduate assistantship. Contact the college for information on these positions.

Internships. Each student is encouraged to participate in the professional internship program. The program provides opportunities for professional experience in some of the nation's leading architectural firms. With advance approval students participating in an internship may take courses offered via distance learning when those courses apply to their degree program.

Master of Architecture (Accredited Professional Degree)

Mandatory Accreditation Statement

The NAAB provides the following statement: "In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure that are accredited by NAAB, which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

"Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not by itself recognized as an accredited degree."

The Master of Architecture accredited professional program consists of an undergraduate curriculum of 131 hours and a graduate curriculum of 42 hours. The dual Master of Architecture/Master of Business Administration includes an additional 30 credit hours in the graduate program. A comprehensive master's degree design project is required.

Master of Science in Architecture (Postprofessional Degree)

The Master of Science in Architecture degree is a research-based academic degree for students interested in a focused area of study. This degree does **not** prepare students for architecture licensure. The degree is for students with

an accredited professional B.Arch., M.Arch., or an approved bachelor's degree in another discipline (e.g., interior design, engineering). Students who have non-architecture degrees and wish to enter the program may be required to complete leveling work that will not accrue graduate credit toward their degree. Students will be required to complete a minimum of 30 credit hours of graduate study, write and defend a thesis (6 hours), and take an oral comprehensive examination. All students will be required to complete a written thesis.

The college provides Master of Science in Architecture degree certification in three focus areas: community development, historic preservation, and visualization. Students applying for the Master of Science in Architecture degree must file for admittance into one of these certificate plans. After the first semester, students will be matched with a faculty member who will serve as their academic advisor and the chair of their thesis committee. The advisor will be responsible for guiding the student concerning electives, developing a thesis proposal, and selecting thesis advisors.

Financial assistance may be available for students applying by January 15 for attendance in the program the following fall semester. Students have the opportunity to become involved with ongoing faculty research. **All students seeking a degree must complete the program in residency, including the thesis.**

Master of Science in Architecture (Community Development Certification)

The Master of Science in Architecture with a certification in community development is an advanced, multidisciplinary, 36-credit-hour thesis degree program that will interest students who care about the quality of the built environment; are interested in the cultural, economic, and political life of communities; want to contribute to the creation and management of healthy and sustainable environments for people; and desire to learn the design and research skills that will allow them to make a difference.

In a world of increasing urbanization and globalization, a critical need exists to explore new solutions for accommodating ever-changing urban conditions while preserving the quality of life of all citizens. Community development aims at innovative and effective design research and practices to assist local governments, non-profit organizations, and development professionals in interpreting the needs of human and natural communities and transforming the demands into tangible proposals that could be implemented.

The curriculum allows students with various backgrounds to explore and investigate the complex realm connecting architecture,

urban design, and urban planning at different scales and to establish linkages among theory and practice. The program also provides opportunities for students to learn and gain hands-on experience through work on actual projects with community clients.

Master of Science in Architecture (Historic Preservation Certification)

The College of Architecture's Master of Science in Architecture with a certification in historic preservation is an interdisciplinary program encompassing 30 hours of course work and 6 hours of thesis. The program has three entry options:

- **Option 1:** Current TTU Architecture students, upon completion of the Master of Architecture program.
- **Option 2:** Students with a four-year B.A. or B.S. degree in architecture, environmental design or approved equivalent (such as interior design or landscape architecture degrees). Some non-graduate credit leveling course work in areas such as architectural history may be required.
- **Option 3:** Students with a four-year B.A. or B.S. degree in other fields. Some graduate credit leveling course work such as architectural history, architectural drawings skills, and building technology may be required.

The college is committed to educate and prepare graduate students to play a significant role in historic preservation. This program recognizes the need for a comprehensive understanding of historic preservation, including history, theory, and preservation technology. To satisfy these needs, the graduate program presents a balanced alignment of courses in these areas, as well as opportunities to work at sites across the state and nation on continuing preservation activities.

The program offers unique opportunities for national and international study, enabling both faculty and graduate students to explore preservation issues in these contexts. It provides students with the knowledge, skills, and awareness of the built, cultural, and natural environments to meet successfully the professional challenges in preserving the nation's heritage. The program enables students and faculty to participate in documentation, preservation, and research through cooperative and collaborative efforts with the public, private, and non-profit organizations.

Master of Science in Architecture (Design Visualization Certification)

The College of Architecture's Master of Science in Architecture with certification in visualization (VIZ) is an interdisciplinary certification that focuses on the digital visualization of art, design, engineering, and science. These inquiries are redefining the disciplines of environmental design, design communication, science, product production, fabrication, simulation, representation, gaming, and entertainment. There are three major areas of faculty interest in the VIZ certification, including the digital creation and exploration of virtual environments, industrial processes, and exploratory geometries.

The VIZ certification consists of 30 hours of course work covering the concepts, principles, and techniques of internet media, animation, and virtual reality. Upon completion of the course work the student will be required to produce a thesis (6 hours). Students will be required to take elective courses related to their specific interest in visualization to give them insight into the application of visualization in their discipline. The student's advisor, upon development of the degree plan, must approve these electives.

Students requesting admission into this certification area must meet or exceed all the entrance standards of the Graduate School and the College of Architecture. An admission application includes a portfolio of digital or analog work that communicates a basic understanding of the use of visualization. Students must also show a basic understanding and accomplishment of digital design skills, including modeling, rendering, and imaging. Candidates with deficiencies in these skills are required to take graduate or undergraduate leveling courses to acquire basic competence, enabling them to perform well

in the visualization course work. Any leveling course requirements will be in addition to the 36 hours required for the degree.

All students entering the program will be required to own, purchase, or lease computing hardware and software that will meet the requirements of the VIZ program. The college will provide studio workspace in which to keep the equipment. Some software is provided by the college. See the college web site for more details. This computing will be available in the student's studio workspace within the college. The college does not take responsibility for loss or damage to the equipment in the building.

Doctor of Philosophy in Land-Use, Planning, Management, and Design

The interdisciplinary Ph.D. degree program in Land-Use Planning, Management, and Design accepts students from diverse educational backgrounds. The program is administered by the dean of the College of Architecture with faculty and courses drawn from participating units across the university. It is designed to provide education in the several facets of physical design, with special emphasis on nonurban lands and those in arid and semi-arid environments. Included in the program are studies of the complex factors influencing human use of resources; training in the research and evaluative methods that can be applied to interdisciplinary studies; and education in the institutional structures that shape policy and action.

An individualized program is determined by the student's chair and committee consisting of 24 credit hours of required core courses, 36 credit hours of track courses, and 6 hours of tool courses. A minimum of 12 hours of dissertation is required to complete the 66 hours of course work beyond the bachelor's degree. Students with interests in architecture, community planning and design, historic preservation, environmental-natural resource planning and management, public policy administration, and many other aspects of land-use may find the program suitable to their needs. Additional course work, research projects, and ultimately the student's dissertation will focus on the track selected. A student also is required to present evidence of competency in an appropriate tool subject, computer science, or statistics.

Requirements considered for admission to the program include GRE, grade-point average, statement of research interests and goals, and letters of recommendation on official letterhead.

Because students come from a variety of backgrounds with different interests and career goals, one standard course of study is not required. Initial advisement and program development is conducted by the program coordinator. A degree plan is formulated by an advisory committee drawn from three or more departments and two or more colleges. This committee will arrange a student's course of study in the track specialization. The student will therefore follow a "custom-designed" program of study. The advisory committee will assist in administering comprehensive exams and direct the dissertation and the student's program in general.

The core courses for the program are listed below, although a certain flexibility is allowed. Current course descriptions may be found in the listings of the various departments.

Core Courses

ARCH 5382.	Urban Theory (3:3:0)
C E 5396.	Environmental Impact Analysis (3:3:0).
GEOG 5309.	Seminar in Regional Analysis (3:3:0).
PHIL 5330.	Philosophy of Science (3:3:0).
PUAD 5340.	Seminar in Public Administration (3:3:0).
LAW 6025.	Land Use Planning Law (V2 or 3).
RWFM 5303.	Synecology (3:3:0).
RWFM 6301.	Research Methods (3).

Courses in Land-Use Planning, Management, and Design (LPMD)

7000.	Research (V1-12).
8000.	Doctor's Dissertation (V1-12).

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

General Architecture Program. Admission to the university. Only courses with a minimum grade of C or better will be accepted for the preprofessional program.

FIRST YEAR			
Fall		Spring	
ARCH 1311, Des., Environ. & Soc.	3	ARCH 1412, Architectonics Studio	4
ARCH 1441, Arch. Delineation I	4	ARCH 1442, Arch. Delineation II	4
ARCH 2311, History World Arch.	3	ARCH 2315, Hist. 18th-20th	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
C E 1130, Civil Engr. Seminar I	1	C E 1305, Engr. Analysis I	3
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
TOTAL	17	TOTAL	20
SUMMER			
MATH 2350, Calculus III	3	MATH 3350, Math for Engr.	3
PHYS 1408, Prin. Physics I	4	PHYS 2401, Prin. Physics II	4
TOTAL	7	TOTAL	7

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, and grade point average.

SECOND YEAR			
Fall		Spring	
ARCH 2401, Arch. Design Studio I	4	ARCH 2402, Arch. Design Studio II	4
ARCH 2353, Computers in Arch.	3	ARCH 2394 Arch. Programming	3
ARCH 2351, Arch. Construction I	3	I E 3341 or MATH 3342, Statistics	3
C E 2301, Statics	3	C E 3303, Mechanics of Solids	3
C E 2101, Const. Materials Lab	1	C E 3103, Mechanics of Solids Lab.	1
HIST 2300, Hist. of U.S. to 1877	3	COMS Elective*	3
TOTAL	17	TOTAL	17
SUMMER			
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. I Lab	1	CHEM 1108, Prin. of Chem. II Lab	1
POLS 1301, Amer. Govt. Org.	3	POLS 2302, Amer. Public Policy††	3
TOTAL	7	TOTAL	7

THIRD YEAR			
Fall		Spring	
ARCH 3501, Arch. Design Studio III	5	ARCH 3502, Arch. Design Studio IV	5
ARCH 3353, Environ. Systems	3	ARCH 4355, Constr. Documents	3
C E 3321, Intro. Geotech. Engr.	3	C E 3302, Dynamics	3
C E 3121, Geotech. Engr. Lab	1	C E 3305, Mech. of Fluids	3
CTEC 2301, Surveying	3	Writing Intensive Elective+	3
HIST 2301, Hist. U.S. Since 1877	3	TOTAL	17
TOTAL	18		

FOURTH YEAR			
Fall		Spring	
C E 3440, Struct. Analysis I	4	C E 3341, Prin. Struct. Design	3
E E 3302, Fund. of Elec. Engr.	3	C E 4340, Structural Analysis II†	3
C E 3309, Envir. Engr. Systems I	3	I E 3301, Engr. Economic Analysis	3
C E 3171, Envir. Eng. Lab. I	1	C E 3372, Water Systems Design	3
M E 2322, Engr. Thermo I	3	C E 4343, Des. Concrete Structures	3
C E 3354, Engr. Hydrology	3	TOTAL	15
TOTAL	17		

FIFTH YEAR	
Fall	
ARCH 4601, Arch. Des. Studio V**	6
ARCH 4381, Urban Theory	3
C E 4330, Design Engr. Systems	3
C E 4342, Design Steel Struct.	3
C E 4361, Transport. Engr.	3
TOTAL	18

Total Hours —184.

Diversity elective required if seeking M.Arch.

* Approved Communication Studies course

† C E 4340 is offered every third semester only.

†† Or approved substitution

+ Select from ENGL 2311, 3365, 3366, or approved course.

** Optional courses are ARCH 4365, 4366 for the Bachelor of Science degree (preprofessional program) or ARCH 4602, Collaboration Studio. ARCH 4601/4602 are prerequisites for ARCH 5604/5605.

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

General Architecture Program. Admission to the university. Only courses with a minimum grade of C or better will be accepted for the preprofessional program.

FIRST YEAR			
Fall		Spring	
ARCH 1311, Des. Env. & Soc.	3	ARCH 1412, Architectonics Studio	4
ARCH 2311, History World Arch.	3	ARCH 2315, Hist. 18th, 19th, & 20th	3
ARCH 1441, Arch. Delineation I	4	ARCH 1442, Arch. Delineation II	4
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
MATH 1321, Trigonometry	3	MATH 1350, Analytical Geometry	3
TOTAL	16	TOTAL	17
SUMMER			
POLS 1301, Amer. Govt. Organ.	3	POLS 2302, American Public Policy*	3
ACCT 2300, Elem. Acct. I	3	ACCT 2301, Elem. Acct. II	3
TOTAL	6	TOTAL	6

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, and grade point average.

SECOND YEAR			
Fall		Spring	
ARCH 2401, Arch. Design Studio I	4	ARCH 2402, Arch. Design Studio II	4
ARCH 2351, Arch. Construction I	3	ARCH 2354, Com. Asst. Des. Dev.	3
ARCH 2353, Computers in Arch.	3	ARCH 3350, Arch. Construction II	3
MATH 2345, Intro. Stats. Bus.	3	ARCH 3373, Environ. Analysis - Site	3
ECO 2301, Prin. Economics I	3	ECO 2302, Princ. Economics II	3
TOTAL	16	TOTAL	16
SUMMER			
PHYS 1403, Gen. Physics	4	Natural Lab Science (4 hrs)†	4
MGT 3370, Org. and Mgt.	3	MKT 3350, Intro. to Marketing	3
TOTAL	7	TOTAL	7

To advance to the upper division of the Business Administration program, satisfactory completion of the above courses and a cumulative 2.75 GPA at Texas Tech is required.

THIRD YEAR			
Fall		Spring	
ARCH 3501, Arch. Design Studio III	5	ARCH 3502, Arch. Design Studio IV	5
ARCH 3353, Environ. Systems	3	ARCH 3354, Integrative Systems	3
ARCH 3355, Arch. Construction III	3	ARCH 3356, Spec. Stud. Con. Tech.	3
HIST 2300 Hist. U.S. to 1877	3	BLAW 3391, Bus. Law I	3
FIN 3320, Corp. Fin.	3	FIN 3332, Real Estate Fund.	3
TOTAL	17	TOTAL	17
SUMMER			
ISQS 3344, Intro. Prod/Oper. Mgt	3	Advanced BA course+	3
HIST 2301 Hist. U.S. Since 1877	3	TOTAL	3
TOTAL	6		

FOURTH YEAR			
Fall		Spring	
ARCH 4365, Project Mgt.**	3	Advanced BA course (3 hrs)+	3
MGT 3373, Managerial Com	3	ARCH 4381, Urban Theory	3
FIN 4336, Urban Land Develop.	3	ARCH 4366, Design/Build Meth.**	3
Economics Course	3	MGT 4380 Strategic MGT	3
Advanced BA Course+	3	TOTAL	12
TOTAL	15		

Total Hours—161.

See the College of Business Administration section of the catalog for information on lower division requirements.

* Or approved substitution

† Choose from Core Curriculum requirements.

+ These courses must be selected from the areas of accounting, economics, ISQS, management, and marketing and there must be at least one course chosen from at least two of the five areas.

** Students continuing to the M.Arch. program may require additional leveling, including ARCH 4601/4602 and a diversity elective.

Bachelor of Science in Architecture

General Architecture Program. Admission to the university. Only courses with a minimum grade of C or better will be accepted for the preprofessional program.

FIRST YEAR			
Fall: SEEING		Spring: MAKING	
ARCH 1311, Design Env. & Soc.	3	ARCH 1412, Architectonics Studio	4
ARCH 2311, History World Arch.	3	ARCH 2315, Hist. 18th, 19th, & 20th	3
ARCH 1441, Arch. Delineation I	4	ARCH 1442, Arch. Delineation II	4
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
MATH 1321, Trigonometry	3	MATH 1350, Analytical Geometry	3
TOTAL	16	TOTAL	17

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, and grade point average.

SECOND YEAR			
Fall: CONCEPTUALIZATION		Spring: SITE/PROGRAMMING	
ARCH 2401, Arch. Design Studio I	4	ARCH 2402, Arch. Design Studio II	4
ARCH 2351, Arch. Construction I	3	ARCH 2394, Arch. Programming	3
ARCH 2353, Computers in Arch.	3	ARCH 2354, Com. Asst. Des. Dev.	3
PHYS 1403, Gen. Physics	4	ARCH 3350, Arch. Construction II	3
Elective	3	ARCH 3373, Environ. Analysis - Site	3
TOTAL	17	TOTAL	16

SUMMER			
Natural Lab. Science†	4	POLS 1301, Amer. Govt. Org.	3
HIST 2300, Hist. of U.S. to 1877	3	HIST 2301, Hist. of U.S. Since 1877	3
TOTAL	7	TOTAL	6

THIRD YEAR			
Fall: TECHNOLOGY		Spring: INTEGRATION	
ARCH 3501, Arch. Design Studio III	5	ARCH 3502, Arch. Design Studio IV	5
ARCH 3353, Environ. Systems	3	ARCH 3354, Integrative Systems	3
ARCH 3355, Arch. Construction III	3	ARCH 3356, Spec. Stu. Const. Tech.	3
Diversity Elective††	3	COMS Elective*	3
Elective	3	POLS 2302, Amer. Public Policy**	3
TOTAL	17	TOTAL	17

FOURTH YEAR	
Fall: COMPREHENSIVE	
ARCH 4601, Design Studio V***	6
ARCH 4381, Urban Theory	3
ARCH 4355, Construction Doc.	3
Elective	3
Writing Intensive Elective+	3
TOTAL	18

Minimum hours required for graduation—131.

† Choose from Core Curriculum requirements.

†† Diversity elective course offerings are available on the architecture web site (www.arch.ttu.edu).

* Or approved oral communication course

** Or approved substitution

*** Optional courses are ARCH 4365, 4366 for the Bachelor of Science degree (preprofessional program) or ARCH 4602, Collaboration Studio. ARCH 4601/4602 are prerequisites for ARCH 5604/5605.

+ Select from ENGL 2311, 3365, 3366, or approved course.

Master of Architecture

General Architecture Program. Admission to the university. Only courses with a minimum grade of C or better will be accepted for the preprofessional program.

FIRST YEAR			
Fall: SEEING		Spring: MAKING	
ARCH 1311, Design Env. & Soc.	3	ARCH 1412, Architectonics Studio	4
ARCH 2311, History World Arch.	3	ARCH 2315, Hist. 18th-20th Cent.	3
ARCH 1441, Arch. Delineation I	4	ARCH 1442, Arch. Delineation II	4
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
MATH 1321, Trigonometry	3	MATH 1350, Analytical Geometry	3
TOTAL	16	TOTAL	17

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, and grade point average.

SECOND YEAR			
Fall: CONCEPTUALIZATION		Spring: SITE/PROGRAMMING	
ARCH 2401, Arch. Design Studio I	4	ARCH 2402, Arch. Design Studio II	4
ARCH 2351, Arch. Construction I	3	ARCH 2394, Arch. Programming	3
ARCH 2353, Computers in Arch.	3	ARCH 2354, Com. Asst. Des. Dev.	3
PHYS 1403, Gen. Physics	4	ARCH 3350, Arch. Construction II	3
Elective	3	ARCH 3373, Environ. Analysis - Site	3
TOTAL	17	TOTAL	16

SUMMER			
Natural Lab. Science†	4	POLS 1301, Amer. Govt. Org.	3
HIST 2300, Hist. of U.S. to 1877	3	HIST 2301, Hist. of U.S. Since 1877	3
TOTAL	7	TOTAL	6

THIRD YEAR			
Fall: TECHNOLOGY		Spring: INTEGRATION	
ARCH 3501, Arch. Des. Studio III	5	ARCH 3502, Arch. Design Studio IV	5
ARCH 3353, Environ. Systems	3	ARCH 3354, Integrative Systems	3
ARCH 3355, Arch. Construction III	3	ARCH 3356, Spec. Stu. Const. Tech.	3
Diversity Elective*	3	POLS 2302, Amer. Public Policy††	3
Elective	3	COMS Elective+	3
TOTAL	17	TOTAL	17

FOURTH YEAR			
Fall: COMPREHENSIVE		Spring: THEORY / IDEAS (Professional Level**)	
ARCH 4601, Design Studio V***	6	ARCH 5604, Urban Design Studio	6
ARCH 4381, Urban Theory	3	ARCH 5365, Arch. Res. Methods	3
ARCH 4355, Construction Doc.	3	ARCH 5362, Theory in Architecture	3
Elective	3	ARCH Elective	3
Writing Intensive Elective++	3	TOTAL	15
TOTAL	18		

Professional Program.** Requirements for admission to the professional level program includes: completion of all academic course work in the first three years and a threshold score on the Admission Criteria Rating System. The threshold score is based on a sliding scale of GRE, GPA, and portfolio scores. A copy of the form is available from the Academic Programs Office. In all graduate courses, no grade below a C will be accepted, a student must have a 3.0 GPA each semester, and a 3.0 GPA is required to graduate.

FIFTH YEAR			
Fall: RESEARCH / SERVICE (Professional Level**)		Spring: MASTER DESIGN STUDY (Professional Level**)	
ARCH 5605, Adv. Design Studio	6	ARCH 5692, Master Design Studio II	6
ARCH 5395, Master Design Studio I	3	ARCH 5392, Professional Practice	3
ARCH 5333, Studies in Arch. Hist.	3	ARCH Elective	3
Elective	3	TOTAL	12
TOTAL	15		

Minimum hours required for graduation—173.

+ Approved oral communication course

† Choose from Core Curriculum requirements.

†† Or approved substitution

* Diversity elective course offerings are available on the architecture web site (www.arch.ttu.edu).

*** Optional courses are ARCH 4365, 4366 for the Bachelor of Science degree (preprofessional program) or ARCH 4602, Collaboration Studio. ARCH 4601/4602 are prerequisites for ARCH 5604/5605.

++ Select from ENGL 2311, 3365, 3366, or approved course.

Dual-Degree Curriculum, Master of Architecture and Master of Business Administration

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

FIRST YEAR

Fall		Spring	
ARCH 1311, Design Env. & Soc.	3	ARCH 1412, Architectonics Studio	4
ARCH 2311, History World Arch.	3	ARCH 2315, Hist. 18th-20th	3
ARCH 1441, Arch. Delineation I	4	ARCH 1442, Arch. Delineation II	4
ENGL 1301, Ess. College Rhetoric	3	ENGL 1302, Adv. College Rhetoric	3
MATH 1321, Trigonometry	3	MATH 1350, Analytical Geometry	3
TOTAL	16	TOTAL	17

Preprofessional Program. Competitive placement based on comprehensive review, including student's portfolio, essay, and grade point average.

SECOND YEAR

Fall		Spring	
ARCH 2401, Arch. Design Studio I	4	ARCH 2402, Arch. Design Studio II	4
ARCH 2353, Comp. in Architecture	3	ARCH 2354, Com. Asst. Des. Dev.	3
ARCH 2351, Arch. Construction I	3	ARCH 2394, Arch. Programming	3
PHYS 1408, Gen. Physics	4	ARCH 3350, Arch. Construction II	3
Elective	3	ARCH 3373, Envir. Analysis - Site	3
TOTAL	17	TOTAL	16

SUMMER

Natural Lab. Science†	4	POLS 1301, Amer. Govt. Org.	3
HIST 2300, Hist. of U.S. to 1877	3	HIST 2301, Hist. of U.S. Since 1877	3
TOTAL	7	TOTAL	6

THIRD YEAR

Fall		Spring	
ARCH 3501, Arch. Des. Studio III	5	ARCH 3502, Arch. Design Studio IV	5
ARCH 3353, Environ. Systems	3	ARCH 3354, Integrative Systems	3
ARCH 3355, Arch. Construction III	3	ARCH 3356, Spec. Stu. Const. Tech.	3
Diversity Elective*	3	COMS Elective††	3
Elective	3	POLS 2302, Amer. Public Policy+	3
TOTAL	17	TOTAL	17

FOURTH YEAR

Fall		Spring (Professional Level**)	
ARCH 4601, Des. Studio V***	6	ARCH 5604, Urban Design Studio	6
ARCH 4381, Urban Theory	3	ARCH 5365, Arch. Res. Methods	3
ARCH 4355, Construction Doc.	3	ARCH 5362, Theory in Architecture	3
Elective	3	ARCH 5333, Studies in Arch. Hist.	3
Writing Intensive Elective+	3	TOTAL	15
TOTAL	18		

Professional Level Program.** Requirements for admission to the professional level program include completion of all academic course work in the first three years and a threshold score on the Admission Criteria Rating System. The threshold score is based on a sliding scale of GRE, GPA, and portfolio scores. In all graduate courses, no grade below a C will be accepted, a student must have a 3.0 GPA each semester, and a 3.0 GPA is required to graduate. In all BA graduate courses, one A above a 3.0 GPA is required to receive the M.B.A. degree. All BA courses must be completed with a minimum grade of B.

SUMMER

BLAW 5290, Bus Law	2	ACCT 5401, Fin. and Mgt. Acct.	4
ISQS 5345, Statistics	3	MGT 5376, Executive Skills	3
ISQS 5137, Mgt. Info. Sys.	1	TOTAL	7
TOTAL	6		

FIFTH YEAR

Fall (Professional Level**)		Spring (Professional Level**)	
ARCH 5605, Adv. Arch. Des. Studio	6	ARCH 5692, Master Design Studio II	6
ARCH 5395, Master Design Studio I	3	ARCH 5392, Professional Practice	3
MGT 5371, Mng. Org. Beh. & Des.	3	ARCH Elective	3
ECO 5310, Price & Income Theory	3	MKT 5360, Mkt. Con. and Strat.	3
TOTAL	15	TOTAL	15

SUMMER

FIN 5421, Financial Mgt. Concepts	4	ISQS 5243, Production/OP Mgt	2
ISQS 5242, Decision Theory	2	ISQS 5240, Systems Man. Analysis	2
TOTAL	6	MGT 5491, Strategy	4
		TOTAL	8

Total Hours—203.

† Choose from Core Curriculum requirements.

†† Or approved oral communication course

+ Select from ENGL 2311, 3365, 3366, or approved course.

* Diversity elective offerings are available on the architecture web site.

*** Optional courses are ARCH 4365, 4366 for the Bachelor of Science degree or ARCH 4602, Collaboration Studio. ARCH 4601/4602 are prerequisites for ARCH 5604/5605.

Master of Science in Architecture Certification in Historic Preservation

Fall		Spring	
ARCH 5315, Res. Meth. Hist. Pres.	3	ARCH 5321, Hist. Bld. Tech. Doc.	3
ARCH 5319, Arch. Hist. Before 1865	3	ARCH 5320, Arch. Hist. After 1865	3
ARCH 5324, History and Theory	3	ARCH 5325, Conservation Policies	3
TOTAL	9	TOTAL	9

SUMMER

Internship or off-campus program Summer Intern Program in Preservation Highly Recommended

Fall		Spring	
Elective*	3	Elective*	3
ARCH 5622, Preservation Studio	6	ARCH 6000, Thesis	6
TOTAL	9	TOTAL	9

Total Program Hours—36.

Most degree plans will require at least 6 hours of research.

Minor in historic preservation may be conferred upon completion of the first 18 hours of the curriculum.

* Must complete 6 hours of elective courses. See College of Architecture for an approved list.

Master of Science in Architecture Certification in Design Visualization

Fall		Spring	
ARCH 5331, Graduate Seminar	3	ARCH 5344, Virtual Reality Tech.	3
ARCH 5341, Internet Media, Vis. Des.	3	ARCH 5345, Des. Vis. Studio	3
ARCH 5352, Computer App., Arch.	3	ARCH 5343, 3-D Animation/Imaging	3
TOTAL	9	TOTAL	9

Fall		Spring	
ARCH 5345, Des. Vis. Studio	3	ARCH 6000, Thesis	6
ARCH 5365, Research Method	3	Elective	3
ARCH 7000, Research	3	TOTAL	9
TOTAL	9		

Total Program Hours—36.

Master of Science in Architecture Certification in Community Development

Total Program Hours—36

Required Courses (30 Hours)

ARCH 5315—Research Methods for Historic Preservation	
or COMS 5301—Qualitative Research Methods	
or COMS 5305—Quantitative Research Methods	
or PUAD 5320—Program Evaluation and Quantitative Analysis	
or PUAD 5321—Adv. Quantitative Methods in Public Policy and Administration	
or SOC 5334 Quantitative Methods in Sociology (3 hours)	
ARCH 5382 Urban Theory (3 hours)	
GEOG 5300 GIS (3 hours)	
ARCH 5605 Community Design Studio or other approved studio (6 hours)	
ARCH 6000 Thesis (6 hours)	

Curriculum includes 9 hours of courses in community design resources, urban land development, and participatory design. These courses are under development.

Suggested Elective Courses (6 hours)

ADV 5326—Advertising and the Consumer
ANTH 5322—Social Anthropology
ANTH 5323—Topics in Cultural Anthropology
ARCH 5331—Graduate Seminar
ARCH 5333—Special Studies in the History of Architecture
ARCH 5341—Internet Media for Design Visualization
ARCH 5362—Theory in Architecture
GEOG 5306—Seminar in Geography of Arid Lands
GEOG 5309—Seminar in Regional Analysis
HIST 5327—Studies in United States Immigration and Urban History
HMG 5327—Heritage Planning
LARC 5302—Advanced Environmental Planning for Sustainable Development
LARC 5303—Advanced Environmental Management for Sustainable Development
MGT 5371—Managing Organizational Behavior and Organizational Design
MGT 5372—Leadership and Team-Building Skills
POLS 5341—Public Policy, Theory, and Process
PUAD 5342—City Management
PR 5340—Foundations in Public Relations
PR 6315—Special Topics in Public Relations
SOC 5312—Seminar in Urban Problems

Architecture (ARCH)*(To interpret course descriptions, see pg. 10)*

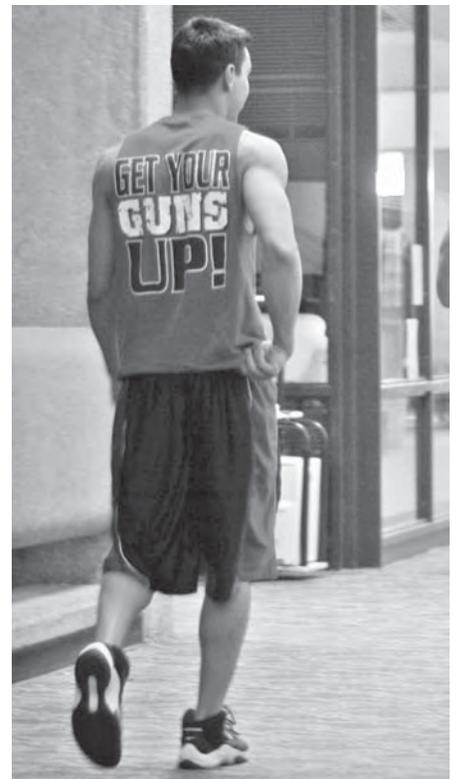
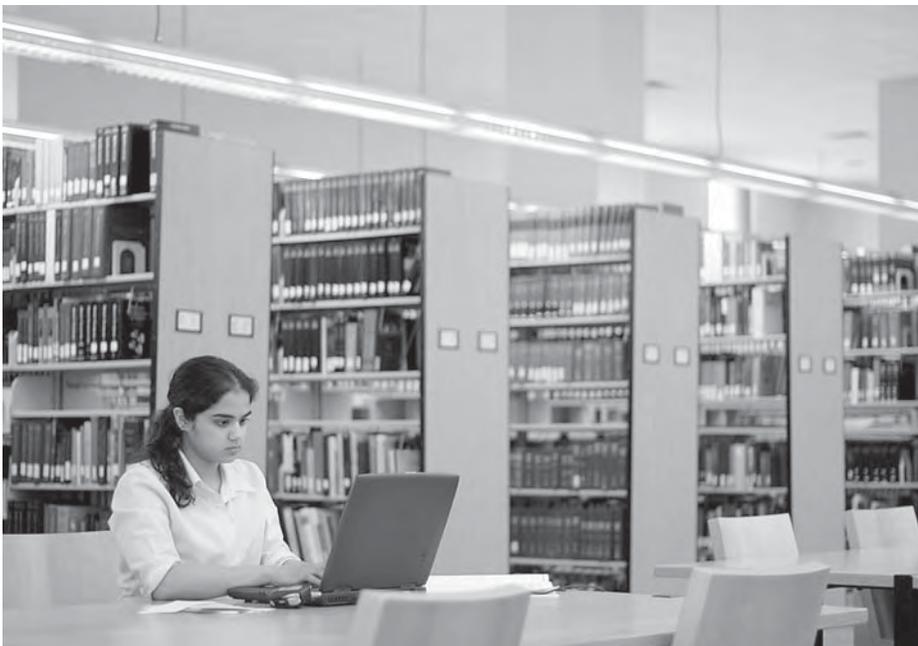
Courses with an asterisk (*) are open only to architecture majors or to students with the dean's permission.

Undergraduate Courses

- 1311. Design, Environment, and Society (3:3:0).** Introduction to architecture as an integral component of a complex world. Examination of societal and environmental contexts and appropriate design responses. F.
- 1412. Architectonics Studio (4:2:4).** Introduction to the principles and methods used at various stages of design analysis and synthesis processes. Skill developments in the abstraction, transformation, composition, and representation of two- and three-dimensional design. Outside assignments required. S.
- 1441. Architectural Delineation I (4:0:8).** Basic skills and techniques in representational drawing. Subjects include the human figure, architectural interiors and exteriors, landscapes and cityscapes. Black and white media. Outside assignments required. F.
- 1442. Architectural Delineation II (4:0:8).** Prerequisite: ARCH 1441. Development of graphic communication skills. Color theory and its application to architectural graphic expression. Presentation techniques. Outside assignments required. S.
- 2311. History of World Architecture c. 3000 BC to c. 1600 AD (3:3:0).** Survey of the development of world architecture from the ancient era to the advent of enlightenment in Europe.
- 2315. History of 18th, 19th, and 20th Century Architecture (3:3:0).** Prerequisite: ARCH 2311. Survey of the development of World Architecture from the Enlightenment in Europe to the present.
- 2351. Architectural Construction I (3:3:0).** Corequisite or credit in: ARCH 2401. Introduction to construction systems, methods, and materials with emphasis on the wall section. Introduction to issues of sustainability and envelope performance.
- 2353. 3-D Computer Design Drawing (3:2:2).** An introduction to the use of the computer as a design drawing tool with an emphasis on conceptual knowledge and computing skills for design communication.
- 2354. Computer Assisted Design Development (3:2:2).** Prerequisite: ARCH 2353. The use of 3-D computer graphics for design development with an emphasis on multimedia design presentations.
- 2394. Architectural Programming (3:3:0).** Introduction to architectural programming methodologies, including problem seeking, issue-goal identification, contextual and case studies, site analysis, space and spatial relationships, determination of budget, and project feasibility.
- 2401.* Architectural Design Studio I (4:1:8).** Prerequisite: Admission to the preprofessional program. Tonality: Conceptualization. Strengthens fundamental design addressing issues of conceptual design, structural order, and application of three-dimensional processes. Outside assignments required. F.
- 2402.* Architectural Design Studio II (4:1:8).** Prerequisite: ARCH 2401. Tonality: Site/Programming. Strengthens fundamental design addressing issues of context, environment, and program development/space planning. S.
- 3312. Architectural Theory Seminar (3:3:0).** Prerequisite: ARCH 2315. Topical theory seminar involving analysis of a body of scholarly literature, frequent writing and focused research. Writing intensive.
- 3313. Architectural History Seminar (3:3:0).** Prerequisite: ARCH 2315. Focused studies in western/non-western architectural history involving written and oral analysis of scholarly sources. Topic varies and may include preservation, race, class and/or gender issues. (Writing Intensive)
- 3324. Architectural Conservation (3:3:0).** Prerequisite: Junior standing or consent of instructor. An in-depth examination of history, theory, and practice of historic preservation, restoration, and federal legislation supporting preservation.
- 3350. Architectural Construction II (3:2:2).** Prerequisite: ARCH 2351. Study of statics, member analysis, material science, and advanced construction systems with emphasis on the systems module and introduction to system integration code and cost.
- 3353. Environmental Systems (3:3:0).** Introduction to thermal design, day-lighting, and analysis of mechanical, electrical, plumbing systems, and acoustical design. F.
- 3354. Integrative Systems (3:1:2).** Prerequisite: ARCH 3353; corequisite: ARCH 3502. Design applications of structural, mechanical, electrical, plumbing, and code/life safety systems. S.
- 3355. Architectural Construction III (3:2:2).** Prerequisite: ARCH 3350; corequisite: ARCH 3501. Study of structural capacity, connection design, and envelope performance and cost with emphasis on cladding. Introduction to system integration. Outside assignments required.
- 3356. Special Studies in Construction Technology (3:3:0).** Prerequisite: ARCH 3355. Approved technology elective dealing with the advanced study of technical building concerns.
- 3361. Design Workshop (3:3:3).** Special projects and project development in architectural design. Repeatable for credit.
- 3362. Product Design Workshop (3:0:6).** Introduction to the design and executed construction of a prototypical piece of furniture or other design product using an architectural design process. May be repeated for credit. S.
- 3373. Environmental Analysis - Site Planning (3:3:0).** A basic course to develop a working knowledge of the techniques and principles involved in site planning to provide optimum living and working environments.
- 3501.* Architectural Design Studio III (5:2:8).** Prerequisite: ARCH 2402. Tonality: Technology. Organization of space into a complex building entity with investigation of technical issues including structural concerns, the basics of environmental systems, and the configuration of envelope systems. Introduces life safety systems, building codes, and accessibility standards. F.
- 3502.* Architectural Design Studio VI (5:2:8).** Prerequisite: ARCH 3501. Tonality: Integration. Studio reinforces the integration of structural, environmental control, building envelope, and building systems into the design of the building. S.
- 4000. Research in Architecture and Urban Studies (VI-6).** Prerequisite: Advanced standing and approval of the dean. Individual studies of special interest in advanced architecture, history of architecture, and city planning. May be repeated for credit.
- 4091.* Architectural Internship (3).** Individual study based on an approved internship position consisting of a minimum of 300 hours per semester or summer.
- 4311. Architecture in Nonwestern Societies (3:3:0).** A study of multicultural architectural contributions, interrelationships of culture and architecture, diversity of traditions, meanings, modernity, and change in the nonwestern world.
- 4353. Advanced Computer Applications (3:2:2).** Prerequisite: ARCH 2353. Continuation of the principles of ARCH 2353. Advanced computer graphics applications, programming, and contract document systems.
- 4355.* Construction Documents (3:2:2).** Prerequisite: ARCH 2353, 3350, 3354, and 3502. Analysis and communication of technical information and the process of preparing documents for building construction.
- 4361. Architectural Studies Seminar (3:3:0).** The study, presentation, and discussion of issues regarding architecture as an aspect of culture. May be repeated for credit.
- 4364. Issues of Differences in the Built Environment (3:3:0).** Issues of race, ethnicity, culture, gender, and political-economic contexts influencing process of design of architecture, the built environment and international and cross-cultural architectural practices.
- 4365. Architectural Project Management (3:3:0).** Project organization and management documentation of project information, budget analysis, and coordination of consultants and building systems.
- 4366. Design and Building Methodology (3:3:0).** Design and construction under one contract as a delivery system, including scheduling, bidding, job site safety, and management.
- 4381. Urban Theory (3:3:0).** Prerequisite: Junior standing in architecture curriculum. An extensive writing course offering a comprehensive exploration of the relationship between culture, the city, planning, and urban design. (Writing Intensive)
- 4601. Architectural Design Studio V (6:3:8).** Prerequisite: ARCH 3502. Comprehensive architectural design involving the integration of programmatic and contextual issues, construction technology, and cultural factors. Outside assignments required. F.
- 4602.* Collaboration Studio (6:3:8).** An interdisciplinary studio for the design professions which addresses the process and skills necessary for collaboration as well as team-developed products.

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.
5302. **Product Design Workshop (3:0:6).** Introduction to the design and executed construction of a prototypical piece of furniture or other design product using an architectural design process. F.
5311. **Special Problems in Architectural History (3).** Individual advanced studies in architectural history of special interest to the student. May be repeated for credit.
5313. **Architecture of the 19th and 20th Centuries (3:3:0).** Social, technical, and intellectual influences on the development of 19th- and 20th-century architecture. Illustrated lectures.
5315. **Research Methods for Historic Preservation (3:3:0).** Survey of historiography and historic method; experience in use, analysis, and interpretation of primary and secondary sources from archives, libraries, and public records. (Writing Intensive)
5319. **History of American Architecture: Pre-Contact to 1865 (3:3:0).** Prerequisite: ARCH 2311 or approval of instructor. History of American Cultural expression, using buildings as a vehicle for exploring diverse issues including race, class and gender. Time period covers Pre-Contact to 1865. (Writing Intensive)
5320. **History of American Architecture: 1865 to the Present (3:3:0).** Prerequisite: ARCH 2311 or approval of instructor. History of American Cultural expression, using buildings as a vehicle for exploring diverse issues including race, class and gender. Time period 1865 to present. (Writing Intensive)
5321. **Historic Building Technology and Documentation (3:3:0).** Survey of techniques of restoration and stabilization of historic buildings; standards of workmanship; traditional methods and new technologies. Survey of documentation techniques and preservation design.
5324. **History and Theory of Historic Preservation (3:3:0).** Survey of theory and practice of historic preservation and restoration; overview of the history of the preservation movement in the U.S.
5325. **Conservation Policies (3:3:0).** Survey of federal and state enabling legislation; federal, state, and local policies on historic preservation and urban design, discussion of redevelopment strategies.
5326. **History of American Architecture: Pre-Columbian-1900 (3:3:0).** A survey of American architecture from the Pre-Columbian period to the year 1900. Architecture will be studied in a broad context that will include American art, literature, city planning, politics, and professional practice.
5331. **Graduate Seminar (3:3:0).** Prerequisite: College approval. Critical readings, discussions, and writing assignments on a range of interdisciplinary issues and theoretical positions. May be repeated for credit. (Writing Intensive)
5333. **Special Studies in the History of Architecture (3:3:0).** Prerequisite: ARCH 2311 and 2315. Studies in American architectural history involving written and oral analysis of scholarly sources. Topic varies and may include preservation, class, race and/or gender issues. (Writing Intensive)
5340. **Design Visualization Seminar (3:3:0).** Prerequisite: Approval of the instructor. Critical readings, discussions and writing assignments on issues pertaining to design visualization. Topics may vary per semester. May be repeated for credit.
5341. **Internet Media for Visualization Design (3:2:2).** Prerequisite: Fundamental understanding of Windows and graphic computer applications or approval of instructor. This course focuses on the design implications and application of interactive Internet visualization media for the communication of virtual environments.
5342. **Architecture Drawing (3:0:9).** Skills and techniques of drawing. Translation of perceptions of three-dimensional objects and spaces into graphic expression. Outside assignments required. May be repeated once for credit.
5343. **3-D Computer Animation and Imaging (3:2:2).** Prerequisite: ARCH 4352, equivalent, or instructor approval. This course covers the theory, design, and application three-dimensional computer animation and imaging.
5344. **Virtual Reality Software and Technology (3:2:2).** Prerequisite: 3D model / animation experience, permission of instructor. Focus on the theory, design, implementation and application of creating 3D stereoscopic real-time virtual environments.
5345. **Design Visualization Studio (3:0:6).** Prerequisite: ARCH 5343 and 5344 or permission of instructor. Students shall pursue the design and visualization of digital environments for design exploration, communication, research simulation, entertainment or gaming. May be repeated for credit.
5352. **Computer Applications to Architecture (3:2:3).** Survey of digital computer applications to the issues and processes of architecture and planning. May be repeated for credit.
5353. **Architectural Technology (3:3:0).** Examination of traditional and innovative uses of building materials, the application of industrial and scientific technology, and the integration of the building systems derived from these considerations. May be repeated for credit.
5361. **Architectural Theory Seminar (3:3:0).** Architecture as art, science, and a contemporary philosophical concept. Exploration of context and goals. May be repeated for credit. (Writing Intensive)
5362. **Theory in Architecture (3:3:0).** Examination of theoretical issues through critical reading of texts selected from Vitruvius to the most contemporary thinkers in relation to emerging design challenges. (Writing Intensive)
5363. **Architectural Design Programming (3:3:0).** Contextual and case studies; analyses of site, activities, space and spatial relationships. Systems and costs criteria. Determination of significant issues, goals, and emerging concepts.
5365. **Architecture Research Methods (3:3:0).** Comprehensive survey of qualitative and quantitative research methods and their method-specific hypothesis formulation, data acquisition, verification, and analysis. (Writing Intensive)
5382. **Urban Theory (3:3:0).** An extensive writing course proffering a comprehensive exploration of the relationship between culture, the city, planning, and urban design. (Writing Intensive)
5383. **Urban Land Development (3:3:0).** The land conversion process including feasibility analysis market and merchandising targets, site selection design, construction and financial analysis. Land-use controls, planning, and environmental constraints.
5391. **Architectural Internship (3).** Individual study based on an approved internship position consisting of a minimum of 300 hours per semester or summer. Internship will not be approved if the student has received credit for ARCH 4091.
5392. **Professional Practice (3:3:1).** The principles and practices of architectural business including the discussion of professionalism, administration, management, legalities, and liabilities. Exploration of current, advanced, and complex processes for the delivery of architecture.
5395. **Master Design Studio I (3:0:6).** Prerequisite: ARCH 5365; corequisite or prerequisite ARCH 5362. Guided individual research and documentation in a studio, leading to a seminal architectural project in ARCH 5692. (Writing Intensive)
5601. **Architectural Graduate Design I (6:0:12).** Knowledge and application of fundamental principles of architectural theory, organization, including the introduction to conceptual design through context, meaning and design processes as well as the introduction to graphic skills.
5602. **Architectural Graduate Design II (6:0:12).** Prerequisite: ARCH 5601. Integration of fundamental building systems, functional requirements, spatial composition and interior-exterior relationships. Course broadens the design process and communication skills.
5604. **Urban Design Studio (6:0:12).** Prerequisite: ARCH 4381 or consent of instructor. Recommended as the penultimate design studio. Explores the interface between culture and architecture at the scale of the city in terms of theory and design.
5605. **Advanced Architectural Design Studio (6:0:12).** Synthesis of human and environmental interaction. Comprehensive architectural design of complex building types involving integration of cultural factors, programming, conceptual issues, construction technology, and cost estimation.
5622. **Preservation Workshop (3:0:6).** Research on current preservation issues. Individual projects required.
5692. **Master Design Studio II (6:0:12).** Prerequisite: ARCH 5395, 5604, and 5605. Design and documentation of a seminal architectural project articulated in ARCH 5395.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**



College of Arts and Sciences



Jane L. Winer, PhD
Dean

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About the College

The College of Arts and Sciences offers a broad spectrum of programs and courses in the arts; humanities; mathematics; and social, behavioral, and natural sciences. The primary function of the college is to impart to students the knowledge, skills of thinking and communicating, and values and attitudes that constitute a liberal education. The faculty of the college seek to instill in their students a humanistic spirit, an appreciation of creativity, a commitment to excellence and truth, an ability to think critically and communicate effectively, and a desire for lifelong learning.

The courses and programs in the college also provide a base of knowledge and skills from which students may enter such professional fields of study as law and medicine.

General Undergraduate Degree Requirements

Core Curriculum Requirements. The Core Curriculum requirements ensure breadth in each academic program. These requirements have been incorporated into the college's various degree programs. Students have no need to refer to the Core Curriculum requirements unless so directed by their specific degree program.

Course Load. A normal full-time course load is 15 hours or more per semester. In calculating the course load, the dean will consider all active correspondence courses as a part of the course load. Course loads in excess of 19 semester hours require approval by the associate dean in the Student Division of the College of Arts and Sciences. The maximum course load for a student on probation is 16 hours. To receive full-time financial aid, students must be enrolled for a minimum of 12 hours. Some 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 one term or a total of 15 hours in both terms.

Correspondence Courses. Approval for courses to be taken by correspondence must be obtained at 102 Holden Hall. All prerequisites must be met to be granted enrollment. Junior status is required to enroll in upper division courses.

Catalog Selection. Students will use the catalog issued for the year in which they were first officially admitted to the College of Arts and Sciences, or a more recent catalog if approved. However, if they later transfer to another institution or another college at Texas Tech and then desire readmission to the College of Arts and Sciences, they will use the catalog in effect when they are readmitted. Students who do not enroll for one calendar year will be placed into the current catalog upon readmission to the university. For graduation purposes, a catalog expires after seven years at which time the current catalog becomes the catalog in effect.



Credit by Examination. A matriculated student may attempt credit by examination (described elsewhere in this catalog). Approval from the dean is required to take an examination a second time before six months has elapsed, if more advanced material in the same subject has already been completed, or if an examination is in the semester of graduation (generally not allowed).

Grading Practices. The College of Arts and Sciences conforms to university grading practices as set forth in the major section entitled Undergraduate Academics in this catalog.

Credits for a course in which a grade of D is earned may not be applied toward fulfillment of the major, adjunct, minor, concentration area, or teaching field requirements for any degree program.

Except for those courses designated “may be repeated for credit” in this catalog, no course may be used more than once on a degree plan unless it has been approved by the associate dean in the Student Division of the College of Arts and Sciences.

Freshman Year. Entering freshmen develop their programs in conference with an academic advisor. The students report to their advisors for such individual conferences or group meetings as are needed for the purpose of orienting themselves to academic regulations and procedures, curricula, and degree requirements in their various areas of interest.

Students are urged to take required freshman courses during the freshman year. During the sophomore year the student should complete the second year of English and all other freshman requirements. Normally, Core Curriculum requirements should be completed by the end of the sophomore year. Freshmen should not enroll in junior-senior level courses.

Admission of Transfer Students. Students transferring from another academic institution must meet the university-wide admission requirements stated in an earlier section. Students requesting permission to transfer from another college at Texas Tech must have an adjusted cumulative GPA of at least 2.0. In addition, they must provide the Student Division office (102 Holden Hall) with a transcript of all academic work. Approval will be granted at the Student Division office. 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 of Arts and Sciences.

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 of Arts and Sciences offers a broad area of education that includes the social sciences, arts, and humanities, as well as the natural sciences and mathematics. Arts and Sciences Undeclared is only a temporary administrative designation in which students cannot earn a degree. Students in the

College of Arts and Sciences are urged to focus on fulfilling general degree requirements during their first two years. This alleviates the pressure to make an immediate decision on a major and career. Students can use their first two years to build a strong academic foundation. At the same time, students can investigate career alternatives and take elective courses in those professional fields or subject areas that are possible majors. Students listed as ASUD are advised by academic counselors in the Advising Center for Texas Tech (79 Holden Hall) to help with selecting general degree requirements, electives, and a major. After taking courses that are required for most majors (e.g., English, American history, political science, mathematics), the student has the flexibility to begin working toward any of the major fields offered within the College of Arts and Sciences. **ONLY STUDENTS WITH FEWER THAN 60 HOURS MAY BE LISTED AS ARTS AND SCIENCES UNDECLARED.** Students who have completed 60 or more hours will have a hold placed on their records until they declare a major.

Final 30 Credit Hours. The final 30 credit hours of a degree program must be completed with Texas Tech enrollments. Credit for courses (other than TTU) taken without prior approval from the associate dean in the Student Division may not be applied to degree program requirements.

Degree Plan and Intention to Graduate. Students are encouraged to file degree plans with the student division office as soon as their academic goals are clearly defined. Students must file degree plans upon completing 60 hours of course work. In addition, the Intention to Graduate form must be submitted upon completion of 80 hours of course work. Students who have completed 80 or more hours will have a hold placed on their records until they file the Intention to Graduate form.

Teacher Education. The curricula of most of the Bachelor of Arts degree programs and some of the Bachelor of Science programs are sufficiently flexible to permit a student to major in an academic subject, yet meet the requirements for certification by taking the required courses in the College of Education. Prospective teachers should refer to the College of Education section of this catalog as well as consult the College of Education and the chairperson or undergraduate advisor of the department in which they wish to major.

Second Bachelor's Degree. Permission to enroll in courses to pursue a second bachelor's degree must be obtained at the Student Division office (102 Holden Hall). No second bachelor's degree is conferred until the candidate has completed at least 30 semester hours in the major in residence, in addition to the courses counted toward the first bachelor's degree. Credit by examination and correspondence courses will not satisfy the 30-hour residence requirement.

Undergraduate Degree Programs

General Degree Requirements

Requirements for the degree of Bachelor of Arts apply to all baccalaureate degrees offered through the College of Arts and Sciences unless specifically shown to the contrary. Not more than 24 hours in agriculture, architecture, business administration, education, engineering, human sciences, and/or mass communications 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 3-6 hours in visual and performing arts to fulfill the general degree requirement.

Major, Minor, and Electives

Students must take major, minor, and elective courses sufficient to total 120 semester hours, although some majors may require more total hours.

The minor may be any departmental minor, an established interdisciplinary minor, or a student-initiated interdisciplinary minor (with approval of the associate dean in the Student Division of the College of Arts and Sciences).

Many departments and programs have residency requirements for the major and minor. See departmental or program listings for specific information. Courses used to fulfill the writing intensive requirement are to be taken in residence.

Students should have selected their major and minor fields by the time they reach their junior year. For the major subject they will be required to complete a minimum of 30-36 semester hours, including 6 hours of intensive writing courses. As indicated in the degree programs on the following pages, some majors require more than the 30-hour minimum. At least 18-24 hours of the major subject must be in courses at the junior-senior level. For the minor, a minimum of 18 semester hours must be completed (except in certain foreign languages as explained in the curriculum for languages), at least 6 of which must be of junior or senior level. All courses in the major and minor must be approved by the appropriate academic unit. Students are expected to develop a degree plan no later than the first semester of the junior year. Forms and information are available in department offices.

A minimum of 40 semester hours of junior and senior work must be presented; not more than 8 hours may be counted in applied music and/or music ensemble; not more than 8 hours of personal fitness and wellness as well as exercise and sport sciences activity courses may be counted except for students offering exercise and sport sciences as a major, minor, or specialization.

Bachelor of Arts

The curriculum established for this degree is designed to provide the foundation of a liberal education through a well-rounded study of the humanities; arts; mathematics; and social,

behavioral, and natural sciences. It also provides the factual basis and the insights requisite for specialized study and professional work in these fields.

General Requirements. See Undergraduate Credit by Examination in the Admissions section of this catalog for information on credit provided by test scores to meet these requirements. Students must take the specified number of hours in the areas listed below. With a few exceptions, courses from the major and minor may be used to satisfy these requirements. Except for the multicultural requirement, a course may not be counted in two different areas of the general requirements nor may a course be counted in requirements for both the major and minor.

Semester Hours

English	12
The 12 hours of English must consist of ENGL 1301 and 1302 and two literature courses (which excludes ENGL 2311, 2371, 3365, 3366, 3367, 3368, 3371, 3372, 3373, 4300, 4360, 4365, 4366, 4367, 4373, and 4378 as they are not literature courses). However, ENGL 2311 or CLAS 1310 may be used as equivalents to fulfill 3 hours of this requirement.	
Oral Communication	3
COMS 1300, 2300 or 3358, CH E 2306, MGT 3373 (MGT 3373 may not be taken by correspondence), PETR 3308.	
Foreign Language	11-16
A student must complete 6 hours at the sophomore level or above in a single language. If 4 or more semesters of high school foreign language are accepted for admission, the student should consult the information preceding the course listing for the foreign language department. A student enrolling in the first-year sequence will have a requirement of 11-16 hours. A student who enrolls in the second-year sequence will have a 6-hour requirement. International students whose native language is not English and who graduated from a secondary school in their native country may satisfy this requirement by bringing their certificate of graduation to the Student Division of the Arts and Sciences Dean's Office. Credit by examination through the language laboratory is available for the following languages: French, German, Latin, and Spanish. Students who petition to complete the foreign language requirement via study abroad through a non-Texas Tech affiliated program will agree to have foreign language credit applied to their degrees based on scores on a language placement test administered by the language laboratory upon their return from the study abroad. Approval to do this must be granted in advance by the Associate Dean. For more information, consult the Department of Classical and Modern Languages and Literatures.	
Mathematics and Logical Reasoning	6
All mathematics courses 1300 and above (except 3430) may be used. Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply. PHIL 2310 or 4310 may be used to satisfy 3 hours of this requirement. The following courses from the Core Curriculum may not be used: AAEC 3401, I E 3341, MUTH 3303, PSY 3400, and SOC 3391.	
Natural Science	8-11
If 4 or more high school semesters of natural laboratory science (not including general, physical, or applied science) are accepted for admission, the requirement is 8 hours; if not, the requirement is 11 hours. The first 8 hours of a student's requirement must come from the natural science laboratory courses listed in the Core Curriculum. Additional required credit hours may come from those courses or from ANTH 3310, 3311, 4341, or HONS 3302.	
Technology and Applied Science	3
Courses must be selected from the list of Core Curriculum options.	
Individual or Group Behavior	6
Three hours must come from courses in individual or group behavior approved for Core Curriculum requirements. The other 3 hours may come from	

the same list or from anthropology, economics, geography, political science, psychology, sociology, and social work but excluding courses cited as options for any other requirement.

American History	6
Students will normally enroll in HIST 2300 and 2301 although any American history courses will satisfy this requirement.	
Political Science	6
Students will enroll in POLS 1301 and normally in 2302. For more information, see the Department of Political Science section of this catalog. One course must be taken from a Texas college or university.	
Humanities	6
Classical and modern languages, English (except ENGL 2311, 3365, 3366, 3367, 3368, 4365, 4366, and 4367), history, philosophy (except PHIL 1310, 2310, 3321, 3330, 3331, 4310), ANTH 3323, 3325, 3346, 3351, ARCH 2311, 2312, 3311, CLAS 3302, 3303, 3320, 3330, 3350, C LT 2301, 3302, 3334, 4305, COMS 3311, 3318, 3319, ADM 3312 HONS 3301, HUM 2301, 2302, JOUR 3350, LAIS 2300, 4300, LARC 3302, POLS 3330, 3331, 3332, 3333, 3334, TH A 2310.	
Visual and Performing Arts	6
Art (except ART 3311, 3362, 4315), ARCH 1412, 1441, 1442, DAN 3313, HONS 3304, LARC 1401, MUAP 1001, 1002, 1123, 1124, 2001, 2002, 2123, 2124, 2133, 2134, 3001, 3002, 3205, 4001, 4002, MUCP 1201, 1202, any MUEN course except 1103, MUHL 1301, 1302, 1308, 2301, 2302, 2308, 2309, 3304, 3308, MUSI 2301, MUTH 1300, 1301 and 1101,1303 and 1103, 1304 and 1104, TH A 2301, 2303, 2304, 2305, 3308, 3309, 3310, 4303, SPAN 4392.	
Multicultural Requirement	3
3 hours of course work chosen from the Core Curriculum requirements approved list. This course may also be used to satisfy another general degree requirement listed above.	
Personal Fitness and Wellness	2
To satisfy the College of Arts and Sciences requirement of 2 hours of personal fitness and wellness, students are to complete successfully any two PF&W courses. For a specific physical activity, the completion of the course sequence is allowed if the sequence is taken in the appropriate order (i.e., beginning then advanced). Only exercise and sport science majors may satisfy this requirement with ESS activities courses. Also accepted for fulfilling the requirement are AERS 1105, 1106, DAN 1107, 1304, 2100, 2102 (all with permission of instructor), MILS 1101, 1102, MUEN 1103. Students over age 25 are exempt. Any student who has served honorably in the U.S. Armed Forces for a minimum of 90 days may receive credit for 2 semester hours in personal fitness and wellness. Application for this credit must be made in the first semester of attendance at the university. Students participating in varsity athletics may enroll in the PF&W course that corresponds to their varsity sport. A maximum of one credit hour per academic year per sport may be earned in this manner.	

Bachelor of General Studies

The B.G.S. is a unique program for students who wish to study multiple fields in equivalent depth. As an interdisciplinary liberal arts degree, it requires the same general requirements as the Bachelor of Arts degree. Instead of a major and minor, the student selects three concentration areas, each of which meets the minimum requirements of an existing departmental or interdisciplinary minor. Together, the three concentration areas (minor fields) formulate a coherent specialization of interest to the student that is unavailable elsewhere in the university as an organized program of study. The student chooses the three concentrations in consultation with the B.G.S. advisor and, as necessary, the departmental or program advisors overseeing the minor areas. Each concentration area consists of a minimum of 18 hours in the chosen discipline, for a total of 54 hours across the three areas.

Through these self-selected concentration areas, forming an integrated specialization, and with a liberal arts foundation, the B.G.S. degree can prepare a student to pursue an intellectual interest, a career goal, or graduate or professional study. For example, a student might focus on a specialization in "science journalism" with concentrations made of minors in biology, chemistry, and journalism. Or one might specialize in "Hispanic studies" using concentrations made of minors in Spanish, history, and Latin American and Iberian Studies. Likewise, a student might fulfill course work in preparation for medical school by forming concentration areas after minors in biology, biochemistry, and psychology; or for law school by basing the concentrations on minors in political science, history, and English. Students who wish to earn teacher certification at the secondary level could make two concentration areas out of the subject matter fields and the third concentration area out of the requisite education courses.

Admission Requirements. A GPA of 2.0 is required. Students declare the General Studies major just as they do any major. A visit with the General Studies advisor (806/742-2353) is the best place to start, followed by visits to program advisors representing the three intended concentration areas. Students who permanently reside at a distance from Texas Tech and who are unable to travel to campus to attend classes may pursue the degree externally using print-based and Internet courses through the Division of Outreach and Extended Studies. For information about Extended Studies, call (806) 742-7200 or visit www.dce.ttu.edu.

Graduation Requirements. Requirements for the B.A. degree apply to the B.G.S. degree. All course work in the general degree requirements, the three concentration areas, and electives must total a minimum of 120 semester hours. Students should be aware that the later one enters the program the greater likelihood of needing more than the minimum total hours to complete the program, due to possible incompatibility of earlier completed courses with the selected concentration areas and general degree requirements. Similarly, prerequisites for courses selected in the concentration areas must be completed and, depending on the concentration, may not count toward the 18-hour minimum. A minimum of 6 hours of upper-division course work is required in each concentration area, with a total of 40 upper-division hours required for the degree. Students wishing to develop a concentration area based on a minor in the College of Mass Communications or the College of Business Administration must meet the GPA standard and complete necessary prerequisites to take those courses. Alternatively, students having an interest to develop a business or finance oriented concentration may do so, with guidance and approval of appropriate advisors, using courses from such disciplines as economics, personal financial planning, agricultural economics, consumer science, and merchandising. Departmental requirements for entering these courses must be met.

Research Option. Highly motivated and focused students may wish to culminate the integration of concentration areas in a written research project supervised by a student-selected faculty member from one of the concentration areas. This can be done by selecting individual research or individual studies courses for the final 6 hours of course work in one or more of the concentrations. Under the direction of a faculty member, such courses engage the student in readings, research, or an applied project related to the concentration areas. The faculty member may recommend, or the student may elect, that the project be evaluated by at least one other faculty member from each of the other concentration areas.

Bachelor of Science

The B.S. degree permits a greater degree of specialization than the B.A. and is currently offered by the following departments: Biological Sciences; Chemistry and Biochemistry; Economics and Geography; Geosciences; Health, Exercise, and Sport Sciences; Mathematics and Statistics; and Physics. Requirements for the B.A. degree apply unless specifically shown to the contrary. The following courses are required for the B.S. degree:

	<i>Semester Hours</i>
English	12
Oral Communication	3
Foreign Language	6-16
Mathematics and Logical Reasoning	6
Political Science and History	12
Natural Science	8
Technology and Applied Science	3
Individual or Group Behavior	3
Humanities	3
3 hours of literature taken in the English requirement will also satisfy this requirement.	
Visual and Performing Arts	3
Personal Fitness and Wellness	2
Multicultural Requirement	3
3 hours of course work chosen from the Core Curriculum requirements approved list. This course may be used to satisfy another general degree requirement.	
Major	(min.) 36
(Including a minimum of 24 junior-senior hours)	
Minor	(min.) 18
Including a minimum of 6 junior-senior hours. The minor may be any departmental minor, or established interdisciplinary minor approved by the major department, or a student-initiated minor approved by the Associate Dean.	
Adjunct Requirements	As required
Requirements determined by the major department as essential to supplement the major.	
Total for degree	(min.) 121

Specific curricula are provided for all programs leading to the Bachelor of Science degree. It is expected that students will follow the suggestions and recommendations contained in the department sections of this catalog.

Bachelor of Science in International Economics

The B.S.I.E. provides understanding of international economic and commercial relationships through concentrations of course work in international economics, international politics, and international business. This understanding is important for a variety of careers with either direct or indirect interna-

tional aspects. Requirements for the B.S. degree apply unless specifically shown to the contrary. The following courses are required for the B.S.I.E. degree:

	<i>Semester Hours</i>
English	12
(Inc. ENGL 2311 and any ENGL literature course)	
Foreign Language	11-16
Mathematics	6
(MATH 1330 and 1331 or more advanced courses)	
Political Science and History	12
Personal Fitness and Wellness	2
Oral Communication	3
Natural (Laboratory) Science	8
Technology and Applied Science	3
Humanities	3
3 hours of literature taken in the English requirement will also satisfy this requirement.	
Visual and Performing Arts	3
Individual or Group Behavior	3
(May be satisfied with courses taken in major)	
Multicultural Requirement	3
3 hours of course work chosen from the Core Curriculum requirements approved list. This course may be used to satisfy another general degree requirement.	
Economics and Int'l. Economics:	30
ECO 2301, 2302, 3311, 3312, 3330, 3333, 4331, 4332, and two advanced elective courses in ECO.	
Intl. Business, Managerial Economics	18-19
and Quantitative Tools: Basic Statistics AAEC 3401 or MATH 2345 or 2300, five of the following: ACCT 2300 and 2301 (counted as one), MKT 4358, MGT 4375, ECO 3320, ECO 4305 or AAEC 4312, AAEC 4302, 4306, 4317, FIN 3320, 4328, ISQS 3343, 3344, FREN 4304, SPAN 3306, 3344, 4308, 4344.	
International Political Science	9
Three of the following: POLS 3360, 3361, 3363, 3366, 3371, 3372, 3373, 3374, 3375, 3376, 3378.	
Elective Courses	0-9
Total for degree	(min.) 121

For more information and academic advisement, contact the Department of Economics and Geography.

Cooperative Agreement With School of Law

"3+3" Early Admission Program. The Arts and Sciences B.A. or B.S. degree may be obtained by Honors College students in good standing with the Honors College by completing course work totaling a minimum of 100 semester hours in the College of Arts and Sciences and then completing the first year of course work at the Texas Tech School of Law. To be eligible to participate in this program, students must meet the following criteria:

- Have an undergraduate GPA of at least 3.5.
- Have an LSAT score that places them in the top half nationwide.
- Have an SAT of at least 1300 or an ACT of at least 29.
- Be enrolled in the Honors College and making satisfactory progress toward an Arts and Sciences B.A. or B.S. degree consistent with the regulations established by the College of Arts and Sciences and the Honors College as set forth below.

In addition, the following regulations apply to program participants:

- Of the 100 semester hours of undergraduate work, at least the last 30 must be completed from Texas Tech. This minimum will apply to transfer students from other colleges, provided they have satisfactorily completed the work outlined in the freshman and sophomore years or its equivalent. (Note that the

Honors College residency requirement generally requires a minimum of three long semesters of work from Texas Tech for Honors graduation.)

- The 100 hours of work must satisfy all graduation requirements for the B.A. or B.S. degree in the College of Arts and Sciences at Texas Tech, with the exception of requirements in the minor. Honors students must complete the minimum requirements for an Honors College designation as outlined in the Honors Student Handbook.

- The applicant for a degree under this plan must submit an official transcript from the Texas Tech School of Law following completion of the first year of course work in the School of Law in order to earn the baccalaureate degree. Evidence of the successful completion of the first year of law school course work (totaling 29 hours) will substitute for the 18 hours required for the minor and any electives needed (totaling up to 11 hours) for the baccalaureate degree.

- The total number of credit hours from outside the College of Arts and Sciences (including those transferred as non-Arts and Sciences credit) and the credit hours from the School of Law applied to the baccalaureate degree cannot exceed 30 hours.

- Any student selecting the "3+3" Early Admission Program option should plan carefully in consultation with the associate deans of the Honors College and the College of Arts and Sciences at least one year prior to beginning professional school. Students wishing to pursue the "3+3" program also must file a degree plan with an Arts and Sciences major and a Law minor at least one semester prior to beginning their course work in the School of Law.

For more information on the Early Admission Program, see the Honors College web site at www.honr.ttu.edu.

Interdisciplinary Programs

Asian Studies

The minor in Asian Studies allows students throughout the university to develop expertise in a vital part of the world. Besides taking core courses and electives drawn from a wide range of disciplines, including architecture, geography, history, philosophy, and political science, students may also study Asian languages such as Chinese, Japanese, or Vietnamese. The minor in Asian Studies requires 18 hours of course work in addition to the courses taken to fulfill a student's major. **Contact information:** Dr. Patricia Pelley, Department of History, (806) 742-1004 ext. 242, patricia.pelley@ttu.edu.

Community and Urban Studies

The College of Arts and Sciences offers an interdisciplinary minor in community and urban studies. The program consists of an integrated course of study that provides the student with a conceptual and theoretical foundation for recognizing and approaching urban problems. An opportunity is also pro-

vided for observation and analysis of community and urban affairs. The program includes core courses in architecture, economics, geography, history, political science, and sociology as well as elective courses in architecture, business administration, economics, geography, history, landscape architecture, political science, sociology, and social work. **Contact information:** Dr. Yung-mei Tsai, 162 Holden Hall, (806) 742-2401 ext. 233, FAX (806) 742-1088, yung.mei.tsai@ttu.edu.

Comparative Literature

Undergraduate Program

Comparative literature is designed for students who are interested in studying literature from interdisciplinary and multicultural perspectives. 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 course work from either the Department of Classical and Modern Languages and Literatures or the Department of English if such course work is not in the student's major field. Students not majoring in a foreign language must complete at least 3 hours at the junior or senior level in a foreign language. Comparative literature minors must take at least 6 hours from the following courses: CLAS 3350, C LT 4300, 4305, 4317, ENGL 3334, 4334, 4335, GERM 4312, HUM 2301, 2302, SLAV 2301, and W S 4310. Individual minor programs are arranged by the student and the Director of the Program on Comparative Literature. This minor may not include course work in the student's major field unless such course work is over and above the minimum catalog requirements for the major. **Contact information:** Dr. Rob Stewart, Associate Dean, (806) 742-3933, rob.stewart@ttu.edu.

Courses in Comparative Literature (C LT)

- 4300. Individual Studies in Comparative Literature (3).** Independent study in comparative literature under the guidance of a faculty member. May be repeated for credit with the consent of instructor.
- 4305. Contemporary Theories of Cultural Meaning (3:3:0).** Introduction to the most important contemporary theories on the nature and origin of meaning in culture.
- 4317. Readings in Comparative Literature and Culture (3:3:0).** Readings from a particular period or study of a literary theme or genre. May be repeated for credit with consent of instructor.

Graduate Program

Administered by the Comparative Literature Committee, this interdisciplinary specialization gives students the opportunity to study literature from an international 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.

At the master's level, there are majors in classical humanities, English, French, German, and Spanish with specializations in comparative literature. At the doctoral level, majors are offered in English and Spanish with specializations in comparative literature. Students specializing in comparative literature at both the M.A. and Ph.D. levels must be admitted to the program in which they plan to major (e.g., English, Spanish). The graduate advisor of the program in comparative literature oversees the preparation of the comparative literature specialization.

Comparative literature candidates who are not international students should have completed sufficient language study to begin or continue graduate work in the literature of at least two languages. Inquiries concerning sound preparation for master's and doctor's level specializations in comparative literature should be addressed to the graduate advisor of the program in comparative literature.

At the master's level, students are required to take at least five courses for the specialization: at least two graduate literature courses in languages other than their major, and at least two graduate Comparative Literature (C LT) courses. The fifth course may be an interdisciplinary elective, approved by the graduate advisor of the comparative literature program. Degree plans must be approved by both the student's major advisor and the graduate advisor in comparative literature.

At the Ph.D. level, the specialization involves a minimum of six courses: at least two in Comparative Literature (C LT); at least three graduate courses must be 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.

Courses in Comparative Literature (C LT)

- 5301. Theories of Literature (3:3:0).** Intensive exploration of selected theories or methodologies of literary study. May be repeated.
- 5310. Literature and Cultural Studies (3:3:0).** Places a variety of national literatures in relation to other cultural institutions and structures. May be repeated for credit. Readings in English.
- 5314. Literature and Gender (3:3:0).** Examines the representation of gender in various national literatures. May be repeated for credit.
- 5355. Studies in Comparative Literature (3:3:0).** Practice of the study of comparative literature with emphasis on themes and motifs. (ENGL 5355)
- 7000. Research (VI-12).**

Dramatic Writing

The faculties of English, Mass Communications, and Theatre and Dance offer an interdisciplinary minor in dramatic writing. The program is designed to prepare students to write scripts for cinema, television, and stage

productions. The minor consists of 21 hours—12 in writing and 9 in analysis. The 12 hours in writing are to be chosen from the following courses, and the selection must include at least one course from each department: ENGL 3351, 4351, EM&C 4370, 4375, and TH A 4303 (may be repeated for credit). The 9 hours in analysis will include EM&C 3345, TH A 3335, and one of the following courses: ENGL 3388, 4312, or 4315. Courses in which the student earns less than a C may not be counted toward the minor. This 21-hour requirement may not include courses taken to fulfill requirements in the student's major field. **Contact information:** Dr. Norman Bert, University Theatre, norman.bert@ttu.edu, (806) 742-3601

Environmental Studies

The college offers an interdisciplinary minor in environmental studies. This minor is non-technical in nature and is specifically designed for students seeking the Bachelor of Arts degree. Its focus is on the interaction of humans and the natural environment and the consequences of that interaction. The environmental studies minor does not seek to train professional environmentalists, but in combination with existing major programs, it will give the student a broad foundation for more advanced environmental studies programs, professional work in law, regional planning or resource management, various environmental positions in government, business, or teaching. The plan will also provide students with a better understanding of basic ecology and the nature of environmental problems so that they can make more knowledgeable value judgments on environmental issues, a vital concern in the contemporary world. The minor consists of 18 hours of elective courses. No more than 6 hours from any department or program may count toward the minor. At least 6 hours must be from upper division. Electives in the program include: AAEC 4313, ANTH 3314, 3317, ATMO 1300, 2301, BIOL 1305, 1401, 1402, 3309, ECO 3336, GEOG 1401, 1402, 3300, 3301, 3310, 3335, 3353, 3360, 4301, 4321, GEOL 1303, 3322, 3323, HLTH 2302, HIST 3327, LARC 4302, 4303, PHIL 3325, RWFM 2301, 2302, 2305. **Contact information:** Dr. Mark Stoll, Department of History, (806) 742-3744, mark.stoll@ttu.edu.

Ethnic Studies

Undergraduate Program

The college offers an interdisciplinary minor in ethnic studies. The goals of the program are to increase students' understanding of the nature and development of race relations and to stimulate a greater sense of dignity for minority students. Students may, if they wish, specialize in African-American, Mexican-American, or Native-American studies. All students minoring in ethnic studies must complete at least 18 hours in ethnic content courses. No more than three courses may be taken in one department. Electives in the program include: ANTH 1301, 2301, 2302, 3325, 3331, 3345, 3347, 3371, 4372, ART 3311, 4315, COMS 3332, ENGL 3322, HIST 3311,

3312, 3318, 3324, 3325, 3326, 3395, 4326, 4383, MUHL 3304, PSY 3305, SOC 3324, 4362, SPAN 4320, 4360. **Contact information:** Dr. Jorge Iber, Department of History, (806) 742-3744, jiber@ttacs.ttu.edu.

Graduate Program

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 it is anticipated that students from diverse fields may benefit from either a broader or a more specialized knowledge of ethnicity. Students may, if they wish, 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 marked with an asterisk will be considered acceptable as part of the minor when the topic studied deals with ethnic groups.

Program Courses

ANTH 5322.	Social Anthropology (3:3:0).
ANTH 5323.*	Topics in Cultural Anthropology (3:3:0).
ANTH 7000.*	Research (V1-12).
ART 5315.	Arts of the Indian Americas (3:3:0).
COMS 5302.	Intercultural Communication (3:3:0).
ECO 7000.*	Research (V1-12).
EDBL 5332.*	Foundations of Bilingual Education (3:3:0).
EDBL 5333.*	Teaching the Multicultural-Multilingual Student (3:3:0).
EDEC 5314.	Early Education for Culturally Diverse Children (3:3:0).
EDCI 7000.*	Research (V1-12).
EDEL 7000.*	Research (V1-12).
HIST 5319.	Studies in Native-American History (3:3:0).
HIST 5333.	Studies in African-American History (3:3:0).
HIST 6304.*	Seminar in American History (3:3:0).
HIST 7000.*	Research (V1-12).
POLS 5327.*	Selected Topics in American Government and Politics (3:3:0).
POLS 7000.*	Research (V1-12).
PSY 5332.	Stereotypes and Prejudice (3:3:0).
SOC 5312.	Seminar in Urban Problems (3:3:0).
SOC 5313.	Seminar in Minority Relations (3:3:0).
SOC 7000.*	Research (V1-12).
SPAN 5381.	Hispanic Literature of the Southwest (3:3:0).
SPAN 7000.*	Research (V1-12).

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 course work divided into two tracks: Historical and Social Sciences (HSS) and Arts and Humanities (AH). Students will take at least 6 hours in each track, but the total hours will number 18. Students will choose from a curriculum that currently includes courses in architecture, art, classical and modern languages and literatures, English, history, music, philosophy, political science and theatre and dance. Students are encouraged to take appropriate courses in a European country. They should also take at least one course in a European language other than English (or a course on an appropriate literature translation) beyond the basic foreign language requirement in the College of Arts and Sciences. Those basic courses and sophomore-level English courses will not count towards the minor. **Contact information:** Dr. David Troyansky, Department of History, d.troyansky@ttu.edu, (806) 742-3744.

Family Life Studies

The Colleges of Arts and Sciences and Human Sciences jointly offer an interdisciplinary minor in family life studies. The program involves an integrated course of study and provides the student with a variety of perspectives on the family. The minor consists of 18 hours chosen from several disciplines. No more than 6 hours may be taken from any one department. Courses counted toward the major will not count toward the minor. At least 6 hours must be at the junior-senior level.

Courses may be selected from the following: HLTH 1300, 1305, 2302, 3313, 3314, HIST 3322, 3323, 3341, 4325, PSY 3341, 4300, 4301, 4310, SOC 2331, 3325, 3331, 4373, S W 3311, 3312, H D 2303, 3301, F S 2322, 3320, 3321, 3322, 3324, 3326, 3328, 3332, HDFS 3331, 3350, FFP 1370, 3325, 3375. **Contact information:** Dr. Charlotte Dunham, Department of Sociology, Anthropology, and Social Work, (806) 742-2400, charlotte.dunham@ttu.edu.

Forensic Sciences

The goal of the interdisciplinary minor is to offer students the opportunity to take courses pertinent to scientific and methodological issues associated with crime investigation and criminal behavior. All students minoring in forensic sciences must complete at least 18 hours in designated forensic-related courses. No more than 12 hours may be taken in one department or program. At least 12 hours

must be taken in upper-division courses. Courses with a grade of D cannot be counted toward fulfillment of the minor. At least 6 hours of upper-division courses must be taken at Texas Tech. All students enrolled in the forensic sciences minor are required to enroll in the introductory forensic science course PHYS 2351.

Cross-listed courses in the physical and biological sciences include CHEM 3141, 3341, 4010, 4114, and 4314; PHYS 2351, 3204, 3351, and 4000; BIOL 3416 and 4301; MBIO 3401; ZOOL 4321; ENTX 4325 and 4326; ANTH 2305 and 4343; AHMT 4305; and NURS 3030.

Cross-listed courses in the social and behavioral sciences include PSY 4000, and 4384; SOC 3327, 3329, 4325, and 4327; and NURS 3371.

Designated courses may require prerequisites before the student can enroll in them. Consult the catalog or contact the specific instructors for details. Prerequisite courses (except PHYS 2351 and ANTH 2305) do not count toward the minor. Cross-listed courses that are required by the major cannot be counted toward the minor. **Contact information:** Dr. Robert Paine, Department of Sociology, Anthropology, and Social Work, (806) 742-2401 ext. 241, robert.paine@ttu.edu.

General Studies

For a description of the General Studies degree program, see "Bachelor of General Studies" in the College of Arts and Sciences General Degree requirements section.

Courses in General Studies (G ST)

- 2001. General Studies Abroad (V1-12).** Individual studies in interdisciplinary, international, and multicultural experiences.
- 2300. Introduction to General Studies (3).** Prerequisite: Sophomore standing and advisor's consent. An elective individual studies course to assist the student in developing an interdisciplinary plan of study for the Bachelor of General Studies degree.
- 4000. Internship in General Studies (V1-6).** Supervised internship with government, profit, and nonprofit offices and agencies including congressional offices in Washington, D.C. Open to all undergraduate students at Texas Tech.
- 4300. Senior Thesis or Project (3).** Preparation of a senior thesis or project for the Bachelor of General Studies degree. May be repeated for credit with the approval of Associate Dean, College of Arts and Sciences.

Geographic Information Science

The College of Arts and Sciences offers an interdisciplinary minor in geographic information science (GIS). The minor is designed to give students a technical background in GIS and related technologies. These skills supplement a wide variety of majors in which spatial information is analyzed. The minor consists of 18 hours, with one course in computers (C S 1300 or equivalent), one course in introduction to GIS (either GEOG 3300 or GEOL 3428), one course in advanced GIS (either RWFM 4403,

GEOG 3301 or GEOL 4331), one course in statistical methods (MATH 2300), and one course in technical writing (ENGL 2311 or ENGL 3365). A GIS-related internship (GEOG 4310) may be used in place of one course from the computers and technical writing categories. Additional course substitutions are allowed, if approved by the director. No more than two courses from the student's major department may be used toward the GIS minor. **Contact information:** Dr. Jeffrey A. Lee, Department of Economics and Geography, (806) 742-2201, jeff.lee@ttu.edu.

International Studies

An interdisciplinary minor in international studies is offered for students who wish to gain an understanding of how the nations of the world are economically, politically, socially, and culturally interdependent. The minor is made up of a 9-hour core of required courses and 9 hours of electives. The core courses are ECO 3333, International Economics; GEOG 2351, Regional Geography of the World; and POLS 3361, International Politics. The advisor may allow substitutions in the core when it can be shown that they fit in with the student's major program and academic objectives. Elective courses are selected from among courses that deal with international topics in departments in the College of Arts and Sciences. Courses from other colleges may be accepted if they have been previously approved by the program advisors. **Contact information:** Dr. John Barkdull, Department of Political Science, john.barkdull@ttu.edu, (806) 742-3121.

Latin American and Iberian Studies (LAIS)

Undergraduate Program

A major in Latin American and Iberian Studies for a Bachelor of Arts degree consists of course work in several departments. It requires 30 semester hours, which must be completed in the three areas indicated below. Nine hours must be taken in the first two areas and six hours in the third area. In addition, students must take the interdisciplinary Latin American and Iberian Studies courses: LAIS 2300 and 4300. A minimum of 9 hours of courses in the major and 6 hours in the minor must be taken in residence at Texas Tech University. **Contact information:** Dr. Alberto Julian Perez, Box 42071, 256 Foreign Languages, (806) 742-1562, julian.perez@ttacs.ttu.edu.

Area I (9 hours): Upper division Latin American and Iberian content courses in Spanish and/or Portuguese.

Area II (9 hours): Latin American anthropology, art, history, geography, economics, and U.S. Latino literature courses.

Area III (6 hours): Latin American history and political science courses.

Interdisciplinary Courses (6 hours): LAIS 2300 and 3300 or 4300.

With prior approval, students may plan programs at variance with the above requirements to meet their special interests.

A minor in Latin American and Iberian Studies consists of 18 hours of content courses taken from those approved for the major in this program. These 18 hours may not include work in the student's major field and must be taken in at least two of the three areas represented in the program. LAIS 2300 and 3300 or 4300 are required. In addition, the standard requirements for a B.A. degree must be met.

Courses in Latin American and Iberian Studies (LAIS)

- 2300. Latin America and Iberia: An Interdisciplinary Introduction (3:3:0).** A basic survey of Latin American and Iberian culture and civilization.
- 3300. Topics in Latin American and Iberian Studies (3:3:0).** Selected multidisciplinary readings dealing with different topics of Latin American and Iberian culture, literature, history and politics. May be repeated once for credit.
- 4300. Seminar in Latin American and Iberian Studies (3:3:0).** Interdisciplinary seminar in selected Latin American and Iberian topics. Readings and lectures in English. May be repeated once for credit with permission of the director.

Graduate Program

The Latin American and Iberian Studies Committee administers a doctoral minor in Latin American and Iberian Studies. The minor consists of 18 hours of graduate level courses taken in the participating departments and approved by the student's doctoral committee. No courses from the student's major field may be included in the minor. At least two different areas must be represented in the minor, and the maximum number of hours permitted in any one field is 9. Doctoral minors in the program must demonstrate competency, as determined by the student's committee, in Spanish and Portuguese except in special circumstances.

A minor at the master's level shall consist of a minimum of 9 hours in at least two areas outside the major.

Certain courses not listed below may be considered acceptable as part of the minor when the topic studied deals with Latin America or Iberia. Students should contact the course instructor in the department in which the course is offered and the Director of Latin American and Iberian Studies to determine if such courses are acceptable.

Contact information: Dr. Alberto Julián Pérez, Department of Classical and Modern Languages and Literatures, (806) 742-3145.

Program Courses

- ART 5315. Arts of the Indian Americas (3:3:0). (when course deals with Latin America)
- GEOG 5307. NAFTA, Western Hemisphere Trade, and Regional Integration in the Americas (3:3:0).
- LAIS 5300. Directed Studies (3:3:0).
- HIST 5355. Studies in Colonial Latin American History (3:3:0).
- HIST 5356. Studies in National Latin American History (3:3:0).
- POLS 5371. Area Studies in Comparative Politics (3:3:0). (when course deals with Latin America or Iberia)

- PORT 7000. Research (V1-12).
- SPAN 5345. History of the Spanish Language (3:3:0).
- SPAN 5347. Language Development (3:3:0). (offered in Mexico)
- SPAN 5348. Culture and Literature (3:3:0). (offered in Mexico)
- SPAN 5354. Hispanic Literary Concepts (3:3:0).
- SPAN 5355. Seminar in Hispanic Literature (3:3:0).
- SPAN 5361. Medieval Literature (3:3:0).
- SPAN 5362. Golden Age Literature (3:3:0).
- SPAN 5364. Nineteenth-Century Spanish Literature (3:3:0).
- SPAN 5366. Twentieth-Century Spanish Prose (3:3:0).
- SPAN 5368. Twentieth-Century Spanish Theatre and Poetry (3:3:0).
- SPAN 5370. Colonial Spanish American Literature (3:3:0).
- SPAN 5374. Nineteenth-Century Spanish American Literature (3:3:0).
- SPAN 5375. Modernism (3:3:0).
- SPAN 5376. Twentieth-Century Spanish American Prose (3:3:0).
- SPAN 5378. Twentieth-Century Spanish American Theatre and Poetry (3:3:0).
- SPAN 5381. Hispanic Literature of the Southwest (3:3:0).

Courses in Latin American and Iberian Studies (LAIS)

- 5300. Directed Studies (3:3:0).** Prerequisite: Consent of instructor and Director of Latin American and Iberian Studies. Content will vary to meet the needs of students. May be repeated for credit.

Linguistics

Undergraduate Program

The Interdepartmental Committee on Linguistics offers a minor in linguistics for the B.A. degree. The minor consists of 18 hours of required and elective courses drawn from the departments of Classical and Modern Languages and Literatures; Communication Studies; English; Mass Communications; Philosophy; Psychology; Sociology, Anthropology, and Social Work; and the Division of Curriculum and Instruction, College of Education.

Contact information: Dr. Sharon Myers, Department of Classical and Modern Languages and Literatures, sharon.myers@ttu.edu, (806) 742-1565

Linguistics is concerned with (1) the scientific description and analysis of languages; (2) the study of language in its social and cultural context; (3) the evolution and historical development of language; (4) the formal study of communication systems involving the acquisition and use of language; (5) the relation of language to literature, philosophy, and other fields in the humanities; and (6) human biology and neurology as they affect the use of language. Linguistics shares interests with speech, science, psychology, anthropology, sociology, literature, philosophy, and other fields of study. It is, therefore, an interesting and useful minor area for students majoring in these fields and one that can, in many cases, help students in developing an area of academic or professional specialization.

The linguistics minor for the B.A. is made up of 18 hours of courses. Of these, it is required that 3 hours be drawn from Group A (general and introductory linguistics courses), 3 hours

from Group B (courses dealing intensively with a single language or a restricted group of languages), at least 3 hours from Group C (courses dealing with applied uses of linguistics and historical linguistics), and 3 hours from group D (courses relating linguistics to other fields). The remaining 6 hours may be taken from any group.

Group A— ANTH 3305, ENGL 3371.

Group B— ENGL 3373, FREN 4302, 4306, GERM 4301, LAT 4302, SPAN 4302, 4303.

Group C— EDBL 3337, ENGL 4373, LING 4311, 4335.

Group D— ANTH 3351, COMS 3332, EDBL 3334, EDLL 3352, MCOM 3300, PHIL 4310, 4331, PSY 4324.

Courses in Linguistics (LING)

4311. Methods of Teaching Second and Foreign Languages (3:3:0). Overview of historical and current methods of teaching second and foreign languages.

4335. Introduction to Linguistics for Second and Foreign Language Education (3:3:0). Basic concepts in linguistics and linguistic analysis as they relate to bilingual education, ESL, and second or foreign language education.

Graduate Program

A Master of Arts degree in Applied Linguistics is offered through the Department of Classical and Modern Languages and Literatures. Students may select a 36-hour nonthesis or a 30-hour plus thesis option in either general applied linguistics or in teaching English as a second or foreign language.

The option in general applied linguistics prepares students who plan to design programs for and/or teach second or foreign languages; it also provides a foundation in applied linguistics for students who plan doctoral studies in first and second language acquisition, second and foreign language teaching and learning, language testing and assessment, studies in second language composition, translation, language planning, or corpus linguistics. Both options include work using 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. 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.

Courses in Linguistics (LING)

5310. Second and Foreign Language Testing (3:3:0). This course is designed to give language teachers a working knowledge of testing principles applied to second and foreign language classrooms and programs.

5315. Pedagogical Grammar of Second/Foreign Languages and ESL (3:3:0). A study of the role of grammar in interlanguage development, aspects of grammar most frequently taught in second/foreign language and ESL and teaching strategies.

5320. Second and Foreign Language Composition (3:3:0). A study of second and foreign language theories and research in composition learning and teaching and their implications for methods of teaching second and foreign language composition.

5322. Methods of Teaching Modern Second and Foreign Languages (3:3:0). Theory and practice of teaching modern second and foreign languages.

5325. Technology for Teaching Second and Foreign Languages (3:3:0). A study of theory, research, and practice in the use of technology for teaching second and foreign languages including audio, video, CALL, and Internet technologies.

5330. Second and Foreign Language Acquisition (3:3:0). A study of the theories and processes of second and foreign language acquisition, with emphasis on adult learners.

5335. Introduction to Linguistics for Second and Foreign Language Educators (3:3:0). Concepts in linguistics and linguistics analysis as they relate to bilingual education, ESL, and second or foreign languages.

5345. Seminar in Applied Linguistics (3:3:0). Study of current topics of interest in applied linguistics. Course content will vary. May be repeated for credit.

5350. Second and Foreign Language Curriculum Design (3:3:0). Analysis of second and foreign language teaching curriculum design models and application to current language teaching contexts.

6000. Master's Thesis (V1-6).

7000. Research (V1-12).

Religion Studies

A minor in religion studies is offered to students who wish to enhance their understanding of religion by studying it from a variety of academic perspectives. The program is intended to enable students to place their conception 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 course work 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. **Contact information:** Dr. D. Paul Johnson, Department of Sociology, Anthropology, and Social Work, 158 Holden Hall, d.paul.johnson@ttu.edu, (806) 742-2400.

Core Courses: ANTH 3323, CLAS 1320, 3350, ENGL 3383, 3384, HIST 3328, 3344, 4347, 4349, PHIL 2350, 3302, 3324, POLS 3339, PSY 3310, SOC 4331.

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.

Russian Language and Area Studies

A major or minor in Russian Language and Area Studies for a Bachelor of Arts degree consists of integrated course work in several departments. The degree is offered to students who wish to study the Russian language and aspects of culture; literature; history; politics; economic relations; and society in Tsarist Russia, the Soviet Union, and post-Soviet Russia. The program is intended to give students qualifications for various types of professional work that require knowledge of Russia and the Commonwealth of Independent States and to prepare motivated students for further study.

The major requires 33 semester hours of course work. RUSN 1501 and 1502 are prerequisites of, but do not count towards, the major or minor. RUSN 2301, 2302 (or their equivalents), and 2303 are required for all students seeking a major. In addition, majors need to take 24 hours of approved courses offered by the Departments of Classical and Modern Languages and Literatures, Economics and Geography, History, and Political Science. Prior to enrolling in the program and to registering for courses, students should consult one of the program directors.

For the minor, 18 hours of course work is necessary from courses approved for the major. RUSN 2301, 2302 (or their equivalents), and 2303 are required for all students seeking a minor. Courses taken for the Russian Language and Area Studies major or minor may not be used to satisfy the requirements for the student's other major or minor. In addition, the standard requirements for a Bachelor of Arts degree must be met.

Contact information: Dr. Anthony Qualin and Dr. Erin Collopy, Department of Classical and Modern Languages and Literatures, (806) 742-3145, orpvtton@ttu.edu.

Substance Abuse Studies

The Colleges of Human Sciences and Arts and Sciences jointly offer an interdisciplinary minor in Substance Abuse Studies. 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 recovery from addiction.

For specific details, see the statement on Substance Abuse Studies in the College of Human Sciences section of this catalog. **Contact information:** Dr. Kitty Harris, Department of Human Development and Family Studies, (806) 742-2891, or @hs.ttu.edu.

Preprofessional Programs

Prelaw Studies

Prelaw is a non-degree granting designation at Texas Tech that serves to introduce students to professional advisors who guide students in the discovery of self, academic pursuits, and professional goals. Students will declare a degree-granting major at the end of their first year.

The College of Arts and Sciences, the Honors College, and the School of Law cooperate in a "3+3" Early Admission Program. Students who qualify and are accepted can take a minimum of 100 semester hours in the College of Arts and Sciences and then complete the first year of course work at the Texas Tech School of Law to complete the required hours for their baccalaureate degree. To learn more about this program, see the Honors College web site at www.honr.ttu.edu.

Not all individuals who earn a law degree practice law in the traditional sense of a law office. Many individuals choose a career in which their education in law is useful, but not necessarily the primary function of their day-to-day duties. Students need to keep in mind that law schools are most interested in applicants who are well-grounded in the fundamentals of a broad liberal arts education and are intellectually mature. Law schools are searching for students who have diverse educational backgrounds in at least three general skill areas: writing and speaking with comprehension and clarity, understanding social institutions and human nature, and thinking creatively and analytically.

Career opportunities include, but are not limited to, such fields as agriculture, communication, computer technologies, education, family relations, international relations, banking and financial services, broadcasting, corrections, health services, labor relations, publishing, and urban planning, as well as the more obvious fields of political science, history, business administration, and philosophy.

Regardless of their major academic field, prelaw students should consult with the advisors for counseling and guidance in planning their programs. **Contact information:** Freshmen should see Albert Buitron or Joe Hamilton in the Advising Center, 79 Holden Hall; students in the College of Arts and Sciences should contact Dr. M. Catherine Miller (806) 742-3744 or k4mcm@ttacs.ttu.edu.

Preprofessional Health Careers

Professional health schools include dentistry, medicine, nursing, optometry, pharmacy, and allied health sciences.

Most professional schools in the field of health care require the completion of specific college level science and general education courses prior to admission. The Preprofessional Health Careers Office maintains a collection of related information on various health careers. **Contact information:** Preprofessional Health Careers Office, 340 Chemistry Building, (806) 742-3078.

Individual advising regarding preparing students for admission to professional health schools is done by advisors in the Preprofessional Health Careers Office up to the time students file a degree plan. Most professional health schools do not specify particular majors as part of their admission requirements. Texas Tech does not offer degrees in premedicine, predentistry, or other prehealth areas. Each preprofessional health career student who intends to earn a baccalaureate degree must choose a major by the junior year and complete the courses required for admission into the professional health school. Preprofessional health career students are advised to choose a major offered within any of the colleges at the university. The major should suit the student's individual interests and abilities and offer alternative career options in the event initial career plans change.

Courses listed as prerequisites for professional schools must be college-level courses taken for letter grades. However, credit by examination, using the standardized tests described in this catalog, is also acceptable for certain courses. Science courses required by professional health schools are those required of science majors. Students are responsible for knowing any special requirements of the professional schools they plan to attend.

The Preprofessional Health Careers Committee will assist Texas Tech University students in coordinating their evaluation packets for application to schools of dentistry, medicine, optometry, or podiatry. Evaluation forms are available in the Preprofessional Health Careers Office.

Pre dentistry

The minimum admission requirements for most dental schools in the United States are 16 semester hours of biology, 8 semester hours of general chemistry, 8 semester hours of organic chemistry, 8 semester hours of physics, and 6 semester hours of English. Applicants to dental schools are required to take the Dental Admission Test and submit their applications approximately one year prior to the planned matriculation. For admission requirements of a specific dental school, students should consult the latest edition of *Admission Requirements of United States and Canadian Dental Schools* or the dental school catalogs. A formal minimum of 90 semester hours is stated for some schools. However, students should plan to complete a baccalaureate degree in the field of their choice before entering dental school.

Pre medicine

The minimum admission requirements for most medical schools in the United States are at least 90 semester hours in an accredited college or university, including 6 semester hours of English, 3 semester hours of calculus, 14 semester hours of biology, 8 semester hours of general chemistry, 8 semester hours of organic chemistry, and 8 semester hours of physics.

All applicants to medical schools are required to take the Medical College Admission Test and submit their applications to the schools approximately one year prior to the date of

the planned matriculation. For admission requirements of medical schools, students should consult the latest edition of *Medical School Admission Requirements*.

Students should plan to complete a baccalaureate degree in the field of their choice before entering medical school, although not all schools require a degree. Premedical and pre dental students may obtain a baccalaureate degree in one of two ways:

Option A. The degree may be obtained by completing the requirements as stated in the catalog for the degree desired. The major selected depends on the interest of the student. This major will usually be in one of the sciences; however, other majors are acceptable and may be chosen in colleges other than the College of Arts and Sciences.

Option B. The Arts and Sciences B.A. or B.S. degree may be obtained by completing course work totaling a minimum of 100 semester hours in the College of Arts and Sciences and then graduating from an accredited U.S. or Canadian school of medicine, osteopathy, or dentistry. The following regulations apply:

- Of the 100 semester hours of preprofessional work, at least the last 30 must be completed in residence at Texas Tech. This minimum will apply to transfer students from other colleges, provided they have satisfactorily completed the work outlined in the freshman and sophomore years or its equivalent.
- The three years of work must satisfy all graduation requirements for the B.A. or B.S. degree at Texas Tech, with the exception of requirements in the major.
- The applicant for a degree under this plan must submit properly approved credentials from an accredited U.S. or Canadian school of medicine, osteopathy, or dentistry to the effect that the applicant has completed satisfactorily the work leading to a degree of Doctor of Medicine or Doctor of Dental Surgery. Evidence of the degree will substitute for the baccalaureate degree requirements in a major field.

Any student selecting Option B should plan carefully in consultation with the Associate Dean at least one year prior to leaving the university to begin professional school.

Pre optometry

Admission requirements differ among the various optometry schools. These courses fulfill requirements in general: 8 semester hours of biology; 4 semester hours of human anatomy; 4 semester hours of physiology; 4 semester hours of microbiology; 8 semester hours of general chemistry; 4 semester hours of organic chemistry; 3 semester hours of biochemistry; 8 semester hours of physics; 6 semester hours minimum of mathematics including algebra and trigonometry, analytical geometry, or precalculus and 3 semester hours of calculus; 3 semester hours of statistical methods in psychology; and 3 semester hours of general psychology. For the admission requirements of a specific optometry school, students should consult the Association of Colleges and Colleges of Optometry. Applicants to optometry school are required to take the Optometry Admission Test and submit all admissions-related documents in a

timely manner. Some optometry schools require the completion of a baccalaureate degree prior to matriculation.

Prepharmacy

The specific admission requirements for schools of pharmacy differ, but most include 8 semester hours of biology; 8 semester hours of general chemistry; 8 semester hours of organic chemistry; 4 semester hours of physics; 4 semester hours of microbiology; 3 semester hours of calculus; 3 semester hours of statistical methods; 6 semester hours of English; 3 semester hours of literature; 3 semester hours of economics, 3 semester hours of public speaking; and 15 semester hours spread across humanities, social sciences, and visual and performing arts. Students should complete 70 or more hours of course work and take the Pharmacy College Admission Test before applying to the professional schools.

Allied Health

Preclinical laboratory science, precommunication disorders, preoccupational therapy, prephysical therapy, and pre-physician assistant programs consist of the 60 to 90 semester hours of preprofessional course work required of a student before being admitted to the professional level in a school of allied health. Most programs require a minimum of 6 to 9 semester hours of English, 6 semester hours each of U.S. history and political science, and 8 semester hours each of biology, chemistry, and physics. Requirements for additional courses in advanced biology and chemistry, zoology, computer science, mathematics, anthropology, psychology, sociology, speech, and statistics vary with each program and with each school of allied health.

Pre nursing

Admission requirements differ among the various nursing schools. These courses fulfill requirements in general: 6 semester hours of English, 3 semester hours of statistics, 8 semester hours of human anatomy and physiology, 4 semester hours of general chemistry, 4 semester hours of microbiology, 3 semester hours of food and nutrition, 3 semester hours of visual and performing arts, 3 semester hours of humanities, 6 semester hours of U.S. history, 6 semester hours of political science, 3 semester hours of psychology, 3 semester hours of sociology or cultural anthropology, and 3 semester hours of lifespan growth and development. Contact information to obtain admission requirements of a specific school of nursing can be found on the all nursing schools web site. Applicants to schools of nursing are required to submit all admission-related documents and take the Nurse Entrance Test in a timely manner.

Other Preprofessional Health Careers

Students who plan other preprofessional programs such as pre dental hygiene, preradiologic technology, and prer respiratory therapy should consult an advisor in the Preprofessional Health Careers Office for further information.

Department of Biological Sciences

Faculty

John C. Zak, Chairperson

Horn Professor: Baker; *Professors:* Allen, Burns, Chesser, Heintz, Holaday, Patino, Phillips, San Francisco, Willig, and Zak; *Associate Professors:* Bilimoria, Bradley, Carr, Collie, Densmore, Deslippe, Dini, Gollahon, Held, Jeter, McGinley, Owen, Rock, Strauss, Tissue, and Zhang; *Assistant Professors:* Cannon, Diamond, McIntyre, Reilly, Salazar-Bravo, and Schmidt; *Instructors:* Atanassov, Block, Khetmalas, and Zimmerman.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Biology
- Bachelor of Science in Cell and Molecular Biology
- Bachelor of Science in Microbiology
- Bachelor of Science in Zoology
- Master of Science in Biology
- Master of Science in Biological Informatics
- Master of Science in Microbiology
- Master of Science in Zoology
- Doctor of Philosophy in Biology
- Doctor of Philosophy in Zoology

Undergraduate Program

Students majoring in biology for the B.S. degree must complete a minimum of 39 semester hours, including the following:

- BIOL 1403, 1404, 3309, 3320, 3120, 3416, and 4305.
- Additional hours at the junior or senior level to bring the total course hours from biological sciences to a minimum of 39.

Students majoring in biology for the B.S. degree may gain a specialization in ecology and environmental biology by completing a minimum of 39 semester hours from this department, including the following:

- BIOL 1403, 1404, 3416, 3309, and 4305.
- Group I — At least one course from BOT 3401, MBIO 3401, ZOOL 4409, or BIOL 3320 and 3120.
- Group II — At least one course from BOT 3404, ZOOL 3406, 4407.
- Three courses from Group III (BIOL 3307, 4301, 4310, MBIO 4401, ZOOL 4321) and Group IV (BOT 3404, ZOOL 3303, 3406, 4306, 4308, 4310, 4312, 4407), including at least one course from each of the offerings in Group III and Group IV.
- One additional course from any of Groups I-IV.

Students majoring in cell and molecular biology for the B.S. degree must complete a minimum of 39 hours from this department, including the following:

- BIOL 1403, 1404, 2120, 3302, 3320, 3120 (or 3310), 3416, 4320, MBIO 3401
- Three of the following courses, at least one of which must include a laboratory: BIOL 3102, 4300 (counts as a laboratory course), BOT 3401, 3409, MBIO 4303, 4310, 4402, 4404, 4406, ZOOL 3401, 4304, 4409.

- Additional junior or senior level courses in the department to bring the total course hours from biological sciences to a minimum of 39 (may include the courses above; no more than 6 hours of undergraduate research credit may be counted toward the major).
- Strongly recommends BIOL 3310 or 4300.
- Requires a chemistry minor, including CHEM 3311, 3312.

Students majoring in microbiology for the B.S. degree must complete a minimum of 39 hours of core courses as well as additional biological sciences courses. Requirements include the following:

- BIOL 1403, 1404, 4101 (4101 may be repeated once for credit), 4305, and MBIO 3401.
- At least five of the following courses: BIOL 3320, MBIO 4303, 4310, 4401, 4402, 4404, and 4406.
- Additional 3000-4000 level courses in biology and microbiology to bring the total course hours from biological sciences to a minimum of 39.
- CHEM 1307, 1308, 1107, 1108, 3305, 3306, 3105, 3106, 3311, and 3312.
- Recommended electives: BIOL 3416, 4300, 4301, ZOOL 3303, MBIO 4400, and FD T 3301.

Students majoring in zoology for the B.S. degree must complete a minimum of 39 hours of the following biological science courses:

- BIOL 1403, 1404, 3416, 3320, 3120.
- One course from each of the following pairs of courses: ZOOL 3405 or 4407, ZOOL 3406 or 3303, BIOL 3302 or ZOOL 4409, BIOL 3309 or 4305.
- Additional biological science courses at the junior or senior level to bring the total course hours to a minimum of 39.

The department encourages undergraduate students to work with professors in research laboratories and projects to obtain first-hand information about research in the life sciences. Opportunities are available in many fields, including systematics and evolutionary biology, ecology and environmental biology, cell and molecular biology, and several areas of biotechnology. These research programs have been well received in the past and have proved beneficial to both students and faculty. Students who have been involved in the research projects have received competitive grants; presented papers at scientific meetings; authored papers published in scientific journals; and progressed to become successful medical doctors, college professors, etc. Students should contact faculty members with whom they will conduct research prior to advisement. Information describing research interests of the faculty are available from advisors or on the departmental web site at www.biol.ttu.edu.

Students majoring in biology or zoology may minor in any other field (major and minor may not be in the same field). Other recommended minors, subject to approval by the

department, are in such areas as chemistry, geosciences, physics, mathematics, entomology, animal science, plant and soil science, and range and wildlife management. A chemistry minor is required of cell and molecular biology and microbiology majors.

Two semesters of organic chemistry are required of all majors within this department except for teacher education biology majors who must have at least one semester of organic chemistry. It is urged that organic chemistry be taken during the second year of study. Students whose area of interest requires a strong background in chemistry should complete a chemistry minor.

Biology, zoology, and ecology and environmental biology majors must take either MATH 1351 (calculus) or MATH 2300 (statistics). Cell and molecular biology majors must take one semester of calculus (MATH 1351). Microbiology majors must take either MATH 1351, 2300, or AAEC 3401.

Students majoring in biology, cell and molecular biology, microbiology, or zoology must complete PHYS 1306, 1103, 1307, 1104, or PHYS 1308, 1105, 2301, 1106. Students majoring in biology with a specialization in ecology and environmental biology may substitute another environmental science for the second physics class with advisor's permission.

All majors in the department must include 3 hours of multicultural course work to fulfill their Core Curriculum requirement, and 6 hours of course work taken in this department for use toward the major must be writing intensive (BIOL 1403, 1404, 3102, 3307, 4101, 4303, 4305, 4320; BOT 3401, 3404, 3409; MBIO 4303, 4307, 4309, 4402, 4404; ZOOL 4310, 4409, 4321).

Courses with a grade of D cannot be counted toward fulfillment of requirements for a major or minor (including adjunct requirements and minors from other departments) in any program in this department.

Departmental Residency Requirement. At least 10 hours of upper division biological sciences courses for all majors in this department and at least 6 hours of upper division biological sciences courses for biology minors must be taken at Texas Tech.

Minors. Students from other departments may minor in biology, cell and molecular biology, microbiology, or zoology. Students wishing to minor in one of these fields must complete 18 hours in biological sciences (includes courses with BIOL, BOT, MBIO, and ZOOL prefixes). BIOL 1403 and 1404 must account for 8 of these hours; another 6 hours must come from junior and senior level courses. Course work for the zoology minor must include one upper division ZOOL class; for cell and molecular biology minor, BIOL 3320; for microbiology minor, MBIO 3401. Only 1 hour of research credit (BIOL 4100) may be used to fulfill the minor requirement. The minor advisor in biological sciences should be consulted no later than the beginning of the junior year.

Teacher Education. Students who complete a major in biology and satisfy other require-

ments for the B.S. degree, including 18 hours of professional educational courses, will be qualified to teach high school biology in the public schools of Texas. The following courses meet both the major and the certification requirements in life science:

- BIOL 1403 and 1404, 3320, 3120, 3416; MBIO 3401; BOT 3403, 3404 or 3401; ZOOL 2403 or 3405; ZOOL 3406 or 4407.
- At least one of BIOL 3309, 3307, 4305, or ZOOL 4312.
- PHYS 1306, 1103, 1307, and 1104 (or 1307, 1105, 2301 and 1106); CHEM 1307, 1107, 1308, 1108, and one semester of organic chemistry, which may be satisfied with CHEM 3305 and 3105.

Students may also satisfy the requirements for the teaching of high school biology under the multidisciplinary science major, with an emphasis in biology. This major is administered by the College of Education. All students must take the following:

- CHEM 1107, 1108, 1307, and 1308; PHYS 1103, 1104, 1306, and 1307 (or 1308, 1105, 2301 and 1106); GEOL 1101, 1102, 1303, and 1304; BIOL 1403 and 1404; ATMO 1300 and 1100; ASTR 1300 and 1100. ZOOL 2403; BIOL 3416; MBIO 3400.
- One of BOT 3403, 3404, or 3401.
- 6 to 8 hours from BOT 3403, 3404, or 3401; ZOOL 3406 or 4407; BIOL 3303, 3320, or 4305.

Either BIOL 1401 and 1402 or BIOL 1403 and 1404 will satisfy the laboratory science requirements for the College of Arts and Sciences. BIOL 1403 and 1404 (or courses with Texas Common Course Numbers BIOL 1406 and 1407) are required for all majors and minors in the department. Students can test out of BIOL 1403 and 1404 by having taken 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 having taken the AP biology test in high school and achieving a score of at least three (3). Alternatively, students can test out of BIOL 1401 and 1402 by taking the CLEP-S test administered by Academic Testing Services, but advanced placement scores for BIOL 1401 and 1402 will not be accepted as credit toward major requirements in the department.

Biological Informatics (BINF)

(To interpret course descriptions, see pg. 10.)

5301. **Biological Informatics (3:3:0).** Introduction to assessment of data in computer data bases, management of multiple layers of biological information, and exploring hidden patterns in the data.

Biology (BIOL)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1113. **Environmental Problems Laboratory (1:0:3) [BIOL 2106].** Prerequisite: BIOL 1313 (or concurrent enrollment) or permission of instructor. Laboratory and field studies of environmental problems. Not for major credit.
1305. **Ecology and Environmental Problems (3:3:0) [BIOL 2306]** An introduction to ecological principles and the analysis of environmental problems. Not for major credit. BIOL 1401, 1402, 1305, and 1306 may be taken in any sequence or simultaneously. Fulfills the lecture component of the natural sciences requirement.
1306. **Biology of Sex (3:3:0).** An introduction to the diversity of reproductive modes in organisms and issues such as human reproduction, the evolution of sex, and mating systems. BIOL 1401, 1402, 1305,

Graduate Program / Biological Sciences

The master's and doctoral programs include specializations in the areas of animal physiology and biomedical sciences, biological informatics, ecology, evolution and systematic biology, microbiology, plant physiology, and plant biotechnology.

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.

The basic degree requirements of the Graduate School determine the policy of the department.

The Department of Biological Sciences has no general requirement of a foreign language. However, it may be necessary for a student to demonstrate proficiency in a foreign language in certain programs, if such is necessary for research purposes. The student's advisory committee will make recommendations concerning language options, statistics, and basic work in other sciences.

The 36-hour nonthesis option may be elected by students working toward the M.S. degrees in biology, microbiology, biological informatics, and zoology. However, those students who expect to work beyond the M.S. degree, and toward the Ph.D. degree are strongly encouraged to choose the 30-hour thesis option.

All graduate students majoring in this department are required to take BIOL 6202 during their first fall semester after acceptance in the graduate degree program.

- and 1306 may be taken in any sequence or simultaneously.
- 1401. Biology of Plants (4:3:3) [BIOL 1411].** An introductory coverage of plant-environment interactions and plant structure and function as they relate to our understanding of the plant world. Expressly designed for students not majoring in a biological science. Will fulfill laboratory science requirements. BIOL 1401 and 1402 may be taken in any sequence or simultaneously.
- 1402. Biology of Animals (4:3:3) [BIOL 1413].** An introductory coverage of animal-environment interactions and animal structure, function, and behavior as they relate to our understanding of the animal world. Expressly designed for students not majoring in a biological science. BIOL 1401 and 1402 may be taken in any sequence or simultaneously.
- 1403. Biology I (4:3:3) [BIOL 1406].** Prerequisite: One year of high school biology. Enrollment as a freshman requires a minimum composite 1100 SAT1 score, minimum composite 24 ACT score, or a minimum AP Biology score of 3. Students accepted provisionally cannot take BIOL 1403. Fundamentals of molecular biology, cell biology, genetics, and evolutionary theory. First semester of an integrated course recommended for students majoring in biological sciences or related disciplines.
- 1404. Biology II (4:3:3) [BIOL 1407].** 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.
- 2120. Introductory Cell and Molecular Biology (1:1:0).** An introduction to current areas of research and to recent technological advances in the field of cellular and molecular biology.
- 3120. Cell Biology Laboratory (1:0:3).** Prerequisite or corequisite: BIOL 3320. A survey of the experimental techniques used to study cells and cellular processes.
- 3302. Developmental Biology (3:3:0).** Prerequisite: Introductory biology and genetics; cell biology recommended. A synthesis of animal and plant development, stressing the basic principles of molecular, cellular, and organismic development.
- 3304. Human Genetics (3:3:0).** Prerequisite: One semester of general genetics (BIOL 3416) or equivalent. A study of the frequency and transmission of human genetics and chromosomal mutations and the application of this information to individual cases.
- 3307. Population Biology (3:3:0).** Prerequisite: BIOL 3309. Introduction to population biology theory with emphasis on interaction between genetics and ecology.
- 3309. Principles of Ecology (3:3:0).** Prerequisite: BIOL 1305, 1401, 1402, or 1404 or consent of instructor. An examination of ecological systems emphasizing populations, communities, and ecosystems.
- 3310. Experimental Cell Biology (3:1:6).** Prerequisite: Declared major in cell and molecular biology, or consent of the instructor, and prior or concurrent enrollment in BIOL 3320. An introduction to the modern research techniques used to study cellular and molecular processes in eukaryotic cells.
- 3320. Cell Biology (3:3:0).** Prerequisite: BIOL 1403, 1404, 3416, and junior standing. An integrated study of the basic principles of cell structure and function.
- 3416. Genetics (4:3:3).** Prerequisite: BIOL 1401, 1402, or 1403. Genetic principles with emphasis on mechanisms and problem solving.
- 4100. Undergraduate Research in Biology (1).** Prerequisite: 15 hours of biology, junior or senior standing, and consent of instructor. Selected research problems according to the needs of the students. May be repeated or taken parallel for credit in another field or with new materials in the same field.
- 4101. Biology Seminar (1:1:0).** Prerequisite: Senior standing in biology, botany, or zoology. Critical reviews of classical and recent literature and reports of original investigations. May be repeated for credit.
- 4110. Topics in Biology (1).** Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for credit up to 3 hours.
- 4300. Undergraduate Research in Biology (3).** Prerequisite: 15 hours of biology, junior or senior standing in biology, and consent of instructor. Selected research problems according to the needs of the students. May be repeated or taken parallel for credit in another field or with new materials in the same field.
- 4301. Topics in Biology (3).** Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for additional credit.
- 4303. Population Genetics (3:3:0).** Prerequisite: BIOL 3416 or equivalent course in genetics; MATH 1320 or equivalent course in algebra recommended. The origin, maintenance, and significance of genetic variation in natural and artificial populations.
- 4305. Organic Evolution (3:3:0).** Prerequisite: BIOL 3416 or equivalent course in genetics. The principles and processes of evolution and how they relate to the ecology, physiology, behavior, morphology, and systematic classification of organisms.
- 4307. Cancer Biology (3:3:0).** Prerequisite: BIOL 3320, ZOOL 4304 is recommended. This course presents a comprehensive overview covering the history of cancer biology to the most recent developments in the field. Molecular and cellular biology as well as clinical topics will be covered.
- 4310. Community Ecology (3:3:0).** Prerequisite: A course in ecology or consent of instructor. An investigation of theoretical and experimental approaches to understanding the composition, diversity, and structure of plant, animal, and microbial communities. F, even years.
- 4320. Molecular Biology (3:3:0).** Prerequisite: BIOL 3320. Includes the study of molecular processes involved in cellular functioning of eukaryotic and prokaryotic cells and viruses together with recent technological advances in molecular biology research.
- 4330. Landscape Ecology (3:3:0).** Prerequisite: BIOL 1404 or 3309 or consent of instructor. An examination of how we quantify patterns and effects of spatial heterogeneity on organisms and ecological processes. F, odd years.
- 4350. Physiological Plant Ecology (3:3:0).** Prerequisite: Consent of instructor. Investigation of the physiological processes of plants that contribute to understanding the ecological distribution and evolutionary success of plants in their physical environment.
- 4392. Marine Biology (3:3:0).** Prerequisite: 1403 and 1404 or consent of instructor. Introduction to the study of marine organisms and their environments.

Graduate Courses

- 5301. Advanced Genetics (3:3:0).** Prerequisite: 8 hours of biology, 8 hours of chemistry, one semester of organic chemistry, or consent of instructor. Genetic and molecular analyses of inheritance. Course is offered to graduate students with limited knowledge in genetics.
- 5302. Advanced Cell Biology (3:3:0).** Prerequisite: 8 hours of biology, 8 hours of chemistry, plus at least one semester of organic chemistry; or consent of instructor. Structure and function of cells with introduction to modern techniques for cell study. Course is offered to graduate students with no formal training in cell biology.
- 5303. Advanced Experimental Cell Biology (3:1:6).** Prerequisite: Consent of instructor and prior or concurrent enrollment in BIOL 5302. A project-oriented introduction to modern research techniques used to study cellular and molecular processes in eukaryotic cells.
- 5305. Organic Evolution for Advanced Students (3:3:0).** Prerequisite: BIOL 3301 or equivalent course in genetics. The concept of evolution, its mode and tempo of operation, and its relationship to organic diversity in its broadest sense are emphasized. S.
- 5306. Advanced Cancer Biology (3:3:0).** Prerequisite: BIOL 5320; ZOOL 5304 is recommended. This course presents a comprehensive overview covering the history of cancer biology to the most recent findings in the field. Molecular and cellular biology as well as clinical topics will be covered.
- 5309. Advanced Ecology (3:3:0).** Prerequisite: Background in organismal biology or undergraduate ecology. A detailed examination of the structural and functional relationships underlying the organization of populations, communities, and ecosystems.
- 5310. Advanced Community Ecology (3:3:0).** Prerequisite: A course in ecology or consent of instructor. An investigation of both theoretical and experimental approaches to understanding the composition, diversity, and structure of plant, animal, and microbial communities. F, even years.
- 5311. Ecology for Teachers (3:3:0).** Prerequisite: Admission to the Multidisciplinary Science Master's Program or consent of instructor. An investigation into ecology for individuals, populations, communities, and ecosystems for practicing teachers.

5312. **Cell and Molecular Biology for Teachers (3:3:0)**. Prerequisite: Admission to the Multidisciplinary Science Master's Program or consent of instructor. An investigation into cellular and molecular biology intended for practicing teachers.
5320. **Advanced Molecular Biology (3:3:0)**. Coverage includes a rigorous examination of molecular processes in cellular functioning. Experimental approaches used to investigate molecular events in eukaryotes, prokaryotes, and viruses will be emphasized. S.
5330. **Advanced Landscape Ecology (3:3:0)**. Prerequisite: Consent of instructor. In-depth examination of how we quantify patterns and effects of spatial heterogeneity on organisms and ecological processes. Discussion section is required. F, odd years.
5405. **Systems Ecology (4:3:3)**. Prerequisite: MATH 1352 or 1552, BIOL 3303 and 3307, or consent of instructor. Theory and techniques of system analysis and mathematical modeling applied to ecological problems. S, even years.
5407. **Advanced Population Biology (4:3:3)**. Prerequisite: BIOL 3301, 3303, or equivalent. Introduction to the genetics and ecology of populations including a survey of topical, historic, and current literature with emphasis on experimental evaluation of testable hypotheses. S.
6000. **Master's Thesis (V1-6)**.
6100. **Advanced Topics in Biology (1)**. Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for additional credit.
6101. **Seminar (1:1:0)**. Various topics in modern biology. May be repeated for credit.
6202. **Preparation for Graduate Learning and Teaching in Biology (2:2:0)**. Prerequisite: Acceptance in a graduate degree program in the Department of Biological Sciences or consent of instructor. Preparation of graduate students for the roles of scholar, researcher, and teaching assistant. Emphasizes literature research, preparation of visual aids, innovative teaching strategies, and problem-solving methods. F.
6301. **Advanced Topics in Biology (3)**. Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for additional credit.
6304. **Principles and Practice of Phylogenetic Systematics (3:3:0)**. Prerequisite: BIOL 4305 or 5305; ZOOL 6302 recommended. Character, analysis, phylogeny reconstruction, consensus procedures, and phylogenetic classification, using morphologic and molecular data.
6309. **Advanced Topics in Quantitative Biology (3:3:0)**. Prerequisite: Consent of instructor. Studies of current applications of mathematics, statistics, and computing to the biological sciences. Content normally different each time offered. May be repeated for additional credit.
6315. **Regulation of Gene Expression (3:3:0)**. Prerequisite: BIOL 5320 or 4320. An advanced, in-depth analysis of current research on mechanisms that regulate eukaryotic gene expression at transcriptional and post-transcriptional levels. S.

6350. **Advanced Physiological Plant Ecology (3:3:0)**. Investigation of the physiological processes of plants that contribute to understanding the ecological distribution and evolutionary success of plants in their physical environment.
6392. **Marine Biology (3:3:0)**. Prerequisite: Undergraduate degree in biology or consent of instructor. The study of marine organisms and their environments.
6408. **Research Techniques in Electron Microscopy (4:1:6)**. Prerequisite: BA or BS in a scientific field. Introduction to operation of electron microscopes emphasizing independent work with organic or inorganic sample preparation and analysis for transmission or scanning electron microscopes.
6502. **Biometry (5:4:3)**. Prerequisite: College algebra. The application of statistical methods to data from various fields of biological research. Special emphasis on conceptual bases of univariate and multivariate tests from both parametric and nonparametric perspectives. F.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Botany (BOT)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3401. **Plant Physiology (4:3:3)**. Prerequisite: Introductory botany or BIOL 1403 and 1404 and one semester of organic chemistry. The physiology of plants with an emphasis on relationships of structure to function in vascular plants.
3403. **Comparative Morphology of Plants (4:3:3)**. Prerequisite: One year of introductory biology. An evolutionary survey of the diversity of plants (broadly defined) emphasizing adaptations in form and sexual life cycles.
3404. **Evolution and Classification of Plants (4:3:3)**. A survey of plant diversity from an evolutionary perspective, including genetic analysis, classification schemes, identification/documentation techniques, and field trips to study local flora.
3409. **Plant Development (4:3:2)**. Prerequisite: BIOL 1403/1404. Integration of positional, environmental, hormonal, and genetic regulation of embryo-, morpho-, and organo-genesis; emphasis on model species and comparisons to animals. Alternate years.
4302. **Field Botany (3:0:6)**. Prerequisite: BOT 3404 or consent of instructor. Thorough knowledge of and familiarity with the flora of West Texas and adjacent areas is developed through field trips, collection, and herbarium work.
4304. **Plant Molecular Biology (3:3:0)**. Prerequisite: Introductory biology, cell biology, and genetics. Molecular analysis of plant metabolism and development. S, even years.

Graduate Courses

5401. **Advanced Plant Physiology (4:3:3)**. Prerequisite: Organic chemistry or biochemistry and general botany or biology. A general plant physiology course for graduate students with no previous training in plant physiology. Emphasis

is placed on recent experimental advances in the field.

6302. **Advanced Field Botany (3:1:6)**. Prerequisite: BOT 3404, 5404, or consent of instructor. A field-trip and herbarium-based course that will provide students with sophistication in the identification and classification of plants in natural areas of West Texas and adjacent regions.
6304. **Advanced Plant Molecular Biology (3:3:0)**. Prerequisite: Introductory biology, genetics, cell biology, or consent of instructor. Molecular mechanisms regulating plant metabolism and plant development. Intensive reading on current literature is required. S, even years.

Microbiology (MBIO)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3400. **Microbiology (4:3:4)**. Prerequisite: 3 hours of introductory biology. Morphology, physiology, and activities of bacteria, fungi, and viruses. Primarily for students of agriculture, food and nutrition, animal science, secondary education, nursing, and others seeking an advanced science elective. May not be applied to degree requirements for biological sciences majors.
3401. **Principles of Microbiology (4:3:4)**. Prerequisite: One year of introductory biology; prerequisite or parallel: CHEM 3305. Morphology, physiology, and classification of microorganisms.
4101. **Microbiology Seminar (1:1:0)**. Prerequisite: Senior standing in microbiology. Critical reviews of classical and recent literature and reports of original investigations. May be repeated for credit.
4303. **Physiology of Bacteria (3:3:0)**. Prerequisite: MBIO 3401. Anatomy and physiology of the bacterial cell; molecular approach.
4307. **Industrial Microbiology (3:3:0)**. Prerequisite: MBIO 3401. An introduction to fermentation techniques, food microbiology, production of various microbial products, microbial transformations, sewage disposal, and microbiological control.
4310. **Introduction to Virology (3:3:0)**. Prerequisite: MBIO 3401 or BIOL 3320 or consent of instructor. An introduction to basic concepts in the structure, replication, and ecology of viruses from animals, plants, and prokaryotes.
4400. **Practicum in Applied Microbiology (4:0:12)**. Prerequisite: Consent of instructor at least one month prior to registration. Practical experience in affiliated governmental, industrial, and medical microbiology laboratories. May not be repeated for credit.
4401. **Microbial Ecology (4:3:3)**. Prerequisite: A course in microbiology, mycology, ecology, or related area, or consent of instructor. An examination of the population and community ecology of bacteria and fungi, and the roles of these organisms in ecosystem processes.
4402. **Immunology and Serology (4:3:4)**. Prerequisite: MBIO 3401 or BIOL 3320 or consent of instructor; or 10 hours of chemistry. Theories of infection and resistance, the production and demonstration of antibodies, the action of antigens,

and diagnostic tests.

4404. **Pathogenic Microbiology (4:3:4)**. Prerequisite: MBIO 3401 and 4402 or consent of instructor. A detailed study of pathogenic microorganisms. Laboratory discussion of medical case studies.
4406. **The Genetics of Microorganisms (4:3:3)**. Prerequisite: MBIO 3401 or consent of instructor. The principles of genetic systems existing among microorganisms, with emphasis upon bacteria and bacteriophages.

Graduate Courses

5301. **Advanced General Microbiology (3:2:3)**. Prerequisite or parallel: Organic chemistry. Content is similar to that of MBIO 3401 except that readings or original research in one area of microbiology is required. May not be taken for credit by students who have taken MBIO 3401. F, S.
5303. **Microbe-Plant Interactions (3:3:0)**. Prerequisite: MBIO 3400 or 3401 or BIOL 3420 or BOT 3401. Biochemical, molecular, genetic, and ecological basis of pathogenic and symbiotic microbe-plant interactions. F, even years.
5401. **Current Perspectives in Microbial Ecology (4:3:3)**. Prerequisite: A course in microbiology, mycology, ecology, or related area, or consent of instructor; may not be taken for credit by students who have taken MBIO 4401. Course will examine specific theories and concepts concerning ecology of the soil microflora and microfauna, and the roles of these organisms in ecosystem functioning. S, odd years.
5403. **Immunobiology (4:3:4)**. Prerequisite: Consent of instructor. Content is similar to that of MBIO 4402 except that readings or research in one area of immunology is required. May not be taken for credit by students who have taken MBIO 4402. S.
5404. **Pathogenic Microbiology (4:3:4)**. Prerequisite: MBIO 3401 or 5301; may not be taken for credit by students who have received credit for MBIO 4404. A detailed study of pathogenic microorganisms. S, odd years.
5408. **Microbial Genetics (4:3:3)**. Prerequisite: MBIO 5301 or consent of instructor. Topics include current techniques of genetic analysis, molecular biology, molecular genetics, nucleic acid metabolism, and gene regulation in microorganisms, with emphasis on bacteria and bacteriophages. May not be taken for credit by students who have taken MBIO 4406. F.
6000. **Master's Thesis (V1-6)**.
6302. **Advanced Bacterial Physiology (3:3:0)**. Prerequisite: MBIO 3401 or 5301; 12 semester hours of chemistry, including biochemistry or concurrent registration; consent of instructor. Advanced study of bacterial physiology. S.
6306. **General Virology (3:2:3)**. Prerequisite: Consent of instructor. An introduction to the biology of animal, bacterial, and plant viruses. S.

Zoology (ZOOL)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

2403. **Human Anatomy and Physiology I (4:3:3) [BIOL 2401]**. Prerequisite or parallel: 6 hours of chemistry recommended. Structure and function of cells and body systems. This is a nonmajors course that is open to students in human sciences, medical technology, physical education, prenursing, preoccupational therapy, preoptometry, and the biology teaching field.
2404. **Human Anatomy and Physiology II (4:3:3) [BIOL 2402]**. Prerequisite: ZOOL 2403. CHEM 1301 or equivalent recommended. In-depth coverage of topics introduced in ZOOL 2403, with emphasis on physiology and its relationship to disease.
2406. **Comparative Anatomy of Game Animals (4:3:3)**. Prerequisite: BIOL 1402 or 1404 or equivalent. A comparative study of game and other wild animals, with emphasis on embryology, functional anatomy, and evolution. Not for major or minor credit in the biological sciences.
3303. **Parasitology (3:2:3)**. Prerequisite: Introductory zoology. Morphology, life cycles, and physiology of protozoan and helminth parasites, with emphasis on broad aspects of parasitism and examples with medical and economic interest.
3401. **Animal Histology (4:2:6)**. Prerequisite: ZOOL 3405. The study of normal tissues of the human and other mammals. An introductory course recommended for students of pathology, medical sciences, and biomedical sciences.
3405. **Vertebrate Structure and Development (4:3:3)**. Prerequisite: Introductory zoology or biology. The comparative study of vertebrate structure and embryological development.
3406. **Comparative Invertebrate Zoology (4:3:3)**. Prerequisite: One year of introductory biology or consent of instructor. Structure, life history, and evolution of the invertebrates.
4304. **General Endocrinology (3:3:0)**. Prerequisite: BIOL 3320 or ZOOL 4409, organic chemistry. Hormones as chemical coordinators of bodily functions.
4306. **Introduction to Mammalogy (3:2:3)**. Prerequisite: Introductory zoology or junior standing in wildlife management; ZOOL 4407 recommended. Study of the classification, natural history, and ecology of mammals.
4308. **General Ornithology (3:2:3)**. Prerequisite: Junior standing. Emphasis on laboratory and field work in systematics, ecology, and anatomy of birds. Local field trips.
4310. **Introduction to Ichthyology (3:2:3)**. Prerequisite: Introductory zoology or equivalent. Diversity, evolutionary relationships, ecology, and anatomy of fishes.
4312. **Animal Behavior (3:3:0)**. Prerequisite: BIOL 1404 or 3309 or consent of instructor. Comparative study of animal behavior; its genetic basis, expression through neurophysiological mechanisms, function in the environment, and adaptive role during evolutionary history.

4321. **Insect Diversity (3:3:0)**. Prerequisite: BIOL 1403 and 1404 required, BIOL 3309 recommended. An advanced exploration of the behavior, ecology, and evolution of insects.
4407. **Natural History of the Vertebrates (4:3:3)**. Prerequisite: One year of introductory biology. Evolutionary relationships, identification, and ecology of vertebrates. Local fauna emphasized.
4409. **Comparative Animal Physiology (4:3:3)**. Prerequisite: CHEM 1308 and BIOL 1404. A comparison of physiological functions of animals in the major phyla.

Graduate Courses

5304. **Comparative Endocrinology (3:3:0)**. Prerequisite: ZOOL 2405, 3301, BIOL 3420, or consent of instructor. Hormones as chemical coordinators of bodily functions. S.
5306. **Advanced Mammalogy (3:2:3)**. Studies of recent advances in mammalogy. For students who have not taken ZOOL 4306. F.
5308. **Advanced Ornithology (3:2:3)**. Prerequisite: Consent of instructor. Selected topics including avian systematics, migration, physiology, ecology, and comparative behavior. S.
5312. **Advanced Animal Behavior (3:3:0)**. Comparative animal behavior with emphasis on genetics and neurophysiology and how they relate to survival. F.
5401. **Animal Histology for Advanced Students (4:2:6)**. Prerequisite: ZOOL 2405 or a course in chordate anatomy or consent of instructor. Microscopic anatomy of the normal cells, tissues, and organ systems of the human and other mammals are studied. Open to graduate students who have not taken ZOOL 3401 or equivalent.
5406. **Advanced Invertebrate Zoology (4:3:3)**. Prerequisite: Consent of instructor. This course develops a comprehension of the structure, function, ecology, and evolution of invertebrate animals, with an emphasis on the relationships among taxa and the diversity within taxa. Written reports on special projects required. F.
5407. **Vertebrate Zoology for Advanced Students (4:3:3)**. Diversity, evolutionary relationships, and adaptations of vertebrates. Field trips required. Open to students who have not taken ZOOL 4307.
5409. **Comparative Physiology for Advanced Students (4:3:3)**. Prerequisite: ZOOL 2405 or 3406; BIOL 3420; CHEM 3305, 3306 recommended. A comparison of physiological functions including homeostatic mechanisms, muscle, nerve, in the major phyla. Laboratory reports written in a journal format are required.
5421. **Ecological Entomology (4:3:3)**. Prerequisite: Consent of instructor. An advanced exploration of the behavior, ecology, and evolution of insects.
6000. **Master's Thesis (V1-6)**.
6302. **Principles of Systematic Zoology for Advanced Students (3:3:0)**. Prerequisite: BIOL 3301 or equivalent; BIOL 4305 or 5305 recommended. Theory and practice of naming, describing, and classifying organisms. Speciation, phylogeny reconstruction, and other current topics in evolutionary biology emphasized. F, even years.

6303. **Seminar in Mammalogy for Advanced Students (3:3:0).** Prerequisite: Consent of instructor. A historical perspective of mammalogy as a science including advances in ideology, character systems, and data analysis. Current topics and controversies will be addressed. S, odd years.

6320. **Comparative Neuroanatomy (3:2:3).** Prerequisite: Consent of instructor. A comparative study of the vertebrate central nervous system, with emphasis on the structure, development, and function of the mammalian brain.

6321. **Advanced Herpetology (3:2:3).** Prerequisite: Consent of instructor. The course will be concerned with the biology of amphibians and reptiles. Stress will be placed on classification, evolution, ecology, and anatomy of the various groups.

Department of Chemistry and Biochemistry

Faculty

Richard Allen Bartsch, Chairperson

Horn Professors: Bartsch, Dasgupta, and Knaff; **Piper Professor:** Casadonte; **Welch Professor:** Hase; **Professors:** Birney, Gellene, Headley, Holwerda, Korzeniewski, Nes, Niwayama, Quitevis, and Roundhill; **Associate Professors:** Li, Liu, Shaw, Shelly, and Whittlesey; **Assistant Professors:** Blake, Mayer, Morales, Paré, Poirier, and Shi; **Instructors:** Jones; **Visiting Faculty:** Marx, Miracle, Truitt, and Yao; **Adjunct Faculty:** Reid.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Chemistry
- Bachelor of Science in Chemistry
- Bachelor of Arts in Biochemistry
- Bachelor of Science in Biochemistry
- Master of Science in Chemistry
- Doctor of Philosophy in Chemistry

Those students seeking graduate degrees may specialize in analytical, inorganic, organic, physical, or theoretical chemistry; chemical education; chemical physics; or biochemistry.

Undergraduate Program

The Department of Chemistry and Biochemistry offers four undergraduate degree programs in chemistry and biochemistry. The Bachelor of Science degree programs are most appropriate for students who plan to pursue a professional, research-based career in chemistry or biochemistry. The Bachelor of Arts options provide a strong undergraduate background in the central sciences of chemistry and biochemistry as preparation for other objectives, such as health-related professional schools, teaching, or sales. The undergraduate advisor provides career counseling and assists students in selecting courses and fulfilling degree requirements. The department offers honors-level courses to qualified students (admitted to the Honors College) in both general and organic chemistry. Highly motivated undergraduate chemistry or biochemistry majors are strongly encouraged to complete an individual research project under the supervision of a faculty member. Undergraduate research students gain a working knowledge of research methods in a specialized area and familiarity with a wide range of instrumentation and techniques. The department has a very active chapter of the Student Affiliates of the American Chemical Society.

Chemistry Curriculum. The undergraduate student may take courses leading to a Bachelor of Arts or a Bachelor of Science degree in chemistry. Either program offers a wide choice of minor subjects in Arts and Sciences or other colleges. Consult the undergraduate advisor prior to registration for a particular minor program. Students who have not completed the prerequisites for a course in which they have enrolled will not be allowed to continue and will be dropped from the course by the department.

Chemistry, B.S. Degree. The Bachelor of Science degree prepares a student for graduate school or a career as a professional chemist. This degree program is technically oriented, requiring greater depth of mathematics, physics, and chemistry than does the Bachelor of Arts degree. With a heavier chemistry requirement in the B.S. degree program, the student has fewer elective courses for other interests. Completion of the B.S. curriculum leads to automatic American Chemical Society certification of a student as the recipient of a professional degree.

Chemistry, B.A. Degree. The Bachelor of Arts in chemistry has a curriculum primarily designed for the student who is interested in using an undergraduate major in chemistry as the background for a career in which extensive training in chemistry is either valuable or essential (e.g., medicine, dentistry, forensics, environmental protection, clinical and pharmacological chemistry, technical sales, and chemical patent law). Though a B.S. is generally preferred by employers, a B.A. may also provide a sufficient background in chemistry for employment as a chemist in a small laboratory or to enter a graduate program leading to the M.S. or Ph.D. degree in chemistry.

CHEM	34 hours
1307, 1308 (or 1301, 1307, 1308), 1107, 1108, 3301, 3305, 3306, 3105, 3106, 3307, 3107, 3341, 3141, 4303, and 4 hours to be chosen from 3000, 3308, 3108, 4300, 4302, 4309, 4105, 4310, 4314, 4114	
MATH	6 hours
1350 (if needed), 1351, 1352	
PHYS	8 hours
1403 & 1404 or 1408 & 2401	
English	12 hours
American History	6 hours
POLS 1301, 2302	6 hours
Social and Behavioral Sciences	6 hours
Humanities	6 hours
Oral Communication	3 hours
Visual and Performing Arts	6 hours
Foreign Language	6-16 hours
Personal Fitness and Wellness	2 hours

All students in the College of Arts and Sciences must complete 125-132 total credit hours for graduation, including minor and free elective courses not listed above.

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 course work in biochemistry, chemistry, and biology. Students who have not completed the prerequisites for a course in which they have enrolled will not be allowed to continue and will be dropped from the course by the department.

Biochemistry, B.S. Degree. The Bachelor of Science in biochemistry program will prepare an undergraduate student for graduate study in biochemistry and related disciplines, for entry into medical or dental school, or for employment in industrial or governmental laboratories in which graduate training is not required. A biology minor may be earned by completing one biology course in addition to those required for the B.S. biochemistry degree (see the biological sciences undergraduate advisor for specific requirements).

Biochemistry, B.A. Degree. The Bachelor of Arts program in biochemistry is primarily designed to prepare an undergraduate student for entry into medical school (admission requirements for Texas medical schools are satisfied) or other medically related professional schools. Graduates with a B.A. in biochemistry are also qualified for industrial employment in areas in which a strong biochemistry background is an asset, such as technical sales or management. The B.A. degree provides sufficient background in biochemistry and chemistry for admission to a graduate program in biochemistry or biotechnology.

CHEM	40 hours
1307, 1308 (or 1301, 1307, 1308), 1107, 1108, 2100, 3305, 3306, 3105, 3106, 3311, 3312, 3313, 3314, 3341, 3141, 4311, and 4 hours to be chosen from 3000, 4300, 4314, and 4114	
BIOL 1403, 1404, 3320, 3416	15 hours
MATH	6 hours
1350 (if needed), 1351, 1352	
PHYS	8 hours
1403 & 1404 or 1408 & 2401	
English	12 hours
American History	6 hours
POLS 1301, 2302	6 hours
Social and Behavioral Sciences	6 hours
Humanities	6 hours
Oral Communication	3 hours
Visual and Performing Arts	6 hours
Foreign Language	6-16 hours
Personal Fitness and Wellness	2 hours

All students in the College of Arts and Sciences must complete 125-132 total credit hours for graduation, including minor and free elective courses not listed above.

Chemistry Minor. Students interested in a chemistry minor should consult with the undergraduate advisor. The chemistry minor

requires a minimum of 19 chemistry credit hours, including at least 4 laboratory hours. Core requirements include CHEM 1107, 1108, 1307, 1308, 3105 and 3305. Chemistry minors must also complete a minimum of one additional laboratory hour (sophomore-level or higher) and a minimum of 6 junior-senior level hours (chemistry or biochemistry) not counting CHEM 3305 or 3306. CHEM 2000, 2100, 2103, 2303, 3000, 3402, 4010, and 4100 may not be counted towards a chemistry minor.

Residency Requirements. The Department of Chemistry and Biochemistry 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 University. For a chemistry minor, at least one of the junior-senior level courses must be taken at Texas Tech University.

Advanced Standing. The Department of Chemistry and Biochemistry 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 University for the first time. Students who are currently enrolled must

apply to the Arts and Sciences Dean's Office for approval to take the examination. For all other courses, it is the student's responsibility to obtain approval from the Dean's Office and to petition the department chair for such examination(s) well before normal enrollment in the course. There is a fee for the CLEP test.

Teacher Education. Students seeking a teaching certificate in physical science are expected to earn a bachelor's degree (B.A. or B.S.) with a major in either chemistry or biochemistry. College of Education requirements for certification in chemistry and science are described in the Teacher Education section (p. 51) of this catalog.

Chemistry Placement Examination. Students wishing to enroll in first-semester, quantitative general chemistry (CHEM 1307) must first complete CHEM 1301 or pass the Chemistry Placement Examination with a score of 50 percent or better. Please consult the department Web site at www.depts.ttu.edu/chemistry for the schedule of examination dates, times, and locations. 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.

Graduate Program / Chemistry and Biochemistry

Students majoring in this department for advanced degrees must pass three diagnostic examinations by the end of their second long semester. These examinations are based on the undergraduate curriculum.

Each student is required to take the diagnostic examinations in his or her area of specialization and any two others or a series of three Biological Chemistry Examinations designed for students whose academic background emphasizes biochemistry. These examinations are offered three times a year.

A master's degree program includes a minimum of 18 credit hours of graduate-level course work, 5 credit hours of research (CHEM 7000), and 6 hours of thesis (CHEM 6000). At least one graduate course must be from outside the area of specialization. A doctoral degree program includes a minimum of 24 credit hours of graduate-level course work, 34 credit hours of research (CHEM 7000), and 12 credit hours of dissertation (CHEM 8000). At least two graduate courses must be from outside the area of specialization.

A cumulative examination system is used as the written part of the qualifying examination for the doctoral degree, with cumulatives offered eight times each year. Passing three cumulative examinations by the end of the second year and an additional three cumulative examinations by the end of the third year is required to satisfy the written part of the qualifying examination. Students in the inorganic chemistry division are required to pass a written preliminary exam instead of the cumulative examinations before the end of their third long semester. The successful oral defense of an independent research proposal is required after satisfying the written part of the qualifying examination requirement. A successful oral defense of the Ph.D. research plan must be completed before the end of the second year.

Chemistry (CHEM)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1105. Experimental General Chemistry Laboratory I (1:0:3) [CHEM 1105].** Corequisite: CHEM 1305. This course is designed to introduce the student to a variety of laboratory techniques and to complement the lecture course CHEM 1305.
- 1106. Experimental General Chemistry Laboratory II (1:0:3) [CHEM 1107].** Prerequisite: CHEM 1105 and CHEM 1305; corequisite: CHEM 1306.
- 1107. Principles of Chemistry Laboratory I (1:0:3) [CHEM 1111].** Corequisite: CHEM 1307. Introduction to a wide variety of experimental techniques.
- 1108. Principles of Chemistry Laboratory II (1:0:3) [CHEM 1112].** Prerequisite: CHEM 1107 and 1307; corequisite: CHEM 1308. A continuation of CHEM 1107, which serves as a prerequisite for all advanced laboratory courses in chemistry.
- 1301. Introductory Chemistry (3:3:0).** Basic vocabulary, concepts, and problem-solving skills required for CHEM 1307 and 1308. This course has no laboratory and will not satisfy a laboratory science requirement.
- 1305. Chemistry and Society I (3:3:0) [CHEM 1305].** Corequisite: CHEM 1105. A non-mathematical survey of basic chemical concepts, properties, and applications within society. Along with CHEM 1105, 1106, and 1306, it satisfies the laboratory science requirement for non-majors and those who do not require CHEM 1307 and 1308.
- 1306. Chemistry and Society II (3:3:0) [CHEM 1307].** Prerequisite: CHEM 1105 and 1305; corequisite: CHEM 1106. This course consists of chemical applications within society and the modern chemical world.
- 1307. Principles of Chemistry I (3:3:0) [CHEM 1311].** Prerequisite: CHEM 1301 or a passing grade on the Chemistry Placement Exam; corequisite: CHEM 1107. A study of fundamental concepts of chemistry including nomenclature, states of matter, the periodic table and periodic trends, chemical reactions, atomic structure, chemical bonding, molecular structure, and the properties of gases, liquids, solutions and solids. This course is recommended for students who plan careers in the physical and biological sciences, as well as medicine and engineering.
- 1308. Principles of Chemistry II (3:3:0) [CHEM 1312].** Prerequisite: CHEM 1107 and 1307; corequisite: CHEM 1108. A continuation of CHEM 1307, which covers solution chemistry, chemical kinetics, acid/base and ionic equilibria, thermodynamics, electrochemistry, nuclear chemistry, and coordination chemistry. This course serves as a prerequisite to all advanced chemistry courses.
- 2000. Introduction to Chemical Research (1:0:3).** Prerequisite: One semester of college chemistry or consent of instructor. Selected research problems according to the needs of students, especially group or team projects. Includes an introduc-

tion to chemical research and mentorship by the staff. May not be repeated for credit.

- 2100. Introduction to Biochemistry Research (1:1:0).** Prerequisite: CHEM 1307 or consent of instructor. A structured seminar series on contemporary biochemical research topics. May not be repeated for credit.
- 2103. Introductory Organic Chemistry Laboratory (1:0:3).** Prerequisite: CHEM 1105, 1106, or 1107, 1108; corequisite: CHEM 2303. Introductory organic laboratory techniques for students in agriculture and human sciences.
- 2303. Introductory Organic Chemistry (3:3:0) [CHEM 1419].** Prerequisite: CHEM 1305, 1306 or 1307, 1308; corequisite: CHEM 2103 is strongly recommended. A brief study of the chemistry of carbon compounds for students in agriculture and human sciences. Not for majors or minors.
- 3000. Undergraduate Research (VI-6).** Prerequisite: Consent of instructor. Individual research project under the guidance of a staff member. May be repeated for credit.
- 3105. Organic Chemistry Laboratory I (1:0:3).** Prerequisite: CHEM 1107, 1108, 1307, 1308; corequisite: CHEM 3305 is strongly recommended. First semester of fundamental techniques of organic chemistry. Will not count as an upper-level elective for a minor.

- 3106. Organic Chemistry Laboratory II (1:0:3).** Prerequisite: CHEM 3305 and 3105; corequisite: 3306 is strongly recommended. Second semester of fundamental techniques of organic chemistry. Will not count as an upper-level elective for a minor.
- 3107. Physical Chemistry Laboratory I (1:0:3).** Corequisite: CHEM 3307. An introduction to physical chemical experimental methods including calorimetry, phase equilibria, surface phenomena, and viscosity.
- 3108. Physical Chemistry Laboratory II (1:0:3).** Prerequisite: CHEM 3307; corequisite: CHEM 3308. An introduction to physical chemical methods, including spectroscopy, high-vacuum techniques, electric and magnetic phenomena.
- 3141. Analytical Chemical Methods Laboratory (1:0:3).** Corequisite: Concurrent enrollment or credit in CHEM 3341. Discovery and practice of analytical laboratory techniques important to the biological and medical sciences.
- 3201. Advanced Organic Chemistry Laboratory (2:0:6).** Prerequisite: CHEM 3105, 3106, 3305, 3306. Advanced synthesis, purification, and analysis of organic compounds. Required for B.S. majors in chemistry.
- 3251. Analytical Chemistry Laboratory (2:0:6).** Corequisite: Concurrent enrollment or credit in CHEM 3351. Discov-

ery and practice of the major analytical laboratory techniques.

- 3301. Descriptive Inorganic Chemistry (3:3:0).** Prerequisite: CHEM 1107, 1108, 1307, 1308. A descriptive survey of modern topics in inorganic chemistry, including coordination compounds, acid-base chemistry, periodicity, transition elements, and inorganic rings, cages, and chains. (Writing Intensive)
- 3305. Organic Chemistry I (3:3:0).** Prerequisite: CHEM 1107, 1108, 1307, 1308; corequisite: CHEM 3105 is strongly recommended. First semester of a thorough foundation course in organic chemistry. Will not count as an upper-level elective for a minor.
- 3306. Organic Chemistry II (3:3:0).** Prerequisite: CHEM 3105 and 3305; corequisite: CHEM 3106 is strongly recommended. Second semester of a thorough foundation course in organic chemistry. Will not count as an upper-level elective for a minor.
- 3307. Physical Chemistry I (3:3:0).** Prerequisite: CHEM 1107, 1108, 1307, 1308, PHYS 1103, 1104, 1306, 1307 or 1105, 1106, 1308, 2301, MATH 1351, 1352; corequisite: CHEM 3107. The study of gases, thermodynamics, chemical and phase equilibria, and solutions.
- 3308. Physical Chemistry II (3:3:0).** Prerequisite: CHEM 3307; corequisite: CHEM 3108 is strongly recommended. The study of kinetic theory, chemical kinet-

Chemistry Curriculum, B.S. Degree

FIRST YEAR

Fall		Spring	
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. Lab. I	1	CHEM 1108, Prin. Chem. Lab. II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
American History	3	American History	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
Personal Fitness and Wellness†	1	Personal Fitness and Wellness†	1
Visual or Performing Arts Elective†	3	Oral Communication†	3
TOTAL	17	TOTAL	17

SECOND YEAR

Fall		Spring	
CHEM 3305, Org. Chem. I	3	CHEM 3306, Org. Chem. II	3
CHEM 3105, Org. Chem. Lab. I	1	CHEM 3106, Org. Chem. Lab. II	1
CHEM 3301, Desc. Inorg. Chem.	3	CHEM 3351, Analytical Chemistry	3
MATH 2350, Calculus III	3	CHEM 3251, Analytical Chem. Lab.	2
PHYS 1408, Prin. of Physics I	4	PHYS 2401, Prin. of Physics II	4
English†	3	Minor	3-4
TOTAL	17	TOTAL	16-17

THIRD YEAR

Fall		Spring	
CHEM 3201, Adv. Org. Chem. Lab.	2	CHEM 3308, Phys. Chem. II	3
CHEM 3307, Phys. Chem. I	3	CHEM 3108, Phys. Chem. Lab. II	1
CHEM 3107, Phys. Chem. Lab. I	1	Advanced Electives+	4
Foreign Language	5	Foreign Language	5
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Pol.	3
Minor	3-4	TOTAL	16
TOTAL	17-18		

FOURTH YEAR

Fall		Spring	
CHEM 4303, Mol. Biochem.	3	CHEM 4309, Inorg. Chem. II	3
Minor	3	CHEM 4105, Inorg. Chem. Lab	1
English†	3	Humanities Elective†	3
Advanced Electives+	3-6	Social or Behav. Sci. Elective†	3
Foreign Language	3	Advanced Electives+	3
TOTAL	15-18	Foreign Language	3
		Minor	3
		TOTAL	19

Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. The student in doubt about which mathematics courses to take in the first year should take the Mathematics Placement Examination.

+ Ten advanced elective hours from CHEM 3000, 4010 (3 hours), 4300, 4314, 4114, MBIO 4402, BIOL 3320, 4320, ZOOL 3405

† Select from Arts and Sciences General Degree Requirements.

Biochemistry Curriculum, B.S. Degree

FIRST YEAR

Fall		Spring	
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. Lab. I	1	CHEM 1108, Prin. of Chem. Lab. II	1
BIOL 1403, Biology I	4	BIOL 1404, Biology II	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
American History	3	American History	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
Physical Fitness and Wellness†	1	Physical Fitness and Wellness†	1
TOTAL	18	TOTAL	18

SECOND YEAR

Fall		Spring	
CHEM 3305, Org. Chem. I	3	CHEM 3306, Org. Chem. II	3
CHEM 3105, Org. Chem. Lab. I	1	CHEM 3106, Org. Chem. Lab. II	1
CHEM 2100, Intro. Biochem. Res.	1	CHEM 3351, Analytical Chemistry	3
BIOL 3416, Genetics	4	CHEM 3251, Analytical Chem. Lab.	2
PHYS 1408, Prin. of Physics I	4	PHYS 2401, Prin. of Phys. II	4
Foreign Language	5	Foreign Language	5
TOTAL	18	TOTAL	18

THIRD YEAR

Fall		Spring	
CHEM 3311, Biol. Chem. I	3	CHEM 3312, Biol. Chem. II	3
MBIO 3401, Prin. of Micro.	4	CHEM 3313, Biol. Chem. Lab.	3
English†	3	CHEM 3314, Biol. Chem. III	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Pol.	3
Foreign Language	3	Foreign Language	3
TOTAL	16	TOTAL	15

FOURTH YEAR

Fall		Spring	
CHEM 4311, Phys. Chem. Biol. Sci.	3	CHEM 4312, Physical Biochemistry	3
Social/Behavioral Science Elective†	3	Humanities Elective†	3
Visual/Performing Arts Elective†	3	English†	3
Oral Communication†	3	Advanced Electives+	7-8
Advanced Electives+	3-4	TOTAL	16-17
TOTAL	15-16		

Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. The student in doubt about which mathematics courses to take in the first year should take the Mathematics Placement Examination.

+ Ten advanced elective hours from CHEM 3000, 4010 (3 hours), 4300, 4314, 4114, MBIO 4402, BIOL 3320, 4320, ZOOL 3405

† Select from Arts and Sciences General Degree Requirements.

- ics, electrochemistry, transport properties, surface chemistry, quantum chemistry, and statistical mechanics.
3311. **Biological Chemistry I (3:3:0)**. Prerequisite: CHEM 3105, 3106, 3305, 3306; BIOL 1401, 1402 or 1403, 1404. First semester of a three-semester course in general biochemistry.
3312. **Biological Chemistry II (3:3:0)**. Prerequisite: CHEM 3311. Second of a three-part course in general biochemistry.
3313. **Biological Chemistry Laboratory (3:1:6)**. Prerequisite: CHEM 3311 or 4303. Techniques for the isolation, purification, and characterization of biomolecular species. (Writing Intensive)
3314. **Biological Chemistry III (3:3:0)**. Prerequisite: CHEM 3311. Third of a three-part course in general biochemistry. Emphasis on nucleotide metabolism and cellular processes involving nucleic acids.
3341. **Analytical Chemical Methods (3:3:0)**. Prerequisite: CHEM 1107, 1108, 1307, 1308; corequisite: CHEM 3141 is required. A lecture course in analytical chemical methods emphasizing practical applications, including techniques important to the biological and medical sciences.
3351. **Analytical Chemistry (3:3:0)**. Prerequisite: CHEM 1107, 1108, 1307, 1308; corequisite: CHEM 3251 is strongly recommended. Basic lecture course in the theories and techniques of analytical chemical methods.
4010. **Individual Studies in Chemistry (V1-6)**. Prerequisite: Consent of instructor. A structured independent studies course under the guidance of a faculty member. May be repeated for credit.
4100. **Case Studies of Chemical Enterprises (1:0:3)**. Prerequisite: Senior standing and consent of instructor. A student seminar opportunity to study the structure and operation of chemical processes and/or enterprises.
4105. **Inorganic Chemistry Laboratory (1:0:3)**. Prerequisite: CHEM 3105. Techniques used in the synthesis and characterization of inorganic compounds: complex ions, vacuum-line techniques, chromatography, inert atmosphere methods, reactivity profiles, spectroscopy of inorganic compounds.
4114. **Instrumental Analytical Methods Laboratory (1:0:3)**. Corequisite: Concurrent enrollment or credit in CHEM 4314. Experience and practice with several important chemical instruments. (Writing Intensive)
4300. **Senior Research (3:0:8)**. Prerequisite: Senior standing with minimum 2.5 chemistry GPA and consent of instructor. Individual research project under the guidance of a staff member. The project will be at a more advanced level than is involved in CHEM 3000. The student is required to use the chemical literature in planning of the research and to submit a formal written report. May not be repeated for credit. (Writing Intensive)
4302. **Structure and Mechanisms in Organic Chemistry (3:3:0)**. Prerequisite: CHEM 3105, 3106, 3305, 3306 and 3307. Organic chemistry at an advanced level. Emphasis on developments in theoretical organic chemistry.
4303. **Molecular Biochemistry (3:3:0)**. Prerequisite: CHEM 3105, 3106, 3305, 3306. Molecular descriptions of biological materials and systems. A one-semester course covering molecular approaches to biochemistry and metabolism.
4309. **Inorganic Chemistry II (3:3:0)**. Prerequisite: CHEM 3105, 3305, and MATH 1352. A theoretical treatment of inorganic chemistry, including symmetry, group theory, bonding principles, spectroscopy, inorganic reaction mechanisms, transition metals, and organometallic chemistry. (Writing Intensive)
4310. **Polymer Chemistry (3:3:0)**. Prerequisite: CHEM 3306 and 4311 or 3306 and 3307. An introduction to the chemistry of macromolecules, including the synthesis, structures, properties, and applications of polymers.
4311. **Physical Chemistry for the Biological Sciences (3:3:0)**. Prerequisite: CHEM 1107, 1108, 1307, 1308, 3311; PHYS 1105, 1106, 1308, 2301 or 1103, 1104, 1306, 1307; MATH 1351, 1352. A physical chemistry course for majors in biochemistry and the biological sciences. Topics include quantum chemistry, thermodynamics, electrochemistry, and kinetics.
4312. **Physical Biochemistry (3:3:0)**. Prerequisite: CHEM 3251, 3311, 3312, 3313, 3314, 3351 and 4311 or 3307; MATH 1351, 1352; PHYS 1105, 1106, 1308, 2301. Applications of physical chemical techniques to proteins, nucleic acids, and membranes.
4314. **Instrumental Analytical Methods (3:3:0)**. Prerequisite: CHEM 3141, 3341 or 3251, 3351 and 3107, 3307 or 4311; corequisite: CHEM 4114 is required. Lecture course covering theories and application of instrumental chemical analysis methods. (Writing Intensive)

Graduate Courses

5010. **Individual Studies in Chemistry (V1-6)**. Prerequisite: Consent of instructor. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
- 5101, 5102. **Seminar (1:1:0 each)**. Prerequisite: Graduate standing in chemistry. Required of all graduate students majoring in chemistry.
5301. **Advanced Inorganic Chemistry I (3:3:0)**. Prerequisite: CHEM 4309 or equivalent. Principles of coordination chemistry. Structure, bonding, properties, and reactions of complex compounds.
5302. **Advanced Inorganic Chemistry II (3:3:0)**. Prerequisite: CHEM 5301. Reaction mechanisms of inorganic compounds.
5304. **Topics in Chemistry (3:3:0)**. Prerequisite: Consent of instructor. Special area of chemistry not commonly included in other courses. Topics may be taken from the traditional chemical disciplines or any interdisciplinary combination. May be repeated under a different topic for credit.
5310. **Polymer Chemistry (3:3:0)**. Prerequisite: CHEM 4311 or 3307 and 3306, or equivalents. An introduction to the chemistry of macromolecules, including the synthesis, structures, properties and applications of polymers.
5314. **Advanced Analytical Chemistry (3:3:0)**. Prerequisite: CHEM 2501, 3307, 3308, or equivalents. General principles and special methods of analytical chemistry.
5315. **Atmospheric Chemistry (3:3:0)**. Prerequisite: Consent of instructor. An advanced course covering the production, monitoring, and fate of gases, vapors, and particulates in planetary atmospheres.
5316. **Aquatic Chemistry (3:3:0)**. Prerequisite: Consent of instructor. An advanced course in the analytical, physical, and inorganic chemistry of naturally occurring aqueous solutions and suspensions.
5318. **Analytical Separation Science and Technology (3:3:0)**. Prerequisite: Consent of instructor. The science and technology of analytical separation techniques, including chromatography, electrophoresis, field flow fractionation, and capillary separation.
5319. **Electrochemical Analysis (3:3:0)**. Prerequisite: Consent of instructor. Principles and applications of electrochemistry with emphasis on topics in electroanalytical chemistry.
5320. **Analytical Spectroscopy (3:3:0)**. Prerequisite: Consent of instructor. A detailed fundamental assessment and survey of the important techniques in analytical spectroscopy.
5321. **Advanced Organic Chemistry I (3:3:0)**. Prerequisite: CHEM 3305 and 3306 or equivalents. Principles and reactions of organic chemistry, with emphasis on the most recent developments from the current literature.
5322. **Advanced Organic Chemistry II (3:3:0)**. Prerequisite: CHEM 5321. Principles and methods of synthesis of organic compounds.
5323. **Modern Principles of Organic Chemistry I (3:3:0)**. A survey of modern organic chemistry with emphasis on reactions and contemporary theory. Not appropriate for graduate students in the department.
5324. **Modern Principles of Organic Chemistry II (3:3:0)**. Prerequisite: CHEM 5323. A continuation of CHEM 5323. Primarily intended for graduate minors in chemistry. Will serve as the prerequisite for other graduate courses in organic chemistry. Not appropriate for graduate students in the department.
5326. **Organic Spectroscopic Analysis (3:3:0)**. Prerequisite: CHEM 3306 or equivalent. Theory and interpretation of spectra of organic compounds: MS, IR, UV-Vis, carbon and proton NMR.
5327. **Physical Organic Chemistry I (3:3:0)**. Prerequisite: CHEM 5321. Properties and reactions of organic compounds and the mechanisms of organic reactions considered from the standpoint of the principles of physical chemistry.
5330. **Biochemistry I (3:3:0)**. Prerequisite: CHEM 3401 or 3105, 3106, 3305, 3306 or equivalents. Properties of biological compounds. Chemical processes in living systems. For advanced study by graduate students with majors outside the department. Not appropriate for graduate students in the department.
5331. **Biochemistry II (3:3:0)**. Prerequisite: CHEM 5330. Properties of biological compounds. Chemical processes in living systems. For advanced study by

- graduate students with majors outside the department. Not appropriate for graduate students in the department.
5332. **Biochemistry III (3:3:0)**. Prerequisite: CHEM 5330. Third semester of a three semester general biochemistry series for nonmajors. Topics include nucleotide metabolism and cellular processes involving nucleic acids. Not appropriate for graduate students in the department.
5333. **Proteins (3:3:0)**. Prerequisite: CHEM 3311, 3312 or CHEM 4303 or BCH 5921 or equivalents. Chemical and physical properties of proteins. Primary and conformational structure determination.
5335. **Physical Biochemistry (3:3:0)**. Prerequisite: CHEM 3307 or 4311 and CHEM 3311, 3312 or equivalents. Biophysical methods and approaches to the study of structure-function relationships in biopolymers.
5336. **Lipids (3:3:0)**. Prerequisite: CHEM 3305, 3306, 3311, and 3312. Structure and function of lipids. Emphasis is placed on the methods of characterization, evolution, biosynthetic pathways, and biological roles of lipids.
5337. **Enzymes (3:3:0)**. Prerequisite: CHEM 3311, 3312 or CHEM 4303 or equivalents. Structure, mode of action, and kinetics of enzymes.
5339. **Nucleic Acids (3:3:0)**. Prerequisite: CHEM 3312 or 4303 and BIOL 4320 or 5320. Eukaryotic and prokaryotic DNA cloning strategies, DNA sequence analysis and manipulation, and recombinant DNA expression.
5340. **Physical Chemistry Principles I (3:3:0)**. Prerequisite: CHEM 1307, 1308, PHYS 1308, 1105, 2301, 1106, MATH 1551, 1552 or equivalents. A foundation course, for the graduate student minoring in chemistry, covering a wide range of principles. Prerequisite for other courses in physical and inorganic chemistry. Not appropriate for graduate students in the department.
5341. **Physical Chemistry Principles II (3:3:0)**. Prerequisite: CHEM 5340. A foundation course, for the graduate student minoring in chemistry, covering a wide range of principles. Prerequisite for other graduate courses in physical and inorganic chemistry. Not appropriate for graduate students in the department.
5342. **Advanced Physical Chemistry (3:3:0)**. Prerequisite: CHEM 3307, 3308, or equivalents. Introduction to quantum mechanics, spectroscopy, and the electronic structures of atoms and molecules.
5343. **Quantum Chemistry (3:3:0)**. Prerequisite: CHEM 5342. The application of non-relativistic wave mechanics to problems of chemical structure and reactivity.
5344. **Kinetics of Chemical Reactions (3:3:0)**. Prerequisite: CHEM 3307, 3308, or equivalents. A survey of chemical kinetics including transition state theory, the theory of mass spectra, spectroscopic methods, and models of reactions in solution.
5345. **Molecular Spectroscopy (3:3:0)**. Prerequisite: CHEM 5342. Principles of electronic, vibrational, and rotational spectroscopy and applications for determining molecular structure and other properties.
5346. **Statistical Mechanics for Chemists (3:3:0)**. Prerequisite: CHEM 5342. Equilibrium and non-equilibrium systems including ensembles, density matrices, and time-correlation functions.
5349. **Physical Chemistry Principles for Biological Sciences (3:3:0)**. Prerequisite: CHEM 1307, 1308, 1107, 1108; PHYS 1308, 2301, 1105, 1106 or 1306, 1307, 1103, 1104; MATH 1351, 1352 or equivalents. A physical chemistry course for graduate students in biological sciences. Topics: Thermodynamics, electrochemistry, chemical kinetics, and quantum mechanics. Not appropriate for graduate students in the department.
5360. **Conceptual Chemistry for Teachers I (3:3:0)**. An integrated course for teachers. Topics include water, acids-bases, the periodic table, compounds, reactivity, structure, and energy.
5361. **Conceptual Chemistry for Teachers II (3:3:0)**. Prerequisite: CHEM 5360. A continuation of CHEM 5360, covering organic chemistry, biochemistry, equilibrium, kinetics, polymers, and nuclear chemistry.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Classical and Modern Languages and Literatures

Faculty

Frederick Suppe, Chairperson

Horn and Qualia Professors: Gafaiti and J. Pérez; Finco Professor: Finco; *Professors:* Christiansen, George, Larmour, A.J. Pérez, G. Pérez, Smith, Suppe, and Wood; *Associate Professors:* Beard, Cabrera, Fry, Grair, Holland, McClain, McVay, Myers, Nell, A. Pérez, Reed, Stein, and Stratton; *Assistant Professors:* Bermudez, Borst, Chávez, Collopy, Connelly, Corbett, Gorsuch, Hopkins, Ladeira, Pratt, Qualin, Santos, Sunseri, and Zamora; *Instructor:* Hays

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Classics
- Bachelor of Arts in French
- Bachelor of Arts in German
- Bachelor of Arts in Spanish
- Master of Arts in Applied Linguistics
- Master of Arts in Classics
- Master of Arts in German
- Master of Arts in Romance Languages
- Doctor of Philosophy in Spanish

The department participates in the Russian Language and Area Studies program at the undergraduate level and the Latin American and Iberian Studies program at the undergraduate level as well as in the minor at the master's and doctoral levels. Graduate students majoring in Romance Languages may specialize in French or Spanish. The department also participates in the ethnic studies, honors, linguistics, comparative literature, and teacher education programs. See the section on Special and Interdepartmental Programs of the College of Arts and Sciences.

Undergraduate Program

Majors and Minors for the B.A. Degree. A major may be obtained in Classics, French, German, Russian Language and Area Studies, and

Spanish. An undergraduate major in French or Spanish consists of 30 hours at the 2000 level and above including a minimum of four 4000 level courses in Spanish and five 4000 level courses in French. The German major consists of 30 hours with a minimum 6 hours at the 3000 level and 15-18 hours at the 4000 level. The Classics major consists of 30 hours from Classics, Latin at the 1502 level and above, Greek, ART 3310, C LT 2301, HIST 3340, and PHIL 3301. Classics students pursuing teacher certification must replace classics with advanced Latin to complete 24 hours specifically in Latin. For information on the B.A. degree or a minor in Russian Area and Language Studies or Applied Linguistics see program descriptions in the College of Arts and Sciences "Interdisciplinary Programs" section of this catalog.

A minor may be obtained in Arabic, American Sign Language, Chinese, Classics, Comparative Literature, French, German, Greek, Italian, Japanese, Latin, Latin American and Iberian Studies, Linguistics, Portuguese, Russian, Russian Language and Area Studies, Spanish, and Turkish. The minor consists of a minimum of 18-22 hours in a particular language or area. A minor in Group I: Greek, Italian, and Portuguese will consist of at least 6 courses totaling 18 hours, with a minimum of two courses numbered at the 3000 level or above. A minor in Group II: Arabic, Japanese, or Turkish will consist of at least 6 courses totaling 22 hours with a minimum of two courses at the 3000 level or above. A minor in Group III: French, German, Latin, Russian, or Spanish will consist of at least 6 courses totaling 18-22 hours (normally 20 hours) with a minimum of 3 courses at the 3000 level and above including at least one course at the 4000 level in French, German, Latin, or Spanish. A minor in Group IV: Classics, Latin American and Iberian Studies, Linguistics, and Russian Language and Area Studies will consist of at least 18 hours from the approved course lists of these areas listed elsewhere in this catalog.

Students wishing to obtain information on a major or minor in one of these languages should consult the department's assistant advisor or one of the faculty advisors in a specific language or area. The advisors can provide information on all aspects of the major and minor programs, including career opportunities. A grade of at least C in all major and minor courses is required. College Level Examination (CLEP) credits are accepted by the department.

Resident Courses. Students who are minors are required to take at least one upper level 3-hour class in residence in the target language at Texas Tech University. Students who are majors are required to take at least three upper level classes (9 hours) in residence in the target language at Texas Tech. Students who study abroad with the university programs (which involve faculty from this department) may include those courses among the required courses. Foreign study courses taken through approved exchange programs or other programs that are affiliated with Texas Tech are not considered as resident courses.

Study Abroad Courses. Students enrolled in Spanish can earn 6 hours of junior and/or senior level residence credit by either studying in Seville, Spain or by participating in the annual summer Mexico Field Course program. Students enrolled in German may earn 6 hours credit (GERM 3305 and 3306) in Germany or Austria with the annual summer German Study Abroad Program. Students in this program may not receive credit towards a major or minor in German for any course below the 3000 level unless completed prior to departure, and they must complete a 33-hour major if they participate in the program twice. Students enrolled in Russian have the option to earn credit by participating in study tours of Russia. These are regularly offered.

Foreign Language Requirements and Options. To fulfill the general Bachelor of Arts requirements, students must complete 6 semester hours in the same language at the sophomore level or above. A student who enrolls in the first-year sequence will have a 11-16 hour requirement. Courses taught in English such as SPAN 3390, 3391, 3392, FREN 3390, GERM 3312, 3313, RUSN 2303, 3301, 3302, 4301, and 4302 may not be used to fulfill the foreign language requirement for any bachelor's degree.

Foreign language courses 1301 and 1302 or 1501 and 1502 or 1507 are prerequisites for courses 2301 or 2607; a minimum grade of B in SPAN 1507 is required to enroll in SPAN 2607. All first- and second-year courses are sequential and should be taken in their proper order beginning with 1301, 1501, or 1507 and progressing up through 2302 or 2607. If credit is earned for 1507, no credit will be awarded for 1501 and/or 1502. Students with two years of high school French, Latin, or Spanish are required to enroll in 1507. Those students enrolled in 1507 but judged not qualified for 1507 are required to take 1501 pass-fail. Successful completion of lower-numbered courses or equivalent competency is a prerequisite for the higher-numbered courses. These higher-numbered courses allow students to pursue their particular interests in language, civilization, and literature.

Teacher Education. For purposes of certification, teaching fields are offered in French, German, Latin, and Spanish. The standard program requires 24-27 hours at the 2000-level and above, which must include 9 hours of 4000-level courses in the specific language (12 hours in German). Students seeking secondary certification in French and Spanish must complete LING 4311, preferably before their student teaching, as part of the teaching field. Students seeking bilingual education endorsement, ESL endorsement, or secondary certification in French, German, Latin, or Spanish should consult with advisors in the College of Education and in the Department of Classical and Modern Languages and Literatures.

Placement and Credit by Examination. The department offers placement exams in French, German, Latin, and Spanish. The department recommends that students with three or more years of study in one of these languages or students with advanced fluency take the placement exam. These exams permit students to earn up to 16 hours credit for a variety of first and second year courses. The placement exams also provide a recommended placement or the next logical course the student should take.

Each placement exam is intended to evaluate an individual's general level of knowledge of the language; a grade is not issued, nor is any specific text or study material recommended for the tests. Any credit earned through these exams is posted to the student's transcript as credit by examination. The hours will count towards languages or other humanities requirements, depending on the student's college, but will not affect the GPA.

Students who earn credit through a language placement test may not later take that course and receive credit. Likewise, an individual cannot receive credit through the placement tests for a course that has already

been completed. Each of the language placement tests (i.e., French, German, Latin, Spanish) may be taken only once per student.

The placement tests are administered by the Language Learning Laboratory and Resource Center. The tests are offered the last Wednesday and Thursday of each month (except December), during preregistration periods and at the beginning of each long semester. Further information may be obtained by calling the Language Laboratory at (806) 742-3151.

Graduate Program / CMLL

Before beginning a graduate program in this department, students should consult the graduate advisor of the particular program concerning departmental admission procedures and degree requirements. Admission to the Graduate School requires departmental recommendation as well as approval by the graduate dean.

The master's program offers advanced study in literature and linguistics. It is intended to be a distinctly different educational experience from undergraduate study. It requires study in greater depth and the development of critical thinking. Applicants for the M.A. degree in Spanish may complete 24 hours of graduate courses and a thesis or 36 hours of course work. The degree may include a six-hour minor. Applicants for the M.A. degree in Applied Linguistics, Classics, French, or German may complete 30 hours of graduate courses and a thesis or 36 hours of course work. Areas of emphasis for Spanish, French, or German include literature, comparative literature, linguistics, civilization and/or culture. Areas of emphasis for Classics include literature, language, gender, and art history. Classics candidates are directed to the *Guide to the M.A. Degree Program in Classics* obtainable from the graduate advisor or the departmental office. Candidates for the M.A. degree in this department must demonstrate a reading knowledge of a second foreign language. Areas of emphasis for applied linguistics include teaching English as a second language, teaching second/foreign languages, or general applied linguistics. Candidates for the M.A. degree in Applied Linguistics must demonstrate knowledge of a language other than English (see also the Applied Linguistics section of this catalog). Oral and written comprehensive examinations are required. This department also participates in the joint MBA-MA program. See a full description under the Rawls College of Business section of this catalog.

The department offers a 150-hour dual BA/MA option for outstanding students.

Graduate minors for the M.A. degree are available in Applied Linguistics, Classics, French, German, Greek, Latin, Portuguese, Russian, and Spanish.

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. In order to qualify for admission to candidacy for the Ph.D. degree in Spanish, applicants must complete a graduate minor in another language or demonstrate a reading knowledge of two approved languages other than English or Spanish. Any substitution must be submitted in writing to the Spanish graduate advisor and approved by the candidate's doctoral committee.

Students in the Ph.D. program normally minor within the department in one of the above mentioned minor areas, but may select a combination of courses within and outside the department if approved by the appropriate graduate advisor. Students should consult with a graduate advisor for approved options. A Ph.D. minor consists of 15-18 hours of course work in approved areas.

Course work for the Ph.D. generally amounts to a minimum 60 hours beyond the B.A. degree including at least 45 hours of course work 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.

Chinese (CHIN)**Undergraduate Courses**

- 1401, 1402. **Beginning Course in Chinese I, II (4:4:1 each)** [CHIN 1411, 1412]. Introduction and development of the four language skills in Chinese: listening comprehension, speaking, reading, and writing.
- 2301, 2302. **Second Course in Chinese I, II (3:3:0 each)** [CHIN 2311, 2312]. Prerequisite: CHIN 1402 for CHIN 2301 and CHIN 2301 for CHIN 2302. Reading, cultural background, grammar review, conversation, and composition.
4300. **Individual Problems in Chinese (3)**. Prerequisite: CHIN 2302 or equivalent as well as consent of instructor and department chairperson. Contents will vary to meet the needs of the student. May be repeated for credit with consent of instructor. Independent work under the guidance of a faculty member.

Classics (CLAS)**Undergraduate Courses**

1310. **Latin and Greek Terminology (3:3:0)**. Analysis of English words through the study of Latin and Greek roots, prefixes, and suffixes.
3302. **Classical Mythology (3:3:0)**. Classical myths: stories of gods, demigods, and heroes; their significance in the ancient and modern worlds. Selected readings in translation with lectures and discussions in English.
3303. **Sports and Public Spectacles in the Ancient World (3:3:0)**. Survey of Greek and Roman athletics, the Roman Triumph, gladiatorial combat, and other spectacles in the Ancient World.
3304. **Ancient Technology (3:3:0)**. Examination of the science and engineering of the ancient Egyptians, Greeks, and Romans through archeological remains and literary sources.
3315. **World of Egypt and the Near East (3:3:0)**. Examination of the literature and/or art and archaeology of ancient Egypt, and the Near East in its cultural context.
3320. **The World of Greece (3:3:0)**. Examination of the literature and/or art and archaeology of ancient Greece in its cultural context.
3330. **The World of Rome (3:3:0)**. Examination of the literature and/or art and archaeology of ancient Rome in its cultural context.
3340. **Gender and Sexuality in the Classical World (3:3:0)**. Examination of the social and cultural dimensions of gender and sexuality in the ancient Greco-Roman world. Readings in English.
3350. **Comparative Mythology (3:3:0)**. Ancient myths in various cultures and their influence on modern literature and film.
4300. **Research in Classics (3)**. Undergraduate research in classics under direction of instructor. May be repeated for credit. (Writing Intensive)
4310. **Seminar in Classics (3:3:0)**. Prerequisite: Six hours of classics or consent of instructor. Intensive study of a topic in ancient culture. May be repeated for credit. (Writing Intensive)

Graduate Courses

5101. **Classical Language Pedagogy (1:1:0)**. Systemic formal training in language pedagogy for Latin and ancient Greek.
5301. **Studies in Greco-Roman Literature (3:3:0)**. Selected studies in major authors, genres, or themes. May be repeated for credit.
5305. **Aims and Methods of Classical Scholarship (3:3:0)**. A general overview of aims and methods of ancient studies covering primary and secondary sources.
5311. **Classical Art and Archaeology (3:3:0)**. Examines architecture, sculpture, and painting of the Greco-Roman World. May be repeated for credit.
5350. **The Classical Tradition (3:3:0)**. Designed to acquaint students with the influence of ancient Rome and Greece on Western culture. Readings in English.
6000. **Master's Thesis (VI-6)**.
7000. **Research (VI-12)**.

Classical and Modern Languages and Literatures (CMLL)**Undergraduate Courses**

- 1301, 1302. **Individual Studies in Modern Languages I, II (3 each)** [SNGL 1401, 1402]. Introduction and development of skills in a modern language, including listening comprehension, speaking, reading, and writing.
- 1501, 1502. **Individual Studies in Modern Languages I, II (5 each)**. Introduction and development of the four languages skills: listening comprehension, speaking, reading, and writing. May be repeated twice for credit when language is different.
- 2301, 2302. **Individual Studies in Modern Languages III, IV (3 each)** [SNGL 1401, 1402]. Prerequisite: CMLL 1301 and 1302, or equivalent. Continuation of study of a modern language. Introduction and development of skills in a modern language, including listening comprehension, speaking, reading, and writing.
4300. **Individual Studies in Modern Language (3)**. Prerequisite: CMLL 2302 or equivalent. Independent study in modern language under the guidance of a faculty member. May be repeated for credit with consent of instructor.

Graduate Courses

5301. **Research Methods & Bibliography (3:3:0)**. Systematic study of research methods, bibliographical materials and problems in the fields of languages and literatures.
5302. **Literary Criticism and Theory (3:3:0)**. Theories and practices of literary analysis and criticism with emphasis on critical/analytic thinking, reading and writing.

English as a Second Language (ESL)**Undergraduate Courses**

1301. **Oral Skills for International Students (3:3:0)**. Prerequisite: Consent of instructor. Development of oral language skills and interaction strategies, English pro-

nunciation and intonation, and idiomatic English expression.

1302. **English Grammar and Composition for International Students (3:3:0)**. Prerequisite: Consent of instructor. Development of academic writing skills with emphasis on the grammar of written English.

Graduate Courses

5301. **Advanced Writing for International Students (3:3:0)**. Focusing on advanced writing projects, the preparation of theses and dissertations, and the preparation of research for publication.

French (FREN)**Undergraduate Courses**

- 1501, 1502. **Beginning Course in French I, II (5:5:1 each)** [FREN 1411, 1412].
1507. **Comprehensive French Review-First Year (5:5:1)**. Prerequisite: Two years of high school French. A comprehensive one-semester review.
- 2301, 2302. **Second Course in French I, II (3:3:0 each)** [FREN 2311, 2312]. Prerequisite: FREN 1501 and 1502 or 1507. Readings, cultural background, conversation, and composition.
3302. **Major French Writers (3:3:0)**. Prerequisite: FREN 2301 and 2302, or equivalent. A survey of major French writers. (Writing Intensive)
3303. **French Conversation (3:3:0)**. Prerequisite: FREN 2301 and 2302, or equivalent. Designed to increase vocabulary and attain oral fluency. May be taken concurrently with FREN 3301 or 3302.
3304. **Grammar: A Comprehensive Review (3:3:0)**. Prerequisite: FREN 2301 and 2302 or equivalent. A comprehensive overview of French grammar.
3390. **French Culture (3:3:0)**. A multimedia approach to topics related to French culture. Taught in English. Credit does not apply to major or minor. May not be repeated.
4100. **Advanced Individual Problems in French (1)**. Prerequisite: FREN 2301 or equivalent. Contents will vary to meet the needs of student. May be repeated for credit with the consent of the instructor.
4300. **Individual Problems in French (3)**. Prerequisite: FREN 2301 and/or 2302, together with consent of instructor and department chairperson. Contents will vary to meet the needs of students. May be repeated for credit with the consent of the instructor. Independent work under the guidance of a staff member.
4302. **Advanced Grammar and Composition (3:3:0)**. Review of important grammatical constructions and idioms, with written practice. May be repeated once for credit for purposes of study abroad. era
3302. **Major French Writers (3:3:0)**. Prerequisite: FREN 2301 and 2302, or equivalent. A survey of major French writers. (Writing Intensive)
3303. **French Conversation (3:3:0)**. Prerequisite: FREN 2301 and 2302, or equivalent. Designed to increase vocabulary and attain oral fluency. May be taken concurrently with FREN 3301 or 3302.
3304. **Grammar: A Comprehensive Review (3:3:0)**. Prerequisite: FREN 2301 and 2302

- or equivalent. A comprehensive overview of French grammar.
3390. **French Culture (3:3:0)**. A multimedia approach to topics related to French culture. Taught in English. Credit does not apply to major or minor. May not be repeated.
4100. **Advanced Individual Problems in French (1)**. Prerequisite: FREN 2301 or equivalent. Contents will vary to meet the needs of student. May be repeated for credit with the consent of the instructor.
4300. **Individual Problems in French (3)**. Prerequisite: FREN 2301 and/or 2302, together with consent of instructor and department chairperson. Contents will vary to meet the needs of students. May be repeated for credit with the consent of the instructor. Independent work under the guidance of a staff member.
4302. **Advanced Grammar and Composition (3:3:0)**. Review of important grammatical constructions and idioms, with written practice. May be repeated once for credit for purposes of study abroad. (Writing Intensive)
4303. **Advanced French Conversation (3:3:0)**. Prerequisite: FREN 3303. Designed to increase fluency in the spoken language. May be repeated once for credit for purposes of study abroad.
4304. **Commercial French (3:3:0)**. Oral and written French, with special attention to idiomatic expressions currently in use in business and technical fields.
4315. **The French Short Story (3:3:0)**. This course will trace the development of the French short story from Voltaire's *Candide* to Boris Vian's *Les Lorettes Furrées*. May be repeated once for credit for purposes of study abroad. (Writing Intensive)
4317. **Readings in French Literature and Culture (3:3:0)**. Prerequisite: FREN 3301, 3302, 3303, or equivalent. May be repeated for credit with consent of instructor. Conducted in French. (Writing Intensive)
4322. **Civilisation Francaise: French Civilization (3:3:0)**. A survey of French civilization from the Middle Ages to the present: literature, art, music, philosophy, science, and architecture. Readings, slides, films, and tapes. Conducted in French. May be repeated once for credit for purposes of study abroad. (Writing Intensive)
- meet the needs of students. May be repeated for credit.
5316. **Sixteenth Century Literature (3:3:0)**. Readings, analysis, and interpretation of selected works of the sixteenth century.
5317. **Seventeenth-Century Literature (3:3:0)**. Reading, analysis, and interpretation of selected works of the seventeenth century.
5318. **Eighteenth Century Literature (3:3:0)**. Reading, analysis, and interpretation of selected works of the eighteenth century.
5319. **Nineteenth Century Literature (3:3:0)**. Readings, analysis, and interpretation of selected works of the nineteenth century. Course content may vary. May be repeated for credit.
5320. **Twentieth Century Literature (3:3:0)**. Readings, analysis, and interpretation of selected works of the twentieth century. Course content may vary. May be repeated for credit.
5321. **French Cinema (3:3:0)**. Presentation of the major trends of French cinema from the beginnings to the present. Course content may vary. May be repeated for credit.
5327. **French Civilization (3:3:0)**. Historical, geographical, social, and artistic aspects of the development of the culture of France. Course content will vary. May be repeated for credit (new).
5328. **Francophone Literature and Culture (3:3:0)**. Readings and topical studies relating to French-speaking cultures (in Africa, Europe, U. S., Quebec, and Caribbean) and French and Francophone culture that may require special treatment. May be repeated for credit.
5329. **Studies in Literary Criticism and Theory (3:3:0)**. Current and traditional ways of analyzing literary texts in their cultural contexts with emphasis on theory. Course content will vary. May be repeated for credit.
- 5341, 5342. **Intensive French for Graduate Research I and II (3:3:0 each)**. French readings with related grammar to acquaint graduates with French as a research skill; equivalent of two years of normal course work. Not intended to meet major or minor degree requirements.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

German (GERM)

Undergraduate Courses

- 1501, 1502. **Beginning Course in German I, II (5:5:1 each)** [GERM 1411, 1412]. Oral practice, elementary reading, and grammar.
1507. **Comprehensive German Review-First Year (5:5:1)**. Prerequisite: Two years of high school German. A comprehensive one-semester review.
- 2301, 2302. **Second Course in German I, II (3:3:0 each)** [GERM 2311, 2312]. Prerequisite: GERM 1501 and 1502 or 1507. Reading, cultural background, grammar review, and conversation.
3301. **German Culture and Society (3:3:0)**. Prerequisite: GERM 2301 and 2302 or equivalent. Study of video, Internet, and textual resources on culture and current issues. Conducted in German. (Writing Intensive)

3303. **Conversation and Composition (3:3:0)**. Prerequisite: GERM 2302 or equivalent. Emphasis on fluency in spoken and written German. May be taken concurrently with GERM 3301. Conducted in German. (Writing Intensive)
3304. **Introduction to Literature (3:3:0)**. Prerequisite: GERM 2302 or equivalent. An introduction to periodization of German literature, literary genres, and literary theory. Conducted in German. (Writing Intensive)
3305. **German Language Studies (3:3:0)**. Prerequisite: GERM 2302 or consent of director. Development of listening, speaking, reading, and writing skills in Austria or Germany. Offered each summer. May be repeated once for credit.
3306. **Contemporary Germany (3:3:0)**. Prerequisite: GERM 2302 or consent of director. Readings in cultural history and literature, lectures, and tours on location. Taught in German. May not be repeated for credit toward major or minor. (Writing Intensive)
3312. **Literature of the Holocaust (3:3:0)**. Examination of the Holocaust as represented in literature, film, and art. Conducted in English.
3313. **Northern Myths and Legends (3:3:0)**. Introduction to Germanic myths, epics, sagas, legends, and fairy tales. Selected readings in translation with lectures and discussions in English.
4000. **Individual and Group Studies in German (V1-6)**. Prerequisite: Consent of chairperson. Study in German under the guidance of a faculty member. May be repeated for credit.
4301. **Grammar (3:3:0)**. Prerequisite: GERM 3301 and 3303 or equivalent. Review of grammatical structure. Practice in pronunciation and in written and spoken German.
4303. **German Classics (3:3:0)**. Prerequisite: 6 hours from GERM 3301, 3303, 3304, or equivalent. Readings in German literature through selected works by Hoffman, Büchner, Keller, Kleist, Storm, and Hauptmann. Conducted in German. (Writing Intensive)
4305. **Readings in German Language and Literature (3:3:0)**. Prerequisite: 6 hours from GERM 3301, 3303, 3304, or equivalent. Readings from a particular period or study of a literary theme. May be repeated for credit with consent of instructor. Conducted in German.
4309. **Business German (3:3:0)**. Prerequisite: 6 hours from GERM 3301, 3303, 3304, or equivalent. Oral and written German with special attention to the idiomatic expressions and cultural practices of business in Germany.

Graduate Courses

Graduate Courses

5100. **Advanced Problems in French Language and Literature (1)**. An individualized research project course. Contents will vary to meet the needs of students.
5101. **Teaching French in College (1:1:0)**. Classroom organization and explanation as well as demonstrations of instructional techniques. Does not count toward the minimum requirement of a graduate degree. Must be taken pass-fail by all teaching assistants each semester.
5312. **Medieval Literature (3:3:0)**. Reading and philological interpretation of selected Old French texts.
5315. **Studies in French Language and Literature (3:3:0)**. This course concentrates on topics in French civilization, linguistics, and literature with content varying to

- 5303, 5304. **Intensive German for Graduate Research I, II (3:3:0 each)**. Accelerated grammar course acquainting graduates with German as a research skill to be used in translating research articles in the graduate's field. Equivalent to two years of normal course work. Not intended to meet major or minor degree requirements.
5317. **The German Novelle (3:3:0)**. A detailed study of the German Novelle from its origins to the early 1900s, with special

emphasis on its development in the nineteenth century.

5318. **German Romanticism (3:3:0)**. Study of German literature from 1790 to 1830.
5319. **The German "Klassik" (3:3:0)**. Introduction to the classical works of Goethe and Schiller and other authors of the period.
5320. **German Women Writers (3:3:0)**. Study of literary works produced by German women writers with emphasis on the 20th century.
5321. **Seminar in Modern German Literature (3:3:0)**. Study of various genres of twentieth-century German literature, with special emphasis on philosophical and psychological aspects. May be repeated for credit.
5323. **German Lyric (3:3:0)**. An introduction to the evolution of German lyric forms with close analysis of selected poems representative of the 18th, 19th, and 20th centuries.
5324. **German Literature of the Enlightenment (3:3:0)**. A study of German literature from 1700 to 1785, including "Aufklärung," "Sturm und Drang," and "Empfindsamkeit."
5325. **German Drama (3:3:0)**. Readings, analysis, and interpretation of German dramas and dramatic theories from the Romantic Age to the Contemporary Period.
5326. **German Modernism (3:3:0)**. Readings, analysis, and interpretation of selected works from 1890-1940.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Greek (GRK)

Undergraduate Courses

- 1301, 1302. **Beginning Course in Greek I, II (3:3:0 each)** [GREE 1311, 1312].
- 2301, 2302. **Second Course in Greek I, II (3:3:0 each)** [GREE 2311, 2312]. Prerequisite: GRK 1301 and 1302, or equivalent. Review; selected readings from standard authors.
4300. **Individual Problems in Greek (3)**. Prerequisite: GRK 2301 and 2302 or equivalent. Contents will vary to meet the needs of students. May be repeated for credit with consent of instructor. Independent readings under guidance of a staff member.

Graduate Courses

5330. **Greek Prose (3:3:0)**. Selected readings from Greek texts in history, philosophy, oratory, rhetoric, biography, and the novel. Topics may vary. May be repeated for credit.
5340. **Greek Poetry (3:3:0)**. Selected readings in Greek poetic texts from various genres. Topics may vary. May be repeated for credit.
7000. **Research (V1-12)**.

Italian (ITAL)

Undergraduate Courses

- 1301, 1302. **Beginning Course in Italian I, II (3:3:0 each)** [ITAL 1311, 1312].
- 2301, 2302. **Second Course in Italian I, II (3:3:0 each)** [ITAL 2311, 2312]. Prerequisite: ITAL 1301 and 1302, or equivalent.

Reading, cultural background, conversation, and composition.

4300. **Individual Problems in Italian (3)**. Prerequisite: ITAL 2301 and 2302, or equivalent. Contents will vary to meet the needs of students. May be repeated for credit with consent of instructor. Independent work under guidance of a staff member.

Graduate Courses

7000. **Research (V1-12)**.

Japanese (JAPN)

Undergraduate Courses

- 1501, 1502. **Beginning Course in Japanese I, II (5:5:1 each)** [JAPN 1411, 1412]. Introduction and development of the four language skills: listening comprehension, speaking, writing, and reading.
- 2301, 2302. **Second Course in Japanese I, II (3:3:0 each)** [JAPN 2311, 2312]. Prerequisite: JAPN 1501 and 1502. Reading, cultural background, grammar review, conversation, and composition.
4300. **Individual Studies in Japanese (3)**. Prerequisite: JAPN 2302 or equivalent. Independent study in the Japanese language under the guidance of a faculty member. May be repeated for credit with consent of instructor.

Latin (LAT)

Undergraduate Courses

- 1501, 1502. **Beginning Course in Latin I, II (5:5:0 each)** [LATI 1411, 1412].
1507. **Comprehensive Latin Review-First Year (5:5:0)**. Prerequisite: Equivalent of two years high school Latin, placement exam, or departmental consent. A comprehensive one-semester review of first year Latin for qualified students.
- 2301, 2302. **Second Course in Latin I, II (3:3:0 each)** [LATI 2311, 2312]. Prerequisite: LAT 1501 and 1502 or 1507. Review; selected readings from standard authors.
4300. **Individual Problems in Latin (3)**. Contents will vary to meet the needs of the students. May be repeated for credit with consent of instructor. Independent reading under guidance of a staff member.
4305. **Individualized Readings in Latin Literature (3)**. Contents will vary to meet the needs of students. May be repeated for credit with consent of instructor. Major works of selected Latin writers.

Graduate Courses

5304. **Latin Poetry: Epic, Lyric, Elegiac, and Pastoral (3:3:0)**. Study of one or more poetic genres. May be repeated for credit.
5310. **Seminar in Latin Literature (3:3:0)**. Content will vary to meet the needs of the students. May be repeated for credit.
5341. **Intensive Latin for Graduate Research I (3:3:0)**. Grammar and readings for reading knowledge. Equivalent to one year of normal course work. Not for classics majors or Latin minor graduate degree requirements.
5342. **Intensive Latin for Graduate Research II (3:3:0)**. Prerequisite: LAT 5341 or 1402. Continuation of LAT 5341. Equivalent

to completion of LAT 2302. Not for classics majors or Latin minor graduate degree requirements.

5360. **Latin Prose (3:3:0)**. Selected readings from Latin texts in history, philosophy, oratory, rhetoric, epistolography, satire, biography, and the novel. Topics may vary. May be repeated for credit.
7000. **Research (V1-12)**.

Linguistics (LING)

Undergraduate Courses

4311. **Methods of Teaching Second and Foreign Languages (3:3:0)**. Overview of historical and current methods of teaching second and foreign languages.
4335. **Introduction to Linguistics for Second and Foreign Language Education (3:3:0)**. Basic concepts in linguistics and linguistic analysis as they relate to bilingual education, ESL, and second or foreign language education.

Graduate Courses

5310. **Second and Foreign Language Testing (3:3:0)**. This course is designed to give language teachers a working knowledge of testing principles applied to second and foreign language classrooms and programs.
5315. **Pedagogical Grammar of Second/Foreign Languages and ESL (3:3:0)**. A study of the role of grammar in interlanguage development, aspects of grammar most frequently taught in second/foreign language and ESL and teaching strategies.
5320. **Second and Foreign Language Composition (3:3:0)**. A study of second and foreign language theories and research in composition learning and teaching and their implications for methods of teaching second and foreign language composition.
5322. **Methods of Teaching Modern Second and Foreign Languages (3:3:0)**. Theory and practice of teaching modern second and foreign languages.
5325. **Technology for Teaching Second and Foreign Languages (3:3:0)**. A study of theory, research, and practice in the use of technology for teaching second and foreign languages including audio, video, CALL, and Internet technologies.
5330. **Second and Foreign Language Acquisition (3:3:0)**. A study of the theories and processes of second and foreign language acquisition, with emphasis on adult learners.
5335. **Introduction to Linguistics for Second and Foreign Language Educators (3:3:0)**. Concepts in linguistics and linguistics analysis as they relate to bilingual education, ESL, and second or foreign languages.
5345. **Seminar in Applied Linguistics (3:3:0)**. Study of current topics of interest in applied linguistics. Course content will vary. May be repeated for credit.
5350. **Second and Foreign Language Curriculum Design (3:3:0)**. Analysis of second and foreign language teaching curriculum design models and application to current language teaching contexts.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Portuguese (PORT)**Undergraduate Courses**

- 1501, 1502. **Elementary Portuguese I and II (5:5:1 each)** [PORT 1411, 1412]. Introduction and development of the four language skills in Portuguese: Listening comprehension, speaking, reading, and writing.
1507. **Intensive Portuguese for Spanish Speakers (5:5:0)**. An intensive course of elementary Portuguese for Spanish speakers. Comparative aspects of Spanish and Portuguese. Topics in Lusophone culture. Covers the material of Portuguese 1301 and 1302. Admits to Portuguese 2301.
- 2301, 2302. **Intermediate Portuguese I and II (3:3:0 each)** [PORT 2311, 2312]. Reading, cultural background, grammar review, conversation, and composition.
3303. **Studies in Portuguese (3:3:0)**. Independent studies in selected topics in Portuguese language and literature. May be repeated once when content differs.
3307. **Luso-Brazilian Civilization and Literature (3:3:0)**. Examines the civilization and cultures of the Luso-Brazilian world through the study of representative literary, cultural and journalistic texts. Topics range from 16th through the 20th centuries. Films will be screened to illustrate the material. Taught in English. Course may be repeated with different content.
4300. **Individual Studies in Portuguese (3:3:0)**. Prerequisite: PORT 2302 or equivalent. Contents will vary to meet the needs of the student. May be repeated once for credit. Independent work under guidance of a faculty member.

Graduate Courses

5307. **Luso-Brazilian Civilization and Literature (3:3:0)**. Examines the civilization and cultures of the Luso-Brazilian world through the study of representative literary, cultural, and journalistic texts. Topics range from 16th through the 20th centuries. Films will be screened to illustrate material. May be repeated for credit with different content.
5355. **Readings in Luso-Brazilian Literature (3:3:0)**. Advanced topics in Luso-Brazilian literature. May be repeated for credit.
7000. **Research (V1-12)**.

Russian (RUSN)**Undergraduate Courses**

- 1501, 1502. **Beginning Course in Russian I, II (5:5:1 each)** [RUSN 1411, 1412]. Introduction and development of the four language skills: listening comprehension, speaking, reading, and writing.
- 2301, 2302. **Second Course in Russian I, II (3:3:0 each)** [RUSN 2311, 2312]. Prerequisite: RUSN 1501, 1502, or equivalent. Training in oral and written expression and in aural and reading comprehension, including optional work in the language laboratory.
3301. **Russian Civilization Through Literature in the 19th Century (3:3:0)**. A survey course of 19th century Russian literature. Includes the works of the century's most important writers from

Alexander Pushkin to Anton Chekhov. Taught in English.

3302. **20th Century Russian Civilization Through Literature in Translation (3:3:0)**. This course will deal with the literature and other arts of the turn of the 20th century in Russia and with the survival of this pre-1917 cultural tradition among the émigrés and in the Soviet Union. Taught in English.
3303. **Russian Conversation and Composition (3:3:0)**. Prerequisite: RUSN 2302 or consent of instructor. The course is designed to increase fluency in the spoken language and proficiency in composition. Taught in Russian. May be repeated for credit.
3304. **Russian Culture (3:3:0)**. An examination of the important historical, political, and cultural events and trends that have been instrumental in forming Russian cultural identity.
4301. **The Great Russian Realists: Tolstoy and Dostoevsky (3:3:0)**. Examines the significance of masterpieces by Tolstoy and Dostoevsky. The works will be read in translation. Conducted in English. (Writing Intensive)
4302. **Contemporary Russian Literature in Translation (3:3:0)**. This course will examine the works of major Russian authors such as Aleksandr Solzhenitsyn and Tatyana Tolstaya from 1953 to the present. (Writing Intensive)
4310. **Russian Language Study in Russia (3:3:0)**. Intensive study of the Russian language and culture. May be repeated for credit with consent of instructor.

Graduate Courses

7000. **Research (V1-12)**.

Slavic (SLAV)**Undergraduate Courses**

3301. **The Vampire in East European and Western Culture (3:3:0)**. An investigation of the myth of the vampire from its inception in early East European culture to its popularization in the West.
4300. **Individual Studies in Slavistics (3)**. Independent study in Slavic and East European subjects under guidance of a faculty member, with content varying according to needs. May be repeated for credit with consent of instructor.

Spanish (SPAN)**Undergraduate Courses**

- 1501, 1502. **Beginning Course in Spanish I, II (5:5:1 each)** [SPAN 1411, 1412].
1507. **Comprehensive Spanish Review-First Year (5:5:1)** [SPAN 1305]. Prerequisite: Two years high school Spanish. A comprehensive one-semester review.
- 2301, 2302. **A Second Course in Spanish I, II (3:3:1 each)** [SPAN 2311, 2312]. Prerequisite: SPAN 1501 and 1502 or equivalent. Reading, cultural background, conversation, and composition. (Honors section offered.)
2607. **Intensive Spanish-Second Year (6:6:1)**. Prerequisite: A minimum grade of B in SPAN 1507. Reading, culture, conversation, and composition. Equivalent to 2301 and 2302.

3303. **Intermediate Spanish Conversation (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent. Designed to increase proficiency in oral Spanish for students who have had little or no extra academic experience in that language. Minors may take one of 3303, 3305, or 4303. May not be taken following 4000-level work.
3305. **Intermediate Spanish Grammar (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent. An overview of important Spanish grammar concepts.
3306. **Introduction to Hispanic Life and Culture (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent. Origins, development, and characteristics of Hispanic life and culture. Conducted in Spanish.
3307. **Introduction to Hispanic Literatures (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent. Introduction Spanish and Spanish American literatures through selected works and authors. This course is highly recommended as a prerequisite to all 4000 level literature courses. (Writing Intensive)
3343. **Spanish Language Development (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent and consent of instructor. Development of listening, speaking, reading, and writing skills on location in Mexico. Offered in Mexico each summer.
3344. **Mexican Life and Culture (3:3:0)**. Prerequisite: SPAN 2301 and 2302 or equivalent and consent of instructor. A basic survey of Mexico, with emphasis on its history and cultural patterns. Offered in Mexico each summer.
3389. **Individual Studies in Spanish (3)**. Prerequisite: SPAN 2302 or equivalent and consent of instructor. Independent work under the guidance of a full-time faculty member. Course is generally for study abroad when organized courses are not available. May be repeated for credit with different course content. May not be taken following 4000 level work.
3390. **Hispanic Culture and Civilization (3:3:0)**. An overview of the Hispanic world, from Roman Spain to modern Latin America. Taught in English. Not for Spanish majors or minors but recommended as supplementary. Carries humanities credits.
3391. **Hispanic Film in Translation (3:3:0)**. A study of Hispanic film and its relationship to literature and culture. Taught in English. Not for Spanish majors or minors, but recommended as supplementary.
3392. **Hispanic Literature in Translation (3:3:0)**. A study of major literary themes and writers of the Hispanic world. Taught in English. Not for Spanish majors or minors, but recommended as supplementary.
4100. **Advanced Individual Problems in Spanish (1)**. Prerequisite: SPAN 2302 or equivalent, together with consent of instructor and department chairperson. Contents will vary to meet the needs of students. May be repeated for credit with consent of instructor. Specifically designed for individual projects calling for fewer than 3 semester credit hours.
4303. **Advanced Conversation (3:3:0)**. Development of conversational skills for students who have completed required work in grammar or composition. No student who has graduated from a secondary school (junior high or high school

- level) in a Spanish-speaking country may receive credit for this course.
4305. **Advanced Grammar (3:3:0).** Spanish language, syntax, and grammar.
4307. **Advanced Composition (3:3:0).** Principles of correct writing and stylistics. (Writing Intensive)
4308. **Business Spanish (3:3:0).** Oral and written Spanish with special attention to idiomatic expressions and cultural practices of business in the Hispanic world.
4309. **Spanish Language Studies-Special Topics (3:3:0).** Study of diverse topics such as media or legal Spanish, Spanish on the Internet, etc. May be repeated for credit with different content.
4320. **Masterpieces of Hispanic Literature (3:3:0).** A study of selected works from Spanish and/or Spanish American literature. May be repeated for credit if different instructor and different content. (Writing Intensive)
4321. **Hispanic Prose (3:3:0).** Readings of selected prose of Spanish and/or Spanish American Literature. May be repeated for credit if different instructor and different content. (Writing Intensive)
4324. **Hispanic Drama and Poetry (3:3:0).** Study of selected dramas and/or poetry from Spanish and/or Spanish American literature. May be repeated for credit with different instructor and different content. (Writing Intensive)
4325. **Hispanic Short Story (3:3:0).** Study of short stories from Spain and/or Spanish America. May be repeated for credit. (Writing Intensive)
4327. **Hispanic Literature-Special Topics (3:3:0).** Subject matter will vary to include such topics as women writers, Mexican Revolution, social protest, etc. May be repeated for credit with different content. (Writing Intensive)
4332. **Civilización Hispánica: Hispanic Civilization (3:3:0).** A thematic study of Spanish and Spanish American patterns of civilization, especially in the contemporary period, and the United States' Spanish heritage. May be repeated for credit.
4335. **Internship in Spanish (3).** Prerequisite: Consent of instructor. Work experience in a community agency that deals with native Spanish speakers. Emphasis on cultural understanding and communicative skills. (Writing Intensive)
4337. **Cultural Topics-Hispanic World (3:3:0).** Subject matter will vary to include such topics as folklore, Latin American women, etc. May be repeated for credit with different content.
4343. **Advanced Language Skills (3:3:0).** A study abroad course to help develop communicative language skills through class work and organized field projects. Offered only in Mexico and/or Spain each summer. May be repeated for credit.
4344. **Contemporary Mexico (3:3:0).** A study of the various facets of contemporary Mexico: history, arts, politics, and economics. Offered only in Mexico each summer. May be repeated for credit.
4346. **Spanish Life and Culture (3:3:0).** Prerequisite: SPAN 3303 or equivalent. A survey of Spain with emphasis on its literature, history, and culture. Offered in Spain each summer. May be repeated for credit.
4360. **Mexican American Literature (3:3:0).** The development of Mexican-American literature from 1849 to the present with

- an emphasis on literature of the Chicano movement. (Writing Intensive)
4361. **Spanish for the Southwest (3:3:0).** Study of similarities and differences between "standard" and "regional" Spanish.
4373. **Capstone Conversational Spanish (3).** Prerequisite: Completion of 4303 with an A or B and departmental consent. For majors and teacher certification candidates. Additional development of aural/oral skills.
4389. **Individual Problems in Spanish (3).** Prerequisite: Two Spanish 3300 level courses and consent of instructor. Independent work under the guidance of a full-time faculty member. Content will vary to meet the needs of the student. May be repeated for credit with different instructor and course content.
4390. **Internship in Spanish (3).** Prerequisite: Consent of instructor. Work experience in a community agency that deals with native Spanish speakers. Emphasis on communicative skills.
4392. **The Play in Spanish (3:3:0).** Prerequisite: Consent of instructor. Intensive analysis of a play and preparation for two public performances. May be repeated for credit with change of content for up to 6 hours.

Graduate Courses

5100. **Advanced Special Problems in Spanish Language and Literature (1).** An individualized research project course. Contents will vary to meet the needs of students.
5304. **Advanced Business Spanish I (3:3:0).** Prerequisite: Consent of instructor. Foundation in business vocabulary and discourse of management. Emphasis on geographic and cultural understanding of the Spanish-speaking world.
5340. **Spanish Language and Linguistics (3:3:0).** Spanish phonology, dialectology, morphology, or Spanish syntax. May be repeated for credit with different emphasis.
- 5341, 5342. **Intensive Spanish for Graduate Research I, II (3:3:0 each).** Spanish readings with related grammar to acquaint graduates with Spanish as a research skill; equivalent to two years of normal course work. Not intended to meet major or minor degree requirements.
5343. **Studies in Spanish (3:3:0).** Concentrated studies in Spanish language or literature. May be repeated up in three times for credit as topic varies.
5345. **History of the Spanish Language (3:3:0).** Prerequisite: One year of Latin or equivalent. The development of the Spanish language from its earliest forms to the present.
5347. **Language Development (3:3:0).** Mastery of language skills through readings, compositions, and directed oral projects. Offered only in summer programs abroad.
5348. **Culture and Literature (3:3:0).** Analysis and interpretation of cultural and literary expressions of the host country. Offered only in programs abroad each summer.
5352. **Methods of Literary Criticism (3:3:0).** Theories and practices of literary analysis and criticism.
5353. **Bibliography and Methods of Research (3:3:0).** Systematic study of bibliographi-

- cal materials, methods, and problems in the field of Hispanic research.
5354. **Hispanic Literary Concepts (3:3:0).** A study of movements, genres, influences, forms, themes, and other concepts in Hispanic literatures from the Middle Ages to the present.
5355. **Seminar in Hispanic Literature (3:3:0).** Advanced topics in Hispanic literature and literary theory. May be repeated for credit.
5361. **Medieval Literature (3:3:0).** Spanish literature from its earliest monuments to the end of the Middle Ages.
5362. **Golden Age Literature (3:3:0).** Selected authors, works, and genres.
5364. **Nineteenth-Century Spanish Literature (3:3:0).** A history of Spanish literature in the nineteenth century.
5366. **Twentieth-Century Spanish Prose (3:3:0).** A comprehensive study of the principal literary currents, authors, and works with emphasis on the contemporary period.
5368. **Twentieth-Century Spanish Theatre and Poetry (3:3:0).** A comprehensive study of the principal literary currents, authors, and works with emphasis on the contemporary period.
5370. **Colonial Spanish American Literature (3:3:0).** A study of this literature from the Pre-Colombian era to the end of the Spanish American baroque.
5374. **Nineteenth-Century Spanish American Literature (3:3:0).** A comprehensive study of the principal literary currents, authors, and works of the nineteenth century.
5375. **Modernism (3:3:0).** A detailed study of Spanish American Modernism.
5376. **Twentieth-Century Spanish American Prose (3:3:0).** The development of prose fiction in Spanish America during the twentieth century.
5378. **Twentieth-Century Spanish American Theatre and Poetry (3:3:0).** The development of the theatre and poetry in Spanish America during the twentieth century.
5381. **Hispanic Literature of the Southwest (3:3:0).** The origin and development of Hispanic literature in the southwest, including Spanish literature (1539-1820), Mexican literature (1821-1848), and Mexican-American literature (1849-present).
5392. **The Play in Spanish (3:3:0).** Prerequisite: Consent of instructor. Intensive analysis of a play and preparation for two public performances.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Vietnamese (VIET)

Undergraduate Course

4300. **Individual Problems in Vietnamese (3).** Content varies to meet the needs of students. May be repeated for credit.

Department of Communication Studies

Faculty

K. David Roach, Chairperson

Professors: Olaniran, Roach, Stewart, and Williams; *Assistant Professors:* Carter, Gring, Heuman, Hughes, Langford, and Scholl; *Lecturers:* Neal and Shafer.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Communication Studies
- Master of Arts in Communication Studies

Undergraduate Program

Study in communication at Texas Tech prepares students for careers in business, industry, social service, and education. Plans are offered that allow for the study of communication skills and theories and their applications to problems in work and social settings. In addition to classroom instruction, the department sponsors cocurricular and extracurricular activity in forensics (speech and debate) and maintains a local chapter of Delta Sigma Rho-Tau Kappa Alpha (national forensic honorary). The department also sponsors a chapter of Lambda Pi Eta (the National Communication Honor Society of the National Communication Association). For advanced students, an undergraduate internship in communication studies is an option. The internship, normally completed in the student's last spring semester, provides an opportunity for practice in applied settings.

Requirements for the Major. Students must have a cumulative GPA of 2.0 or better to be admitted to the major in communication studies. Continued enrollment requires a 2.0 GPA or better in the first 15 hours taken at Texas Tech.

Students seeking an undergraduate degree in communication studies will complete a course of study that consists of 36 hours of communication studies courses with at least 18 hours of advanced courses. The department recognizes that each student has unique educational objectives and professional goals. Therefore, a flexible and individualized plan of undergraduate study is developed to be compatible with the student's aims. A total of 12 hours toward the major must be completed in residence at Texas Tech.

All students who major in communication studies must complete COMS 1300, 1301, 2300, 2301, 2302, and 3311. Students have the option to declare a specialization in one of three areas: Communication and Public Affairs (CPA), Interpersonal Communication (IPC), or Corporate-Organizational Communication (COC). A student who declares a specialization will take 12 hours in the specialization and 6 hours of electives in communication studies. A student who chooses not to declare a specialization will take 6 hours from each of the three specializations toward the

required total of 36 hours in the major. Courses in the communication and public affairs specialization include COMS 3313, 3314, 3315, 3318, 4304, and 4310. Courses in the interpersonal communication specialization include COMS 3331, 3332, 3333, 3334, 4304, and 4330. Courses in the corporate-organizational communication specialization include 3351, 3353, 3355, 3358, 3359, 4304, and 4350.

Requirements for the Minor. A minor consists of 18 hours of communication studies with at least 9 hours in advanced courses. At least 6 hours of the minor must be completed in residence at Texas Tech. Students who minor in communication studies must complete COMS 1300, 2300, and 2301. These three courses should be taken before enrolling in upper division courses. Remaining courses may be selected from other departmental offerings.

Teacher Certification. Students desiring secondary certification in communication studies must complete the following: COMS 1300, 2300, 3314, 3351, 4314; TH A 2305; MCOM 1300; and 9 hours of electives in communication studies, all of which must be at the upper division level.

Graduate Program

The graduate program for the master's degree in communication studies requires a minimum of 30 semester hours of course work plus 6 hours of thesis. Required courses are COMS 5300, 5301, 5305, 5306, and 5307.

Communication Studies (COMS)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

2302. **Communication Research (3:3:0).** An introduction to the theory and practice of research in communication studies, including the critical evaluation of communication research. Required for all majors. (Writing Intensive)
2350. **Introduction to Communication Disorders (3:3:0).** Explores the range and types of communication disorders and examines the impact of these disorders on an individual's psychological, social, emotional, cultural, and educational status. May be applied toward the individual or group behavior Core Curriculum requirement.
3102. **Forensic Activities (1:0:3).** Opportunity is offered the student who wishes to participate extensively in forensic activities to secure credit for this laboratory work. May be repeated up to 4 semester hours; 2 semester hours may be applied toward Communication Studies major.
3105. **Listening (1:1:0).** A study of the basic factors in effective aural comprehension in various situations, such as lectures and interpersonal relationships.
3150. **Parliamentary Procedures (1:1:0).** Principles and procedures governing deliberative groups with practice in their usage.
3311. **Rhetoric in Western Thought (3:3:0).** Explores theories of rhetoric ranging from ancient Greece to modern times. Students examine different conceptions of how rhetoric negotiates public character, social truths, and power. May be applied toward the Core Curriculum humanities and multicultural requirement. Required for all majors.
3313. **Persuasion (3:3:0).** A study of the psychological and rhetorical principles of motivation, suggestion, and other aspects of audience psychology as used in business, mass media, and public affairs. May be applied toward the individual or group behavior Core Curriculum requirement.
3314. **Argumentation and Debate (3:3:0).** Evolution of argumentation with emphasis on modern viewpoints, application of theory to selected controversies.
3315. **Political Campaign Communication (3:3:0).** A study of the strategies of communication and persuasion in American political campaigns, focusing on the campaign currently in progress.
3318. **Persuasion and Social Movements (3:3:0).** Study of the role of persuasion in social movements, both historical and contemporary. Analysis of the various persuasive strategies employed as social movements evolve. May be applied toward the Core Curriculum humanities requirement.
3331. **Nonverbal Communication (3:3:0).** The study of the origin, function, and control of nonverbal, symbolic elements inherent in Communication Studies. May be applied toward the Core Curriculum individual or group behavior requirement.
3332. **Intercultural Communication (3:3:0).** Studies the role of cultural differences in human communication; theoretical and experiential approaches toward gaining competence in communicating

- across cultural barriers. May be applied toward the Core Curriculum individual or group behavior requirement and the multicultural requirement.
3333. **Communication in Relationships (3:3:0).** Prerequisite: COMS 1301 or consent of instructor. A survey of research concerning the role of communication in the development, maintenance, and decay of interpersonal relationships.
3334. **Gender and Communication (3:3:0).** Studies the similarities and differences of communication issues for males and females, with practical communication applications. Satisfies the individual or group behavior Core Curriculum requirement. (W S 3312)
3351. **Communication in Instruction and Training (3:3:0).** Instructional communication theory applied to the processes of instruction, training, and performance in varied learning contexts. Attention to delivery skills.
3353. **Small Group Communication (3:3:0).** An introduction to group process and interaction, the concepts of leadership, and effective participation. May be applied toward the Core Curriculum individual or group behavior requirement.
3355. **Communication in Organizations (3:3:0).** A survey of research on communication in organizations with emphasis on relevant verbal and nonverbal factors; applications to basic communication skills and rudimentary research. May be applied toward the Core Curriculum individual or group behavior requirement.
3356. **Leadership and Communication (3:3:0).** A broad-based theoretical approach to the study of leadership and communication. Application to a variety of settings will also be discussed. May be applied toward the Core Curriculum individual or group behavior requirement.
3358. **Business and Professional Communication (3:3:0).** Basic principles of speech applied to the communication needs of the professional person. Practice in the construction and delivery of the various types of speeches and participation in interviews and group discussions. May be applied toward the Core Curriculum oral communication requirement.
3359. **Interviewing: Process and Procedures (3:3:0).** Principles drawn from contemporary interpersonal communication theory are specifically applied to informational, employment, and persuasive interview situations. Practical application of theoretical concepts is encouraged through in-class role-playing interviews and through analysis of actual interviewing techniques.
3365. **Communication in Health Care (3:3:0).** Introductory survey of the influence of communication in health and health care delivery.
4000. **Independent Research in Communication Studies (V1-3).** Prerequisite: 18 hours of COMS courses. Individual research in COMS area of student's choice under faculty member guidance. May be repeated once for credit up to 6 hours.
4304. **Internship in Communication Studies (3:1:4).** Prerequisite: 24 hours of COMS courses or consent of instructor. Student internship, under supervision of faculty

- coordinator, in a selected area of applied communication.
4310. **Special Topics in Rhetoric (3:3:0).** Prerequisite: Junior standing. Consideration of selected topics in rhetoric. May be repeated for credit.
4314. **Directing Speech and Debate Activities (3:3:0).** Methods and principles involved in directing extracurricular speech activities such as debate, oral interpretation, and public speaking.
4330. **Special Topics in Interpersonal Communication (3:3:0).** Prerequisite: Junior standing. Consideration of selected topics in interpersonal communication. May be repeated for credit.
4350. **Special Topics in Corporate-Organizational Communication (3:3:0).** Prerequisite: Junior standing. Consideration of selected topics in corporate-organizational communication. May be repeated for credit.

Graduate Courses

5111. **Communication Instruction in Higher Education I (1:1:0).** First of two courses required of all communication studies teaching assistants. Provides individual development in philosophies and practices unique to teaching basic oral communication courses.
5112. **Communication Instruction in Higher Education II (1:1:0).** Second of two courses required of all communication studies teaching assistants. Provides individual development in philosophies and practices unique to teaching basic oral communication courses.
5300. **Communication Theory (3:3:0).** A comprehensive overview of contemporary communication theories and research. Students will read original work beginning with general semantics theory and culminating with the most recently published reviews of theoretical work in communication studies.
5301. **Qualitative Research Methods (3:3:0).** The course will introduce research methods of discourse analysis, conversation analysis, ethnography, applied qualitative communication research, and development of grounded theory. Students must engage in field work, interview participants, and write essays based on gathered data to complete this course successfully.
5302. **Intercultural Communication (3:3:0).** An examination of the relationship between culture and communication and approaches to studying intercultural communication.
5303. **Communication in Small Groups (3:3:0).** A study of factors affecting interpersonal communication in small group settings. Course content includes consideration of both theoretical and applied orientations to the study of small group communication.
5304. **Communication in Organizations (3:3:0).** This course examines theoretical perspectives, contemporary research, and practical models of human communication in complex organizations.
5305. **Quantitative Research Methods (3:3:0).** The study of quantitative research methods in communication research, emphasizing research designs, quantitative treatments, and analysis. Course re-

- quirements include data entry, statistical analysis, and a research prospectus.
5306. **Theories of Rhetoric (3:3:0).** An in-depth study of rhetorical theories which have had significant impact on the research, teaching, and practice of communication behavior. Students must write a lengthy research paper in order to successfully complete this course.
5307. **Historical-Critical Research Methods (3:3:0).** Survey of contemporary methods of rhetorical criticism and their application in analyzing a wide variety of message types. Students must write multiple essays exemplifying rhetorical criticism in order to successfully complete this course.
5309. **Conflict Management and Problem Solving (3:3:0).** In-depth study of, and research into conflict resolution through mediation and negotiation.
5313. **Theories of Persuasion (3:3:0).** Analysis of representative theories and models of persuasive processes and their implications for communication behavior. Theories of public, interpersonal, and mass communication are included.
5314. **Communication Issues in Health and Health Care (3:3:0).** An exploration of the nature and roles of discourse processes in health care interactions, including interpersonal, organizational, public, and intercultural communication contexts.
5315. **Nonverbal Communication (3:3:0).** Examines communicative functions of nonverbal message behavior. Considers a variety of behavioral domains and interaction contexts from both theoretical and practical perspectives.
5318. **Interpersonal Communication (3:3:0).** Communication theory and research on historical and contemporary topics in interpersonal communication contexts.
6000. **Master's Thesis (V1-6).**
6302. **Seminar in Interpersonal Communication (3:3:0).** A research course focusing on specific topics in interpersonal communication. Topics vary with students' needs. May be repeated for credit.
6303. **Seminar in Organizational Communication (3:3:0).** A research course focusing on specific topics in organizational communication. Topics vary with students' needs. May be repeated for credit.
6304. **Seminar in Rhetorical Theory (3:3:0).** A research course focusing on specific topics in rhetorical theory. Topics vary with students' needs. May be repeated for credit.
6307. **Seminar in Instructional Communication (3:3:0).** A research course focusing on specific topics in instructional communication. Topics vary with students' needs. May be repeated for credit.
6308. **Seminar in Cultural and Intercultural Communication (3:3:0).** A research course focusing on specific topics in cultural and intercultural communication. Topics vary with student's needs. May be repeated for credit.
7000. **Research (V1-12).**

Department of Economics and Geography

Faculty

Joseph E. King, Chairperson

Professors: Elbow, King, Steinmeier, and Templer; *Associate Professors:* Becker, Gilbert, Lee, McComb, Rahnama, and Von Ende; *Assistant Professors:* Al-Hmoud, Carter, Carton, De Silva, Edwards, Keen, Mulligan, and Wong; *Instructors:* Barbato and Jones.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Economics
- Bachelor of Science in Economics
- Bachelor of Science in International Economics
- Bachelor of Arts in Geography
- Master of Arts in Economics
- Doctor of Philosophy in Economics

The economics faculty supervises the professional requirements of the economics major for the Bachelor of Business Administration degree offered through the College of Business Administration. The geography faculty participates in the Latin American and Iberian Studies program leading to the Bachelor of Arts degree and in the Asian studies, environmental studies, international studies, and community and urban studies programs.

Undergraduate Program

Economics Programs. The undergraduate program leading to the Bachelor of Arts degree is offered to students who want to pursue a broad liberal education while, at the same time, studying the complex interrelationships between consumers, producers, and governments in an economic system. A minimum of 30 semester hours in economics courses (including ECO 2301, 2302, 3311, 3312, 4314, and a course in statistics: AECO 3401, MATH 2345 or 2300) and 18 semester hours in a minor field are required for the B.A. degree. The minimum number of hours required for majors in economics is a total of 126. Candidates for the B.A. degree in economics are encouraged to consult with their advisors and to select from the wide range of possibilities a complementing set of economics and non-economics electives in accordance with their developing interests. Other requirements are specified in the General Degree requirements section of the College of Arts and Sciences.

The undergraduate program leading to the Bachelor of Science degree combines a broad liberal education with rigorous and extensive training in theoretical and mathematical economics. The program is highly structured and technically oriented. Students in this major must include ECO 2301, 2302, 3311, 3312, ECO 4305 or AAEC 4312, and 21 hours of advanced economics electives. The mathematics minor consists of 18 hours of mathematics subject to the approval of the Mathematics Department. The basic requirements are listed in the General Degree requirements

of the College of Arts and Sciences. The adjunct requirements include a two-semester course sequence in statistics (MATH 4342 and 4343).

The B.S. in international economics degree program provides correlated emphasis on international economics, international politics, and international business. The minimum number of hours required for majors in international economics is a total of 126. Course requirements for this degree are specified in the General Degree requirements section of the College of Arts and Sciences.

Students majoring in economics must complete a minimum of 12 semester hours of their economics courses in residence at Texas Tech University. Students minoring in economics must complete a minimum of 6 semester hours of their economics courses in residence at Texas Tech.

At least a C in all economics courses in all programs is required of majors and minors. Moreover, a minimum grade of C is required in all core courses in the B.S. degree in international economics. Courses specifically required in the core by course number for the B.S. degree in international economics may not be taken pass-fail. Courses required for the major or minor in the B.A. or B.S. degree in economics may not be taken pass-fail. Courses taken pass-fail by a student before declaring a major or minor will be evaluated by the curriculum committee of the department and a decision rendered as to whether they will satisfy the degree requirements.

Geography Program. The undergraduate geography program at Texas Tech University offers a B.A. in geography and a minor in geography. Geography appeals to students who have broad interests in the relationships of humans and the environment, who are curious about the world, and who like to be challenged. Geographers study how people interact with the environment and how vari-

ous phenomena are distributed and move over the surface of the earth. The B.A. degree is intended to provide students with a background in the nature of human interactions with the environment and a solid grounding in data collection and analysis techniques such as field data collection, statistical analysis, and geographic information systems. Due to its broad nature, geography is a minor that complements most majors, allowing the student to delve into the geographical aspects of his or her major field of study. Undergraduate majors find interesting careers in the public and private sectors. Geographers work with local, state, and national government agencies and the military. In the private sector, there are increasing demands by business and industry for employees trained in field research methods, geographic information systems, statistical analysis, remote sensing, and other skills acquired by geography students. Geography majors also become teachers at the elementary, secondary, and post-secondary levels. In addition, the undergraduate program provides a foundation for students who wish to pursue graduate study, whether in geography or some related professional field such as urban or regional planning, environmental and resource management, law, and public affairs.

The geography major consists of 31 hours of course work in geography plus MATH 2300 (or equivalent). Required courses are GEOG 1401, 2351, 3300, and 3350. In addition, GEOG 4300 must be taken twice; this fulfills the writing intensive requirement. An additional 6 hours of courses must be selected from each of the following two blocks: Physical geography and geographic information systems block (GEOG 3301, 3310, 3335, 3353, 4301, 4302, 4321, and 4400) and human and regional geography (GEOG 3337, 3351, 3352, 3354, 3355, 3356, 3358, 3359, 3360, 3363, 3364, 4305, and 4357). GEOG 4310, Internship in Geogra-

Graduate Program

Students seeking a degree in economics should consult with the graduate advisor or the chairperson of the department.

The Master of Arts program requires a thesis and 24 semester hours beyond the bachelor's degree. A student may instead select a nonthesis 36-semester hour plan. In addition to the traditional program, the student may take courses with an applied emphasis in economics and related minor fields after consultation with the graduate advisor.

The candidate for the doctor's degree must choose three specializations from within the areas of international economics, economic development, monetary economics, public finance, labor economics, agricultural economics, natural resource economics, industrial organization, and special fields of economics.

The doctoral student in economics must demonstrate a mathematical proficiency in calculus and analytical geometry.

Although no graduate major is offered in geography, minors for both the master's and doctor's degrees are available. The geography faculty also participates in the University's interdisciplinary Doctor of Philosophy program in Land-Use Planning, Management, and Design and in the arid land studies, environmental evaluation, and international development plans of the Interdisciplinary Studies master's program. Selected geography graduate-level courses may be used to fulfill requirements for these degrees.

phy, is open to seniors with a 3.0 GPA or better and may be substituted for 3 hours of courses in either of the blocks. Requirements for the minor are GEOG 1401, 2351, 3300, and 9 hours of upper division geography.

Students majoring in geography must complete a minimum of 12 semester hours of geography courses from Texas Tech. The geography minor requires at least 6 hours from Texas Tech.

Teacher Education. Geography course work is included in the social science composite field certification program in secondary education. Specific course requirements for this program may be obtained in the department.

Economics (ECO)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 2301. Principles of Economics I (3:3:0) [ECON 2302].** Emphasis on theories of the firm, value and price determination, and functional distribution, with the application of these theories to the problems of particular firms, industries, and markets.
- 2302. Principles of Economics II (3:3:0) [ECON 2301].** An introduction to modern economic society and theories of production and exchange. Emphasis upon monetary and fiscal policy and macroeconomics.
- 2305. Principles of Economics (3:3:0).** An abridged course for students not majoring in economics or business. Covers the most significant portions of ECO 2301 and 2302, with emphasis upon monetary and fiscal policy. Credit will not be given for both ECO 2305 and 2302.
- 3311. Intermediate Macroeconomics (3:3:0).** Prerequisite: ECO 2302. Analysis of the determinants of aggregate demand and supply with special emphasis on macroeconomic problems such as unemployment and inflation and on techniques used to forecast macroeconomic variables.
- 3312. Intermediate Economic Theory (3:3:0).** Prerequisite: ECO 2301. Intermediate price theory and introduction to welfare theory. Includes theory of demand, theory of the firm, and welfare theory.
- 3320. Managerial Economics (3:3:0).** Prerequisite: ECO 2301. The application of economic theory to problems of business enterprise.
- 3323. Principles of Money, Banking, and Credit (3:3:0).** Prerequisite: ECO 2301 and 2302. A basic course which deals with the commercial banking system, the Federal Reserve System, and other matters associated with money, prices, and credit control.
- 3324. Taxation and Public Expenditure (3:3:0).** The objective of this course is to explore the justification for and effects of the entrance of government into the U.S. marketplace.
- 3326. Industrial Organization, Antitrust, and Regulation (3:3:0).** Prerequisite: ECO 2301. This course combines the latest theories with empirical evidence about the organization of firms and industries. Particular attention is paid to antitrust and regulation issues.
- 3330. Economic Systems (3:3:0).** Prerequisite: ECO 2301 and 2302 or consent of instructor. Study of different economic systems, with attention given to selected ones or types (e.g., market economies, Yugoslavia's co-participation, corporate statism, Scandinavian socialism, Soviet central planning).
- 3333. International Economics (3:3:0).** Prerequisite: ECO 2301 and 2302 or consent of instructor. Principles of international trade, balance of payments, trade policies, and agreements.
- 3336. Environmental and Natural Resource Economics (3:3:0).** Prerequisite: ECO 2301 or consent of instructor. Economic analysis of environmental and natural resource problems. Topics include externalities, market failures, property rights, public goods, environmental regulation, and optimal resource use.
- 4300. Economic Research (3).** Prerequisite: ECO 3311 and 3312. Economics major, or consent of instructor or chairperson. Directed undergraduate student research in selected areas under the supervision of selected departmental faculty.
- 4305. Introduction to Econometrics (3:3:0).** Prerequisite: ECO 2301, 2302, 3311, and AAEC 3401 or consent of instructor. Application of linear regression analysis including simple statistics, probability, distributions, hypothesis testing, and linear regression.
- 4314. Development of Economic Doctrines (3:3:0).** Prerequisite: ECO 2301 and 2302. The basis, nature, and effects of economic doctrines from ancient times through the 19th century.
- 4323. Monetary Theory (3:3:0).** Prerequisite: ECO 3311. Analysis of money supply, money demand, interest rates, income and price level determination, and transmission mechanisms. Emphases include monetary policies in an open economy context.
- 4331. Economics of Multinational Enterprise (3:3:0).** Prerequisite: ECO 2301 or consent of instructor. Examination of the economics of international enterprise and associations with the major dimensions of the international economy and international political economy.
- 4332. International Finance (3:3:0).** Prerequisite: ECO 3323 or 3333 or consent of instructor. Analysis of international monetary system theory, policy, and institutions. Includes attention to foreign exchange markets and roles of international banking and international managerial finance.
- 5310. Price and Income Theory (3:3:0).** Designed for graduate students who need intensive study of intermediate economic price and income theory.
- 5311. Macroeconomic Theory and Policy (3:3:0).** Prerequisite: ECO 3311 or 5310. Market clearing and non-market clearing business cycle models and their policy implications. Emphases include inflation, real growth, unemployment, and balance of payments and their interactions.
- 5312. Microeconomic Analysis (3:3:0).** Prerequisite: ECO 5310 or consent of instructor. Theory of household and firm choice, duality, commodity, and factor market structures, general equilibrium and welfare economics. Emphasis on theory and policy applications.
- 5313. Mathematical Economics I (3:3:0).** Prerequisite: Consent of instructor. The application of mathematical techniques to economic model-building.
- 5314. Econometrics I (3:3:0).** Prerequisite: AAEC 5311 or ISQS 5349 or consent of instructor. Topics chosen from the following: problems in single and multiple regressions, qualitative choice models, specification tests, estimation of rational expectations models, and fixed-effects models.
- 5315. Mathematical Economics II (3:3:0).** Prerequisite: ECO 5313 or consent of instructor. Advanced topics in the application of mathematics to economic model-building including dynamic models and programming techniques.
- 5316. Time Series Econometrics (3:3:0).** Prerequisite: ECO 5314. Contemporary issues in time series econometrics. Topics include dynamic models, ARMA models, stationarity, causality and exogeneity, unit root tests, integration and error correction.
- 5317. Natural Resource and Environmental Economics (3:3:0).** Prerequisite: ECO 5312 or consent of instructor. Covers theory and policy in natural resource and environmental economics. Optimal rules for renewable and nonrenewable patterns of use, public policy. Intensive study of one sector (energy, water, forestry).
- 5318. History of Economics (3:3:0).** This course examines various historical episodes and their influence on the development of economic theories.
- 5323. Monetary Theory I (3:3:0).** Prerequisite: ECO 3323 or 5310. Introduction to monetary theories and their policy implications. Partial and general equilibrium models of price levels, inflation rates, income flows, and interest rates are developed in an open economy context.
- 5324. Seminar in Public Finance (3:3:0).** Prerequisite: Consent of instructor. Analysis of economic effects of taxation, governmental expenditures, debt management, and budgetary planning and administration.
- 5325. Seminar in Economic Policy (3:3:0).** Prerequisite: Consent of instructor. Analysis of major economic issues, theories, or policies. May be repeated for credit.
- 5328. Monetary Theory II (3:3:0).** Prerequisite: ECO 5323 or consent of instructor. Recent developments and controversies in monetary theory and policy. Emphasis on leading edge issues and literature and on development of research skills in monetary economics.
- 5329. Current Problems in Public Finance (3:3:0).** Prerequisite: Consent of instructor. Research in and analysis of public goods, public choice, public budgeting, cost-benefit analysis, and intergovernmental fiscal relations.
- 5332. Advanced International Finance (3:3:0).** Prerequisite: Advanced graduate standing and consent of instructor. Advanced study of theory, problems, and policies associated with the international monetary system. (FIN 5332).

Graduate Courses

5333. **Advanced International Economics (3:3:0)**. Prerequisite: ECO 3333 or consent of instructor. Advanced study of theory, problems, and policies in international economics.
5337. **Health Care Economics (3:3:0)**. Prerequisite: ECO 5300 or equivalent. The application of economic principles to the analysis of problems and the formulation of policies in the health-care sector of the economy.
5346. **Game Theory (3:3:0)**. Introduction to game theory with an emphasis on economic applications.
5347. **Topics in Industrial Organization (3:3:0)**. Prerequisite: ECO 5312 or consent of instructor. Study of recent research in applied microeconomics and business behavior. Topics include oligopoly, vertical integration, collusion, and the empirical links between monopoly power and profitability.
5381. **Empirical Studies in Macroeconomics (3:3:0)**. Prerequisite: ECO 5311 or consent of instructor. Contemporary theoretical and empirical macroeconomic issues. Use of empirical studies to evaluate competing hypotheses. Student conducted empirical studies.
5382. **Advanced Microeconomics (3:3:0)**. Prerequisite: ECO 5312 or consent of instructor. Topics include investment and capital theory, uncertainty, general equilibrium, and welfare.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Geography (GEOG)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1101, 1102. **Physical Geography Laboratory (1:0:2 each)**. Optional laboratories for GEOG 1301, 1302. GEOG 1101 accompanies GEOG 1301 and GEOG 1102 accompanies GEOG 1302.
1300. **Geography for Educators (3:3:0)**. Introduction to the world and its regions; provides a background in geography and geography education for teachers in training.
1401. **Physical Geography (4:3:2) [GEOG 1301]**. Study of the atmospheric and terrestrial systems that shape our natural environment, especially the global patterns of climate, landforms, and vegetation. Fulfills laboratory science requirements.
2351. **Regional Geography of the World (3:3:0) [GEOG 1303]**. An introduction to the geography of world regions for students who have had no previous geography courses.
3300. **Geographic Information Systems (3:2:3)**. Fundamentals of cartography and the use of geographic information systems for thematic mapping and spatial analysis. Laboratory emphasizes experience with GIS software.
3301. **Remote Sensing of the Environment (3:2:3)**. Prerequisite: GEOG 3300 or equivalent. Introduction to remote sensing techniques, including air photo interpretation and digital satellite image processing. Emphasis on the use of remote sensing imagery in geographic information systems.
3310. **Environmental Change (3:2:2)**. Prerequisite: GEOG 1401 or equivalent natural science courses. Investigates changes in climate, hydrology, soils, biota and landforms since the start of the Ice Age, and the effects of these environmental changes on humans.
3335. **Field Seminar in Physical Geography (3:3:0)**. Seminar conducted in field setting to provide students with first-hand opportunity for observing actual physical and human aspects of study area. Specific region and topic may vary. May be repeated for credit with change of subject matter.
3337. **Economic Geography (3:3:0)**. Consideration of the characteristics and distribution of production and consumption of goods and services and of variation and interaction of economic activities.
3340. **Introduction to Research in Human Geography (3:3:0)**. An introduction to research and research methods in geography.
3350. **Human Geography (3:3:0)**. An examination of the spatial dimensions of human social, cultural, economic, and historical interactions.
3351. **Geography of Urban Places (3:3:0)**. An analysis of the location, distribution, function, and spread of urban places, including a study of current urban problems sprawl, city decline, and metropolitan transportation.
3352. **Geography of US and Canada (3:3:0)**. Study of the physical and cultural geography of the United States and Canada, including geographical aspects of the development of Texas.
3353. **Man, Resources, and Environment (3:3:0)**. Prerequisite: Introductory physical geography or consent of instructor. Study of the interrelated problems of population growth, efficient use of natural resources, and human disruption of the earth's environment.
3354. **Historical Geography of the United States (3:3:0)**. Survey of the settlement geography of the United States in the 18th and 19th centuries with special emphasis on Texas.
3356. **Contemporary Texas and the American Southwest (3:3:0)**. Study of the physical and contemporary cultural geography of Texas and the American Southwest.
3360. **Technology and the Human Landscape (3:3:0)**. Study of the relationship of technological development and energy use with human use of the earth from pre-humans to the present.
3363. **Geography of South America (3:3:0)**. Study of the physical and human geography of South America, with special emphasis on contemporary issues.
3364. **Geography of Middle America (3:3:0)**. Study of the physical and human geography of Mexico, Central America, and the West Indies, with emphasis on contemporary issues.
4300. **Seminar in Geography (3:3:0)**. A capstone course required of all majors, intended to assess knowledge in the discipline. Topics vary. May be repeated for credit.
4301. **Geomorphology in Environmental Management (3:2:2)**. Prerequisite: GEOG 1401, GEOL 1303, or consent of instructor. Evaluation and analysis of earth-forming processes and terrain features in relation to human activities. Course emphasizes analytical techniques.
4302. **Advanced Geographic Information Systems (3:2:3)**. Prerequisite: GEOG 3300 or equivalent. An advanced course in geographic information systems. Major topics include data acquisition, database management, and spatial analysis techniques. Laboratory emphasizes experience with professional GIS software.
4305. **Geography of Trade and Regional Integration in the Western Hemisphere (3:3:0)**. The geographic bases of regional integration in the Western Hemisphere and the relationship of the free trade movement to the internal development of Western Hemisphere countries, with emphasis on Latin America and the Caribbean.
4310. **Internship in Geography (3)**. Prerequisite: Minimum of 12 hours in geography, minimum 3.0 GPA in geography, and consent of instructor. Supervised activity in a nonacademic setting. Students gain experience in the working world while having the opportunity to utilize accumulated geographic concepts and tools.
4321. **Biogeography (3:3:0)**. Prerequisite: GEOG 1401 or consent of instructor. Study of plants and animals in their spatial context, functional interaction, and as related to human impacts.
4357. **Geography of Arid Lands (3:3:0)**. Systemic and regional inquiry into the physical nature and the problems of human utilization of the arid and semi-arid lands of the earth.
4369. **Independent Research in Geography (3)**. Conference course. May be repeated for credit.
4400. **Topics in Geographic Information Systems (4:2:4)**. Prerequisite: Consent of instructor. A focused exploration of specialized applications of geographic information systems. Laboratory emphasizes the use of GIS software in problem solving context. May be repeated for credit when topics vary.

Graduate Courses

5300. **Geographic Information Systems (3:2:3)**. Review of basic cartographic principles and the use of geographic information systems for thematic mapping and spatial analysis. Laboratory emphasizes experience with GIS software.
5301. **Remote Sensing of the Environment (3:2:3)**. Review of remote sensing techniques, including air photo interpretation and digital satellite image processing. Emphasis on the use of remote sensing imagery in geographic information systems.
5302. **Advanced Geographic Information Systems (3:2:3)**. Prerequisite: GEOG 5300 or equivalent. An advanced course in geographic information systems. Major topics include data acquisition, database management, and spatial analysis techniques. Laboratory emphasizes experience with professional GIS software.

5303. **Advanced Human Geography (3:3:0).** Consideration of current research in human geography with special reference to the spatial aspects of natural resource-environmental analysis. May be repeated as topic varies.
5304. **Advanced Physical Geography (3:3:0).** Consideration of current research in physical geography with special reference to the spatial aspects of natural resource-environmental analysis. May be repeated as topic varies.
5306. **Seminar in Geography of Arid Lands (3:3:0).** Systematic and regional review and analysis of the physical nature and problems of human utilization of the arid and semi-arid lands of the earth.
5307. **NAFTA, Western Hemisphere Trade, and Regional Integration in the Americas (3:3:0).** Consideration of spatial and cultural aspects of trade and economic development in the Western Hemisphere with emphasis on NAFTA, Mercosur, CACM, and regional integration organizations.
5309. **Seminar in Regional Analysis (3:3:0).** Consideration of the objectives and methods of regional analysis and the application of research techniques to the spatial analysis of selected regions. May be repeated as topic varies.
5310. **Readings in Geography (3).** Conference course. May be repeated for credit.
5400. **Topics in Geographic Information Systems (4:2:4).** Prerequisite: Consent of instructor. A focused exploration of specialized applications of Geographic Information Systems. Laboratory emphasizes the use of GIS software in problem solving context. May be repeated for credit when topics vary.
7000. **Research (V1-12).**

Department of English

Faculty

Sam A. Dragga Jr., Chairperson

Professors: Aycock, Barker, Clarke, Covington, Dragga, Hurst, Kuriyama, Miner, Purinton, and Whitlark; **Associate Professors:** Conrad, Crowell, Daghistan, Desens, Kemp, Lang, Patterson, Rickly, Samson, Schoenecke, and Wenthe; **Assistant Professors:** Baake, Baehr, Baugh, Borshuk, Carter, Chico, Couch, Eaton, Fitzgerald, Frangos, Grass, Hawkins, Jones, Kimball, Koerber, Kolosov-Wenthe, Manriquez, McFadden, Mohamed, Poch, Rice, Sadowski-Smith, Shelton, Silva, Shu, St. Amant, and Zdenek; **Lecturers:** Duke, Heise, Hester, Hiemstra, McLaughlin, Myers, and Rylander.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in English
- Master of Arts in English
- Master of Arts in Technical Communication
- Doctor of Philosophy in English
- Doctor of Philosophy in Technical Communication and Rhetoric

The department also cooperates in the interdepartmental programs in linguistics and comparative literature at both the undergraduate and the graduate levels.

Undergraduate Program

Undergraduate English majors must specialize in either literature and language, in technical communication, in creative writing, or in the certification program for teaching in the secondary schools.

The department sponsors both the local chapter of Sigma Tau Delta (of the national English honorary society) and a chapter of the Society for Technical Communication. The department publishes four international journals—*Conradiana*, *The Eighteenth Century: Theory and Interpretation*, *The Iron Horse Review*, and *William Carlos Williams Review*.

An English minor consists of 18 hours: ENGL 1302, two 2000-level English courses, and 9 hours of advanced English courses (3000 or 4000 level). Students wishing to pursue a particular area of study (British or American literature, creative writing, linguistics, techni-

cal communication, comparative literature, etc.) may do so by taking their three advanced courses in the appropriate area. To receive credit toward graduation, a student who is an English major or minor must receive at least a C in all courses in English. A maximum of 9 advanced hours of transfer credit in English will be accepted for the major, and a maximum of 3 advanced hours of transfer credit will be accepted for the minor.

Written Communication Requirements

ENGL 1301 and 1302 are required of all undergraduate students. Some colleges require additional hours in English; students should consult their advisors concerning additional required English courses.

Students who score 360 or below (verbal) on the SAT-I examination or 15 or below (English) on the ACT examination are required to pass ENGL 0301 or any approved assessment instrument approved by the Coordinating Board (ASSET, COMPASS, ACCU-PLACER, or THEA) before they can take ENGL 1301. Although ENGL 0301 appears on the transcript, the hours do not count as part of the minimum number of hours required for graduation in any degree program of the university. A grade is awarded for the semester but is not recorded on the transcript; therefore, it will not be computed in the student's grade point average. This course counts for meeting the Texas Success Initiative (TSI) requirements for writing skills development. Students who must fulfill this requirement should visit the TSI Office located in 72 Holden Hall.

ENGL 1301 and 1302 are prerequisites for all 2000-level English courses. Two 2000-level English courses are prerequisites for all 3000 and 4000 level English courses (except ENGL 3365). If a student's major does not require two 2000-level English courses, a student may take ENGL 3351 after completion of the English courses required by the student's major.

Literature and Language Specialization

Students majoring in English with a specialization in literature and language study literary works from a wide variety of periods and

genres, and they learn to think critically and analytically about literature and about language itself. This specialization 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, and 2308 are required for an English major with a specialization 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

- One early literature period course: ENGL 3302, 3304, 3305, or 3335
- One British literature period course: ENGL 3302, 3304, 3305, 3307, 3308, or 3309
- One American literature period course: ENGL 3323, 3324, or 3325
- Two additional 3000-level courses

II. 4000 level

- ENGL 4301
- One genre course: ENGL 4311, 4312, 4313, 4314, or 4315
- ENGL 4374
- One additional 4000-level course

Technical Communication Specialization

The major in English with a specialization in technical communication prepares students to become technical and professional writers and editors. This plan also prepares students for graduate professional schools in which written communication plays an important part, such as law and business.

Students selecting the technical communication plan are advised to minor in and choose electives from disciplines within which they expect to write or edit. Minors and electives in fields such as computer science, engineering, chemistry, biology, physics, business, and agriculture provide knowledge that is helpful in technical and professional writing and editing.

ENGL 1301, 1302, 2311, and a 2000-level literature course are required for a specialization in technical communication. Majors must complete 15 hours at the 3000 level and 12 hours at the 4000 level in the following courses:

I. 3000 level

- A. One style or linguistics course: ENGL 3366, 3371, or 3373
- B. Four courses from 3365, 3366 (may not also be used for I.A.), 3367, 3368, or 3369

II. 4000 level

- A. Three courses from 4365, 4366, 4367, 4368, 4369, or 4378
- B. ENGL 4380

Creative Writing Specialization

The major in English with a specialization 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 specialization is especially appropriate for students interested in teaching creative writing and literature, studying creative writing and literature in graduate school, and preparing for professional graduate schools, such as law and business. Permission to take the 4000-level creative writing courses requires submission of a writing sample and permission of the instructor.

The creative writing specialization requires ENGL 1301 and 1302 and 6 hours of 2000-level courses: 3 hours from ENGL 2305, 2306, 2307, or 2308; 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. 6 hours of ENGL 3351 under two separate genres (fiction, poetry, or creative nonfiction)

II. 4000 level

- A. ENGL 4301
- B. One genre course: ENGL 4311, 4312, 4313, 4314, or 4315
- C. ENGL 4351
- D. One additional 4000-level course (may include a repetition of ENGL 4351).

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, or 2391). Students wishing to follow any of the degree programs leading to certification should consult with the department's undergraduate advisor.

Graduate Program / English

Before beginning a graduate program in English, students must consult the Director of Graduate Studies concerning departmental admission procedures and degree requirements. Admission to the Graduate School requires departmental recommendation as well as approval by the Graduate Dean. Information on the requirements is available at www.english.ttu.edu.

The master's degree program in English offers advanced study in literature, creative writing, rhetoric, and linguistics. It is intended to be not merely a continuation of undergraduate work but a distinctly different educational experience requiring study in greater depth and the development of critical thinking.

Applicants for the M.A. degree in English may complete 30 hours of graduate courses and a thesis or 36 hours of course work. Areas of specialization are English and American literature, comparative literature, composition and rhetoric, and creative writing. Supporting work is available in bibliography, film, literary criticism, linguistics, teaching college composition, and technical and professional writing. Reading knowledge of one foreign language is required. In their final semester in the M.A. program, thesis students must successfully complete an oral defense and nonthesis students must submit a portfolio of their work for faculty review.

The doctoral program in English requires both greater breadth of study than the M.A. program and greater concentration in an area selected for specialization. To fulfill these requirements the student must demonstrate a reasonably comprehensive knowledge of literature and the ability to engage in original research.

Doctoral students in English may specialize in an area of English literature, American literature, two closely related areas of English and American literature, composition and rhetoric, comparative literature, or creative writing. They may minor outside the department or create a secondary specialization within the department in one of the above areas or in linguistics or technical communication. Course work for the Ph.D. generally amounts to 60 hours beyond the B.A. degree, including at least 45 hours of course work 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.

The master's degree program in technical communication combines study of the history, theory, research, and genres of technical communication with practice in applying this knowledge. The thesis option requires students to complete 24 hours of graduate courses in technical communication and electives or a minor, 6 hours of research methods, and a thesis. The nonthesis option requires students to complete 36 hours of graduate courses in technical communication, electives, and a minor. Students who elect the nonthesis option must pass a comprehensive examination in the semester of graduation.

The doctoral program in technical communication and rhetoric aims to engage the students in acquiring broad knowledge of the history, theory, research, genres, and practice of technical communication and rhetoric; specialized knowledge of some aspect of communication or rhetoric; and ability to conduct independent research. The Ph.D. requires at least 60 hours of graduate courses beyond the bachelor's degree, proficiency in research methodology, and a dissertation. The 60 hours include 45 hours in the specialization. The remaining 15 hours may be used for a minor in a field other than technical communication and rhetoric or for more courses in the specialization, including communication-related courses in other departments. A minor may be taken in one department or may consist of a cluster of courses on related topics from different departments.

The master's degree in technical communication is also available online. Application and admission processes and degree requirements are similar to those for the nonthesis option for the degree. All distance students complete 36 hours of graduate course work in technical communication, language- and communication-related electives, or a minor. One of the courses requires a substantial independent research project that could result in an article for publication. Prospective students are advised to consult www.english.ttu.edu/TC/DL for details of degree requirements and the course schedule.

English (ENGL)*(To interpret course descriptions, see pg. 10.)***Developmental Course**

0301. Developmental Writing (3:3:0). Emphasizes the development of fluency and coherence in writing and increased capability in usage and grammar. Students are assigned to this course on the basis of testing and evaluation, and successfully complete this course before registration in ENGL 1301. Not applicable toward general degree requirements in any degree program. Hours for ENGL 0301 are in addition to the minimum number needed for graduation.

Undergraduate Courses

1301. Essentials of College Rhetoric (3:3:0) [ENGL 1301]. Prerequisite: Successful completion of ENGL 0301 or a satisfactory score on SAT1, 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.

1302. Advanced College Rhetoric (3:3:0) [ENGL 1302]. Prerequisite: Successful completion of ENGL 1301. Focuses on writing from sources, research methods, and documentation.

2305. Introduction to Poetry (3:3:0). Prerequisite: ENGL 1301 and 1302. Critical study of and writing about a variety of poems.

2306. Introduction to Drama (3:3:0). Prerequisite: ENGL 1301 and 1302. Critical study of and writing about a variety of plays.

2307. Introduction to Fiction (3:3:0). Prerequisite: ENGL 1301 and 1302. Critical study of and writing about a variety of short stories and novels.

2308. Introduction to Nonfiction (3:3:0). Prerequisite: 1301 and 1302. Critical study of and writing about a variety of historical, biographical, and scientific writings.

2311. Introduction to Technical Writing (3:3:0) [ENGL 2311]. Prerequisite: ENGL 1301 and 1302. Introduction to patterns of writing used in reports and letters for business, industry, and technology.

2351. Introduction to Creative Writing (3:3:0) [ENGL 2307, 2308]. Prerequisite: ENGL 1301 and 1302. Fundamentals of creative writing with much practice in writing poetry and short fiction.

2371. Language in a Multicultural America (3:3:0). Prerequisite: ENGL 1301 and 1302. This course examines language in the U.S. as it relates to race, gender, class, religion, and ethnicity.

2388. Introduction to Film Studies (3:3:0). Introduction to the history, aesthetics, and criticism of avant-garde, documentary, and narrative film.

2391. Introduction to Critical Writing (3:3:0). Prerequisite: ENGL 1301 and 1302. Extensive practice in writing critical essays about literature.

3302. Old and Middle English Literature (3:3:0). Prerequisite: 6 hours of 2000-level English. Poetry, prose, and drama from 700 to 1500. This course may be repeated once for credit when topics vary.

3304. Medieval and Renaissance Drama (3:3:0). Prerequisite: 6 hours of 2000-level English courses. English drama to 1642. This course may be repeated for credit once when topics vary.

3305. British Renaissance Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. British poetry, prose, and drama from 1485 to 1660. This course may be repeated for credit once when topics vary.

3307. Restoration and Eighteenth Century British Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. British poetry, prose, and drama from 1660 to 1800. This course may be repeated for credit once when topics vary.

3308. Nineteenth Century British Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. British poetry, prose, and drama from 1780 to 1900. This course may be repeated for credit once when topics vary.

3309. Modern and Contemporary British Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. British poetry, prose, and drama since 1900. This course may be repeated for credit once when topics vary.

3323. Early American Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. American poetry and prose to 1800. This course may be repeated for credit once when topics vary.

3324. Nineteenth Century American Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. American poetry, prose, and drama from 1800 to 1900. This course may be repeated for credit once when topics vary.

3325. Modern and Contemporary American Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. American poetry, prose, and drama since 1900. This course may be repeated for credit once when topics vary.

3335. Ancient and Medieval World Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. Representative works in translation, primarily Greek and Roman. This course may be repeated for credit once when topics vary.

3336. Early Modern World Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. Representative works in translation from 1400 to 1900. This course may be repeated for credit once when topics vary.

3337. Modern and Contemporary World Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. Representative works in translation since 1900. This course may be repeated for credit once when topics vary.

3351. Creative Writing (3:3:0). Prerequisite: 6 hours of 2000-level English or, if a student's major does not require those courses, completion of English courses required by the student's major. Discussion of basic techniques in the genres of fiction, poetry, or creative nonfiction, with emphasis on student's creative writing. May be repeated once under a separate genre.

3360. Issues in Composition (3:3:0). Prerequisite: 6 hours of 2000-level English courses. Exploration of principles and practices in rhetoric and writing.

3365. Professional Report Writing (3:3:0).

Prerequisite: Junior standing. Preparation of professional and academic reports and publications through the use of communication analysis.

3366. Style in Technical Writing (3:3:0). Prerequisite: Junior standing. Investigation of the varieties, characteristics, and function of prose style in technical and professional writing.

3367. Usability Testing (3:3:0). Prerequisite: ENGL 2311 or 3365. Principles and techniques of testing online and print documents using video and digital equipment with emphasis on rhetorical effectiveness and usability of graphics, text, and format.

3368. World Wide Web Publishing of Technical Information (3:3:0). Prerequisite: ENGL 2311 or 3365. Principles and techniques of designing usable Web sites, with emphasis on needs assessment, information architecture, and navigation.

3369. Information Design (3:3:0). Prerequisite: ENGL 2311 or 3365. Principles of design, visual rhetoric, and visual communication and application of those principles in document design.

3371. Linguistic Science (3:3:0). Prerequisite: 6 hours of 2000-level English courses. Modern theory and practice in the description and analysis of natural languages.

3372. History of the English Language (3:3:0). Prerequisite: 6 hours of 2000-level English courses. An historical and descriptive survey of the English language in the context of the cultural development of the English-speaking peoples.

3373. Modern English Syntax (3:3:0). Prerequisite: 6 hours of 2000-level English courses. The syntactic and morphological analysis of modern English.

3381. Literature of the Fantastic (3:3:0). Prerequisite: 6 hours of 2000-level English courses. The analysis and criticism of the literary methods and style by which fantasy and science fiction explore cultural, psychological, and scientific issues.

3382. Women Writers (3:3:0). Prerequisite: 6 hours of 2000-level English courses. Significant works by women. (W S 3382)

3383. Bible as Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. The styles and forms of biblical lyrics and narration as well as various theories of biblical interpretation.

3384. Religion and Literature (3:3:0). Prerequisite: 6 hours of 2000-level English courses. The function of religious images and ideas in British and American literature as well as in works in translation.

3385. Shakespeare (3:3:0). Prerequisite: 6 hours of 2000-level English courses. Nine to twelve plays.

3386. Literature and Science (3:3:0). Prerequisite: 6 hours of 2000-level English courses. An exploration of the relations between science and technology and literature and discourse.

3387. Literature of Diverse Americans (3:3:0). Prerequisite: 6 hours of 2000-level English courses. Representative works by Americans of different cultures. May be repeated for credit when topic varies.

3388. Film Genres: Avant-Garde, Documentary, and Narrative (3:3:0). Prerequisite: 6 hours of 2000-level English courses. Concepts of visual and aural communi-

- cation and a survey of various film genres. May be repeated for credit when topic varies.
3389. **Short Story (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Short stories around the world.
3390. **Literatures of the Southwest (3:3:0)**. Prerequisite: 6 hours of 2000-level English courses. Examines the diverse literatures and cultures of the Southwest.
4300. **Individual Studies in English (3:3:0)**. Prerequisite: Junior or senior standing and approval of the instructor and department chairperson. Independent study under the guidance of a member of the faculty. May be repeated once.
4301. **Studies in Selected Authors (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive examination of one or more authors. May be repeated once for credit when topics vary.
4311. **Studies in Poetry (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
4312. **Studies in Drama (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
4313. **Studies in Fiction (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
4314. **Studies in Nonfiction (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
4315. **Studies in Film (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in the genre. May be repeated once for credit when topics vary.
4321. **Studies in Literary Topics (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive examination of one or more issues, themes, or motifs in British, American, or world literature. May be repeated once for credit when topics vary.
4342. **Studies in Literary Theory (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive studies in theories and traditions of literary criticism. May be repeated once for credit when topics vary.
4351. **Advanced Creative Writing (3:3:0)**. Prerequisite: 6 hours of creative writing (ENGL 3351) and consent of instructor. Form and techniques of creative nonfiction, fiction, or poetry, with emphasis on writing and discussion of the student's own creative writing. May be repeated.
4360. **Advanced Exposition (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive examination of one or more issues in the study of writing. May be repeated once for credit when topics vary.
4365. **Special Topics in Technical Communication (3:3:0)**. Prerequisite: ENGL 3365 or consent of instructor. Development of complex documents, such as manuals, proposals, and newsletters. May be repeated once for credit when topics vary.
4366. **Technical and Professional Editing (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Methods of editing and publishing in business, science, technology, and the professions. Practical experience with editing reports and publications produced in the university and community.
4367. **Developing Instructional Materials (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Preparation of instructions for complex procedures with focus on task and user analysis, organization, format, and usability testing.
4368. **Advanced Web Design (3:3:0)**. Prerequisite: ENGL 3367, 3368, or 3369. Advanced study of content design for database web sites, interactive design using single sourcing, and scripting technologies.
4369. **Interaction Design (3:3:0)**. Prerequisite: ENGL 3367, 3368, or 3369. The study of information gathering for design of efficient user interaction with software and hardware through adaptive interfaces, dynamic text structures, and single-sourcing methodologies.
4373. **Studies in Linguistics (3:3:0)**. Prerequisite: 6 hours of 3000-level English courses. Intensive examination of one or more issues in the study of language. May be repeated once for credit when topics vary.
4374. **Senior Seminar in English (3:3:0)**. Prerequisite: 15 hours junior or senior English. Required of English majors with specializations in literature and language. Seminar covering contemporary professional concerns and key issues in literature, language, and writing. Topics vary.
4378. **Internship in Technical Communication (3)**. Prerequisite: Junior or senior standing, ENGL 3365, declared specialization in technical communication, and approval of the director of technical communication. Supervised work in technical communication. Requires portfolio and research paper.
4380. **Professional Issues in Technical Communication (3:3:0)**. Prerequisite: Senior standing, declared specialization in technical communication, 3 hours of 4000-level English courses, or approval of the technical communication director. Advanced study of trends in technical communication, application of theory in community service-learning project, and preparation of a professional portfolio.

Graduate Courses

5301. **Old English (3:3:0)**. Survey of the grammar and vocabulary of Old English together with readings.
5303. **Studies in Medieval British Literature (3:3:0)**. Concentrated studies in British literature to 1500, treating in various semesters poetry, prose, drama, and major authors.
5304. **Studies in Renaissance British Literature (3:3:0)**. Concentrated studies in British literature, 1500-1600, treating in various semesters poetry, prose, drama, and major authors.
5305. **Studies in Shakespeare (3:3:0)**. Emphasis on the comedies, tragedies, histories, poetry, or a combination of these.
5306. **Studies in Seventeenth-Century British Literature (3:3:0)**. Concentrated studies in British literature, 1600-1660, treating in various semesters poetry, prose, drama, and major authors.
5307. **Studies in Restoration and Eighteenth-Century British Literature (3:3:0)**. Concentrated studies in British literature, 1660-1800, treating in various semesters poetry, prose, drama, and major authors.
5309. **Studies in Nineteenth-Century British Literature (3:3:0)**. Concentrated studies in British literature, 1800-1900, treating in various semesters poetry, prose, drama, and major authors.
5313. **Studies in Twentieth-Century British Literature (3:3:0)**. Concentrated studies in British literature, 1900-present, treating in various semesters poetry, prose, drama, and major authors.
5315. **Studies in British Fiction (3:3:0)**. Concentrated studies in British fiction, treating in various semesters major figures and movements.
5320. **Studies in Seventeenth- and Eighteenth-Century American Literature (3:3:0)**. Concentrated studies in American literature, 1600-1800, treating in various semesters poetry, prose, drama, and major authors.
5323. **Studies in Nineteenth-Century American Literature (3:3:0)**. Concentrated studies in American literature, 1800-1900, treating in various semesters poetry, prose, drama, and major authors.
5324. **Studies in Twentieth-Century American Literature (3:3:0)**. Concentrated studies in American literature, 1900-present, treating in various semesters poetry, prose, drama, and major authors.
5325. **Studies in American Fiction (3:3:0)**. Concentrated studies in American fiction, treating in various semesters major figures and movements.
5334. **History of the English Language (3:3:0)**. An exploration of the external and internal history of the English language and the people who speak it. Considers linguistic, historical, and literary materials.
5335. **Principles of Language (3:3:0)**. A broad introduction to the major subfields of descriptive and applied linguistics. Covers theoretical and practical issues in modern analyses of language.
5337. **Studies in Linguistics (3:3:0)**. Special topics.
5340. **Research Methods (3:3:0)**. Survey of research methods in literature and language providing experience with bibliography, microform collections, scholarly journals, and other research tools.
5342. **Critical Methods (3:3:0)**. Survey of contemporary critical methods with special attention to their application to literature.
5343. **Studies in Literary Criticism (3:3:0)**. Concentrated study of specific problems in literary theory and its application to literature.
5350. **Studies in Drama (3:3:0)**. Concentrated studies in American, British, or world drama.
5351. **Studies in Film and Literature (3:3:0)**. Readings, analysis, and research in the interrelationships between film and literature.
5352. **Studies in Fiction (3:3:0)**. Concentrated studies in world fiction.
5353. **Studies in Poetry (3:3:0)**. Concentrated studies in American, British, or world poetry.

5355. **Studies in Comparative Literature (3:3:0).** Theory and practice of the study of comparative literature, with emphasis on themes and motifs.
5360. **History and Theories of College Composition (3:3:0).** Seminar in history and contemporary theories of composition and rhetoric studies. Required for all new teaching assistants and graduate part-time instructors.
5361. **Theories of Invention in Writing (3:3:0).** Classical and modern theories of rhetorical invention.
5362. **Rhetorical Analysis of Text (3:3:0).** Classical and modern theories of rhetorical analysis.
5363. **Composition Research (3:3:0).** Survey of research methods in composition studies with emphasis on current research trends.
5364. **History of Rhetoric (3:3:0).** Survey of history and theories of rhetoric with an emphasis on applications to written communication.
5365. **Studies in Composition (3:3:0).** Consideration of classical and modern theories and research in written communication.
5366. **Teaching Technical and Professional Writing (3:3:0).** The theory and teaching of technical and professional writing with special attention to developing course objectives, syllabi, and teaching techniques.
5367. **Methods of Teaching College Composition (3:3:0).** Prerequisite: ENGL 5360. Introduces methods of teaching writing through assigned readings, supervised participation in teaching activities, and seminar discussion.
5368. **Studies in Written Argumentation (3:3:0).** History and theories of written argumentation.
5369. **Discourse and Technology (3:3:0).** Study of the effects of computer networks and digitally mediated knowledge management on theoretical, practical, and pedagogical notions of discourse and discourse communities.
5370. **Studies in Creative Writing (3:3:0).** Prerequisite: Consent of instructor. Theory and practice of creative writing. This class may be taught as a single genre poetry, fiction, creative nonfiction, or other writing or as multiple genres. May be repeated for credit towards creative writing specialization.
5371. **Foundations of Technical Communication (3:3:0).** Theory and practice of technical communication.
5372. **Technical Reports (3:3:0).** Theory and practice of reports and proposals.
5373. **Technical Manuals (3:3:0).** Theory and practice of manual development and design.
5374. **Technical Editing (3:3:0).** Substantive editing and design of technical documents.
5375. **Document Design (3:3:0).** Theory and practice of creating comprehensible, usable, and persuasive texts.
5376. **Online Publishing (3:3:0).** Design and testing of online materials to support instruction and information retrieval.
5377. **Theoretical Approaches to Technical Communication (3:3:0).** Intensive analysis and application of one or more theories of technical communication.
5378. **Graduate Internship in Technical Communication (3:0:0).** Prerequisite: Consent of the Director of Technical Communication. Substantial writing and editing experience combined with research.
5380. **Advanced Problems in Literary Studies (3:3:0).** Concentrated studies in works, authors, or approaches.
5384. **Rhetoric of Scientific Literature (3:3:0).** Study of the role of rhetoric in the texts of scientific inquiry.
5385. **Ethics in Technical Communication and Rhetoric (3:3:0).** Definitions, philosophies, and applicability of ethics to technical communication problems and solutions.
5386. **Written Discourse and Social Issues (3:3:0).** Study of uses of written discourse in problem solving on social issues involving science or technology.
5387. **Publications Management (3:3:0).** Strategies of managing processes and knowledge that support publication.
5388. **Usability Testing and Research (3:3:0).** Methods of planning, conducting, and analyzing usability tests.
5389. **Field Methods of Research (3:3:0).** Survey of methods such as ethnography, observation, and participatory design with application to research in rhetoric and technical communication.
5390. **Writing for Publication (3:3:0).** This course is designed to teach students in graduate programs how to write clear and effective articles for professional journals in their field.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Department of Environmental Toxicology

Faculty

Ronald J. Kendall, Chairperson

Professor: Cobb, Dixon and Kendall; *Associate Professors:* Anderson, Hooper, McMurphy, Presley, E. Smith, and Wang; *Assistant Professors:* Cox, P. Smith, and Theodorakis; *Research Assistant Professor:* Ramkumar.

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Environmental Toxicology
- Doctor of Philosophy in Environmental Toxicology

A combined degree leading to a joint J.D./Master of Science degree in cooperation with the Texas Tech School of Law is offered. In addition, a joint M.S./M.B.A. degree with the Rawls College of Business is also offered.

Undergraduate Program

Environmental toxicology offers a graduate program within the College of Arts and Sciences as well as fixed and variable credit courses for undergraduates. The courses are designed to provide undergraduate students the opportunity to conduct scientific research in environmental toxicology at The Institute of Environmental and Human Health. Generally, a background in the natural, physical, or health sciences will provide the necessary preparation for completion of these courses. Interested students should contact faculty within the department.

Graduate Program

The Institute of Environmental and Human Health integrates the efforts of Texas Tech University, the School of Law, and the Health Sciences Center in a joint venture to assess toxic chemical impacts on environments. Attracting graduate students at both the master's and doctoral level, TIEHH includes faculty from biological sciences, medicine, epidemiology, biostatistics, engineering, chemistry, computer science, law, mathematics, pharmacology, physiology, and range, wildlife, and fisheries management.

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 Texas Tech Graduate School at www.gradschool.ttu.edu and to the Environmental Toxicology Graduate Program at www.tiehh.ttu.edu/Education/application.asp.

The M.S. program (36 hours) and the Ph.D. program (72 hours) are composed of course work emphasizing the principles of toxicology, the environmental fate of chemicals, statistical approaches to study design and data handling, and seminars in environmental toxicology. Supplemental course work, 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.

Environmental Toxicology (ENTX)*(To interpret course descriptions, see pg. 10.)***Undergraduate Courses**

4000. **Undergraduate Research in Environmental Toxicology (V1-3).** Prerequisite: 15 hours of biology or chemistry, junior or senior standing, and consent of instructor. Selected research problems according to the needs of the student. May be repeated for credit.
4325. **Principles of Toxicology I (3:3:0).** Prerequisite: Senior standing or consent of instructor. First half of two-semester course. Examines foundations of toxicological sciences, covering principles, disposition and half of toxicity mechanisms.
4326. **Principles of Toxicology II (3:3:0).** Prerequisite: ENTX 4325. Second half of two-semester course. Covers remaining toxicity mechanisms, toxic agents and applied toxicology.
4301. **Special Topics in Environmental Toxicology (3:3:0).** Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other undergraduate courses (e.g., wildlife toxicology, pesticides in the environment).

Graduate Courses

6000. **Master's Thesis (V1-6).**
6100. **Graduate Seminar (1:1:0).** Prerequisite: Graduate standing or consent of instructor. A participatory seminar where graduate students condense, review, and present research findings on focused topics. Subject matter varies by semester. May be repeated for credit.
6251. **Analytical Toxicology Laboratory (2:0:2).** Corequisite: ENTX 6351 or consent of instructor. Extraction, cleanup, and quantitative analysis of environmental chemicals and their degradates. Reinforces and applies theories taught in ENTX 6351.
6300. **Advanced Topics in Environmental Toxicology (3:3:0).** Special areas of current interest not generally covered in other courses. Content normally different each time offered. May be repeated for credit.
6312. **Biological Threats in the Environment (3:3:0).** Prerequisite: Undergraduate biological background or consent of instructor. Detailed examination of characteristics, surveillance, and control of naturally-occurring zoonoses and diseases exploitable as biological weapon agents.
6314. **Chemical Warfare and Protective Countermeasures (3:3:0).** Coverage of chemical warfare agents, their protective measures, and technologies. Suitable for science and engineering majors.
6325. **Principles of Toxicology I (3:3:0).** Prerequisite: Graduate standing in the department or consent of instructor. First half of two semester course. Examines the foundations of toxicological sciences. Covers principles, disposition, and first half of toxicity mechanisms.
6326. **Principles of Toxicology II (3:3:0).** Prerequisite: ENTX 6325. Second half of two semester course. Covers remaining mechanisms, toxic agents, and applied toxicology.

6327. **Molecular Toxicology (3:3:0).** Prerequisite: ENTX 6325 and 6326 or consent of instructor. Molecular mechanisms and control of phase I and phase II xenobiotic metabolizing enzymes, oxidative stress, and carcinogenesis. Emphasizes prototypical chemicals with multiple modes of action.
6331. **Reproductive and Developmental Toxicology (3:3:0).** Prerequisite: ENTX 6325 and 6326 or consent of instructor. Mechanistic treatment of chemical effects on reproductive and developmental processes and the resulting impacts on reproductive function, fertility, and the developing offspring.
6332. **Biotoxin Detection Methods (3:2:1).** Prerequisite: ENTX 6326. Toxic effects of mycotoxins, bacteria, and cyanobacteria toxins. Historic and current status of biotoxin research. Laboratory stresses breadth for biotoxin detection.
6351. **Analytical Toxicology Lecture (3:3:0).** Prerequisite: ENTX 6445 or consent of instructor. Theory of isolation, detection, identification, and quantification of toxic substances and their transformation products in environmental and biological samples.
6361. **Environmental and Wildlife Toxicology (3:3:0).** Prerequisite: Organic chemistry, ecology, or consent of instructor. Examines exposure and effects of chemicals in wildlife, their study in the lab and field, and use of conducting ecological risk assessments.
6365. **Fundamentals of Aquatic Ecotoxicology (3:3:0).** Prerequisite: Graduate or advanced undergraduate background in biological, chemical, or environmental sciences or consent of instructor. Covers effects of water pollution on aquatic organisms and human health. Subjects include fate and transport in aqueous systems, acute toxicity and toxicity tests, and effects of pollutants on aquatic systems from the molecular to the global levels.
6366. **Advanced Environmental Toxicology (3:3:0).** Prerequisite: ENTX 6325 and 6326, 6445, or consent of instructor. Examines toxicological principles at population, community, and ecosystem levels stressing population dynamics, life history changes, community composition, and ecosystem dynamics.
6367. **Advanced Wildlife Toxicology (3:3:0).** Prerequisite: ENTX 6325 and 6326, 6445, or consent of instructor. Environmental contaminant effects on reproduction, health, and well being of wildlife species and applications to ecological risk assessment.
6371. **Procedures and Techniques in Ecological Risk Assessment (3:3:0).** Prerequisite: ENTX 6325, 6326, or permission of the instructor. This course is designed to provide students with a solid foundation in risk assessment methods. Students will learn how the ecological risk assessment framework developed by the U.S. EPA is used to assess the potential hazards of chemicals in the environment using case studies to illustrate and bring to life the concepts presented.

6385. **Statistical Applications in Environmental Toxicology (3:3:0).** Prerequisite: STAT 5302 or equivalent. Designed for students who wish to understand the interrelationships of statistical distributions and particular statistical approaches to environmental toxicology data analysis.
6391. **Modeling and Simulation in Ecotoxicology (3:2:1).** Prerequisite: Calculus. Model development, implementation, and simulation applied to ecotoxicology; stressor responses; toxicokinetics; individual organism effects; individual-based models; population, community, and landscape effects; parameter estimation; design and analysis of simulation experiments; and model validation.
6431. **Biomarkers in Toxicology (4:2:2).** Prerequisite: ENTX 6325 and 6326. Lecture and laboratory on biomarker theory and use. Biochemical, physiological, histological responses to chemical exposure, effects and susceptibility are studied. Laboratory stresses individual and team approaches.
6445. **Chemical Sources and Fates in Environmental Systems (4:4:0).** Prerequisite: Organic and analytical or environmental chemistry or consent of instructor. Environmental phenomena and physical properties of chemicals are used to understand processes governing chemical fate in the environment from global to micro scales.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Toxicology (TOX)*(To interpret course descriptions, see pg. 10.)*

6105. **Introductory Seminar in Environmental Toxicology (1:1:0).** Prerequisite: Graduate standing. A tour through the discipline of environmental toxicology focusing on its composition and workings. Demonstrations of laboratory, field, computational, presentation, safety, quality assurance, permitting, and career components.
6115. **Interdisciplinary Seminar in Environmental Toxicology (1:1:0).** Prerequisite: Graduate standing or consent of instructor. Seminar on timely topics by experts in aspects of environmental toxicology. Focuses on basic and applied research, regulatory decision-making, and industry perspectives. Required for all environmental toxicology students. May be repeated for credit.

Department of Geosciences

Faculty

Richard Emil Peterson, Chairperson

Horn Professor: Chatterjee; *Professors:* Asquith, Barnes, Barrick, Güven, Haragan, Leary, Lehman, and Peterson; *Associate Professors:* Chang, Gurrola, and Karlsson; *Assistant Professors:* Nagihara, Ridley, Schroeder, and Yoshinobu; *Adjunct Faculty:* Johnson.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Geosciences
- Bachelor of Science in Geosciences
- Master of Science in Atmospheric Science
- Master of Science in Geosciences
- Doctor of Philosophy in Geosciences

Areas of specialization at the undergraduate level include geology and geophysics and a minor in atmospheric science.

Undergraduate Program

Geology Specialization, B.S. Degree. The geology specialization for the Bachelor of Science degree is designed to prepare the student for admission to a graduate program in geology and employment as a professional geologist. Each student must complete a senior research project (GEOL 4312) as part of the degree requirements. The minor must be in a field of science, mathematics, engineering, or an approved composite of courses from these fields. A well-prepared student should be able to complete the B.S. in geology with a minimum of about 40 hours in geosciences, 18 hours in the minor, and 22 hours in mathematics and physical sciences. For other students, leveling courses may be required. The residency requirement for the major is 12 hours; for the minor, 6 hours.

Geophysics Specialization, B.S. Degree. The geophysics specialization for the Bachelor of Science degree is flexible, allowing the student to design a plan to prepare for employment as a professional geophysicist or to enter a graduate program in geophysics, atmospheric sciences, or related areas. A geophysics degree requires a minor in mathematics, physics, atmospheric sciences, geology, engineering, or an approved composite of courses from these fields. The courses required for the geophysics major will vary depending on the chosen minor. The geophysics major combined with the appropriate minor (or adjunct classes) must include all the following courses: GEOL 1303, 1101, 1304, 1102, 2305, 3310, 3402, 3421; G PH (two of the following) 4300, 4322, 4323; CHEM 1307, 1107; PHYS 1408, 2401; MATH 1351, 1352, 2350, and 2360 (or 3350); an additional 15 hours of approved upper-level electives chosen from atmospheric science, geology, geophysics, physics, engineering, or mathematics (at least 6 hours of these electives must be in fields other than geology); and a senior research

project (GEOL 4312) in a topic related to geophysics.

Geology Specialization, B.A. Degree. The geology program leading to the Bachelor of Arts degree is designed to provide a broad liberal arts background and basic training in the principles of geosciences. The program is designed for students with strong interests in earth processes and the history of nature's initiation of and response to continuous change. Students interested in professional employment or graduate degrees in geology should complete the B.S. degree program, not the B.A.

The B.A. program with a major in geology requires GEOL 1303, 1101, 1304, 1102, 2305, 3402, 3421, 3428, at least 13 hours of junior-senior level geosciences electives (six hours of which must include a laboratory), and a senior research project, GEOL 4312. Adjunct requirements include MATH 1321; CHEM 1307, 1107; PHYS 1403. The minor may be in any area approved by the college.

Geosciences Minors. The department offers three minors. The geology minor requires GEOL 1303, 1101, 1304, 1102, and 12 additional hours of geology courses, 6 of which must be at the junior-senior level and one course that must include a laboratory. The geophysics minor requires 9 hours in geophysics and 9 hours of related science or mathematics course work; 6 hours must be at the junior-senior level. The atmospheric science minor requires ATMO 1300, 1100, 2301, 3301, 4300, and 6 hours of related science or mathematics course work.

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.

Graduate Program

Master's degree candidates may specialize in areas within geology, atmospheric science, and geophysics. At the doctoral level, research specializations for the major in geoscience are available in (a) sedimentology, sedimentary petrology, petroleum geology; (b) clay mineralogy and low temperature geochemistry, igneous petrology, high temperature geochemistry, and stable-isotope geochemistry; (c) paleobiology and biostratigraphy; (d) geophysics, structural geology, tectonics; and (e) integrated studies in earth and atmospheric sciences. Details concerning the specific makeup of these groups are available from the department.

General degree requirements are those of the Graduate School. Admitted students are strongly encouraged to associate themselves with a faculty member or members by the end of their first semester in residence. The instructor(s) will serve as the student's principal advisor and will be responsible for the student's degree program.

The department encourages students with bachelor's degrees from other sciences to enter the geosciences graduate program. Required leveling work will be determined on an individual basis, primarily by the staff member(s) in the student's field of interest. A graduate minor may be taken either inside or outside this department.

Requirements for the master's degree in atmospheric science beyond those stipulated by the Graduate School, if any, are determined in each case by the student's thesis committee. Requirements for the master's degree in geoscience are completion of 27 graduate hours in geology, geophysics, or related fields; 3 hours in science or engineering beyond those required for an undergraduate degree; and 6 hours of thesis credit. A 36-hour nonthesis option in geoscience is also available.

Requirements for the doctor's degree follow those of the Graduate School. The first year Ph.D. student will be expected to prepare and defend a research proposal. The intent of this work is to determine whether the individual is capable of Ph.D.-level research. In the second year, the student will formalize the dissertation topic and committee. Under normal circumstances, the committee will consist of between 3 and 5 members, including the faculty advisor. The Comprehensive Examination will be completed before the end of the fourth long semester in residence. One tool subject is required. Tool subjects include foreign language, computer science, and statistics and are determined by the graduate advisor and the student's dissertation committee. The tool can be met by taking two successive courses in the tool subject for a total of at least 6 semester hours, except for foreign language, the requirements for which are outlined in an earlier section of this catalog.

Geosciences—Geology Specialization Curriculum, B.S. Degree

FIRST YEAR			
Fall		Spring	
GEOL 1303, Physical Geology	3	GEOL 1304, Historical Geology	3
GEOL 1101, Physical Geol. Lab.	1	GEOL 1102, Historical Geol. Lab	1
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. I (Lab.)	1	CHEM 1108, Prin. of Chem. II (Lab.)	1
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
Personal Fitness and Wellness†	1	Personal Fitness and Wellness†	1
TOTAL	15	TOTAL	15

SECOND YEAR			
Fall		Spring	
GEOL 2305, Intro. Crystal. & Min.	3	GEOL 3421, Petrology	4
Oral Communication†	3	GEOL 4320, Optical Mineralogy	3
Physics	4	Physics	4
Foreign Language	5	Foreign Language	5
TOTAL	15	TOTAL	16

THIRD YEAR			
Fall		Spring	
GEOL 3402, Structural Geology	4	Geosciences Elective	3-4
GEOL 3310, Quant. Meth. Geol. or MATH 2300, Stat. Meth.	3	Minor+	3-4
American History†	3	American History†	3
Foreign Language	3	Foreign Language	3
English Literature†	3	English Literature†	3
TOTAL	16	TOTAL	15-17

SUMMER	
Geology Field Course††	6

FOURTH YEAR			
Fall		Spring	
Geosciences Elective	3-4	Geosciences Elective	3-4
Minor+	3-4	GEOL 4312, Research	3
Minor+	3-4	Minor+	3-4
POLS 1301, Amer. Govt. Org.	3	POLS 2302, Amer. Pub. Policy	3
Social or Behavioral Sci. Elect.†	3	Visual or Performing Arts Elect.†	3
TOTAL	15-18	TOTAL	15-17

Adequate training in algebra, trigonometry, and analytic geometry is a prerequisite for calculus. The student must take the Mathematics Placement Examination. PHYS 1408, 2401; OR PHYS 1403, 1404

+ Minor course work must be in mathematics, sciences, or engineering.

† Select from Arts and Sciences General Degree Requirements. Course work must also satisfy the multicultural, and Technology and Applied Science requirements.

†† Summer field course must be approved by the department before enrollment.

Atmospheric Science (ATMO)

(To interpret course descriptions, see pg. 10.)

Courses with an asterisk may be used in fulfilling natural (laboratory) science requirements. Courses marked with double asterisks may be used in fulfilling technology and applied science requirements.

Undergraduate Courses

- 1100.* **Atmospheric Science Laboratory (1:0:2).** Discussion and practical experience in weather analysis, methods of instrumentation, and observational meteorology.
- 1300.* **Introduction to Atmospheric Science (3:3:0).** An investigation of atmospheric properties and physical processes that determine current weather events and long-term climate conditions.
- 2301.** **Weather, Climate, and Human Activities (3:3:0).** Observation and analysis of the impacts of weather and climate on human activity, e.g., storms, climate change, forecasting, weather modification, health, energy, transportation.
- 3301.** **General Meteorology (3:3:0).** A basic study of atmospheric processes and the principles that control them.
4300. **Independent Studies in Atmospheric Science (3:3:0).** Prerequisite: Consent of instructor. Independent studies in atmospheric science. May be repeated once for credit.

Graduate Courses

5101. **Atmospheric Science Seminar (1:1:0).** Discussions of current research or selected topics of interest. May be repeated for credit.
5301. **Individual Studies in Atmospheric Science (3:3:0).** Prerequisite: Consent of instructor. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.

5302. **Weather, Climate, and Applications (3:3:0).** Basic principles of atmospheric science, with particular emphasis on applications, including severe weather, air pollution, and global climate change.
5315. **Atmospheric Convection (3:3:0).** Observations and models of convection in the atmosphere. Governing equations for shallow and deep convection. Natural and man-made plumes. Numerical and laboratory simulation of atmospheric convection.
5316. **Dynamics of Severe Storms (3:3:0).** Observations and theoretical studies of severe storms. Conceptual and numerical models of storm structure and development.
5319. **Boundary Layer Meteorology (3:3:0).** Boundary-layer turbulent transfer processes are examined, including diffusion, mixing, diabatic modification, low-level jet formation, and moisture discontinuities.
5320. **Mesometeorology (3:3:0).** Temporal and spatial analysis of mesoscale phenomena, including thunderstorms. Models of mesoscale circulations.
5321. **Cloud and Precipitation Physics (3:3:0).** Processes of cloud droplet nucleation; initial growth of droplets and cloud droplet size spectra; theories of natural precipitation processes and techniques for precipitation enhancement.
5327. **Radar Meteorology (3:3:0).** Applications of radar to investigation of precipitating weather systems. Emphasis is given to analysis and interpretation of radar data in conjunction with other data sources.
5328. **Synoptic Meteorology (3:2:3).** Basic techniques of interpreting meteorological data. Applications of analysis techniques to basic research and weather forecasting.
5331. **Analysis of Geophysical Data Fields (3:3:0).** The application of Fourier analysis, time series and spectral analyses, and objectives analysis to geophysical data fields.
5332. **Regional Scale Numerical Weather Prediction (3:3:0).** Regional scale dynamics, numerical solution of geophysical problems, and numerical prediction of severe weather events such as tornadic storms and flash floods.
5351. **Meteorological Data Acquisition and Instrumentation Systems (3:2:3).** Exploration, design, integration and application of meteorological data acquisition and instrumentation systems.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**

Geochemistry (G CH)

Graduate Courses

5300. **Individual Studies in Geochemistry (3:3:0).** A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
5303. **Trace Element Geochemistry (3:3:0).** Theoretical basis for trace element distribution and fractionation. Trace element "fingerprints," use of stable and radioactive isotopes and rare-earth elements in petrology.
5305. **Environmental and Aqueous Geochemistry (3:3:0).** Prerequisite: Inorganic chemistry or equivalent. Theoretical and applied aspects of geochemistry occurring in the upper crust. Repeatable for credit.
5307. **X-ray Powder Diffraction Methods (3:2:3).** Fundamental and practical aspects of X-ray diffraction on polycrystalline substances such as minerals, rocks, and other solids.
5309. **Clay Mineralogy (3:2:3).** Atomic structures of clay minerals in relation to physical, engineering, and colloid chemical properties of these materials. Instrumental methods of clay analysis such as X-ray diffraction and ion exchange methods.
5350. **Isotope Geochemistry (3:3:0).** Principles of isotope chemistry as applied to the earth and solar system. Radioactive and stable isotope systematics.
5405. **Inorganic Geochemistry (4:4:0).** Origin of elements and isotopes. Theory and application of isotopic systems, element mobility, thermodynamics, solution geochemistry, and geochemical cycles.

Geology (GEOL)

Courses with an asterisk may be used in fulfilling natural (laboratory) science requirements. Courses marked with double asterisks may be used in fulfilling technology and applied science requirements.

Undergraduate Courses

- 1101.* **Physical Geology Laboratory (1:0:2).** Laboratory study of rocks, minerals, and geologic mapping.
- 1102.* **Historical Geology Laboratory (1:0:2).** Prerequisite: GEOL 1101. Laboratory study of fossils, geologic maps, and geologic structure.

- 1105.* **History of Life Laboratory (1:0:2).** Introduction to and applications of methods employed by paleontologists to interpret the fossil record. Not for credit for majors.
- 1303.* **Physical Geology (3:3:0).** Beginning course. A study of earth materials (rocks and minerals), gradation (erosion and deposition), diastrophism (earth movements and mountain building), vulcanism and earth resources.
- 1304.* **Historical Geology (3:3:0).** Prerequisite: GEOL 1303. A study of the history and evolution of the earth and life from the beginning of time to the present.
- 1350.* **History of Life (3:3:0).** A survey of the evolution of life on earth as interpreted from the fossil record and the processes that produced extinct and modern ecosystems. Not for credit for majors.
2305. **Introduction to Crystallography and Mineralogy (3:2:3).** Prerequisite: GEOL 1101, 1303, and CHEM 1307. Introduction to symmetry, crystal chemistry, and atomic structures of minerals. Classification of minerals and description of rock-forming minerals.
3102. **Field Methods in Structural Geology (1:0:3).** Corequisite: GEOL 3302. Topics include field structural analysis and an introduction to geologic mapping.
3301. **Geomorphology and Aerial Photointerpretation (3:2:3).** Prerequisite: GEOL 1303, 1101, or consent of instructor. Introductory course in processes that produce morphogenic changes at earth's surface. Evolutionary development of hill slopes and drainage channels. Illustrated by aerial photos.
3302. **Structural Geology (3:2:3).** Prerequisite: GEOL 2305 or GPH 2300. Topics include rock mechanics, folds, joints, faults, structural petrology, and crystalline-rock structures. Laboratory work concerns structural aspects of surface and subsurface mapping and interpretation, including the use of stereonet. Required field trip.
3310. **Quantitative Methods in Geology (3:3:0).** This class will emphasize error propagation in geologically sampled data, and computer methods to process and model these data.
3322. **Oceanography (3:3:0).** Prerequisite: GEOL 1303 or GEOG 1401 or ATMO 1300. The physiography and origin of ocean basins and the processes and systems operative in them including physical, chemical, and biological factors as well as sedimentation patterns.
- 3323.** **Environmental Geology (3:3:0).** Prerequisite: GEOL 1303 or GEOG 1401. Study of geological processes that affect human activities, emphasizing natural hazards, water resources, waste disposal, energy, mineral resources, and land use and planning.
3421. **Petrology (4:2:6).** Prerequisite: GEOL 2305. Origin, identification, and mode of occurrence of rocks. Systematic classification of igneous, metamorphic, and sedimentary rocks, with emphasis on field-based methods. Required field trip.
- 3428.** **GIS in Natural Science and Engineering (4:3:3).** Prerequisite: MATH 1320 or equivalent. Survey of the broad band spectrum of geoinformation science and technology applied to research in natural science and engineering. Involves computer lab exercises.
3450. **Paleontology and Paleoecology (4:3:3).** Classification, evolution, and paleobiology of invertebrate fossils. Applications of paleontological data in geological dating, correlation, and paleoenvironmental analyses.
4001. **Problems in Geosciences (V1-6).** Independent study under guidance of faculty member.
4101. **Undergraduate Seminar (1:1:0).** May be repeated for credit.
4300. **Independent Studies in Geology (3:3:0).** Prerequisite: Consent of instructor. Independent studies in geology. May be repeated for credit.
4312. **Undergraduate Research (3).** Prerequisite: Senior standing. Independent research in an area of current interest in the geosciences. Prior approval from specific professor required.
4318. **Geology of Texas (3:3:0).** A comprehensive study of the structure, stratigraphy, and economic geology of Texas and parts of adjacent states.
4320. **Optical Mineralogy (3:2:3).** Prerequisite: GEOL 2305. Principles of transmitted light within isotropic and anisotropic crystals, and the identification of minerals by observation and measurement of their behavior in plane-polarized light. Emphasis on variations due to chemical changes in the common rock-forming silicates.
4321. **Igneous and Metamorphic Petrography (3:2:3).** Prerequisite: GEOL 4320. The study of rock texture and paragenesis in thin section.
4324. **Geology of Hydrocarbons (3:3:0).** A study of the world-wide distribution and geologic setting of petroleum in addition to methods of exploration.
4331. **Digital Imagery in Geosciences (3:2:3).** Prerequisite: MATH 1320 or equivalent. Introduction to digital image processing, visualization, and raster GIS modeling applied to geosciences. Involves computer lab exercises.
4332. **Spatial Data Analysis and Modeling in Geosciences (3:2:3).** Prerequisite: MATH 2300 or equivalent. Introduction to vector GIS data manipulation, geostatistics, and spatial modeling applied to geosciences. Involves computer lab exercises.
4361. **Advanced Structural Geology (3:3:3).** Prerequisite: GEOL 3302. Topics include deformation mechanisms and rheology, tectonic evolution of oceanic lithosphere and evolution of arcs.
4362. **Tectonics (3:3:0).** Prerequisite: Senior standing in geology or consent of instructor. Survey of the plate tectonic paradigm in terms of historical development and modern application.
4420. **Sedimentology and Stratigraphy (4:3:3).** Prerequisite: Senior standing in geosciences or approval of instructor. Sedimentary textures and structures, classification, petrography, and diagenesis of sedimentary rocks, lithostratigraphy, facies, and basin models.
5101. **Seminar (1:1:0).**
5211. **Sedimentary Petrology (2:2:0).** Origin, classification, and diagenesis of siliclastic and carbonate sediments and sedimentary rocks. May be repeated for credit.
5212. **Sedimentary Petrology Methods (2:0:6).** Textural analysis, mineral separation, and thin section petrography of siliclastic and carbonate sediments and sedimentary rocks. May be repeated for credit.
5300. **Individual Studies in Geology (3:3:0).** A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
5303. **Advanced Igneous Petrology (3:3:0).** Phase relations, geochemistry, and tectonic setting of igneous rocks. Emphasis on modern concepts of magma origin and differentiation. May be repeated for credit.
5305. **Tectonic Evolution of Western North America (3:3:0).** Prerequisite: Consent of instructor. Survey of the geologic and tectonic evolution of the western margin of North America over the past 3 billion years.
5310. **Advanced Quantitative Methods in Geology (3:3:0).** This class will emphasize computer methods of error analysis, data processing, and modeling of geological data. Applications to current research problems will be included.
5311. **Micropaleontology (3:2:3).** Lectures and labs are designed to acquaint the student with basic lab techniques, morphology, and classification within the major microfossil groups, and to demonstrate the usefulness and importance of microfossils as biostratigraphic and paleoecologic tools.
5314. **Problems in Stratigraphy (3:3:0).** Analysis of selected stratigraphic units emphasizing geometry, paleogeography, environments of deposition, depositional models, and theoretical problems.
5322. **Sedimentary Processes (3:3:0).** Principles of fluid dynamics important in sedimentation, interpretation of primary sedimentary structures, and description of depositional environments.
5323. **Depositional Systems and Basin Analysis (3:3:0).** Sedimentary Facies models for clastic and carbonate depositional systems and models for sedimentary basins in different tectonic settings.
5325. **Petrophysics (3:3:0).** Physical properties of reservoir rocks, including porosity, permeability, composition, and texture. Interrelationships between rock characteristics and electric log responses in geologic exploration and exploitation.
5327. **Problems in Paleontology (3:2:3).** Subjects include origin of life, Precambrian life, origin and relationships of fish, amphibians, reptiles, dinosaurs, pterosaurs, birds, and primates; mass extinction and impact cratering processes.
5340. **Advances in Historical Geology (3:3:0).** Survey of currently important topics in earth processes and history for science educators, with an emphasis on how geologists interpret modern and past geologic events.
5341. **Digital Imagery in Geosciences (3:2:3).** Introduction to digital image processing,

Graduate Courses

5001. **Problems in Geosciences (V1-6).** Independent study under guidance of a faculty member.

visualization, and raster GIS modeling applied to geosciences. Involves computer lab exercises.

5342. **Spatial Data Analysis and Modeling in Geosciences (3:2:3).** Introduction to vector GIS data manipulation, geostatistics, and spatial modeling applied to geosciences. Involves computer lab exercises.
5361. **Advanced Structural Geology (3:3:3).** Prerequisite: GEOL 3302. Topics include deformation mechanisms and rheology, tectonic evolution of oceanic lithosphere, and evolution of arcs. May be repeated once for credit.
5362. **Advanced Tectonics (3:3:0).** Survey of the plate tectonics paradigm in terms of its historical development and modern application.
5399. **Advanced Petrophysics (3:3:0).** Analysis of complex reservoirs, such as shaly sands, carbonates with complex pore geometries, fractured reservoirs, and gas-bearing dolomites. The development and use of new logging tools is also covered.
5410. **Vertebrate Paleontology (4:3:3).** An introduction to the principles of paleontology governing evolution, morphology, and phylogeny of major groups of vertebrates.
5420. **Geological Correlation (4:2:6).** Principles and methods of correlation of stratigraphic units with the geological

time scale including chronostratigraphy, biostratigraphy, ecostratigraphy, sequence stratigraphy, event stratigraphy, chemostratigraphy, and related techniques.

5428. **GIS in Natural Science and Engineering (4:3:3).** Survey of the broad spectrum of geo-information science and technology applied to researches in natural science and engineering. Involves computer lab exercises.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Geophysics (G PH)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

4300. **Independent Studies in Geophysics (3:3:0).** Prerequisite: Consent of instructor. Independent studies in geophysics. May be repeated for credit.
4321. **Seismic Exploration Methods (3:2:3).** Prerequisite: GEOL 3302 or MATH 1351 or consent of instructor. Methods to collect, process, and interpret seismic data are discussed.
4323. **Applied Electrical Methods (3:2:3).** Prerequisite: GPH 4321. Electromagnetic, resistivity, and ground penetrating radar methods of geophysical investigation are discussed.

Graduate Courses

5221. **Advanced Seismic Exploration Methods (2:1:3).** Methods to collect, process, and interpret seismic data are discussed.
5223. **Advanced Applied Electrical Methods (2:1:3).** Electromagnetic, resistivity, and ground penetrating radar methods of geophysical investigation are discussed.
5231. **Seismology (2:2:0).** Seismic wave and ray theory is discussed.
5233. **Electrical Methods (2:2:0).** Theory and numerical representation of electromagnetic and electrical methods are discussed.
5300. **Individual Studies in Geophysics (3:3:0).** Prerequisite: Consent of instructor. A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
5310. **Geophysical Fluid Dynamics (3:3:0).** Survey of dominant modes of wave motion in the atmosphere. Scale analysis for problems in atmospheric dynamics with application to mid-latitude synoptic scale systems.
5324. **Radiative Transfer (3:3:0).** Principles of radiation, the radiative transfer equation. Applications to absorption, emission, and scattering processes. Determination of physical properties from satellite measurements.

Department of Health, Exercise, and Sport Sciences

Faculty

T. Gilmour Reeve, Chairperson

Professor: G. Reeve; *Associate Professors:* Dornier, Hall, James, Massey-Stokes, McComb, and Meaney; *Assistant Professors:* Bennett, Bixby, Dickin, Hart, Lochbaum, Miller, Roncesvalles, Smucker, Tacón, and Williams; *Instructors:* Griffin, Juergens, and S. Reeve.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Exercise and Sport Sciences
- Bachelor of Science in Exercise and Sport Sciences
- Bachelor of Science in Health
- Master of Science in Exercise and Sport Sciences
- Master of Science in Sports Health
- Doctor of Philosophy in Physiology (Joint degree with Department of Physiology, Health Sciences Center)

These academic programs prepare individuals for professional careers, advanced graduate study, and entry into allied health programs. The department also participates in a joint Doctor of Philosophy degree program in physiology with the Department of Physiology in the Texas Tech University Health Sciences Center. The joint doctoral program is designed to include both basic and applied physiology course work for students pursuing teaching and research careers in exercise physiology. In addition, the department offers courses for all university students in the personal fitness and wellness program.

Undergraduate Program

Bachelor of Science, Bachelor of Arts Exercise and Sport Sciences

Students majoring in exercise and sport sciences may choose from one of four tracks: Physical education teacher education; exercise and health promotion; exercise science; or sport studies. The minimum

number of hours for the major is 36, including 24 junior-senior level hours. Departmental faculty members will provide information about career options associated with each track. A four-year plan for each track is presented in this section. Students must meet with the departmental advisor to verify appropriate courses and other degree requirements for each track. Students in pre-allied health fields should consult with the departmental advisor for information on required courses and acceptable substitutions.

Bachelor of Science in Health

Students interested in careers in community or school health should choose to major in health, which requires 48 hours. The two tracks in this major are the community health track and the school health track.

Minors in Exercise and Sport Sciences, Health

The minors in exercise and sport sciences and in health require a minimum of 18 hours in ESS/HLTH courses with at least 12 hours from 3000 level or above ESS/HLTH courses. No more than 3 hours from ESS 4000 or HLTH 4300 may be counted. Six credit hours of ESS/HLTH courses required in residency. See departmental advisor for additional information and completion of the minor in exercise and sport sciences or health on the degree plan.

Athletic Training

Students who wish to become athletic trainers must contact the Athletic Training Program in the Texas Tech Department of Intercollegiate Athletics. Students must be accepted into the student athletic training program and complete a noncredit internship of at least 1800 hours over a 3-year period. Students must complete the following courses: ZOO 2403, ESS 3301, 3305, 3323, 4325, and one course from health, nutrition, or first aid (ESS 3321). Beginning September 2004, course work in therapeutic exercise-modalities will be required. Upon satisfactory completion of these requirements students will be qualified to take the Texas Athletic Training Licensure Examination.

Personal Fitness and Wellness Program

University students interested in learning sport skills, improving their physical fitness, and developing knowledge about sport, exercise, and physical activity should enroll in courses in the personal fitness and wellness program. To satisfy the College of Arts and Sciences requirement of two hours of fitness and wellness, students may complete any two personal fitness and wellness (PF&W) courses. For a specific activity, the completion of the course sequence is allowed if the sequence is taken in the appropriate order from beginning to advanced levels. Students participating in varsity athletics may enroll in the personal fitness and wellness course that corresponds to their varsity sport. A maximum of 1 credit hour per academic year per sport may be earned in this manner.

Physical Education Teacher Education Track

Students majoring in exercise and sport sciences pursue teacher certification through the physical education teacher education (PETE) track. The certification program prepares students to teach in the EC - 12 grade levels. In addition to the required courses in the PETE track, students must complete the minor in education. A 2.5 GPA is required to enroll in teacher education courses. Also, students must meet other requirements outlined by the College of Education. Students interested in sport coaching in junior and senior high schools should complete the requirements in this track.

FIRST YEAR

Fall		Spring	
ENGL 1301, Ess. of Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, Coll. Algebra or above	3	MATH or PHIL 2310	3
HIST 2300, History of US to 1877	3	HIST 2301 or HIST 3310	3
POLS 1301, American Govt.	3	POLS 2302, Amer. Public Policy	3
ESS 1301, Introduction to ESS	3	PF&W	1
PF&W	2	Visual Arts	3
TOTAL	17	TOTAL	16

SECOND YEAR

Fall		Spring	
ENGL 23—	3	ENGL 23—	3
BIOL 1402 or BIOL 1403 or CHEM 1305/1105 or PHYS 1303/1110	4	ZOOL 2403, Human An. & Phys. I	4
Foreign Language	3	Foreign Language	3
EDSE 2300, Schools, Soc., & Div.	3	EDIT 2318, Comp. and Info. Tech	3
ESS 2245, Practical Exp in Phys Ed 2	3	COMS 2300 or COMS 3358	3
PF&W	2	ESS electives	2
TOTAL	17	TOTAL	18

THIRD YEAR

Fall		Spring	
ESS 3301, Biomechanics	3	ESS 3305, Exercise Physiology	3
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Dev.t	3
ESS 3318, Exer. and Sport Psyc.	3	ESS 3345, Adapted Physical Act.	3
ESS 3342, Prin Tching Sk Themes	3	EDSE 4310, Lrng, Cogn, Inst Des.	3
ESS Electives	6	EDLL 4380, Literacy in Con. Areas	3
TOTAL	18	ESS Electives	3
		TOTAL	18

FOURTH YEAR

Fall		Spring	
ESS 4445, School-Based Phys.Ed.	4	EDSE 4000, Stud. Teaching Sec.	3
ESS 4345, Assess. of Phys. I Per.	3	EDEL 4000, Stud. Teaching Elem.	3
EDSE 4311, Curr Plan, Dev, & Ev.	3	TOTAL	6
EDSE 43—	3		
EDSE 43—	3		
TOTAL	16		

- PETE core requires a minimum of 5 hours of PF&W. ESS electives include PF&W (2 additional hours maximum), ESS 2222, ESS 3321, ESS 3352, ESS 3354, ESS 3356, ESS 4398 (see advisor for appropriate topics).
- Foreign language requires 6 hours of sophomore level. A high school transcript is needed if 2 years of language was not taken in high school. If you have taken two years in high school, a placement test or review course is required before enrolling in sophomore level course.
- Minor is education courses. (See College of Education advisor for appropriate courses.)
- University and College of Arts and Sciences degree requirements must be satisfied.

Graduate Program

The Master of Science in Exercise and Sport Sciences provides advanced study in biomechanics, exercise physiology, motor behavior, sport and exercise psychology, sports management, or teaching physical education and sport. The degree program consists of a minimum of 36 hours of graduate work, thesis and nonthesis options are available. The department will determine and prescribe any necessary leveling work. There is no foreign language requirement.

The Master of Science in Sports Health is designed to prepare students to work in medically based health and fitness settings. These clinical settings use exercise as a tool to improve health and fitness or as a means of rehabilitation (cardiovascular, pulmonary, or musculoskeletal). This program integrates sports medicine and exercise science and is appropriate for clinical exercise scientists and allied health professionals who wish to pursue careers in fields related to exercise science (e.g., clinical exercise physiologist, nurse, athletic trainer, physical therapist, physician). Students complete courses offered by the Department of Health, Exercise, and Sport Sciences in the College of Arts and Sciences and the Department of Rehabilitation Sciences at the Health Sciences Center. The knowledge, skills, and abilities required for certifications by leading organizations such as the American College of Sports Medicine and the National Strength and Conditioning Association serve as the foundations for the courses in this degree program.

Both thesis and nonthesis options are available for the degree which is administered through the Department of Health, Exercise, and Sport Sciences. The thesis option requires 42 hours of course work including 6 hours of thesis credit and the nonthesis option requires 42 hours of course work and the completion of comprehensive examinations covering course content. In consultation with their academic advisor, students have the option to select courses that are aligned with their career goals to fulfill degree requirements. Current course descriptions may be found in the listings of the various departments.

Program Courses

AHAT 5300, Advanced Anatomy (3:3:0)
ESS 5002, Internship in Sports Health (V1-6)
ESS 5305, Motor Learning (3:3:0)
ESS 5306, Biomechanics of Exercise and Sport (3:3:0)
ESS 5307, Motor Development (3:3:0)
ESS 5310, Biomechanics of Musculoskeletal System (3:3:0)
ESS 5312, Behavioral and Psychological Aspects of Exercise (3:3:0)
ESS 5314, Methods in Biomechanics Research (3:3:0)
ESS 5315, Research Methods in Exercise and Sport Sciences (3:3:0)
ESS 5332, Applied Physiology of Exercise (3:3:0)
ESS 5334, Clinical Exercise Testing and Prescription (3:3:0)
ESS 5335, Cardiopulmonary Exercise Physiology (3:3:0)
ESS 5336, Skeletal Muscle Physiology (3:3:0)
ESS 5337, Electrocardiography (3:3:0)
ESS 6000, Master's Thesis (V1-6)
ESS 7000, Research (V1-12)
HLTH 5313, Health Behavior and Health Promotion (3:3:0)
HLTH 5344, Psychosocial Aspects of Health (3:3:0)

Students seeking either degree should consult with the chairperson of the department or the departmental secretary for graduate programs about their programs before enrolling in any courses.

The department also participates in a joint Doctor of Philosophy degree in physiology with the Department of Physiology at the Health Sciences Center. The joint doctoral program is designed to include both basic and applied physiology course work with laboratory experiences using animal and human models.

Exercise Science Track

The exercise science track provides students an opportunity for concentrated study in the scientific foundations of exercise and physical activity. Students are prepared for advanced graduate study in biomechanical, physiological, and psychological aspects of exercise. Students pursuing entry into allied health programs (e.g., physical therapy, occupational therapy, medical school) may select this track. Students interested in admission to allied health programs must consult with the departmental advisor regarding prerequisites for those programs.

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. College Rhet.	3	ENGL 1302, Adv. College Rhet.	3
MATH 1351 Calculus I	3	MATH 1352, Calculus II	3
CHEM 1307 or PHYS 1308 (+labs)	4	HIST 2300, History of US to 1877	3
ESS 1301, Introduction to ESS	3	POLS 1301, American Government	3
COMS 2300 or COMS 3358	3	ZOOL 2403, Human An. & Phys. I	4
TOTAL	16	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 2311, Technical Writing	3	ENGL 23—	3
HIST 2301 or HIST 3310	3	ESS 3301, Biomechanics	3
Foreign Language	3	ESS 3354, Sport in World Cultures	3
CS 1300, Computers & Mod. Soc.	3	Foreign Language	3
POLS 2302, American Public Policy	3	Visual & Performing Arts	3
PF&W	1	PF&W	1
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Dev.	3
ESS 3305, Exercise Physiology	3	ESS 4392, Res. Methods in ESS	3
ESS 3318, Exercise & Sport Psyc.	3	Major, minor, or electives	9
Major, minor, or electives	8	TOTAL	15
TOTAL	17		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ESS major	6	ESS major	6
Major, minor, or electives	9	Major, minor, or electives	9
TOTAL	15	TOTAL	15

- Exercise Science electives must include a minimum 9 hours from the following: ESS 3323, ESS 3368, ESS 4361, ESS 4363, ESS 4365, ESS 4366, ESS 4368, ESS 4398 (see advisor for appropriate topics).
- Exercise Science designated electives (select as needed to complete the 36-hour major) from the above list plus:
 - ESS 4000, ESS 4395, ESS 4398, HLTH 3301, HLTH 3311, CE 2301 Statics (PHYS 1308 & 1105 and MATH 1352 are corequisites and can be completed as part of the General Degree Requirements).
 - CE 3302 Dynamics (CE 2301 is a prerequisite and MATH 2350 is a corequisite).
 - CHEM 2303 Introductory Organic Chemistry (CHEM 1307 is a prerequisite and can be completed as part of the General Degree Requirements).
 - PSY 3317 Psychology of Learning or PSY 3327 Introduction to Physiological Psychology (prerequisites required).
 - ZOOL 2404 Human Anatomy & Physiology II (ZOOL 2403 is prerequisite).
 - CHEM 1301 or equivalent is recommended and other electives as approved by departmental advisor.
 - CHEM 1307 and 1107 fulfill the chemistry recommendation.
 - CHEM 1307, 1107, and ZOOL 2403 can be completed as part of the General Degree Requirements.
- Foreign language requires 6 hours of sophomore level. A high school transcript is needed if 2 years of language was not taken in high school. If you have taken two years in high school, a placement test or review course is required before enrolling in sophomore level course.
- Minor is 18 hour minimum.
- University and College of Arts and Sciences degree requirements must be satisfied.

Sport Studies Track

The sport studies track provides for the study of interdisciplinary ideas, concepts, and issues related to sport and physical activity from social and cultural perspectives. Upon graduation, students may pursue management and/or coaching opportunities in youth, intercollegiate, or professional sports. Additionally, students may pursue the advanced study of sport at the graduate level. Students interested in coaching interscholastic (junior/high school) sports should pursue teacher certification through the PETE track.

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. of Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, Coll. Algebra or above	3	MATH or PHIL 2310	3
COMS 2300 or 3358	3	HIST 2300, History of US to 1877	3
BIOL 1402 or BIOL 1403	4	POLS 1301, American Government	3
or CHEM 1307/PHYS 1308 (+labs)		ZOOL 2403, Human An. & Phys. I	4
ESS 1301, Introduction to ESS	3	TOTAL	16
TOTAL	16		

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ENG 23—	3	ENGL 23—	3
POLS 2302, American Public Policy	3	Visual & Performing Arts	3
Foreign Language	3	Foreign Language	3
HIST 2301 or HIST 3310	3	ESS 3301, Biomechanics	3
CS 1300, Comp. and Mod. Society	3	ESS 3354, Sport in World Cultures	3
PF&W	1	PF&W	1
TOTAL	16	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Dev.	3
ESS 3305, Exercise Physiology	3	Major, minor, or electives	12
ESS 3318, Exercise & Sport Psyc.	3	TOTAL	15
Major, minor, or elective	8		
TOTAL	17		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
ESS Major	6	ESS Major	6
Major, minor, or electives	9	Major, minor, or electives	9
TOTAL	15	TOTAL	15

- Foreign language requires 6 hours of sophomore level. A high school transcript is needed if 2 years of language was not taken in high school. If you have taken two years in high school, a placement test or review course is required before enrolling in sophomore level course.
- Supporting Coursework and Electives are 11 hours. Selected electives are those credit hours that the student may select that they feel can best supplement their area of interest in the Sport Studies track. The student may take classes in ESS that have not been used in the other categories of the Sport Studies track or other university courses.
- A student in Exercise and Sport Sciences is limited to a maximum of 24 credit hours to be taken outside of the College of Arts and Sciences.
- Minor is 18-hour minimum.
- University and College of Arts and Sciences degree requirements must be satisfied. Additional support and elective courses may be required to fulfill the 126-hour degree requirement as stipulated by the College of Arts and Sciences and Texas Tech University. Students should choose electives (1) to contribute to the completion of the degree and (2) to ensure that 40-hours of 3000-4000 level courses have been completed, with 24 hours of these coming from ESS courses.

Exercise and Health Promotion Track

Students majoring in exercise and sport sciences seeking careers in commercial, corporate, or clinical exercise settings should complete the exercise and health promotion track. The knowledge, abilities, and skills gained in this track prepare students to pursue nationally recognized certifications, such as those offered by the American College of Sports Medicine and other professional fitness organizations.

FIRST YEAR

Fall		Spring	
ENGL 1301, Ess. of Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhet.	3
MATH 1320, Coll. Algebra or above	3	MATH or PHIL 2310	3
HIST 2300, History of US to 1877	3	HIST 2301 or HIST 3310	3
POLS 1301, American Government	3	POLS 2302, American Public Policy	3
ESS 1301, Introduction to ESS	3	ESS 2222, Res. Trng and Cond	2
TOTAL	15	Visual Arts	3
		TOTAL	17

SECOND YEAR

Fall		Spring	
ENGL 2—	3	ENGL 2311 (recommended)	3
CHEM 1305/1105	4	ZOOL 2403, Human An. & Phys. I	4
Foreign Language	3	Foreign Language	3
ESS 3354, Sport in World Cult.	3	CS 1300, Comp. and Modern Soc.	3
Designated multicultural elective		COMS 2300 or 3358	3
ESS 2275, Prac. in Ex & Hlth Prom	2	TOTAL	16
ESS 3321, First Aid	3		
TOTAL	18		

THIRD YEAR

Fall		Spring	
ESS 3301, Biomechanics	3	ESS 3305, Exercise Physiology	3
ESS 3303, Motor Learning	3	ESS 3314, Life Span Motor Dev.	3
ESS 3318, Exer. and Sport Psych.	3	ESS 4363, Ex. Psy.	3
ZOOL 2404, Human An. & Phys. II	4	F&N 3320, Nut. and Diet Therapy	3
Minor	3	Minor	3
TOTAL	16	TOTAL	15

FOURTH YEAR

Fall		Spring	
ESS 3368, Ex. Testing & Pres.	3	ESS 4475, Intern Ex. and Hlth.	4
ESS 4368, Applied Exercise Phys.	3	Minor	6
ESS 4372, Mgt in Ex and Hlth Prom	3	ESS designated electives	6
Minor	6	TOTAL	16
TOTAL	15		

- Exercise and Health Promotion designated electives include ESS 3323, ESS 4345, ESS 4398 (see advisor for appropriate topics), HLTH 3301, HLTH 3311, HLTH 4307, F&N 4330, PSY 4330.
- Foreign language requires 6 hours of sophomore level. A high school transcript is needed if 2 years of language was not taken in high school. If you have taken two years in high school, a placement test or review course is required before enrolling in sophomore level course.
- Minor is 18 hour minimum.
- University and College of Arts and Sciences degree requirements must be satisfied.

School Health Track

The school health track prepares students for careers in teaching health in EC-12 schools. A 2.5 GPA is required to enroll in teacher education courses. Also, students must meet other requirements outlined by the College of Education.

FIRST YEAR

Fall		Spring	
ENGL 1301, Ess. of Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, Coll. Algebra or above	3	MATH or PHIL 2310	3
BIOL 1402 or BIOL 1403 or CHEM 1305/1105 or PHYS 1303/1101	4	POLS 2302, American Public Policy	3
POLS 1301, American Government	3	ZOOL 2403, Human An. & Phys. I	4
HLTH 1300, Pat. of Healthful Living	3	PF&W 1112, Diet and Exercise	1
TOTAL	16	HLTH 1302, Foundations of Health	3
		TOTAL	17

SECOND YEAR

Fall		Spring	
ENGL 23—	3	ENGL 23—	3
Foreign Language	3	Foreign Language	3
EDIT 2318, Comp. & Info. Tech.	3	HIST 2301 or HIST 3310	3
HIST 2300, History of US to 1877	3	COMS 2300	3
HLTH 1305, Human Sexuality	3	Visual and Performing Arts	3
PF&W	1	HLTH 3312, Hlth Con. of Sp Pop	3
TOTAL	16	TOTAL	18

THIRD YEAR

Fall		Spring	
HLTH 3311, Comm. & Chronic Dis.	3	HLTH 3314, Health for Adolescents	3
HLTH 3313, Preadolescents	3	HLTH 3325, Hlth Con. Chem. Dep.	3
HLTH 4312, Psychosocial Health	3	HDFS 3326 or HD 3306	3
ESS 3321, First Aid	3	EDSE 4310, Lrng, Cogn, Inst Des.	3
EDSE 2300, Schools, Soc., & Div.	3	EDLL 4380, Lit. in Content Areas	3
Elective	3	Elective	3
TOTAL	18	TOTAL	18

FOURTH YEAR

Fall		Spring	
HLTH 4307, Hlth Prog Plan & Eval.	3	EDSE 4000, Stud. Teaching Sec.	3
HLTH 4330, Coor. School Hlth Prog	3	EDEL 4000, Stud. Teaching Elem.	3
EDSE 4311, Cur. Plan, Dev., & Eval	3	TOTAL	6
EDSE 4320, Instructional Methods	3		
EDSE 43—	3		
Elective	3		
TOTAL	18		

- Designated electives: ESS 3314, HLTH 2302, 2307, 3301, 3302.
- Foreign language requires 6 hours of sophomore level. A high school transcript is needed if 2 years of language was not taken in high school. If you have taken two years in high school, a placement test or review course is required before enrolling in sophomore level course.
- Minor is education courses.
- University and College of Arts & Sciences degree requirements must be satisfied.

Exercise and Sport Sciences (ESS)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1301. Introduction to Exercise and Sport Sciences (3:3:0) [PHED 1164, 1238, 1301].** An introduction to the professions in exercise and sport sciences including the history, ideas, events, people, and programs that shaped those professions.
- 2222. Resistance Training and Conditioning (2:0:4).** Principles of resistance training and other methods of physical conditioning with emphasis on program planning and implementation.
- 2225. Water Safety Instructor and Lifeguard Training (2:1:2).** Prerequisite: Swimming proficiency. Skills and knowledge in progressive swimming courses, emergency water safety, and lifeguard training; American Red Cross Lifeguard Training and Water Safety Certification is possible. Open to all students.
- 2245. Practical Experiences in Physical Education (2:1:2).** Prerequisite: ESS 1301. Teaching experiences in physical education settings.
- 2275. Practicum in Exercise and Health Promotion (2:0:4).** Prerequisite: ESS 1301. Supervised experiences in clinical, commercial, and corporate exercise and health facilities.
- 3301. Biomechanics (3:2:2).** Prerequisite: ZOOL 2403 or equivalent. The mechanical analysis of human motion with emphasis on biomechanical principles and techniques.
- 3303. Motor Learning (3:2:2).** A study of the many aspects of learning and performance of motor skills.

- 3305. Exercise Physiology (3:2:2).** Prerequisite: ZOOL 2403 or equivalent. A study of various physiological systems as they function during exercise and training.
- 3314. Life Span Motor Development (3:2:2).** Examines factors that influence human motor development from conception through adulthood. Discusses theoretical perspectives and practical applications of motor development principles throughout the life span.
- 3318. Exercise and Sport Psychology (3:2:2).** Emphasis on the social and psychological factors pertaining to participation in sport and exercise.
- 3321. First Aid (3:2:2).** American Red Cross Standard and Instructors First Aid and Personal Safety course.
- 3323. Care and Prevention of Athletic Injuries (3:3:0).** Prerequisite: ZOOL 2403 or equivalent. An introduction to athletic training and the qualifications and functions of the athletic trainer including emphasis on common athletic injuries.
- 3335. Health and Physical Education for Children (3:3:0).** Prerequisite: Junior standing. Knowledge and experiences in planning and implementing developmentally appropriate health and physical education programs for early childhood settings and elementary schools.
- 3342. Principles of Teaching Skill Themes and Movement Concepts (3:2:2).** Knowledge and experiences in teaching skill themes and movement concepts.
- 3345. Adapted Physical Activities (3:2:2).** Prerequisite: ESS 2245 and ESS 3342. Theory and practice in administering and interpreting screening tests and adapting motor activities to the needs of the disabled.

Community Health Track

The community health track prepares students for careers in public and private agencies that provide health information and interventions to a variety of individuals and groups.

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. of Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1320, Coll. Algebra or above	3	MATH or PHIL 2310	3
BIOL 1402 or BIOL 1403 or CHEM 1305/1105 or PHYS 1303/1101	4	POLS 2302, Am. Public Policy	3
POLS 1301, Am. Government	3	ZOOL 2403, Human An. & Phys. I	4
HLTH 1300, Pat. of Healthful Living	3	PF&W 1112, Diet and Exercise	1
TOTAL	16	TOTAL	17

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ENGL 23—	3	ENGL 23—	3
Foreign Language	3	Foreign Language	3
COMS 2300	3	HIST 2301 or HIST 3310	3
HIST 2300, History of US to 1877	3	Individual or Group Behavior	3
HLTH 2360, Community Health	3	Visual and Performing Arts	3
PF&W	1	HLTH 2275, Prac. in Com Health	2
TOTAL	16	TOTAL	17

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
HLTH 3311, Com. and Chronic Dis.	3	HLTH 3312, Hlth Cons. of Sp Pop	3
HLTH 3325, Con. in Chem Dep.	3	ESS 3321, First Aid	3
COMS 3332 or COMS 3365	3	Elective	3
CS 1300, Com. and Mod. Society	3	Minor	6
Minor	3	TOTAL	15
Elective	3		
TOTAL	18		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
HLTH 4307, Prog Plan and Eval.	3	HLTH 4475, Inter. in Com Health	4
HLTH 4312, Psychosocial Health	3	Minor	3
ESS 3314 or PSY 4330	3	Elective	3
Elective	3	TOTAL	10
Minor	6		
TOTAL	18		

- Electives: 12 hours of electives required. Choose a minimum of 9 hours from the following courses: HLTH 1305, HLTH 2302, HLTH 2307, HLTH 3301, HLTH 3302, F&N 4220, ESS 2209, ESS 3311, PSY 4332. Departmental advisor may approve other electives depending on student's career interest.
- Foreign language requires 6 hours of sophomore level. A high school transcript is needed if 2 years of language was not taken in high school. If you have taken two years in high school, a placement test or review course is required before enrolling in sophomore level course.
- Minor is 18 hours minimum.
- University and College of Arts and Sciences degree requirements must be satisfied.

- 3352. **Gender Issues in Sport (3:3:0).** Examination of the ways sport experiences differ for males and females emphasizing historical, social, behavioral, and physiological dimensions. (W S 3307)
- 3354. **Sport in World Cultures (3:3:0).** Historical and philosophical aspects of contemporary sport and leisure patterns across cultures, emphasizing the role of sport in society.
- 3356. **Principles of Sport Coaching (3:3:0).** Principles of effective coaching including team motivation and organization, managing coach - athletic relationships, and administering personnel, facilities, and contests.
- 3368. **Exercise Testing and Prescription (3:2:2).** Prerequisite: ESS 3305. Physiological theory and its practical application to exercise testing and prescription. Emphasis on hands-on physiological testing.
- 4000. **Independent Studies in Exercise and Sport Sciences (V1-6).** Prerequisite: Departmental approval. A structured independent study under the guidance of a faculty member. May be repeated for credit up to 6 hours.
- 4325. **Advanced Techniques of Athletic Training (3:3:0).** Prerequisite: ESS 3323. Administration of an athletic training program. Includes the use of therapeutic modalities and the advanced care, prevention, and treatment of athletic injuries.
- 4326. **Practicum in Athletic Training (3).** Prerequisite: ESS 3323, 4325, or departmental approval. Supervised clinical experience in athletic training. May be repeated once for credit.

- 4345. **Assessment of Physical Performance (3:3:0).** Methods of measurement and evaluation, including statistical applications, used in assessing fitness and motor skills.
- 4358. **Sport Management (3:2:2).** Fundamental concepts and theories for management in sport programs.
- 4361. **Applied Biomechanics (3:3:0).** Prerequisite: ESS 3301. Study and application of biomechanical principles and methods in exercise, sport and clinical assessment and applied research.
- 4363. **Principles and Theories in Exercise Psychology (3:3:0).** Prerequisite: ESS 3318. Psychological principles and theories related to exercise behavior in apparently healthy individuals and special populations.
- 4365. **Applied Motor Behavior (3:3:0).** Prerequisite: ESS 3303 and 3314. Analysis and application of motor behavior principles to special and clinical populations with motor problems.
- 4366. **Motor Control (3:3:0).** Prerequisite: ESS 3303 and 3305, or equivalents. Multi-level approach to the neural foundations and theories underlying the control movements.
- 4368. **Applied Exercise Physiology (3:3:0).** Prerequisite: ESS 3305. Examination of physiological adaptations including changes in metabolic energy pathways, cardiorespiratory and musculoskeletal systems to training, environmental stresses, and in special populations.
- 4372. **Management in Exercise and Health Promotion (3:3:0).** Prerequisite: ESS 2275. Applied knowledge for the operation of fitness centers, emphasizing development of practical skills for management of commercial, corporate, and clinical centers.
- 4392. **Research Methods in Exercise and Sport Sciences (3:3:0).** Prerequisite: Junior standing or departmental approval. Research methods, designs, and analysis and interpretation of data.
- 4395. **Senior Research Project (3).** Prerequisite: ESS 4392 and consent of instructor. Student conducted and faculty supervised research project in exercise and sport sciences. Student must consult with a faculty advisor regarding project topic.
- 4398. **Seminar in Exercise and Sport Sciences (3:3:0).** Prerequisite: Senior standing. Selected topics in exercise and sport including fitness, health, and human performance. May be repeated once for credit.
- 4445. **School-Based Physical Education (4:3:2).** Prerequisite: ESS 2245 and 3342. Theory, practice, and instructional methodologies appropriate for teaching physical education in school settings.
- 4475. **Internship in Exercise and Health Promotion (4:0:8).** Prerequisite: ESS 3368, 4372, and current CPR Certification. Provides work-related experiences in exercise and health promotion organizations, including commercial, corporate, and clinical settings.

Graduate Courses

- 5002. **Internship in Sports Health (V1-6).** Prerequisite: 12 hours of approved course work in sports health and/or departmental approval. A maximum of 6 hours credit may be earned in one or more semesters.
- 5003. **Internship in Sports Administration (V1-6).** Prerequisite: 18-24 hours of approved course work in sports administration and departmental approval. A maximum of 6 hours credit may be earned in one or more semesters.
- 5303. **Psychology of Sport (3:3:0).** Theory and practice of the major psychological dimensions underlying the behavior of the coach and athlete in the sport context.
- 5305. **Motor Learning (3:3:0).** The study of the principles and concepts of human behavior related to and affected by human movement with emphasis on motor skill learning.
- 5306. **Biomechanics of Exercise and Sport (3:3:0).** A study of the laws and principles governing human motion. Analysis of human movement with applications to sport, exercise, and clinical settings.
- 5307. **Motor Development (3:3:0).** The study of human development from conception through adulthood. Examines and discusses theoretical perspectives and motor development research throughout the life span.
- 5309. **Children in Sport (3:3:0).** The study of the physiological, psychological, and sociological variables that influence children's participation in sport.
- 5310. **Biomechanics of the Musculoskeletal System (3:3:0).** Structure and function of the musculoskeletal system. Emphasis on tissue loading, joint and muscle function, and biomechanical considerations for human performance and injury prevention.
- 5312. **Behavioral and Psychological Aspects of Exercise (3:3:0).** The study of psychological processes and behaviors as they relate to exercise adoption, participation, and adherence. Motivation, personality, and behavior modification research will be discussed.

5313. **Applied Psychology of Sport (3:3:0).** Applied aspects of psychological skills in sport and exercise and how individuals can use these skills to positively affect sport and exercise participation, performance, motivations, and enjoyment.
5314. **Methods in Biomechanics Research (3:3:0).** Prerequisite: ESS 5306 or consent of instructor. Examination of methods of research, instrumentation, and quantitative application of kinematic and kinetic concepts in the biomechanical analysis of human movement.
5315. **Research in Exercise and Sport Sciences (3:3:0).** Research methods, research design, treatment and interpretation of data.
5317. **Seminar in Exercise and Sport Sciences (3:3:0).** Specific research topics in exercise and sport sciences will be studied. May be repeated for credit.
5320. **Sport Leadership (3:3:0).** The study of leadership theory and its application to the effective management of sport programs. The course will also examine current sport leadership research.
5321. **Financial Management in Sport (3:3:0).** Financial concepts and issues related to the sport industry, including methods and sources of revenue acquisition, financial analysis techniques, and economic impact.
5322. **Management of Sport and Athletics (3:3:0).** Methods of organizing and administering sport and athletic programs. Study of staff, program, budget, health and safety, facilities, publicity, history, duties of an athletic director, and national, state, and local controls.
5323. **Historical Perspectives in Exercise and Sport Sciences (3:3:0).** Examination of significant historical people and events that shaped the scientific study of exercise and sport.
5324. **Marketing and Promotion in Sport (3:3:0).** Understanding the sport industry. Developing knowledge and skills of marketing process in sport operations. Sport sponsorship, promotion, and public relations.
5325. **Legal and Ethical Aspects of Sport (3:3:0).** Ethical theory and professional ethics of sport managers. The principles of laws (constitutional, tort, contractual, labor, and antitrust laws, etc.) effecting sport management.
5327. **Sport Facility Planning and Management (3:3:0).** Principles, terminology, and standards for planning, construction, use, and maintenance of facilities.
5328. **Sport in American Culture (3:3:0).** Analysis of the place of sport in American society and the impact of sport on American culture.
5332. **Applied Physiology of Exercise (3:3:0).** Prerequisite: ESS 5308 or equivalent. Applied principles of exercise physiology including cardiorespiratory, biochemical, and environmental considerations.
5334. **Clinical Exercise Testing and Prescription (3:3:0).** Prerequisite: ESS 5308 or consent of instructor. Advanced theory and practical application to clinical aspects of exercise testing and prescription. Concentration on diseased and disabled populations.
5335. **Cardiopulmonary Exercise Physiology (3:3:0).** Structure and function of the human cardiopulmonary system during exercise.
5336. **Skeletal Muscle Physiology (3:3:0).** Structural and functional characteristics of skeletal muscle and the regulation of energy pathways that support muscle contractile activity.
5337. **Electrocardiography (3:3:0).** An in-depth study of exercise-electrocardiography (ECG) preparation, administration, and interpretation.
5339. **Laboratory Techniques in Exercise Physiology (3:3:0).** Prerequisite: ESS 5336 or consent of instructor. Selected research methods used in the quantitative assessment of exercise tolerance, muscle metabolism, and training adaptations.
5341. **Curriculum and Instruction in Physical Education and Sport (3:3:0).** An examination of contemporary curriculum and methodologies for effective instruction in physical education and sport.
5343. **Applied Research in Physical Education and Sport (3:3:0).** Prerequisite: ESS 5315 or consent of instructor. Survey of physical education and sport research focusing on contemporary issues. In-depth study of systematic observation of teaching and learning.
5347. **Practicum in Teaching Physical Education and Sport (3:2:2).** Supervised laboratory and field experience in schools and community agencies.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**
- Health (HLTH)**
(To interpret course descriptions, see pg. 10.)
- Undergraduate Courses**
1300. **Patterns of Healthful Living (3:3:0) [PHED 1304].** Studies patterns of mental, physical, and social development of the individual including relationships of individual and community health.
1302. **Foundations of Health (3:3:0).** Basic knowledge of the health field for persons pursuing a degree in health. Principles of the discipline as well as historical overview will be addressed.
1305. **Human Sexuality (3:3:0) [SOCl 2306].** Examination of the structural and functional traits of sexuality and how they affect well-being; covers relationships, reproduction, and lifestyle alternatives. (W S 1305)
2275. **Practicum Community Health (2:0:4).** Prerequisite: HLTH 2360. Supervised field experience in community health setting.
2302. **Environmental Health and Awareness (3:3:0).** Examines critical issues and relationships affecting biospheric health including personal, community, and international ecology.
2307. **Understanding Death and Dying (3:3:0).** Exploration of issues concerning the death and dying process, including death anxiety, bereavement, grief, and mourning. Biological, psychological, social, and cultural aspects will be addressed.
2360. **Community Health (3:3:0).** An introduction to community health, including an overview of the competency areas of a health education specialist and their applicability in community settings.
3301. **Epidemiology (3:2:2).** Principles and practices in cause, prevention, and control of diseases in school, community, national, and international settings. Includes examination of culture, belief, and values in disease transmission.
3302. **Current Trends in Health (3:3:0).** An in-depth analysis of current issues that govern the politics, policies, and practices in the health field.
3311. **Communicable and Chronic Diseases (3:3:0).** Examines etiology of diseases from a body-systems approach, with special emphasis on sexually transmitted diseases, cancer, and cardiovascular disease.
3312. **Health Considerations of Special Populations (3:3:0).** A process-oriented course addressing health needs and/or problems of various ethnic, cultural, and socio-economic groups.
3313. **Health for Preadolescents (3:3:0).** Prerequisite: Junior standing. An in-depth study of health issues relating to children as well as emphasis on behaviors that would affect health for children.
3314. **Health for Adolescents (3:3:0).** Prerequisite: Junior standing. Studies health factors that affect the adolescent; addresses social, emotional, and physical factors of health.
3325. **Health Concerns in Chemical Dependencies (3:3:0).** A holistic approach to the nonuse, use, and misuse of substances that alter mood and behavior, focusing on the implications to family relationships and personal health.
4300. **Individual Studies in Health (3:3:0).** Prerequisite: Departmental approval. An independent study program allowing students to pursue an area of special interest under the guidance of a professor.
4307. **Health Program Planning and Evaluation (3:3:0).** Principles and applications of planning and implementing health programs in a variety of school and community settings including monitoring techniques.
4312. **Psychosocial Health (3:3:0).** Prerequisite: Junior standing. The role of psychological, social, and stress-related factors in health, illness, and recovery processes, including mental, emotional, social, and spiritual aspects of well-being.
4330. **Coordinated School Health Program (3:3:0).** Prerequisite: HLTH 3313 and 3314. Analysis of the philosophy, organization, and administration of the coordinated school health program.
4475. **Internship in Community Health (4:0:8).** Prerequisite: Senior standing, HLTH 2275, ESS 3321 or current certification in first aid, and HLTH 4307. Advanced, supervised field work in a community health setting.
- Graduate Courses**
5313. **Health Behavior and Health Promotion (3:3:0).** Provides an overview of various health behavior theories and their application to health promotion and education.
5344. **Psychosocial Aspects of Health (3:3:0).** This course is an examination of psychosocial factors and processes that influence health status, health beliefs, behaviors, and outcomes.

Personal Fitness and Wellness (PF&W)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1110. **Adventure Activities (1:0:2).** “Challenge by choice” atmosphere in nontraditional games and adventure. Includes but is not limited to indoor rock climbing and ropes course activities.
1111. **Aerobic Dance (1:0:2).** Introduction to aerobic dance, fitness, and physiological response to exercise.
1112. **Diet and Exercise (1:0:2).** A concepts-based activity course in which the student learns to create and participate in an individualized lifetime physical activity program.
1113. **Golf (1:0:2).** Basic golf rules, etiquette, and mechanics. Four full rounds of golf must be completed by semester’s end. Class meets off campus. Extra fee required.
1114. **Jogging (1:0:2).** Principles and practice of recreational jogging for cardiovascular health. Includes flexibility training, individual progression instruction, complementary weight training, and nutritional practices.
1116. **Tai Chi (1:0:2).** Basic techniques and applications of martial art of yang style tai chi chuan; also includes philosophy and theory.
1117. **Walking (1:0:2).** Topics include walking technique, principles and practice of personal walking programming, interval, and circuit training, flexibility and muscular endurance training.
1118. **Weight Training (1:0:2).** Basic principles and practice of weight training, developing and modifying an individual program. Includes flexibility and cardiovascular fitness.
1119. **Yoga (1:0:2).** Basic poses, principles of movements and balance in yoga. Breathing techniques, stress reduction, relaxation, advanced poses, and twists will be covered.
1120. **Aikido (1:0:2).** Provides students with a basic understanding of the philosophy of self-defense and practical application of aikido, a soft martial arts style.
1121. **Jui Jitsu (1:0:2).** Basic principles of Brazilian jui jitsu. Opportunity to safely learn, practice, and use jui jitsu as an approach to self-defense.
1122. **Karate (1:0:2).** Practical self-defense techniques and strategies; an appreciation of karate on an aesthetic level through the practice of kata.
1123. **Racquetball (1:0:2).** Introduction to rules, shots, and strategies for singles, doubles, and cut-throat.
1124. **Self-Defense (1:0:2).** Emphasizes philosophy, practical applications of both hard (karate) and soft (aikido) martial arts styles, and a better understanding of individual physical capabilities and limitations.
1125. **Tennis (1:0:2).** Concepts of stroke mechanics, skill development, offensive and defensive strategies, rules, game play, singles and doubles, organization and communication, flexibility, and conditioning for tennis.
1130. **Basketball (1:0:2).** Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility and conditioning for basketball.
1131. **Sand Volleyball (1:0:2).** Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for sand volleyball.
1132. **Soccer (1:0:2).** Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for soccer.
1133. **Softball (1:0:2).** Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for softball.
1134. **Volleyball (1:0:2).** Concepts of skill development, offensive and defensive strategies, rules, team organization and communication, game play, flexibility, and conditioning for volleyball.
1140. **Lifeguard Training (1:0:2).** Training for the American Red Cross Certification. Includes lifeguarding, standard first aid, and CPR for the professional rescuer.
1141. **Scuba (1:0:2) [PHED 1151, 1152, 1251, 1252].** Allows the student to explore the underwater in a warm, pristine environment. Scuba and snorkeling gear are provided. SSL Certification is possible.
1142. **Beginning Swimming (1:0:2).** Swimming principles, basic stroke mechanics, breathing technique, and conditioning for beginning swimmers.
1155. **Special Topics in Fitness (1:0:2).** Skill development, conditioning, and strategies for various activities including inline skating, ice skating, cycling, triathlons, and water polo. May be repeated once for credit.
1160. **Varsity Baseball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1161. **Varsity Men’s Basketball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1162. **Varsity Women’s Basketball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1163. **Varsity Cross Country (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1164. **Varsity Football (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1165. **Varsity Golf (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1166. **Varsity Soccer (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1167. **Varsity Softball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1168. **Varsity Tennis (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1169. **Varsity Track and Field (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
1170. **Varsity Volleyball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
2113. **Advanced Golf (1:0:2).** Improvement and refinement of stroke mechanisms. Seven full rounds of golf must be completed before the final. Class meets off campus. Extra fee required.
2118. **Advanced Weight Training (1:0:2).** Advanced principles of weight training, individualized weight training programs, goal specific lifting, flexibility and cardiovascular fitness.
2125. **Advanced Tennis (1:0:2).** Refinement of stroke mechanics, skill development, offensive and defensive strategies, flexibility, and conditioning for tennis. For players with varsity-level experience and ability.
2130. **Advanced Basketball (1:0:2).** Refinement of skill development, offensive and defensive strategies, organization and communication, game play and officiating, flexibility and conditioning for basketball. For players with club-level ability.
2132. **Advanced Soccer (1:0:2).** Refinement of skill development, offensive and defensive strategies, team organization and communication, game play, flexibility and conditioning for soccer. For players with club-level ability.
2134. **Advanced Volleyball (1:0:2).** Refinement of skill development, offensive and defensive strategies, organization and communication, game play and officiating, flexibility and conditioning for volleyball. For players with club-level ability.
2142. **Advanced Swimming (1:0:2) [PHED 2155].** Review and refinement of strokes. For students with the ability to complete multiple lengths of the pool while correctly performing the basic strokes.
2143. **Swim Conditioning (1:0:2).** For students with the ability to complete multiple lengths of the pool with sound stroke mechanics. Techniques for fitness improvement through swimming will be addressed.

Department of History

Faculty

Bruce C. Daniels, Chairperson

Horn Professor: Kuethe; **Professors:** Barr, Bell, Carlson, Daniels, Howe, King, and Rainger; **Associate Professors:** Brink, Iber, McBee, Miller, Mosher, Pelley, Reckner, Snead, Steinhart, Stoll, Troyansky, Walker, and Willet; **Assistant Professors:** Adams, Alford, D'Amico, Deslandes, Forsythe, Gray, Lévesque, Lorcin, and Wong; **Lecturer:** Ashby-Martin.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in History
- Master of Arts in History
- Doctor of Philosophy in History

The department also participates in the Latin American and Iberian Studies and Russian Language and Area Studies programs leading to the Bachelor of Arts degree, in the Arts and Sciences minors in Asian studies, community and urban studies, environmental studies, ethnic studies, European studies, family life studies, humanities, religion studies, women's studies, and the university Honors College.

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 in colleges and universities or in the public schools; in park administration; in regional and local historical society work; in archives and records management; in museum work; in various branches of government work; and in business and industry generally. Many students use their undergraduate history major as a preparation for advanced studies in such areas as law, medicine, and theology.

Bachelor of Arts. Students seeking an undergraduate degree in history will complete 30 hours of history including the following:

- HIST 1300 and 1301.
- 6 hours of U.S. history.
- 18 hours in advanced courses, including HIST 4398 and 3 hours each of U.S.; European; and African, Asian, or Latin American history.
- Six hours of the major in addition to HIST 4398 must be in writing intensive 4000-level courses.
- With prior departmental consent, 3 advanced hours in related disciplines may be counted toward the major.
- At least 12 of the 30 hours required for a history major must be taken in residence, including 9 upper-division hours.

Art History Specialization. The department offers an art history specialization in conjunction with the Department of Art. It consists of 33 hours as follows:

- 21 hours of history approved by the undergraduate history advisor, at least 12 of which must be at the advanced level and include HIST 4398 and at least 6 hours of U.S. history.
- 12 hours of art history courses from the Department of Art. One of the courses must be ART 3310, 3315, 4310, or 4311. In exceptional cases, HIST 4397 may be substituted with the prior consent of the undergraduate history advisor.

History of Religions Emphasis. The department also offers a history major with a history of religions emphasis. This program consists of 36 hours as follows:

- 6 hours of Western Civilization (HIST 1300-1301).
- 6 hours of American history.
- 15 hours of advanced history (including HIST 4398 and 3 hours each in American; European; and African, Asian, or Latin American).
- 9 hours chosen from courses taught outside the department and having an emphasis on the study of religion.
- At least 9 of the total history hours must be chosen from HIST 3301, 3302, 3328, 3342, 3344, 3348, 4347, 4349, and 4374. HIST 4397 may be chosen with consent of instructor.
- All courses must be chosen with the approval of the undergraduate history advisor.

History Minor. A minor in history consists of 18 hours, including the following:

- 6 hours must be in U. S. history.
- 6 hours must be in non-U.S. history.
- 9 hours, including 3 at the 4000 level, must be in advanced courses.
- At least 6 of the 18 hours required for a history minor must be taken in residence, including 3 at the 4000 level and 3 in an advanced course.

General Requirements. Under state law, all students who receive bachelor's degrees from Texas Tech must complete 6 hours in American history. Students will normally fulfill this requirement by completing HIST 2300 and 2301. However, juniors, seniors, or students with approval by the department undergraduate advisor may satisfy this requirement by completing any 6 hours from among the American history courses listed as (US) in the course list.

All courses numbered above 3000 are advanced courses. All courses above 4000 are writing intensive courses and require junior standing or consent of the instructor. A student must receive at least a C in any history course if it is to count toward the major or minor.

Teacher Education. In the teacher education certification programs, history may be used at the secondary level as either a teaching field or as part of the composite field of social studies.

Teaching Field Options:

Secondary Education Teaching Field in History (36 hours—6 hours must be 4000-level)

- HIST 1300 and 1301, also 2300 and 2301
- HIST 3310 (History of Texas) and 3 advanced hours in U.S. History
- HIST 2322 or 2323 (Studies in World History) and 3 advanced hours in African, Asian, or Latin American History
- 6 advanced hours in European History
- 6 advanced hours in history (including HIST 4398)

Secondary Education Teaching Field in Social Studies (69 hours—6 hours must be 4000-level history courses and 3 hours must be 4398)

- HIST 1300 and 1301; HIST 2300 and 2301; HIST 3310 or 3316
- 15 advanced hours in history, including 3 in U. S., 3 in European, and 3 in African, Asian, or Latin American
- POLS 1301 and 2302; also two from 3323, 3325, 3327, and 3351
- GEOG 1401 and 2351; 3353 or 3360; and 3352, 3354, or 3356
- ECO 2301, 2302, and 3311
- PSY 1300
- SOC 1301

Graduate Program

Information on departmental admission standards, prerequisites, and other matters dealing with graduate study in history may be acquired by writing the graduate advisor or the chairperson of the department or by consulting the departmental web site.

A student in the standard master's degree program must complete 30 hours of graduate courses including HIST 5304 and 6301 which will count as the required seminar in the 6000 course series. Students must also complete a 6-hour nondepartmental minor and 6 hours in thesis work. Course work is planned in consultation with the graduate advisor or thesis director soon after admission to the graduate program. The department requires a reading knowledge of one foreign language. A student with an interest in archival administration may substitute a 6 semester hour minor, composed of HIST 5309 and 3 hours of archival practicum (taken as HIST 7000), for the usual 6 hour minor in another department which is required for the standard master's degree. Students may take HIST 5305 or 5306 as an elective.

To provide a program of study for persons whose interests may not be oriented toward formal research, the department offers a nonthesis master's plan designed to contribute significantly to their intellectual development. The plan is not recommended for students contemplating doctoral work. To complete the program, a student must offer a minimum of 30 semester hours in history and 6 in a minor. Of the history hours, 6 must be

Continued on next page

Graduate Program (continued from previous page)

from HIST 5304, 6301, and either 5305 or 5306. Students must also take an additional 6000-level class and earn a grade of B or better in both courses under two or more instructors. No more than 18 semester hours may be offered in any one of the three geographical areas: North America, Europe, or World. Students following the nonthesis route must pass a comprehensive examination during the semester they plan to graduate.

The department offers doctoral work in three major geographical areas: North America, Europe, World, and in certain approved thematic and/or interdisciplinary areas of study. For purposes of examining students, these areas are usually subdivided into the fields listed below. Students may propose other fields, which will require approval by the student's Ph.D. committee and the graduate advisor.

North America: Chronological grouping—Colonial and early Republic, nineteenth-century United States, and twentieth-century United States history. Topical grouping—African American, cultural, diplomatic, economic, environmental, Hispanic-Latino, immigration, intellectual, legal and constitutional, military, Native American, popular culture, science and technology, social, South, sports, Texas, urban, West, and women's history.

Europe: Ancient, medieval, early modern Europe to 1789, modern Europe, modern Britain and the Empire-Commonwealth, science and technology. Early modern European history and modern European history may each be subdivided into two topical or chronological fields. Topics may include social, gender, family and demography, urban, cultural, intellectual, colonial/postcolonial, race and ethnicity, diaspora and immigration, political, diplomatic, science and technology, and military history.

World History: Africa, regional and national histories; Asia, regional and national histories; Latin America, colonial and national histories. Thematic areas: colonial histories, nationalist and anticolonial movements, postcolonial histories, religious studies, social history, economic history, diasporic studies, cultural and intellectual history.

Thematic and/or Interdisciplinary: religion and such other fields as approved by the student's Ph.D. committee and the graduate advisor.

Doctoral students must choose four fields of study for their programs. Students shall have two fields in one geographic area, one field in a different geographic area, and one thematic and/or interdisciplinary field. Thematic and/or interdisciplinary fields include colonial/postcolonial, cultural, ethnic, gender, intellectual, military, public history, religion, science and technology, social, and other topics. A student may do a 15-hour outside minor for the fourth field. Students will define their fields in consultation with their Ph.D. advisor and with approval by their Ph.D. committee and the graduate advisor. A student choosing two fields in North America or Europe shall select at least one field from the chronological grouping. Dissertations may be written in North American, European, or World history (projects in other areas require the specific approval of the department's Graduate Studies Committee). All doctoral programs must include HIST 5305 and two seminars in the 6000-course

series, or their equivalents. All doctoral students who have not previously taken HIST 5305 are required to take it in the first fall semester of their Ph.D. program. Students writing dissertations in American history must take HIST 5306 in the second semester of the first year of their Ph.D. program.

Within the first year of a student's doctoral program, the student and his or her Ph.D. committee chair will put together a preliminary degree plan. The plan will then be discussed and refined in a joint meeting of the student and the full Ph.D. committee, prior to approval of the plan by the graduate advisor. In the qualifying examination, the student is expected to show command of four fields.

All Ph.D. students must demonstrate minimum research competency in foreign language. Students may do so by fulfilling one of the options listed below. Students must obtain approval of their committee for the option they choose, and must complete the requirement to the committee's satisfaction. The language requirement must be completed before taking the qualifying examination. Among foreign languages offered, students will normally choose German, French, Latin, or Spanish. For dissertation projects in the area of Southeast Asia utilizing the Vietnam Archive, the approved languages are normally French and Vietnamese. Some dissertation proposals may require proficiency in more than two non-English languages.

1. Complete two foreign language programs of study, each of which will be the equivalent of two years of university study as defined in the "Foreign Language Requirement" section of this catalog. After completion of each language, a student will need to prove competency by successfully translating an assigned passage of text.
2. After completing one foreign language program of study, which will be the equivalent of two years of university study as defined in the "Foreign Language Requirement" section of this catalog, and after successful translating an assigned passage of text, the student may continue work in that language with a faculty member in the department. Students must demonstrate "advanced proficiency" as defined by the *American Council on the Teaching of Foreign Languages Proficiency Guidelines* (revised 1999), and will need to translate historically relevant text in a manner acceptable to both the student's Ph.D. committee and the graduate advisor.
3. After completing one foreign language program of study, which will be the equivalent of two years of university study as defined in the "Foreign Language Requirement" section of this catalog, and after successful translating an assigned passage of text, the student may complete the requirement by gaining competency with a research tool broadly relevant to the student's research program and career interests. That will require taking at least two graduate level classes or their equivalent pertaining to that research tool. The graduate advisor will maintain a listing of possible research tool courses. Students may propose other research tool courses, which will require approval by the student's Ph.D. committee and the graduate advisor. Research tool courses may not be counted toward a student's Ph.D. fields.

History (HIST)*(To interpret course descriptions, see pg. 10.)*

Courses in U.S.; European; and African, Asian, or Latin American history are identified as (US), (E), and (AAL).

Undergraduate Courses

1300. **Western Civilization I (3:3:0) [HIST 2311]**. Western civilization from its dawn to the 17th century. Culture and the arts stressed alongside politics. (E)
1301. **Western Civilization II (3:3:0) [HIST 2312]**. The revolutionary transformations of European civilization in the 17th, 18th, and 19th centuries; world dominion and the world wars; intellectual and cultural developments. (E)
1325. **Introduction to Mexican American History (3:3:0) [HIST 2380]**. A broad survey of Mexican-American life in the United States. Culture and economics stressed alongside politics. (US)
2300. **History of the United States to 1877 (3:3:0) [HIST 1301]**. This course and HIST 2301 satisfy the legislative history requirement. Combines political, military, constitutional, and social history. Special sections emphasize technology, agriculture, business, and family life. (Honors section offered.) (US)
2301. **History of the United States Since 1877 (3:3:0) [HIST 1302]**. Continuation of HIST 2300. (Honors section offered.) (US)
2322. **World History to 1500 (3:3:0) [HIST 2321]**. Introduces basic narrative and major themes in world history from origins to 1500. Satisfies humanities and multi-cultural requirements.
2323. **World History Since 1500 (3:3:0) [HIST 2322]**. Introduction to basic narrative and major themes in world history since 1500. Satisfies university's humanities and multi-cultural requirements.
3301. **Ancient Civilization I (3:3:0)**. Introduction to the study of the ancient Near East and classical Greece.
3302. **Ancient Civilization II (3:3:0)**. Introduction to the study of ancient Rome.
3305. **Creating the American Nation, 1785-1840 (3:3:0)**. This course examines the political and cultural processes by which the U.S. was formed in the decades following the American Revolution. (US)
3306. **African American History to 1877 (3:3:0)**. This course surveys the history of African Americans from the African background through the Civil War and Reconstruction. (US)
3307. **African American History from 1877 to Present (3:3:0)**. This course surveys the history of African Americans from the Post-Reconstruction period through Civil Rights years and new forms of activism in the 1900s to the present. (US)
3308. **United States Diplomatic History to 1913 (3:3:0)**. A survey of U.S. diplomatic history from the American Revolution to 1913 with an emphasis on the development of the U.S. as a world power. (US)
3309. **United States Diplomatic History Since 1913 (3:3:0)**. A survey of U.S. diplomatic history from 1913 to the present with an emphasis on the U.S. as a world leader. (US)
3310. **History of Texas (3:3:0)**. A survey of Texas history beginning with the Native American occupation and tracing the major social, political, and economic developments of the state into the modern era. (US)
3311. **Social and Cultural History of the Southwest (3:3:0)**. Survey of the history of the varied cultures of the American Southwest, emphasizing Anglo-American, Spanish-Mexican, and Indian backgrounds. (US)
3312. **Spanish-Speaking Peoples in the United States: A Chronological Survey of Mexican Americans, Cuban Americans, and Puerto Ricans (3:3:0)**. This course will explore the history of Mexican Americans, Cuban Americans, and Puerto Ricans in the United States during the 19th and 20th centuries. (US)
3313. **The Old South (3:3:0)**. Explores the society, politics, economics, and race relations of the antebellum South, the development of sectionalism, and the impact of the Civil War. (US)
3314. **The South Since the Civil War (3:3:0)**. Explores the degree to which the South has remained a separate region socially, politically, economically, and in race relations from Reconstruction to the present. (US)
3315. **North American Ranching History (3:3:0)**. A history of North American ranching from Columbus to the present. (US)
3316. **Mexican American History of Texas (3:3:0)**. Surveys the history, culture, and contribution of Mexican Americans to the history and economic development of Texas. (US)
3317. **The Frontier and American West (3:3:0)**. Explores the settlement of the American West to 1900, with emphasis on trapping, mining, transportation and farming frontiers, Spanish borderlands, and Indian-United States relations. (US)
3318. **The Plains Indians (3:3:0)**. Culture and history of the Plains Indians; cultural developments prior to contact with the Whites; Plains Indians-White relations; Plains Indians in the 20th century. (US)
3320. **History of Film and American Society (3:3:0)**. A history of American film from its beginnings to the present with focus on film and the role it plays in reflecting or changing American society. (US)
3321. **Twentieth Century American West (3:3:0)**. An examination of the history and development of the American West from ca. 1900 to the present. (US)
3323. **The History of Women in America (3:3:0)**. Examines the gender expectations from 1607 to the present that have produced for women and men different experiences, strengths, and perceptions of American history. (US) (W S 3323)
3325. **History of Mexican Americans in the United States (3:3:0)**. Survey of the history of Mexican Americans of the United States during the 20th century, relating their daily life and institutional experience to United States and Mexican history. (US)
3326. **History of Native Americans in the United States (3:3:0)**. Survey of the history of American Indians from their earliest migrations through the acculturation, termination, and civil rights movements of the 20th century. (US)
3327. **Survey of American Environmental History (3:3:0)**. Prerequisite: Junior standing or consent of instructor. A survey of American environmental and conservation history from pre-Columbian America through contemporary environmental awareness. (US)
3328. **History of Religion in America (3:3:0)**. Traces the development of religious groups in America from colonial times to the present. Emphasizes beliefs and interaction with society. (US)
3329. **Development of Modern Science (3:3:0)**. Examines the historical development of the intellectual, institutional, and social dimensions of Western science from the 17th century to the present. (E)
3330. **The Vietnam War (3:3:0)**. Prerequisite: HIST 2300, 2301, or equivalent. Explores the military, diplomatic, political, and social dimensions of the war from its origins in the 1940s through its conclusion in the 1970s. (US)
3331. **History of United States Military Affairs to 1900 (3:3:0)**. Explores American military history from the Colonial period through the Spanish-American War, with an emphasis on strategy and the development of military institutions. (US)
3332. **History of United States Military Affairs Since 1900 (3:3:0)**. Examines 20th American military history up to the present. (US)
3334. **Technology in Modern America (3:3:0)**. An analysis of major developments in American technology since 1870 and their impact on society, culture, politics, and the economy. (US)
3335. **Progressive Reforms and Arts (3:3:0)**. Reforms of the Progressive era 1880-1930, roots and legacies; focusing on arts as a tool in economic, political, social, and cultural reforming efforts at local, national levels.
3337. **Science in American Society (3:3:0)**. An examination of major developments in American science with an emphasis on the 20th century and their impact on society, politics, and the economy. (US)
3338. **History of Sports and Recreation in the U.S. (3:3:0)**. Study of the development and role of sports and recreation in American social history with emphasis on organized amateur and professional sports. (US)
3339. **The History of Baseball: A Mirror on America (3:3:0)**. Examines the history of the national pastime with an eye to how the sport has reflected and influenced American society since the late 19th century. (US)
3341. **Women in European Civilization (3:3:0)**. What women were supposed to do; what women did, from prehistory to the vote in 1920. (E) (W S 3341)
3342. **Religion and Science (3:3:0)**. Through analysis of historical development from antiquity to the present, the course will examine the relationship between religion and science in the western tradition. (E)
3343. **Development of Modern Medicine (3:3:0)**. A chronological study of concepts and treatment of disease and medicine as a social institution in Western culture. (E)
3344. **History of Christianity (3:3:0)**. Surveys Christianity from immediate pre-Christian era to present. Emphasizes various churches and organizations, theology

- and Biblical studies, and Christianity's impact on Western culture. (E)
3345. **The Birth of Europe (3:3:0)**. Examines the confrontation between the Later Roman Empire and its barbarian invaders, which ultimately produced new economic, political, social, and cultural structures a new civilization. (E)
3346. **The Age of Chivalry (3:3:0)**. Medieval Europe, 1000-1450, witnesses the domestication of a warrior aristocracy through chivalric ideals, feudal monarchy, and the rise of a powerful bourgeoisie. (E)
3348. **The Crusades (3:3:0)**. Surveys the origins of the holy war ideal, the military campaigns and their leaders, life in the Crusader States, and the Crusades' ultimate results. (E)
3351. **History of Spain (3:3:0)**. A survey of Spanish history from ancient times to the present, including the Roman and Medieval heritage, the Golden Age, Enlightenment, and modern developments. (E)
3353. **History of Modern France (3:3:0)**. Surveys French political, social, and cultural history from the middle of the 18th century to the present. (E)
3354. **Twentieth Century Europe (3:3:0)**. Survey of European history from the immediate origins of World War I to the present. (E)
3355. **Europe in Transformation, 1815-1914 (3:3:0)**. Transformations in the social, cultural, political, and economic structures of Europe, including Russia and Great Britain during the 19th century. Revolution, nationalism, industrialism, and mass culture. (E)
3356. **The Lands Between: Eastern Europe 1789-1989 (3:3:0)**. Survey of East European history from the French Revolution to the collapse of communism. (E)
3358. **Modern Germany, 1648-1918 (3:3:0)**. Surveys the history of Germany from the Peace of Westphalia (1648) through World War I. (E)
3359. **The Nazi Era, 1919-1945 (3:3:0)**. Surveys post-World War I Germany, the rise of national socialism, Hitler in power, the Nazi State, and Germany in World War II. (E)
3360. **The British Isles to 1688 (3:3:0)**. Examines the social, cultural, and political history of British Isles to 1688, focusing on institutions, religious beliefs, literature, art, and everyday life. (E)
3361. **British Politics, Society, and Culture Since 1688 (3:3:0)**. Examines the social, cultural, and political history of Britain since 1688, focusing on the expansion of government, social movements, industrialization, popular culture, and the world wars. (E)
3367. **The Second World War (3:3:0)**. A history of the major diplomatic, military, social, and economic developments associated with the Second World War. (E)
3372. **Tsarist Russia (3:3:0)**. Political, economic, cultural, and social development as well as the territorial expansion of Russia from the earliest times to the beginning of the 20th century. (E)
3373. **Revolutionary Russia, 1894 to 1924 (3:3:0)**. Studies the decline of Tsarist Russia, growth of a revolutionary movement, and events and consequences of the Revolutions of 1905 and 1917 and the Civil War. (E)
3374. **History of Soviet and Post-Soviet Russia (3:3:0)**. Russian history from the revolutions of 1917 to the present, emphasizing the Soviet state's internal development, role in international relations, and collapse. (E)
3381. **Colonial Latin America (3:3:0)**. General introduction to the formation of Latin American civilization, including the Indian empires, voyages of discovery, conquest, extraction of treasure, pirates, and royal administration. (AAL)
3382. **Modern Latin America (3:3:0)**. Survey of the principal events in Latin American history beginning with the independence movement and reaching into the contemporary scene. (AAL)
3383. **Modern Mexico and Central America (3:3:0)**. This course covers major themes in Mexico and Central America since Independence. (E)
3384. **History of Brazil (3:3:0)**. Brazil from preconquest times down to the present with emphasis on unique characteristics of Brazilian culture in the context of world history. (AAL)
3389. **The British Empire, 1783 to Present (3:3:0)**. Studies the growth of the British Empire in the 19th century and its later decline in the 20th century under the impact of war and nationalism. (AAL)
3394. **Religion, Family, and the State in Asia (3:3:0)**. Surveys the main religious traditions of Asia and modern transformations; explores traditional and modern notions of family; examines changing political patterns. (AAL)
3395. **Africa: Empires and Civilizations (3:3:0)**. A survey of the development of Africa's civilizations and cultures from ancient Egypt to the West African trading states of the 18th century. (AAL)
3396. **Africa: Revolution and Nationalism Since 1800 (3:3:0)**. Surveys the colonial impact on African political, social, and economic life; the rise of African nationalism; and the creation of new nations. (AAL)
3398. **The Modern Middle East, 1800 to the Present (3:3:0)**. The history of the Middle East from ca. 1800 to the rise of Arab and other nation-states and the coups and revolutions of recent decades. (AAL)
3399. **Readings in History (3:3:0)**. Prerequisite: Junior standing and consent of instructor. An independent study course involving in-depth reading. May be repeated for credit.
4301. **The Founding of the American Colonies (3:3:0)**. An exploration of why and how Elizabethan England spawned thirteen disputatious and diverse societies on the Atlantic seaboard. (US)
4302. **The American Revolution and Colonial Society (3:3:0)**. An exploration of why and how thirteen disputatious and diverse colonies united to wage a revolution and form a nation. (US)
4304. **Civil War and Reconstruction, 1850-1877 (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Explores the causes of the Civil War; the military, political, economic, and social aspects of the war; and the issues and results of Reconstruction. (US)
4305. **Rise of Modern America, 1877-1919 (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Focuses on the economic, social, political, and military impact of the transformation of the United States into an urban, industrial nation. (US)
4306. **Roaring Twenties, Depression, and War, 1920-1945 (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines political, social, economic, and military developments in the United States during the 1920s, the Great Depression, the New Deal, and World War II. (US)
4307. **The United States, 1945 to the Present (3:3:0)**. Prerequisite: Junior standing or consent of instructor. The study of American society from the Second World War through the 1970s, including political developments, wars, and cultural conflicts. (US)
4308. **United States Urban and Immigration History (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Explores the economic and political issues surrounding U.S. urban and immigration policy and how these policies affected the lives of "ordinary" men and women. (US)
4309. **United States and the Cold War (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines the causes, course, and consequences of the Cold War between the U.S. and the Soviet Union. (US)
4311. **The Nuclear Age (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines the historical development of nuclear weaponry and power and their impact on 20th century American politics, society, and culture. (US)
4317. **The American Culture of Curiosity, 1800-1860 (3:3:0)**. Examines the creation of a mass culture which combined education and amusement in print and commerce between the Revolution and the Civil War.
4323. **Nature and Americans (3:3:0)**. Prerequisite: Junior standing or consent of instructor. History of the relationship between Americans and their land from prehistory to the present. (US)
4324. **Courts and Capitalism (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines relationship between law and economic development from the writing of the Constitution through the regulatory state. Considers court decisions and changing meaning of property rights. (US)
4325. **Major Issues in U.S. Women's History (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Prerequisite: HIST 2300 and 2301, or 3323. In-depth study of the evolution of gender roles, women in literature, the suffrage movement, and modern feminism. (US) (W S 4325)
4326. **A History of Sexuality in the United States (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines the history of sexuality in the United States. Themes and topics include relations of power, sexual identities, commercialization of sex, courtship, marriage, and reproduction. (US)
4327. **Gender, Race, and Class in United States Law (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines law's treatment of gender, race, and class; legal impact of struggles of women, African-Americans, and workers; meaning of liberty, citizenship, pub-

- lic/private spheres. (US) (W S 4327)
4328. **Citizenship, War, and Dissent (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines evolution of citizenship and the Bill of Rights through the study of political trials and Supreme Court decisions during periods of war and domestic conflict. (US)
4337. **History of American Seapower (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines history of the American Navy, organizational and technological development, evolution of strategic planning, and impact on foreign relations. (US)
4341. **Ancient Greece (3:3:0)**. Prerequisite: Junior standing or consent of instructor. From the origins of classical Greek civilization to the Roman conquest. Tyranny and democracy, imperialism, the Hellenistic age. (E)
4342. **Ancient Rome (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Imperialism and its consequences from the early Republic through the partial collapse of the Empire in the 5th century A.D.; Christianity and the Empire. (E)
4343. **Alexander the Great (3:3:0)**. This course is a detailed study of the rise of ancient Macedonia, the reign of Alexander the Great, and the Hellenistic world. (E)
4344. **The History of Early Rome (3:3:0)**. This course is a detailed study of the numerous problems surrounding the history of Rome's early institution and conquest of Italy. (E)
4347. **History of the Medieval Church (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Origins of the Roman Church, the papacy, monasticism, scholastic and mystical theology, church-state relations, and the decline of medieval Christendom. (E)
4348. **The Renaissance (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Cultural and political history of Italy, France, and England from 1300-1600; the "rebirth" of wisdom through art, architecture, literature, music, economics, and religion. (E)
4349. **The Protestant Reformation (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Europe from 1517 to 1648. Religious revolt and the establishment of Protestantism; the age of religious wars; attempts at religious peace. (E)
4350. **European Urban History 1300 to 1800 (3:3:0)**. This course will explore social, economic, political, and cultural structures of Western European cities from the 14th to the 18th century. (E)
4353. **The French Revolution and Napoleon (3:3:0)**. Prerequisite: Junior standing or consent of instructor. The Old Regime and the Enlightenment. The Revolution and its drama, ideas, events, personalities, and complexities. (E)
4355. **Let's Talk Women; Let's Talk War: Women and Conflict in 20th Century Europe (3:3:0)**. Prerequisite: Junior standing or consent of instructor. The course will examine the involvement and reactions of European women to situations of war and revolution in the 20th century. (E)
4357. **France and Algeria: From the Colonial to the Postcolonial (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Ideological and cultural relationship between France and Algeria from 1800 to the present. (E)
4358. **The Habsburg Monarchy in Grandeur and Decline (3:3:0)**. Prerequisite: Junior standing or consent of instructor. History of this multinational dynastic state and its legacies in East Central Europe. (E)
4360. **Germany Since 1945: A Divided Nation Confronts Its Past (3:3:0)**. A comparative study of capitalism and communism in West and East Germany emphasizing problems of national unity and efforts to atone for Nazi crimes.
4363. **Emergence of New Nations in Latin America (3:3:0)**. Prerequisite: Junior standing or consent of instructor. This 19th century course covers the formation of political systems, challenges to social stability, abolition of slavery, and relationship to North Atlantic world. (AAL)
4370. **Great Cities (3:3:0)**. Seminar on the history of a single major city, using it as a microcosm to study political, social, cultural, and intellectual development over time. May be repeated when topics vary.
4371. **Race, Nation, and Identity (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Nineteenth and twentieth century concepts of difference as construed by race, nation, and identity. (E)
4373. **Tudor-Stuart England, 1450-1688 (3:3:0)**. Prerequisite: Junior standing or consent of instructor. This course deals with enormous and seminal changes religious, political, constitutional, intellectual, and geographical that took place in England from 1450 to 1688. (E)
4374. **Love, Death, and Magic in Europe, 1500-1800 (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Topics in social and cultural history. Under-side of civilization, population, social structure, family and household, economic growth, and crisis. Attitudes toward love and death, popular religion and culture, witchcraft, violence, revolt. (E) (W S 4374)
4375. **Social and Cultural History of Europe, 1800 to the Present (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Modernization, industrialization, urbanization, gender, household, new professions, old occupations, and labor unrest. Bourgeois and working-class culture, avant-garde and masses, war, genocide, Europe today. (E)
4376. **History of the Italian Mafia (3:3:0)**. This course discusses the origins and development of the Mafia in the context of Italian politics, economy, and society in the 19th and 20th centuries. (E)
4377. **Twentieth Century Britain in Film (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Examines the history of Britain and British entities in the 20th century through the study of film. (E)
4380. **A History of Masculinity (3:3:0)**. Examines the history of masculinity and manhood in Great Britain and the United States since the mid-nineteenth Century.
4381. **Colonial Mexico and the Spanish Borderlands (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Study of the Spanish conquest of Mexico and the evolution of the Spanish Empire in North America until Mexican independence in 1821. (AAL)
4391. **Modern South Africa (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Description and analysis of the social, economic, and political development of South African society, focusing on the struggle against apartheid. (AAL)
4393. **Modern China (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Chinese history from late Ming and early Qing period (17th century) until contemporary times. Emphasis on social, cultural, and political history. (AAL)
4394. **Modern Japan (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Social, cultural, political, and economic history of Japan (17th to 20th century). Focus on merchant culture, Tokugawa times, civic training of Meiji period, militarism, postwar period. (AAL)
4395. **Modern Vietnam (3:3:0)**. Prerequisite: Junior standing or consent of instructor. Covers the social, political, and cultural history of Vietnam, beginning with the emergence of frontier society in the 16th century and concluding with the Vietnamese diaspora. (AAL)
4397. **Readings and Research in History (3:3:0)**. Prerequisite: Senior standing and consent of instructor. An independent study course involving in-depth reading and intensive historical writing. May be repeated for credit.
4398. **Senior Seminar in History (3:3:0)**. Prerequisite: Senior standing or completion of 18 hours in history. Required of history majors. An intensive study in historical methodology, document analysis, retrieval and collection of data, and synthesis into well-written history. May be repeated once for credit.

Graduate Courses

5101. **Teaching of History in College (1:1:0)**. An observation-and-advice course rather than a seminar. Concerned with supervision of teaching assistants: classroom visitation, judgment on performances, and advice and assistance to individual instructors.
5303. **Oral History Methodology (3:3:0)**. This course offers materials on the theory and methods for the collection and analysis of oral histories uses in reconstructing US, European, and non-Western history.
5304. **Historical Methods (3:3:0)**. Research methods; bibliography, government documents, newspapers, dissertations, archives and manuscripts, oral history, quantitative history, historical archeology; literary organization and style; footnote and bibliographic forms.
5305. **Historiography (3:3:0)**. A survey of major historians and historical works from Herodotus to the present, emphasizing the development of history as an intellectual orientation and as an academic discipline.
5306. **Recent Interpretations of American History (3:3:0)**. A survey of recent major works discussing chronological periods and topics in American history. Required of some master's and doctoral students.
5307. **Studies in World History (3:3:0)**. This course provides an overview of the field of world history emphasizing both the global past and methodological debates.

5308. **Historical Studies of Religion (3:3:0).** A survey of scholarly attempts to understand the history of religion emphasizing historiographical achievements and methods.
5309. **Administration of Archival and Manuscript Collections (3:3:0).** An intensive study of archival principles and techniques emphasizing current trends and challenges, with an opportunity for professional management and/or research facility enhancement through in-service training.
5310. **Studies in American Cultural and Intellectual History (3:3:0).** Examines the intersection of intellectual and cultural history at various periods in American history. May be repeated once for credit when topics vary.
5311. **Studies in United States Colonial and Revolutionary History (3:3:0).** Topics vary from semester to semester, including seventeenth-century Massachusetts, the coming of the American Revolution, and the new nation after 1776.
5312. **Studies in Nineteenth-Century United States History (3:3:0).** Selected topics in the history of the United States, 1789-1890 with emphasis on bibliography and problems of interpretation. Extensive readings of monographs and journals.
5313. **Studies in Recent United States History (3:3:0).** Selected periods in twentieth-century American history: the Progressive Era and the 1920s, the New Deal and World War II, and the postwar years.
5315. **Studies in Texas History (3:3:0).** Topics vary with interests and needs of each class; emphasis on Spanish heritage, Texas Revolution, Republic, political, economic, and social developments, ethnic groups.
5316. **Studies in Southern History (3:3:0).** An analysis of the major issues and controversies of the South with emphasis on the period from the American Revolution to the present.
5317. **Studies in Frontier and Western American History (3:3:0).** An examination of selected areas with emphasis on exploration, settlement, Anglo-American expansion, foreign and Indian conflicts, life-ways, and resulting changes in American institutions.
5319. **Studies in Native-American History (3:3:0).** A reading seminar on the literature of Native-American history and the Native Americans of the plains and the southwest.
5321. **Studies in American Legal and Constitutional History (3:3:0).** An examination of selected topics concerning the history of the bar, judiciary, police, corrections, legal doctrines, and statutory law.
5322. **Studies in United States Diplomatic History (3:3:0).** American diplomacy and foreign policy with emphasis on either pre-1900 or post-1900 periods. Stress on the literature of United States diplomatic history.
5323. **Studies in the History of Science and Technology (3:3:0).** Topics vary to include 20th-century American science, the industrial revolution, and the social relations of science and technology.
5324. **Studies in American Religious History (3:3:0).** A survey of recent major works covering the social, political, and cultural implications of American religious history. Topics may vary.
5325. **Studies in American Economic History (3:3:0).** Historical analysis and interpretation of growth and change in the United States economy, with emphasis on ideas and institutions in business and agriculture.
5326. **Studies in American Environmental History (3:3:0).** A reading in American environmental and conservation historical literature from the Age of Discovery to the present environmental movement.
5327. **Studies in United States Immigration and Urban History (3:3:0).** Explores a series of problems in United States immigration and urban history since the mid-nineteenth century.
5328. **Studies in American Military and Naval History (3:3:0).** A study of American military and naval history. Emphasis on development of institutions and national struggles.
5333. **Studies in African-American History (3:3:0).** Studies of African influences, racial ideas, slavery, and post-emancipation efforts to achieve civil and political rights, education, economic opportunity and the creation of social institutions.
5337. **Studies of Women in American History (3:3:0).** A survey of significant literature and analysis of problems related to the study of women in American history.
5338. **Studies in American Social History (3:3:0).** Reading, analysis, and critical reviews of pivotal works. Emphasis on varieties and impact of social history on topics such as family, community, race, gender, and work.
5339. **Studies in Ancient Greek History (3:3:0).** Studies of selected topics in the political or intellectual history of ancient Greece based upon a study of sources, in translation if advisable.
5340. **Studies in Ancient Roman History (3:3:0).** Studies of selected topics in the political or intellectual history of ancient Rome based upon a study of sources, in translation if advisable.
5341. **Studies in Medieval History (3:3:0).** Study of selected topics in the intellectual history of the early and high middle ages. Individual reports discussed in a seminar situation.
5342. **Studies in Renaissance and Reformation History (3:3:0).** Study of selected topics in the intellectual or religious history of the Renaissance or the Reformation. Individual reports discussed in a seminar situation.
5343. **Studies in Eighteenth-Century European History (3:3:0).** Examines the social, cultural, and intellectual history of Europe in the era of the Enlightenment and the French Revolution.
5344. **Readings in European Nationalism (3:3:0).** Takes a cross-disciplinary approach to the study of European nationalism. Emphasizes historians' contribution to this field. May be repeated for credit.
5345. **Studies in the History of Fascist and Related Right-Wing Movements in Europe (3:3:0).** Examines individually and collectively themes of nationalism, anti-Semitism, militarism, and anti-Marxism, chiefly in the period 1918-1945.
5346. **Studies in Modern European History (3:3:0).** Examines the social, cultural, and political history of Europe from 1815 to the present.
5347. **Studies in British History (3:3:0).** An organized studies course covering selected topics in British history. Topics vary according to the students' needs.
5348. **Studies in Roman Law (3:3:0).** Topics in the historical development of classical Roman law. Designed to meet the needs of both law and graduate students.
5349. **Readings in Modern East Central European History (3:3:0).** The history and historiography of modern East Central Europe from the Revolutions of 1848 to the collapse of Communism in 1989. May be repeated twice for credit.
5350. **Studies in African History (3:3:0).** A survey of African history focusing on major problems of interpretation. Includes political, economic, religious, and cultural change; pre-colonial and colonial encounters.
5351. **Slavery in a World Perspective (3:3:0).** An examination of the main areas and epochs in which slavery institutions were central: Antiquity, Medieval Europe, Pre-Colonial Africa, the West Indies, and Southern U.S.
5352. **Studies in Asian History (3:3:0).** A reading and research course in Asian history focusing on developments in nineteenth- and twentieth-century social, political, and cultural history.
5355. **Studies in Colonial Latin American History (3:3:0).** Explores the principal historical literature and interpretations for Colonial Spanish America from the conquest to independence.
5356. **Studies in National Latin American History (3:3:0).** Examines the history of the areas since independence with emphasis on modernization. Includes consideration of Latin America as a civilization while revealing unique characteristics of the individual countries.
5362. **Studies in the History of Aging and the Family (3:3:0).** Examines topics in historical demography and the history of childhood, gender, family types, aging, the aged, and death. Emphasis on Europe and the United States.
5366. **Studies in Religious History (3:3:0).** Investigations of the development of religious institutions, the relationship between religion and society, and cross-cultural religious phenomena.
6000. Master's Thesis (V1-6).
6301. **Research Methods Seminar (3:3:0).** Prerequisite: HIST 5304. Continues advanced examination of historical methods, emphasizing particular approaches to historical investigation and the writing of an ambitious piece of original work.
6304. **Seminar in American History (3:3:0).** A research course featuring formal papers on selected topics. Topics chosen in consultation with the instructor.
6305. **Seminar in European History (3:3:0).** Research seminar, with stress on methodology, types of research materials available in our library in European history, delivery of reports, and submission of an extensive term paper.
7000. Research (V1-12).
8000. Doctor's Dissertation (V1-12).

Department of Mathematics and Statistics

Faculty

Lawrence E. Schovanec, Chairperson

Horn Professors: Dayawansa, Martin, and Ruymgaart; **Professors:** E. Allen, L. Allen, Barnard, Bennett, Chanda, D. Gilliam, Harris, Ibragimov, Lewis, Mansouri, Pearce, Schovanec, M. Shubov, V. Shubov, Smith, Strauss, Victory, Wang, and Yang; **Associate Professors:** Byerly, Drager, Korchagin, Lee, Neusel, Patrangenanaru, Seaquist, Sun, and Weinberg; **Assistant Professors:** Dwyer, Gelca, Hadjicostas, Juan, Ledet, Manservisi, Monico, Paige, Roeger, Seshaiyer, Surles, Toda, Venkataraman, and Williams; **Instructors:** X. Gilliam, Sugathadasa, and Temple

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Mathematics
- Bachelor of Science in Mathematics
- Master of Arts in Mathematics
- Master of Science in Mathematics
- Master of Science in Statistics
- Doctor of Philosophy in Mathematics

In addition, the department supervises programs leading to minors in mathematics and to teacher certification in mathematics at the elementary and secondary levels.

Undergraduate Program

Flexibility of elective courses in mathematics is designed to allow the student to prepare to enter the industrial job market, graduate school or professional school, or a teaching career. Recent 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), and transportation (airlines, trucking). Some graduates have entered law school or medical school, while many have pursued graduate degrees at various universities.

The curricula leading to the Bachelor of Arts or Bachelor of Science degrees follow the general patterns described in the Arts and Sciences section of this catalog. Immediately upon declaring a major in mathematics, students should consult with the department's Director of Undergraduate Studies for the design and approval of their individual mathematics degree programs. A typical program includes proficiency in calculus at the level of MATH 2350, plus MATH 2360, 3354, 3360, 4350 and at least two of MATH 4343, 4351, 4354, and 4360. In addition, candidates for the B.A. degree must take at least 6 additional hours of approved electives in mathematics at the 3000 level and above, while candidates for the B.S. degree must take at least 12 additional hours of approved electives in mathematics at the 3000 level and above.

For a major in mathematics, a minimum of 30 to 39 hours of mathematics is required, depending on where the student can start in calculus and which degree the student seeks. Also, a student must have a grade of C or better in each mathematics course counted toward the degree.

Candidates for the B.S. degree must choose their minor from the following: atmospheric science, biology, botany, chemistry, chemical engineering, civil engineering, computer science, economics, electrical engineering, exercise and sport sciences, geosciences, industrial engineering, mechanical engineering, microbiology, petroleum engineering, physics, or zoology. A minor must include 18 semester hours in the minor department, 6 of which must be advanced. Courses counted for the minor must be approved by the minor department.

In addition to the minor, candidates for the B.S. degree must complete 8 hours of laboratory science (biology, botany, chemistry, geosciences, microbiology, physical geography, physics, or zoology) outside their minor area.

Dual Degree. The Department of Mathematics and Statistics also participates with the Department of Computer Science to offer a dual-degree program in mathematics and computer science. This is a five year program. See the Computer Science portion of the catalog for the curriculum, culminating in a B.S. degree with a major in mathematics and minor in computer science from the College of Arts and Sciences, and a B.S. degree in computer science from the College of Engineering. Students should consult with an academic advisor in each college and may declare either as their primary college.

A minor in mathematics requires 18 semester hours, at least 6 of which must be at the 3000 level or above and must be approved by the Director of Undergraduate Studies. The minor sequence is MATH 1351, 1352, 2350, and 2360 plus 6 semester hours of approved courses at the 3000 level or above. Students cannot receive minor credit for both MATH 3350 and 3354. Students must receive a grade of at least C in all courses counted toward a minor in mathematics.

For the minor and major in mathematics, at least one half of the upper level mathematics courses must be taken in the Department of Mathematics and Statistics at Texas Tech University. This residency requirement will be waived by the department only in very exceptional circumstances.

Teacher Education. The Department of Mathematics and Statistics cooperates with the College of Education in offering plans for teacher certification in mathematics at both the middle and secondary school levels. The student preparing to teach in the secondary school may select mathematics as a teaching field and complete the program for teacher certification in mathematics. The student should consult the Department of Mathematics and Statistics concerning teacher certification. A student must have a grade of C or better

in each mathematics course counted toward middle or secondary education certification.

The courses offered in mathematics for students intending to prepare themselves for elementary teaching are MATH 1320, 2370, 2371, 3370, 3371, 4370, and 4371.

The minimum requirements for the teaching field in mathematics (option II) at the secondary level are:

- MATH 1351 and 1352 (See Guide for Initial Enrollment in Mathematics) and MATH 2350, 2360, 3430, and 4331
- One of MATH 2300, 3342, or 4342
- One of MATH 3354 or 3360
- One of MATH 3430 or 4371

Mathematics Placement. Placement for students into entry-level mathematics courses (0301-2345) is based on either appropriate previous prerequisite collegiate mathematics credit or the results of the departmentally administered Mathematics Placement Examination (MPE). The MPE will be given on the first day of each summer orientation for students enrolling in the fall and during the open registration periods prior to each semester and term. Students without appropriate prerequisite collegiate mathematics credit will be placed into entry-level courses based on the results of the MPE. Students may retake the MPE if necessary. Students who have scored at least 610 on the SATM or at least 26 on the ACTM may enroll in any entry-level mathematics course independent of whether they have the appropriate previous prerequisite collegiate mathematics credit or the appropriate MPE score. However, they are encouraged to take the MPE during an orientation session to provide them with a current assessment of their mathematics skills for advisement purposes.

Students having 6 hours or less of basic mathematics requirements in their degree program may wish to satisfy the requirements by choosing from among these courses: MATH 1300, 1320, 1321, 1330, 1331, 1350, 1351, 1352, 1420, 2300.

The following list describes the mathematics courses most frequently taken by freshmen:

- MATH 0301 and 0302 are remedial courses and do not carry any degree credit. Students earning a grade of A or B in MATH 0302 will be eligible to enroll in MATH 1300, 1320, 1330, or 1550.
- MATH 1300—Contemporary Mathematics*
- MATH 1320—College Algebra*
- MATH 1330—Introductory Mathematical Analysis
- MATH 1321—Trigonometry
- MATH 1350—Analytical Geometry
- MATH 1351—Calculus I
- MATH 1420—College Algebra with Review*
- MATH 1430—Introductory Mathematical Analysis with Review
- MATH 1550—Precalculus

* Only one course from among MATH 1300, 1320, and 1420 can be counted towards the mathematics and logical reasoning core curriculum requirement.

NOTE: Satisfactory score on the placement exam is required for entrance to all above courses. TASP students who have not passed the mathematics section of the TASP test may not enroll in MATH 1320 or 1321 until they have successfully completed their prescribed program of TASP mathematics skills develop-

Graduate Program / Mathematics and Statistics

Students seeking an advanced degree in mathematics or statistics should consult with the Graduate Director of the Department of Mathematics and Statistics before enrolling in any courses. The department offers a number of graduate courses that are suitable for students who wish to complete a minor in mathematics or statistics.

The Department of Mathematics and Statistics does not have a foreign language requirement for the master's degree. Any foreign language requirement for the Ph.D. degree will be at the discretion of the student's dissertation advisor.

The M.A. degree in mathematics consists of 36 hours of graduate work, including 3 hours of credit for a departmental report. The student must complete three sequences chosen from algebra, analysis, geometry, probability and statistics, modeling and applications, and computer literacy. This degree is offered primarily for those students who wish to teach mathematics at the secondary level or at a junior/community college.

The M.S. degree in mathematics consists of 36 hours of graduate work, including 3 hours of credit for a departmental report, or 30 hours of graduate work including 6 hours of credit for the master's thesis. The student must complete at least two of the core sequences listed on the Ph.D. program for the 36-hour plan and at least one of the core sequences for the 30-hour plan. In the 36-hour plan a minor of 9 hours is permitted and in the 30-hour plan a minor of 6 hours is permitted. In each case the minor must be approved by the graduate advisor.

A M.S. degree in mathematics with emphasis in computer science is also offered. The degree consists of 36 hours with 3 hours of credit for a departmental report. This plan calls for 18 to 21 hours of graduate course work in mathematics and 12 to 15 hours of graduate course work in computer science. Of the 18 to 21 hours of mathematics course work, at least two sequences from the list in the departmental handbook must be completed. The 12 to 15 hours of computer science course work constitute adjunct requirements and must be approved by the graduate advisor.

The M.S. degree in statistics consists of 36 hours of graduate work including 3 hours of credit for a departmental report or 6 hours of credit for the master's thesis. Up to 3 hours of graduate work are permitted in other areas such as agriculture, biology, business, economics, engineering, psychology, sociology, or fields as approved by the graduate advisor.

Each doctoral student will undergo a preliminary examination as early as possible during graduate training. The examinations will be administered annually in May and the results evaluated by the Graduate Programs and Policies Committee of the Mathematics and Statistics Department. Details concerning the preliminary examinations can be found in the departmental handbook. Each doctoral student must also pass a qualifying examination in a specialty area.

Each degree plan must be approved by the graduate advisor.

ment. See course listings for descriptions and prerequisites for the courses listed above.

Mathematics (MATH)

(To interpret course descriptions, see pg. 10.)

Developmental Courses

- 0301. Essential Mathematics (3:3:0).** A developmental course for students with weak preparation in fundamental mathematics, high school algebra, and geometry. MATH 0301 counts in the student's semester load and is recorded on the transcript, but the hours do not count as part of the minimum number of hours required for graduation in any degree program of the university. Grades are awarded for the semester, but they are not computed in the student's grade point average. This course counts for TASP math skills development provided the student has met with an advisor in the TASP Skills Development Office in 72 Holden Hall.
- 0302. Intermediate Algebra (3:3:0).** Prerequisite: Score on the Mathematics Placement Examination of 2 or higher or a grade of B or better in MATH 0301. A developmental course for students with weak preparation in algebra or who need a review of high school algebra before enrolling in MATH 1320 or higher. MATH 0302 counts in the student's semester load and is recorded on the transcript, but the hours do not count as part of the minimum number of hours required for graduation in any degree program of the university. Grades are awarded for the semester, but they are not computed in the student's grade point average. This course counts for TASP math skills development provided the student has met with an advisor in the TASP Skills Development Office in 72 Holden Hall.

Undergraduate Courses

- 1300. Contemporary Mathematics (3:3:0) [MATH 1332].** Prerequisite: Score on mathematics placement examination of 3 or higher or a grade of B or better in MATH 0302. Quantitative literacy and problem solving with applications to finance, population dynamics, politics, and business. MATH 1300 and 1320 cannot both be counted towards the mathematical and logical reasoning core requirements.
- 1320. College Algebra (3:3:0) [MATH 1314].** Prerequisite: Score on the mathematics placement examination of 3 or higher or a grade of B or better in MATH 0302. Inequalities; determinants; theory of equations; binomial theorem; progressions; mathematical induction. MATH 1300 and 1320 cannot both be counted towards the mathematical and logical reasoning core requirements.
- 1321. Trigonometry (3:3:0) [MATH 1316].** Prerequisite: Score on the mathematics placement examination of 4 or higher MATH 1320, or a grade of A in MATH 0302. Trigonometric functions; radians; logarithms; solutions of triangles; identities; trigonometric equations; complex numbers; De Moivre's Theorem.
- 1330, 1331. Introductory Mathematical Analysis (3:3:0 each) [MATH 1324, 1325, 1425].** Prerequisite-1330: Score on the mathematics placement examination of 3 or higher or a grade of B or better in MATH 0302 or 1300; prerequisite-1331: Score on the mathematics placement examination of 4 or higher or MATH 1330. MATH 1330 contains set theory; inequalities; equations, relations; functions; vectors; matrices; linear programming; probability; progressions; mathematics of finance. MATH 1331 contains differential, integral, and multivariable calculus.
- 1350. Analytical Geometry (3:3:0) [MATH 1348, 2312, 2412].** Prerequisite: Score on the mathematics placement examination of 6 or higher and knowledge of basic trigonometry or MATH 1320 and 1321. Fundamental concepts of analytical geometry.
- 1351. Calculus I (3:3:0) [MATH 2313, 2413, 2417, 2513].** Score on the mathematics placement examination of 7, MATH 1350, 1550, or score on MPE of 5 and MATH 1321. Differentiation of algebraic and transcendental functions, applications of the derivative, differentials, indefinite integrals, definite integrals. (Honors section offered.)
- 1352. Calculus II (3:3:0) [MATH 2314, 2414, 2419, 2517].** Prerequisite: MATH 1351 or consent. Methods of integration, parametric equations, polar coordinates, hyperbolic functions, applications. (Honors section offered.)
- 1420. College Algebra With Review (4:3:2) [MATH 1414].** Prerequisite: MPE code 2 or higher or grade of B in MATH 0301. Review of topics from high school algebra, inequalities, functions and graphs, linear systems, sequences, mathematics induction. Cannot receive credit for both 1320 and 1420.

- 1430. Introductory Mathematical Analysis With Review (4:3:2).** Prerequisite: MPE code 2 or higher or a grade of B in MATH 0301. Review of topics from high school algebra, set theory, inequalities, equations, relations, functions, vectors, matrices, linear programming, probability, progression, mathematics of finance. Cannot receive credit for both 1330 and 1430.
- 1550. Precalculus (5:5:0).** Prerequisite: Score on the MPE of 3 or higher or a grade of A in MATH 0302. Topics from college algebra, trigonometry, and analytical geometry that are necessary prerequisites for calculus I.
- 2300. Statistical Methods (3:3:0) [MATH 1342, 1442, 2342, 2442].** Prerequisite: Score on MPE of 4 or higher, MATH 1300, 1320, or equivalent. Methods of analyzing data; statistical concepts and models; estimation; tests of significance; introduction to analysis of variance, linear regression, and correlation.
- 2322. Analytical Geometry and Calculus for Engineering Technology I (3:3:0).** Prerequisite: Score on MPE of 6 or higher or MATH 1320 and 1321. This course is intended for students of engineering technology. It covers selected topics in analytical geometry and stresses the geometric and physical aspects of calculus.
- 2323. Calculus for Engineering Technology II (3:3:0).** Prerequisite: MATH 2322. This course is a continuation of MATH 2322.
- 2345. Introduction to Statistics with Application to Business (3:3:0).** Prerequisite: Score on MPE of 4 or higher, MATH 1300, 1320, or equivalent. Statistics and probability for business. Data collection, description, interpretation, prediction, inference, and computer software.
- 2350. Calculus III (3:3:0) [MATH 2315, 2415, 2519].** Prerequisite: MATH 1352. Partial differentiation; functions of several variables; multiple integrals, line integrals, surface integrals, Stokes Theorem. (Honors section offered.)
- 2360. Linear Algebra (3:3:0) [MATH 2318, 2418].** Prerequisite: MATH 1352. Finite-dimensional vector spaces; linear transformations and matrices; eigenvalues and eigenvectors.
- 2370. Elementary Analysis I (3:3:0) [MATH 1350].** Prerequisite: MATH 1320, and sophomore standing. Analytic geometry and the real number system with applications. Not for engineering, science, or mathematics majors.
- 2371. Elementary Analysis II (3:3:0).** Prerequisite: MATH 1350 or 2370. Elementary differential and integral calculus with application. Not for engineering, science, or mathematics majors.
- 3322. Higher Mathematics for Engineering Technology (3:3:0).** Prerequisite: MATH 2323. Topics include differential equations, Laplace transform, Fourier series, and vector and matrix algebra.
- 3342. Mathematical Statistics for Engineers and Scientists (3:3:0).** Prerequisite: MATH 2350. Descriptive statistics; elementary probability; random variables and distributions; mean; variance; parameter estimation; hypothesis testing; regression; analysis of variance. MATH 3342 and 4332 cannot both be counted toward a mathematics major or minor.
- 3350. Higher Mathematics for Engineers and Scientists I (3:3:0).** Prerequisite: MATH 2350 or concurrent registration with departmental consent. Ordinary differential equations. Laplace transforms. Other selected topics. MATH 3350 and 3354 may not both be counted towards a mathematics major or minor.
- 3351. Higher Mathematics for Engineers and Scientists II (3:3:0).** Prerequisite: MATH 3350 or 3354. Partial differential equations and numerical methods. MATH 3351 and 4354 cannot both be counted toward a mathematics major or minor.
- 3354. Differential Equations I (3:3:0).** Prerequisite: MATH 2350 and 2360. Solutions of ordinary differential equations; geometric and physical applications. MATH 3350 and 3354 may not both be counted toward a mathematics major or minor.
- 3360. Foundations of Algebra I (3:3:0).** Prerequisite: MATH 2360. Fundamental concepts of abstract algebra. Primarily group theory. (Writing Intensive)
- 3370. Elementary Geometry (3:3:0).** Prerequisite: MATH 2370 and junior standing. Congruence and measures of plane and solid figures; similarity; areas; volumes; and a brief introduction to concepts in probability and statistics.
- 3371. Elements of Finite Mathematics (3:3:0).** Prerequisite: MATH 1331, 1351, or 2371. Combinatorics, probability theory. Bayes' Theorem, Bernoulli Trials. Probability distributions and statistics. Not for engineering, science, or mathematics majors.
- 3430. Computational Techniques for Science and Mathematics (4:3:2).** Prerequisite: MATH 2360. Emphasis on scientific computing and problem solving techniques using state-of-the-art mathematics software packages. Restricted to mathematics majors or students enrolled in a secondary mathematics teacher program.
- 4000. Selected Topics (V1-3).** Prerequisite: Consent of undergraduate program director. Selected topics in upper division mathematics. May be repeated for credit.
- 4310. Introduction to Numerical Analysis I (3:3:0).** Prerequisite: MATH 3350 or 3354, including an elementary knowledge of programming or consent of instructor. Interpolation, approximations, numerical integration, and differentiation.
- 4312. Introduction to Numerical Analysis II (3:3:0).** Prerequisite: MATH 2360, including an elementary knowledge of programming or consent of instructor. Numerical techniques in linear algebra.
- 4330. Mathematical Computing (3:3:0).** Prerequisite: Consent of the Director of Undergraduate Programs. Topics from computer literacy and programming.
- 4331. Advanced Geometry (3:3:0).** Prerequisite: MATH 2350. Euclidean and non-Euclidean geometries.
- 4342, 4343. Mathematical Statistics (3:3:0 each).** Prerequisite: MATH 2350. Frequency functions, moments, probability, correlation and regression, testing hypotheses, small sample distributions, analysis of variance, nonparametric methods, sequential analysis. 4342 is prerequisite for 4343. MATH 3342 and 4342 cannot both be counted toward a mathematics major or minor.
- 4350, 4351. Advanced Calculus (3:3:0 each).** Prerequisite: MATH 2360 (MATH 3360 recommended). Sets, functions, vector fields, partial derivatives, power series, theory of integration, line, surface, and multiple integrals. 4350 is prerequisite for 4351. (4350 Writing Intensive)
- 4354. Differential Equations II (3:3:0).** Prerequisite: MATH 3354. Partial differential equations and boundary value problems. MATH 4354 and 3351 cannot be counted toward a mathematics major or minor.
- 4356. Elementary Functions of Complex Variables (3:3:0).** Prerequisite: MATH 2360 (MATH 4350 is recommended). The complex number system; functions of a complex variable; differentiation; elementary functions; and contour integration.
- 4360. Foundations of Algebra II (3:3:0).** Prerequisite: MATH 3360. Continuation of MATH 3360. Rings, fields, and applications.
- 4362. Theory of Numbers (3:3:0).** Prerequisite: MATH 2360 (MATH 3360 is recommended). Prime numbers; congruencies; theorems of Fermat, Euler, and Wilson; residues; reciprocity law; Diophantine Equations.
- 4370. Elementary Problem Solving (3:3:0).** Prerequisite: MATH 2371, or equivalent. Techniques of problem solving using elementary number theory.
- 4371. Basic Computer Literacy and Programming (3:3:0).** Prerequisite: MATH 2371 or equivalent. Computer literacy, structured programming, and problem solving using elementary number theory. (For students seeking elementary school certification as mathematics specialists.)

Graduate Courses

- 5101. Seminar in Algebra (1:1:0).** Discussion of current research and topics of interest in algebra. Must be taken pass-fail. May be repeated for credit.
- 5102. Seminar in Analysis (1:1:0).** Discussion of current research and topics of interest in analysis. Must be taken pass-fail. May be repeated for credit.
- 5103. Seminar in Control Theory (1:1:0).** Discussion of current research and topics of interest in control theory. Must be taken pass-fail. May be repeated for credit.
- 5104. Seminar in Statistics (1:1:0).** Discussion of current research and topics of interest in statistics. Must be taken pass-fail. May be repeated for credit.
- 5105. Seminar in Topology (1:1:0).** Discussion of current research and topics of interest in topology. Must be taken pass-fail. May be repeated for credit.
- 5106. Seminar in Applied Mathematics (1:1:0).** Discussion of current research and topics of interest in applied mathematics. Must be taken pass-fail. May be repeated for credit.
- 5107. Seminar in Biomathematics (1:1:0).** Discussion of current research and topics of interest in biomathematics. Must be taken pass-fail. May be repeated for credit.
- 5310, 5311. Principles of Classical Applied Analysis I, II (3:3:0 each).** Fourier series and integrals, discrete Fourier series, Laplace transforms, calculus of varia-

tions, Sturm-Liouville problems, integral equations, equations of fluids and solids, and ordinary and partial differential equations.

5312. **Control Theory I (3:3:0)**. Prerequisite: MATH 2360, 3354, 4351, or consent of instructor. Linear dynamical systems, stability, frequency response and Laplace transform, feedback, state-space description, and geometric theory of linear systems. (M E 5312)
5313. **Control Theory II (3:3:0)**. Prerequisite: MATH 5312, 5316, 5318, or consent of instructor. Quadratic regulator for linear systems, Kalman filtering, non-linear systems, stability, local controllability, and geometric theory of non-linear systems. (M E 5313)
5316. **Applied Linear Algebra (3:3:0)**. Prerequisite: Consent of instructor. Solution of linear systems, matrix inversion, vector spaces, projections, determinants, eigenvalues and eigenvectors, Jordan form, computational methods, and applications.
- 5318, 5319. **Intermediate Analysis I, II (3:3:0 each)**. The real number system, introduction to metric spaces, sequences, continuity, differentiation, Riemann integration, power series, functions of several variables, and differential forms.
- 5320, 5321. **Functions of a Complex Variable I, II (3:3:0 each)**. Prerequisite: MATH 4350 or 4356. Analytic functions as mappings; Cauchy theorems, Laurent series, maximum modulus theorems and ramifications; normal families; Riemann mapping theorem; Weierstrass factorization theorem; Mittag-Leffler theory; analytic continuation; and harmonic functions.
- 5322, 5323. **Functions of a Real Variable I, II (3:3:0 each)**. Prerequisite: MATH 5319 or equivalent. General measure and integration theory, L_p theory, differentiation theory, and basic functional analysis.
- 5324, 5325. **Topology I, II (3:3:0 each)**. Prerequisite: MATH 4350 or consent of instructor. Point set theory; introduction to combinatorial topology and homology theory.
- 5326, 5327. **Modern Algebra I, II (3:3:0 each)**. Prerequisite: MATH 3360 or consent of instructor. Groups; rings; fields; linear algebra; Galois theory.
- 5330, 5331. **Theory of Ordinary Differential Equations I, II (3:3:0 each)**. Prerequisite: MATH 4351, 4354, or consent of instructor. Existence and uniqueness results, continuation of solutions, continuous dependence on data, linear equations, oscillation and comparison theorems, boundary value problems, and stability analysis.
5332. **Partial Differential Equations I (3:3:0)**. Prerequisite: MATH 4351, 4354, or consent of instructor. Topics include first order equations, method of characteristics, parabolic, hyperbolic and elliptic equations, variational and Hilbert space methods.
- 5334, 5335. **Numerical Analysis I, II (3:3:0 each)**. Prerequisite: MATH 5316 or equivalent. Stability and error analysis; numerical solution of ordinary and partial differential equations; integral equations.
- 5340, 5341. **Functional Analysis I, II (3:3:0 each)**. Prerequisite: MATH 5322. Hilbert and Banach space theory, linear operator theory, the closed graph theorem, the open mapping theorem, the principle of uniform boundedness, linear functionals, dual spaces and weak topologies, distribution theory, topological vector spaces, spectral theory of compact and unbounded self-adjoint and unitary operators, and semigroup theory.
- 5342, 5343. **Advanced Topics in Analysis I, II (3:3:0 each)**. Prerequisite: Consent of instructor. Current topics in analysis. May be repeated for credit.
- 5344, 5345. **Topics in Numerical Analysis I, II (3:3:0 each)**. Prerequisite: MATH 5335. Current advanced topics in numerical analysis; research work using computers. May be repeated for credit.
5346. **Advanced Topics in Applied Mathematics I (3:3:0)**. Prerequisite: Consent of instructor. Current topics in applied mathematics. May be repeated for credit.
5347. **Advanced Topics in Control Theory (3:3:0)**. Prerequisite: Consent of instructor. H theory of linear and non-linear systems, stochastic control, geometric theory of non-linear systems, distributed parameter control systems, and computational methods in control.
5354. **Biomathematics I (3:3:0)**. Prerequisite: Differential equations and linear algebra or consent of instructor. Qualitative and quantitative behavior of deterministic biological models are studied.
5355. **Biomathematics II (3:3:0)**. Prerequisite: Statistics, differential equations, and linear algebra or consent of instructor. Qualitative and quantitative behavior of stochastic biological models are studied.
5356. **Topics in Biomathematics (3:3:0)**. Prerequisite: Biomathematics II or consent of instructor. Current topics in biomathematics are studied such as biomechanics, mathematical epidemiology, mathematical neurology, mathematical ophthalmology, and image processing. May be repeated for credit.
- 5360, 5361. **Advanced Mathematics for Teachers I, II (3:3:0 each)**. Prerequisite: Consent of instructor. Selected topics in mathematics. May be repeated for credit.
5362. **Theory of Numbers (3:3:0)**. Prerequisite: MATH 4362. Diophantine equations; binary quadratic forms; algebraic numbers; theory of number-theoretic functions; partitions; the prime number theorem.
- 5364, 5365. **Computer Literacy and Programming I, II (3:3:0 each)**. Development of computer literacy and programming ability, algorithms and data structures, and recursion.
- 5382, 5383. **Advanced Probability I, II (3:3:0 each)**. Prerequisite: MATH 5319 or consent of instructor. Measure and integration; axiomatic foundations of probability theory; random variables; distributions and their characteristic functions; stable and infinitely divisible laws; limit theorems for sums of independent random variables; conditioning; Martingales.
5399. **Advanced Problems (3)**. Prerequisite: Graduate standing in mathematics. May be repeated for credit.
6000. **Master's Thesis (V1-6)**.
6310. **Master's Report (3)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Statistics (STAT)

(To interpret course descriptions, see pg. 10.)

Graduate Courses

- 5302, 5303. **Applied Statistics I, II (3:3:0 each)**. Prerequisite: Consent of instructor. Graphical presentation of data, histograms, confidence intervals for binomial probabilities, one-sample and two-sample t-test, regression and correlation with two variables, hypothesis testing and confidence intervals; multivariate regression and correlation, partial correlation coefficients, analysis of variance and covariance, multiple comparison procedures. Emphasis on analysis of research data. Not for mathematics, statistics, engineering, or physical science majors; these students should take STAT 5384, 5385.
5326. **Statistical Analysis (3:3:0)**. Prerequisite: Calculus or consent of instructor. Descriptive statistics, testing and estimation in one- and two-sample problems, analysis of variance, multiple comparisons, linear regression and correlation, nonparametric methods.
- 5328, 5329. **Intermediate Mathematical Statistics I, II (3:3:0 each)**. Prerequisite: MATH 2350 or consent of instructor. Probability space; special families of distribution functions; expectations; conditional distributions; sampling distributions; point and interval estimation; hypothesis testing; distribution of functions of random variables; regression; nonparametric techniques.
5370. **Decision Theory (3:3:0)**. Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Game theory; statistical decision; Bayesian statistics.
5371. **Regression Analysis (3:3:0)**. Prerequisite: STAT 5326 and 5329. Estimation and testing in linear regression, residual analysis, influence diagnostics, multicollinearity logistic regression, nonlinear regression.
5372. **Nonparametric Statistical Inference (3:3:0)**. Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Statistical inference, rank order statistics; chi-square and slippage tests; Kolmogorov and Smirnov type tests; confidence intervals and bands; runs tests; applications.
5373. **Design of Experiments (3:3:0)**. Prerequisite: MATH 4343 or STAT 5329 Principles of design and analysis of experiments; Latin squares; split plots; incomplete block designs; efficiency.
5374. **Theory of Linear Statistical Models (3:3:0)**. Prerequisite: MATH 4343 or STAT 5329. Multivariate normal; covariance matrix and operations; distribution of quadratic forms; general linear hypothesis of full and non-full rank; specific linear models.
5375. **Statistical Multivariate Analysis (3:3:0)**. Prerequisite: STAT 5329 or consent of instructor. Multivariate normal distribution; estimation of the mean vector and covariance matrix; distribution of sample correlation coefficients; the generalized T^2 statistic; classification; distribution of the sample covariance matrix.
5376. **Advanced Statistical Methods (3:3:0)**. Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Applied regres-

- sion analysis; cluster analysis; factor analysis; modeling; special topics in designs; sensitivity analysis; non-linear estimation. May be repeated for credit.
5377. **Statistical Sampling Theory (3:3:0)**. Prerequisite: MATH 4343 or STAT 5329. Theory of simple random sampling; stratified random sampling; cluster sampling; ratio estimates; regression estimates; other sampling methods.
5378. **Stochastic Processes (3:3:0)**. Prerequisite: STAT 5329. Markov chains; Markov processes in discrete and continuous time; diffusion processes; Brownian motion and transformations of Brownian motion; non-Markovian processes.
5379. **Time Series Analysis (3:3:0)**. Prerequisite: STAT 5329 or consent of instructor. Stationary and nonstationary time series; finite linear models; identification, filtering, and diagnostic checks of such models; spectral analysis of time series data; forecasting and control.
- 5380, 5381. **Advanced Mathematical Statistics I, II (3:3:0 each)**. Prerequisite: STAT 5329; STAT 5380 is prerequisite for STAT 5381. Theory of estimation and tests of statistical hypotheses; sequential analysis.
5384. **Statistics for Engineers and Scientists I (3:3:0)**. Prerequisite: MATH 2350 or consent of instructor. Probability, descriptive statistics, distributions, estimation, hypothesis testing, nonparametric statistics, data analysis using the computers. Not for mathematics or statistics majors.
5385. **Statistics for Engineers and Scientists II (3:3:0)**. Prerequisite: STAT 5384 or consent of instructor. Continuation of STAT

- 5384; simple and multiple regression analysis; analysis of variance; nonparametric statistics; categorical data analysis; quality control; reliability; data analysis using the computer. Not for mathematics or statistics majors.
5386. **Statistical Computing and Simulation (3:3:0)**. Prerequisite: Consent of instructor. Methods of approximating functions and probabilities; computational methods in linear algebra; introduction to theory and applications of random number generation; testing generators.
6000. **Master's Thesis (V1-6)**.
6310. **Master's Report (3)**.
7000. **Research (V1-12)**.

Department of Philosophy

Faculty

Peder George Christiansen, Chairperson

Professors: Christiansen, Curzer, and Suppe;
Associate Professors: Nathan and Schaller;
Assistant Professors: Kim, Kutach, Meskin, Rupert, Sowaal, and Webb.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Philosophy
- Master of Arts in Philosophy

The department also participates in the Honors College Natural History and Humanities major and minors in Humanities and Women's Studies at the undergraduate level and the doctoral program in Fine Arts at the graduate level.

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 effectively increases one's ability to understand and communicate with others. 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 a 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 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

thirty disciplines on the law school admission test (LSAT). Additionally, philosophy majors have been more likely than almost all other majors to gain admission to medical schools. No other undergraduate discipline can match such a record of achievement across the entire range of professional and graduate schools.

The Philosophy Department brings distinguished guest speakers for public lectures, classroom discussions, and visits with philosophy majors and graduate students. These visits provide a unique chance to talk informally about philosophical topics with world famous scholars.

Students majoring in philosophy must complete 30 hours in philosophy, including PHIL 2310, 2320, 3301, 3303, and either 4330 or 4340. Majors may not count PHIL 1310 toward fulfilling the 30-hour requirement, but they may substitute PHIL 4310 for the 2310 requirement. Minors are required to complete 18 hours in philosophy at least 6 of which must be at the 3000 or 4000 level. For transfer students, at least 9 hours of the major or 6 hours of the minor must be completed in residency at Texas Tech. Philosophy students must receive at least a C in any philosophy course for it to satisfy major or minor requirements. Many students combine a philosophy major with a second major.

Philosophy (PHIL)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1310. **Reasoning (3:3:0) [PHIL 2303]**. Prerequisite: Freshman or sophomore standing. Basic methods of objective thinking. Considers elementary forms of reasoning, problem-solving techniques, and avoidance of common fallacies. Emphasis is upon developing skills in the practice of everyday logic.
2300. **Beginning Philosophy (3:3:0) [PHIL 1301]**. An introduction to philosophical thinkers, ideas, and methods. Satisfies the Core Curriculum humanities requirement.
2310. **Logic (3:3:0)**. Development of formal methods for evaluating deductive rea-
2320. **Introduction to Ethics (3:3:0) [PHIL 2306]**. Discussion of problems and theories of morality. Includes the application of philosophical techniques to issues of contemporary moral concern. Satisfies the Core Curriculum humanities requirement.
2350. **World Religions and Philosophy (3:3:0) [PHIL 2350]**. Philosophical study of the doctrines and practices of the major world religions, including Hinduism, Buddhism, Christianity, Judaism, and Islam. Satisfies the Core Curriculum humanities and multicultural requirement.
3301. **Classical Greek Philosophy (3:3:0)**. Study of the major philosophical ideas as originally developed in the Western world by thinkers such as Socrates, Plato, Aristotle, and others. Satisfies the Core Curriculum humanities and multicultural requirement. (Writing Intensive)
3302. **Asian Philosophy (3:3:0)**. Study of the major philosophical ideas originating in India and China, and developed generally in Asia. Satisfies the Core Curriculum Humanities requirement. Satisfies the Core Curriculum multicultural requirement.
3303. **Modern European Philosophy (1600-1800) (3:3:0)**. Study of the major philosophical ideas as they developed in Great Britain and on the European continent since the Renaissance, covering such figures as Descartes, Hume, and Kant. Satisfies the Core Curriculum humanities requirement. (Writing Intensive)
3304. **Existentialism and Phenomenology (3:3:0)**. Consideration of the meaning of human existence through study of thinkers such as Nietzsche, Heidegger, Husserl, Merleau-Ponty, Sartre, and others. Satisfies the Core Curriculum humanities requirement.
3320. **Introduction to Political Philosophy (3:3:0)**. Basic issues and concepts in po-

Graduate Program / 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 27 hours of graduate course work plus 6 hours of thesis. Alternatively, the student may complete 36 hours of graduate course work and then take an oral exit examination over a significant research paper. Up to one third of the student's course work 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.

- litical philosophy, including discussion of such topics as justice, freedom, equality, authority, community, and the nature of politics and the state. Satisfies the Core Curriculum humanities requirement. (POLS 3331)
3321. **Philosophy of Law (3:3:0)**. Discussion, based on study of philosophical writings, of various conceptions of law and their relation to morality. Includes philosophical problems about liberty, privacy, justice, and criminal punishment. Satisfies the Core Curriculum social and behavioral sciences requirement. (Writing Intensive)
3322. **Biomedical Ethics (3:3:0)**. Discussion of conceptual and moral problems surrounding such issues as abortion, euthanasia, genetic research, behavior control, allocation of medical resources, health, and disease. Satisfies the Core Curriculum humanities requirement.
3324. **Philosophy of Religion (3:3:0)**. An examination of general philosophical problems that arise in connection with religion. Topics may include the nature of religion, the existence of God, the problem of evil, the relation between faith and reason, and the relation between religion and morality. Satisfies the Core Curriculum humanities requirement.
3325. **Environmental Ethics (3:3:0)**. Discussion of conceptual and moral questions surrounding human population and consumption of resources, loss of biodiversity and wilderness areas, and human use of nonhuman animals.
3330. **Philosophy of Science (3:3:0)**. Inquiry into the nature of science including the examination of basic scientific concepts and the forms of scientific reasoning. Satisfies the Core Curriculum technology and applied science requirement.
3331. **Philosophy of Social and Human Sciences (3:3:0)**. Study of selected approaches, concepts, and methods in the social and human sciences, especially as these are related to the question of the nature of man and of human society. Satisfies the Core Curriculum social and behavioral sciences requirement.
3332. **Feminism and Philosophy (3:3:0)**. Feminist philosophical perspectives on issues arising in such areas as ethics, legal theory, epistemology, and the study of race, gender, and sexuality. Satisfies the Core Curriculum humanities requirement.
3334. **Philosophy of Biology (3:3:0)**. Study of the nature and scope of biological theories. Topics may include evolution and creation, natural selection and design, sociobiology, or genetic engineering.
3335. **Philosophy of Technology (3:3:0)**. This course will give students a chance to reflect on ethical, epistemological, and ontological issues lying behind the production and use of technology.
3340. **Minds, Brains, and Computers (3:3:0)**. Study of the nature of mental entities and how they fit into the causal structure of the world, with particular reference to recent developments in the cognitive sciences.
3341. **Philosophy and Literature (3:3:0)**. Philosophical ideas in literature, including the nature of evil, free will, personal identity, the mind-body problem, and the philosophical status of literature.
3342. **Philosophy and Film (3:3:1)**. Philosophical examination of issues raised by film, such as cinematic representation, realism, film genre, the power of cinema, and the interpretation of film. Required screenings.
4000. **Philosophical Problems (VI-3)**. Prerequisite: Previous course work in philosophy and consent of instructor. Directed individual studies or conferences on selected advanced topics. May be repeated for credit.
4301. **Seminar in Ancient Philosophy (3:3:0)**. Prerequisite: Previous philosophy course work or consent of instructor. In-depth study of one or two philosophical texts or themes from the ancient world. Topics vary.
4310. **Advanced Logic (3:3:0)**. Prerequisite: PHIL 2310 or consent of instructor. Full treatment of sentential logic and first-order predicate logic. May also treat topics such as identity, definite descriptions, axiomatic systems, completeness. Satisfies the Core Curriculum mathematics requirement (in conjunction with a mathematics course).
4320. **Ethics (3:3:0)**. Prerequisite: PHIL 2320 or consent of instructor. Advanced topics in ethical theory, with special emphasis on the meaning and justification of moral judgments, the possibility of ethical knowledge, and the nature of moral standards. Satisfies the Core Curriculum humanities requirement.
4321. **Political Philosophy (3:3:0)**. Prerequisite: Previous course work in philosophy or consent of instructor. Study of contemporary writings in political philosophy. Discussion of selected philosophical issues concerning liberalism, conservatism, communitarianism, liberal neutrality, social choice theory, and political obligation.
4323. **Aesthetics (3:3:0)**. Prerequisite: Previous course work 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. Satisfies the Core Curriculum humanities requirement.
4330. **Epistemology (3:3:0)**. Prerequisite: Previous course work in philosophy or consent of instructor. An examination of the nature and scope of knowledge, and the justification of various types of knowledge claims. Satisfies the Core Curriculum humanities requirement.
4331. **Philosophy of Language (3:3:0)**. Prerequisite: Previous course work in philosophy or consent of instructor. General theory of significance, meaning, and interpretation. Satisfies the Core Curriculum humanities requirement.
4340. **Metaphysics (3:3:0)**. Prerequisite: Previous course work 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). Satisfies the Core Curriculum humanities requirement.
4341. **Great Figures in Philosophy (3:3:0)**. Prerequisite: Previous course work in philosophy or consent of instructor. In-depth study of the works of just one or two great philosophers.
5301. **Studies in Greek Philosophy (3:3:0)**. Studies in the Pre-Socratics, Plato, Aristotle, and Hellenistic philosophy. May be repeated as topic varies.
5302. **Studies in Modern Philosophy (1600-1800) (3:3:0)**. Studies in major philosophical works of the modern period drawn from such philosophers as Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant. May be repeated as topic varies.
5308. **Basic Issues in Contemporary Philosophy (3:3:0)**. Major philosophical theories and controversies of the twentieth century. Works will be drawn from such philosophers as Wittgenstein, Russell, Heidegger, Husserl, Quine, Davidson, and Kripke. May be repeated as topic varies.
5310. **History of Aesthetics (3:3:0)**. Major philosophical theories of art and beauty from classical Greece to the mid-twentieth century. May be repeated as topics vary.
5311. **Issues in Logic and Epistemology (3:3:0)**. A study of one or two questions about the justification of our knowledge of the external world, the mind, mathematics, or logic. May be repeated as topic varies.
5314. **Contemporary Aesthetics (3:3:0)**. Current problems in aesthetics: the nature of a work of art, of aesthetic experience and judgment; issues of interpretation and evaluation in the arts. May be repeated as topic varies.
5320. **Seminar in Ethics (3:3:0)**. Selected topics in ethical theory: relativism, moral reasons, the nature of moral value,

- deontological and teleological ethics. May be repeated as topic varies.
5321. **Social and Political Philosophy (3:3:0).** Study of selected social or political philosophers or of selected topics such as justice, liberty, equality, liberalism, conservatism, and rights. May be repeated as topic varies.
5322. **Law and Philosophy (3:3:0).** Study of works of legal philosophers and 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 (3:3:0).** Central issues in philosophy of religion including the nature of religion, the existence of God, the relation between faith and

- reason, and the problem of evil. May be repeated as topic varies.
5330. **Philosophy of Science (3:3:0).** Methodological and conceptual issues in the physical and social sciences. Emphasis upon scientific investigation as a way of knowing. May be repeated as topic varies.
5331. **Philosophical Psychology (3:3:0).** Central issues in philosophy of the mind, including the nature of the mental and the relation between mental and physical. Emphasis on thought and perception. May be repeated as topic varies.
5340. **Seminar in Metaphysics (3:3:0).** An intensive study of one or two topics which include the nature of existence, cause, identity, kinds and their instances,

- change, and/or mind. May be repeated as topic varies.
5341. **Great Figures in Philosophy (3:3:0).** In-depth study of the works of just one or two great philosophers. May be repeated as topic varies.
5350. **Seminar in Teaching Philosophy (3:3:0).** Theory, practice, and problems teaching philosophy for beginning instructors. Development of course objectives, syllabi, and teaching techniques. Practical pedagogical and associated philosophical issues.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Department of Physics

Faculty

Lynn Lamar Hatfield, Chairperson

Horn Professors: Estreicher and Menzel; *Professors:* Borst, Cheng, Hatfield, Holtz, Lichti, Lodhi, Myles, Papadimitriou, Quade, and Wigmans; *Associate Professors:* Akchurin, Gibson, Glab, Huang, Lamp, and Thacker; *Assistant Professors:* Menon and Wilhelm; *Adjunct Faculty:* Gangopadhyay and Scully; *Joint Faculty:* Dallas, Kristiansen, Krompholz, Poirier, Quitevis, and Temkin.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Physics
- Master of Science in Physics
- Doctor of Philosophy in Physics

The department also supervises an applied physics option leading to the M.S. and the Ph.D. degrees. The B.S.E.P. program in engineering physics is listed under the College of Engineering. These interdisciplinary options afford flexibility in course work and area of research concentration. Specializations in chemical physics (in cooperation with the Department of Chemistry and Biochemistry) and biophysics (in cooperation with the Health Sciences Center and the University Medical Center) are also available. An M.S. degree involving industry internships is available to selected graduate students.

Undergraduate Program

A typical sequence of courses in physics begins with: PHYS 1305, 1408, 2401, and 2402, for a total of 15 hours at the introductory level. These are followed by the intermediate and advanced sequences: PHYS 3204 (1 semester required, 2 semesters recommended), 3301, 3305, 3306, 4302, 4304, and 4307. It is recommended that students who intend to pursue graduate work in physics take courses in advanced topics such as Computational Physics (4301), Solid State Physics (4309), and Nuclear and Particle Physics (4312).

The required mathematics courses for physics majors are MATH 1351, 1352, 2350, 3350, and 3351. The sequence MATH 3354 and 4354 can be substituted for MATH 3350 and 3351.

Students planning to pursue graduate work in physics should consult the physics advisor about which math courses to take.

In fulfilling degree requirements, majors in this department must have a grade-point average of 2.0 or better in physics courses, at least 37 hours of physics in which a grade of C or better was received, and meet the general requirements of the degree they are seeking (as described in this catalog). The minimum number of hours required for a degree in physics is 133. Credit for transferred physics hours will be handled by the departmental advisor on an individual basis.

Students are encouraged to devote time to undergraduate research. Research in the department includes atomic, molecular, and optical physics, condensed matter physics, nuclear physics, particle physics, and biophysics. Applied physics is pursued in fluorescence spectroscopy, forensic studies, pulsed power, semiconductor, materials, and surfaces.

A broad variety of minor subjects can be elected by a student majoring in physics. These include such traditional choices as mathematics, chemistry, and geophysics, but also other areas such as computer science, business, and electrical engineering. Students contemplating minors outside the College of Arts and Sciences should seek advice from the departmental advisor before beginning that minor.

A minor in physics requires 18 semester hours, at least 6 of which must be at the 3000 level or above and must be approved by the undergraduate advisor. The minor sequence is PHYS 1408, 2401, and 2402, plus 6 semester hours of approved courses at the 3000 level or above. Students must receive a grade of at least C in all courses counted toward a minor in Physics. The astronomy courses may not be used to satisfy requirements for the physics major or minor.

Students are encouraged to join The Society of Physics Students, which sponsors the "Physics Circus" and many other academic and social activities.

Teacher Education. Students seeking secondary certification to teach physics and other sciences should consult the undergraduate advisor in the Physics Department and the "Teacher Education" section (p. 51) of the catalog. For information on certification in physical or composite sciences, the College of Education should also be consulted.

Graduate Program

A core curriculum consisting of PHYS 5301, 5303, 5305, and 5306 forms the nucleus of the Master's and Ph.D. programs and is the basis for the master's final examination and the Ph.D. qualifying examination. A student selecting any of the degree options may designate a minor consisting of a minimum of 6 hours of course credit in a related area and satisfy any additional requirements of the minor department. (These 6 hours may be taken in the Physics Department.) Full-time study towards the master's degree should be completed in about two years.

All graduate students must enroll in PHYS 5101 for the first four semesters and PHYS 5104 whenever on a teaching assistantship. PHYS 5312, 5322, and 5307 are tools courses that develop necessary skills for use in other courses and in research. They are most useful when taken early.

M.S. Degree in Physics, Thesis Option: A minimum of 24 hours of course credit plus 6 hours of thesis research with a minimum of 18 hours in the department. The thesis is defended in a final oral examination.

M.S. Degree in Applied Physics, Thesis Option: A minimum of 24 hours of course credit plus 6 hours of thesis research with a minimum of 9 hours in a specified

Continued on next page

Graduate Program (continued from previous page)

applied area. This may be in a subfield of physics or in a related discipline, with the master's thesis from that area. The thesis is defended in a final oral examination.

M.S. Degree in Applied Physics, Internship Option: 24 hours of course credit with a separate course sequence as discussed with the graduate advisor, plus two semesters of internship in a regional industry or research laboratory arranged through the department. A report is written following each internship period, and defended in an oral examination. Twelve hours of internship or report credit is required beyond the course work.

M.S. Degree in Physics, Nonthesis Option: 36 hours of course credit with a minimum of 24 hours in the department, plus passing a comprehensive master's final examination. This option is normally reserved for students in the Ph.D. program.

Ph.D. Degree in Physics: The core courses for the Ph.D. degree are the same as those for the M.S. degree plus PHYS 5302 and 6306. Further selections should be made from PHYS 5304, 5307, 5311, 5322, 7304, and 5300 (which may be repeated in different topics).

Students seeking the Ph.D. degree must pass a preliminary examination and a qualifying examination as described in the departmental *Graduate Booklet* and in accordance with Graduate School requirements. The examination topics are from general undergraduate physics and graduate core courses. Students perform Ph.D. thesis research. After completing the research, the candidate prepares the dissertation and makes a public oral defense before the dissertation committee.

Students are encouraged to get involved in research early by taking PHYS 7000, which may count toward the degree. Thesis hours in PHYS 6000 are 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.

Astronomy (ASTR)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1400. **Solar System Astronomy (4:3:2) [PHYS 1411].** This course covers the sun, planets, moons, asteroids, comets, gravitation, and formation. (Honors section offered.)
1401. **Stellar Astronomy (4:3:2) [PHYS 1412].** This course covers stars, star formation, galaxies, and cosmology models. (Honors section offered.)

Physics (PHYS)**Undergraduate Courses**

1304. **Physics: Basic Ideas and Methods (3:3:0).** Intended to provide physics background to pre-engineering students. Examines basic concepts in physics. Problem-solving techniques, graphical representations, and pertinent mathematics
1305. **Engineering Physics Analysis I (3:3:0).** The profession of engineering physics and its relation to energy, materials, resources, computers, communication, and control. Basic computer programming. Synthesis and analysis of typical engineering physics problems.
1401. **Physics for Non-Science Majors (4:3:2) [PHYS 1410].** This covers the basic laws and vocabulary of science using a minimum of mathematics and counts toward fulfillment of the natural science requirement in A&S.
1403. **General Physics I (4:3:2) [PHYS 1310, 1401].** Prerequisite: MATH 1320 and 1321 or 1550. This course is non-calculus introductory physics covering mechanics, heat, and sound, thus providing background for study in science-related areas.
1404. **General Physics II (4:3:2) [PHYS 1402].** Prerequisite: PHYS 1403. This course is non-calculus introductory physics covering electricity, magnetism, light, and modern physics, thus providing background for study in science-related areas.

Physics Curriculum**FIRST YEAR**

Fall		Spring	
PHYS 1305, Engr. Phys. Anal. I	3	PHYS 2401, Prin. of Phys. II	4
PHYS 1408, Prin. of Phys. I.	4	CHEM 1307, Prin. of Chem. I	3
MATH 1351, Calculus I	3	CHEM 1107, Prin. of Chem. I Lab.	1
ENGL 1301, Ess. Coll. Rhetoric	3	MATH 1352, Calculus II	3
Health and Physical Fitness	1	ENGL 1302, Adv. Coll. Rhetoric	3
TOTAL	14	Health and Physical Fitness	1
		TOTAL	15

SECOND YEAR

Fall		Spring	
PHYS 2402, Prin. of Phys. III	4	PHYS 3204, Intermed. Lab.	2
MATH 2350, Calculus III	3	MATH 3350, Math. Eng. & Sci.	3
CHEM 1308, Prin. of Chem. II	3	POLS 2302, Am. Pub. Pol.	3
CHEM 1108, Prin. Chem. II Lab.	1	English	3
POLS 1301, Am. Govt.	3	Foreign Language	3
Foreign Lang.	3	Social or Behavioral Science	3
TOTAL	17	TOTAL	17

THIRD YEAR

Fall		Spring	
PHYS 3305, Elect. & Magnet.†	3	PHYS 3204, Intermed. Lab.††	2
PHYS 3401, Optics	4	PHYS 3306, Elect. & Magnet.†	3
MATH 3351, High. Math. Eng. & Sci.	4	HIST 2301 Hist. of U. S. Since 1877	3
HIST 2300, Hist. of U. S. to 1877	3	Electives	6
Elective	3	TOTAL	14
English	3		
TOTAL	19		

FOURTH YEAR

Fall		Spring	
PHYS 4307, Quant. Mechanics	3	PHYS 4301, Comp. Phys.†	3
Adv. Physics Elective	3	PHYS 4302, Stat. and Therm.†	3
Adv. Electives+	12	PHYS 4304, Mechanics†	3
TOTAL	18	COMS 2300	3
		Adv. Electives+	6
		TOTAL	18

Select from Arts and Sciences General Degree requirements. See English requirements.

† Offered in alternating years. Check with undergraduate advisor.

†† Recommended.

+ Computer language and advanced physics courses recommended.

1406. **Physics of Sound and Music (4:3:3).** Designed to acquaint the student with the principles of physics used in the production of sound and music. A minimum of mathematics will be used. Some of the physical principles are exemplified in laboratory sessions. Satisfies natural science requirement in Arts and Sciences.
1408. **Principles of Physics I (4:3:2) [PHYS 2425].** Corequisite: MATH 1351. This course is calculus-based introductory physics covering mechanics, kinematics, energy, momentum, and thermodynamics. (Honors section offered.)
2351. **Introduction to Forensic Science (3:3:0).** Identification methods (fingerprints, DNA, serology), physical and biological trace evidence examination, arson and explosives detection, spectroscopic and analytical chemical techniques, pathology, and law.
2401. **Principles of Physics II (4:3:2) [PHYS 2426].** Prerequisite: PHYS 1408; corequisite: MATH 1352. This course is calculus-based introductory physics covering electric and magnetic fields, electromagnetic waves, and optics. (Honors section offered.)
2402. **Principles of Physics III (4:3:3) [PHYS 2427].** Prerequisite: PHYS 2401. Study of atomic, molecular, and nuclear phenomena. Relativity, quantum effects, hydrogen atom, many electron atoms, and some molecular physics. Includes laboratory.
3000. **Undergraduate Research (V1-6).** Individual and/or group research projects in basic or applied physics, under the guidance of a faculty member.
3204. **Intermediate Laboratory (2:0:6).** Prerequisite: PHYS 1408, 2401, 2402, with laboratories. Laboratory course on advanced physical principles, including experiments in optics, atomic, molecular, solid state, and nuclear physics. May be repeated for credit.
- 3305, 3306. **Electricity and Magnetism (3:3:0 each).** Prerequisite: PHYS 2401. Maxwell's equations, electrostatics, dielectric materials. Magnetic fields and materials. Electromagnetic waves, radiation. Relativity.
3351. **Photoluminescence in Criminalistics (3:3:0).** Prerequisite: PHYS 2401: Spectroscopic techniques and instrumentation, fingerprint detection methodology, fiber and document examination, trace evidence, explosives, blood detection, and DNA labeling.
3400. **Fundamentals of Physics (4:3:3).** Prerequisite: MATH 1320. This course teaches the fundamentals of physics and strategies for teach-

ing these fundamentals. This course is not open to engineering, science, or mathematics majors.

3401. **Optics (4:3:3)**. Prerequisite: PHYS 1408 and 2401. This course covers geometrical and physical optics, waves, reflection, scattering, polarization, interference, diffraction, modern optics, and optical instrumentation.
4000. **Independent Study (V1-4)**. Prerequisite: Approval of advisor. Study of advanced topics of current interest under direct supervision of a faculty member.
4301. **Computational Physics (3:2:2)**. Prerequisite: PHYS 1408, 2401, 2402. Numerical modeling of physical systems. Data acquisition and analysis. Graphics for displaying complex results. Quadrature schemes, solution of equations. Use of microcomputers in assignments.
4302. **Statistical and Thermal Physics (3:3:0)**. Prerequisite: PHYS 2402 and knowledge of differential equations. Introduction to statistical methods in physics. Formulation of thermodynamics and statistical mechanics from a unified viewpoint with applications from classical and quantum physics.
4304. **Mechanics (3:3:0)**. Prerequisite: PHYS 1408, 2401, or equivalent, and differential equations. Dynamics of particles and extended bodies, both rigid and fluid, using Newtonian mechanics and the Euler-Lagrange equations from Hamilton's principle. Nonlinear systems and chaos with numerical modeling. Applications of the Navier Stokes equation.
4306. **Senior Project (3)**. Prerequisite: Senior standing in physics or engineering physics. Individual research project under the guidance of a faculty member.
4307. **Introduction to Quantum Mechanics (3:3:0)**. Prerequisite: MATH 3350. Experimental and conceptual bases. Dualism, uncertainty principle. Mathematical framework. Schroedinger equation, solutions. Hydrogen atom. Pauli principle, spin. Periodic table. Perturbation theory.
4309. **Solid State Physics (3:3:0)**. Prerequisite: PHYS 3305 and knowledge of elementary quantum mechanics. The structural, thermal, electric, and magnetic properties of crystalline solids. Free electron theory of metals. Concept of energy bands and elementary semiconductor physics.

Graduate Courses

5000. **Independent Study (V1-3)**. This course is to offer independent study under the direct supervision of a faculty member. This course is not to be used for thesis or dissertation research or writing.
5001. **Master's Internship (V1-12)**. Internship in an industrial or research laboratory setting. Arranged through the department and directly related to degree program with approval of Internship Coordinator.
5101. **Seminar (1:1:0)**. Must be taken by every graduate student for at least the first four semesters. Taken pass-fail.
5104. **Instructional Laboratory Techniques in Physics (1:1:0)**. Laboratory organization and instructional techniques. Does not count toward the minimum requirement of a graduate degree. Must be

taken pass-fail by all teaching assistants when on appointment.

5300. **Special Topics (3:3:0)**. Prerequisite: Approval of graduate advisor. Topics in semiconductor, plasma, surface, particle physics, spectroscopy, and others. May be repeated in different areas.
5301. **Quantum Mechanics I (3:3:0)**. Experimental basis and history, wave equation, Schrödinger equation, harmonic oscillator, piecewise constant potentials, WKB approximation, central forces and angular momentum, hydrogen atom, spin, two-level systems, and scattering. M.S. and Ph.D. core course.
5302. **Quantum Mechanics II (3:3:0)**. Prerequisite: PHYS 5301 or equivalent. Quantum dynamics, rotations, bound-state and time-dependent perturbation theory, identical particles, atomic and molecular structure, electromagnetic interactions, and formal scattering theory. Ph.D. core course.
5303. **Electromagnetic Theory (3:3:0)**. Electrostatics and magnetostatics, time varying fields, Maxwell's equations and conservation laws, electromagnetic waves in materials and in waveguides. M.S. and Ph.D. core course.
5304. **Solid State Physics (3:3:0)**. Prerequisite: PHYS 5301 or equivalent. A survey of the microscopic properties of crystalline solids. Major topics include lattice structures, vibrational properties, electronic band structure, and electronic transport.
5305. **Statistical Physics (3:3:0)**. Elements of probability theory and statistics; foundations of kinetic theory. Gibb's statistical mechanics, the method of Darwin and Fowler, derivation of the laws of macroscopic thermodynamics from statistical considerations; other selected applications in both classical and quantum physics. M.S. and Ph.D. core course.
5306. **Classical Dynamics (3:3:0)**. Lagrangian dynamics and variational principles. Kinematics and dynamics of two-body scattering. Rigid body dynamics. Hamiltonian dynamics, canonical transformations, and Hamilton-Jacobi theory of discrete and continuous systems. M.S. and Ph.D. core course.
5307. **Methods in Physics I (3:3:0)**. Provides first-year graduate students the necessary skill in mathematical methods for graduate courses in physical sciences; applications such as coordinate systems, vector and tensor analysis, matrices, group theory, functions of a complex variable, variational methods, Fourier series, integral transforms, Sturm-Liouville theory, eigenvalues and functions, Green functions, special functions and boundary value problems. Tools course.
5309. **Atomic and Molecular Physics (3:3:0)**. Prerequisite: PHYS 5301 or equivalent. A survey of atomic and molecular physics. Major topics include group theory, molecular orbital theory, and energy transfer processes.
5311. **Nuclear Physics (3:3:0)**. Prerequisite: PHYS 5301 or equivalent. Symmetries in nuclear physics, nuclear interactions, nuclear models, nuclear reactions, scattering, resonance, nuclear energy, and applications.
5322. **Computational Physics (3:2:2)**. Numerical modeling of physical systems. Data

acquisition and analysis. Graphics for displaying complex results. Quadrature schemes and solution of equations. Use of minicomputers and microcomputers. Tools course.

5324. **Classical Mechanics I (3:3:0)**. Prerequisite: PHYS 1308, MATH 3350, 3351, or equivalent. Introduction to Newtonian Mechanics, Euler-Lagrange Equations, and Hamilton's Principle. For graduate students in departments other than physics.
5330. **Semiconductor Materials and Processing (3:3:0)**. Survey of semiconductor materials deposition, characterization, and processing techniques with emphasis on the fundamental physical interactions underlying device processing steps.
5332. **Semiconductor Characterization and Processing Laboratory (3:1:4)**. A hands-on introduction to semiconductor processing technology and materials characterization techniques. Intended to accompany PHYS 5330.
5335. **Physics of Semiconductors (3:3:0)**. Theoretical description of the physical and electrical properties of semiconductors; Band structures, vibrational properties and phonons, defects, transport and carrier statistics, optical properties, and quantum confinement.
5336. **Device Physics (3:3:2)**. Principles of semiconductor devices; description of modeling of p/n junctions, transistors, and other basic units in integrated circuits; relationship between physical structures and electrical parameters.
5371. **Conceptual Physics for Teachers (3:3:0)**. Inquiry-based course in elementary physical principles of mechanics, heat, electricity, and magnetism.
5372. **Astronomy for Teachers (3:3:0)**. Inquiry-based course in solar system, stellar, and galactic astronomy. Discusses history of human understanding of the universe.
5380. **Introduction to Microsystems (3:3:0)**. Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces basic microsystem design, analysis, simulation, and manufacture through several case studies using representative devices.
6000. **Master's Thesis (V1-6)**.
6002. **Master's Report (V1-6)**.
6306. **Advanced Electromagnetic Theory (3:3:0)**. Prerequisite: PHYS 5303. Classical theory of electromagnetic fields, radiation, scattering and diffraction, special theory of relativity and electrodynamics, special topics. Ph.D. core course.
7000. **Research (V1-12)**.
7304. **Condensed Matter Physics (3:3:0)**. Prerequisite: PHYS 5304. Problems of current interest in condensed matter physics. Topics include transport properties in solids, superconductivity, magnetism, semiconductors, and related topics.
8000. **Doctor's Dissertation (V1-12)**.

Department of Political Science

Faculty

Philip Howard Marshall, Chairperson

Professors: Cochran, Dometrius, Lee, Marshall, and Mayer; *Associate Professors:* Barkdull, Emmert, and Khan; *Assistant Professors:* Banducci, Collins, Edwards, Gerber, Karp, Patterson, Prins, Scott, and Thames.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Political Science
- Master of Arts in Political Science
- Master of Public Administration
- Doctor of Philosophy in Political Science

The department also participates in both the Latin American and Iberian Studies program and the Russian Language and Area Studies program leading to the Bachelor of Arts degree as well as in the urban studies, international studies, ethnic studies, women's studies, Asian area studies, and religion studies minor programs and the university Honors College. For more information visit the departmental Web site at www.depts.ttu.edu/politicalscience.

Undergraduate Program

The political science curriculum is designed to provide students with a solid foundation and broad understanding of the discipline of political science and allow them to specialize in areas of particular substantive interest. Students seeking an undergraduate degree in political science must complete 30 hours of course work within the department. Political science majors are required to take POLS 1301. POLS 2302 may be skipped if the student receives an A or B in POLS 1301. Majors may, however, elect to take and count POLS 2302 as part of their program. All majors are required to take POLS 3310 and three of the following: POLS 3331, 3351, 3361, or 3371. The 12 remaining hours must include at least two writing intensive courses. At least 12 of the 30 hours required for a political science major must be taken in residence.

The requirement for a minor in political science is 18 hours, including POLS 1301 and 2302. Minors may skip POLS 2302 if they receive an A or B in POLS 1301. Political science minors are also required to take any two of the following courses: POLS 3331, 3351, 3361, 3371. At least 6 of the 18 hours required for a political science minor must be taken in residence.

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.

The Department of Political Science coordinates a special multidisciplinary program at the graduate level for students interested in local, state, or federal government careers. The course work is interdepartmental in nature and includes courses tailored to meet the student's career objectives. An integral part of the program is placement as an intern in a unit of government.

Under state law, all students who receive bachelor's degrees from Texas Tech must have received credit for 6 semester hours in political science, covering the federal and Texas constitutions. Students will normally fulfill this requirement by completing POLS 1301, which is a prerequisite for all upper division political science courses, and POLS 2302. A student who earns an A or B in POLS 1301 may substitute in place of POLS 2302 one of the upper level courses marked with an asterisk in the course list. Permission of the instructor may be required for such substitution.

Teacher Education. Students seeking certification to teach in the secondary schools of Texas may qualify for such certification by completing requirements for the Bachelor of Arts. Consult the political science advisor and the College of Education for details.

Requirements and Prerequisites. POLS 1301 is a prerequisite for all upper division political science courses. A student must receive at least a C in courses in political science that apply to major, minor, or teaching field requirements.

Joint Bachelor's and Master's Degree Program. Undergraduate political science majors may apply for admission to the political science master's program during their junior year. If accepted, they will begin taking graduate courses during their senior year. Nine hours of graduate course work taken during the senior year will count toward both undergraduate and graduate degree requirements. For more information and application procedures, contact the graduate advisor at POLSGRAD@ttu.edu or visit the department.

Political Science (POLS)

(To interpret course descriptions, see pg. 10.)

A student who earns an A or B in POLS 1301 may substitute in place of POLS 2302 one of the upper level courses marked with an asterisk. Permission of the instructor may be required for such substitution.

Undergraduate Courses

3301. **American Government, Organization (3:3:0) [GOVT 2301, 2305].** Constitutions and organization of the governments of the United States, the states in general, and Texas in particular.
3202. **American Public Policy (3:3:0) [GOVT 2302, 2306].** Completion of POLS 1301 not required but strongly recommended before enrolling in POLS 2302. The policy-making process in the governments of the United States, the states in general, and Texas in particular.
3300. **Selected Topics in Political Science (3:3:0).** Topics of contemporary interest, varying from semester to semester. Consult the department for current topic. Open to all students. May be repeated for credit with changing topics.
3310. **Introduction to Political Analysis (3:3:0).** Survey of methods of and approaches to the study of politics and their underlying assumptions as they apply to the major concepts of the discipline.
3311. **Political Data (3:3:0).** Prerequisite: Consent of instructor. An introduction to political data sources, their strengths and weaknesses and their uses in research.
- 3323.* **Legislation (3:3:0).** Factors involved in the framing and enactment of statutory law with emphasis upon the work of the Congress of the United States.
- 3325.* **Political Parties (3:3:0).** Party history, functions, organization, finance, nominations, campaign methods, and elections.
- 3326.* **Women in Politics (3:3:0).** A study of female political participation in the United States, including voting, campaign activity, interest group activity, and office holding. (W S 3326)
- 3327.* **The American Presidency (3:3:0).** The presidency, its constitutional basis, structure, powers, functions, and responsibilities.
3330. **Ancient and Medieval Political Theory (3:3:0).** Political ideas of the great thinkers in the Western world from the time of the Golden Age of Greece until the rise of modern political thought.
3331. **Introduction to Political Philosophy (3:3:0).** Basic issues and concepts in political philosophy, including discussion of such topics as justice, freedom, equality, authority, community, and the nature of politics and the state. (PHIL 3320)
3332. **Modern Political Theory (3:3:0).** Major political thinkers starting with Machiavelli and Hobbes and movements such as liberalism, conservatism, utilitarianism, socialism, and communism.
3333. **Contemporary Political Theory (3:3:0).** Political thought since World War II; liberalism, conservatism, socialism, communism, and existentialism are examined and criticized. Attention is given to the roots of contemporary thought in the 19th century.
- 3339.* **Religion and Politics (3:3:0).** Exploration of various aspects of the relationship between major world religions and politics, including questions of church and state.
- 3340.* **Fiscal Administration (3:3:0).** Governmental budgeting and revenue raising, emphasizing theories, techniques, procedures, implementation, the political environment in which such activities take place, and possible alternatives to existing practices.
- 3341.* **The Administrative Process (3:3:0).** A survey of the field of public administration. Principles of administrative organization; distribution of administrative functions together with the structure of government charged with the carrying out of public policy.

- 3346.* **Public Policy Analysis (3:3:0).** The study of public policy formulation, implementation, and evaluation at various levels of government. Particular focus on health, social, and development policies. Attention to policy analysis skills and approaches used in government and consulting.
- 3350.* **Criminal Process (3:3:0).** An introduction to the law and government in action when man and state are in conflict.
- Areas examined include the nature and rationale of punishment, legislative problems in defining criminal behavior, and judicial problems in adjudicating within the legislative framework.
- 3351.* **The Judicial Process (3:3:0).** Analysis of the judicial process as part of the political process; judicial personnel and organization; sources and instruments of judicial power; judicial reasoning and behavior; and impact of judicial activity.
- 3352.* **Constitutional Law-Powers (3:3:0).** A case study of American constitutional law emphasizing constitutional bases of governmental power. Leading cases demonstrating the principles of separation of powers, judicial review, taxation, commerce, and implied powers.
- 3353.* **Constitutional Law - Limitations (3:3:0).** Primarily a case study of American constitutional law emphasizing the constitutional limitations on govern-

Graduate Program / Political Science

For the M.A. and Ph.D. degrees, the department emphasizes and encourages specialization in the following areas of political science: American institutions and behavior, comparative politics, and international relations. In addition, the department offers graduate courses in political theory, methodology, public policy, and public administration.

To be admitted to the M.A. or Ph.D. program, the student must submit a department application form along with three letters of reference. In addition, the student must complete the Graduate School admission process including, the Graduate School application form, submission of GRE scores, and submission of official transcripts showing prior graduate and undergraduate work. Students applying to any of these programs should have an overall GPA of at least 3.0 in undergraduate and graduate work. M.A. and Ph.D. students must develop their courses of study in consultation with the department's director of political science graduate programs.

Master's Programs

Master's degree work may follow either of two plans: 24 hours of course work plus a thesis or 36 hours of course work without a thesis. M.A. students are required to take POLS 5381 and 5482. The M.P.A. program requires 36 hours of course work and an internship assignment. Courses are scheduled so that the M.P.A. degree may be obtained in evening study.

Master of Public Administration. The program for the Master of Public Administration degree is designed to prepare students to assume administrative positions in government and nonprofit agencies with particular emphasis on municipal government and specialty tracks associated with it. Persons already employed in government can be prepared to assume more advanced positions. Applicants to the M.P.A. program should complete the Graduate School application process and submit two letters of reference if they wish to be considered for a teaching assistantship.

Students are required to take 36 hours of graduate courses, including a specified core curriculum of 18 hours of public administration courses. All degree candidates lacking substantial prior administrative experience must also register for 6 hours of internship credit and complete internship responsibilities in a government or nonprofit agency. Students will not be allowed to graduate with less than a B grade in any core course. A core course may be retaken only once. There are no foreign language or thesis requirements. M.P.A. students must develop their courses of study in consultation with the department's M.P.A. director. Comprehensive examinations are given during the last semester of the candidate's course work.

Specialty tracks include public management, fiscal administration, policy analysis, health administration, health policy and planning, and nonprofit management.

Doctoral Programs

The doctoral degree requires a minimum of 60 semester hours of graduate work beyond the bachelor's degree, exclusive of credit for the dissertation. A minimum tool requirement for all Ph.D. students is the successful completion of POLS 5381 and 5482 (or their equivalent)

plus POLS 5383. Additional language or tool requirements may be imposed at the time of the student's preliminary examination and will be tailored to the student's field of specialization. Students may be admitted directly into the doctoral program without first having completing a master's degree.

Students are required to complete course work in one major field and two minor fields, one of which may be taken outside the department. For the qualifying examination, the student will select one major field and one minor field, and will be tested in those fields only. However, if the student chooses to take a minor outside the department, the outside field will automatically be counted as the second minor field and will be exempted from examination.

Additional information and application materials for these programs can be found on the Web at www.depts.ttu.edu/politicalscience. Interested students may also address questions and information requests to polsggrad@ttu.edu for the M.A. and Ph.D. programs and to mpa@ttu.edu for the M.P.A. program. A brochure providing additional information may also be obtained by writing to the department.

Joint Programs

Master of Public Administration—Master of Arts in Economics.

The Center for Public Service in the Department of Political Science and the Department of Economics and Geography, both in the College of Arts and Sciences, offer a 54-hour joint degree program leading to the Master of Public Administration and Master of Arts in Economics degrees. The program is designed primarily for students who wish to complement their administrative skills with knowledge of economics. The joint M.P.A.–M.A. in Economics degree program will be particularly helpful to students intending to specialize in areas such as fiscal administration, health administration, and policy analysis.

Students wishing to pursue this dual degree program must apply to, and be accepted by, both the M.P.A. program in the Department of Political Science and the Department of Economics and Geography. To fulfill the requirements of the dual degree program, the student must take 18 hours of core courses in public administration, 18 hours of core courses in economics, and 12 hours of approved elective courses in public administration, economics, or in a related field, plus 6 hours of internship in public administration for a total of 54 hours. The first two years of study will consist entirely of the core courses in public administration and economics. The third year will consist of the balance of course work in specialized areas in public administration or economics.

Doctor of Jurisprudence—Master of Public Administration. The Center for Public Service, in association with the School of Law, offers a program which enables the student to earn both the J.D. and M.P.A. degrees in approximately four years of full-time study. Both degrees can be completed with 102 hours of public administration and law courses (plus 6 hours of internship) instead of the 129 hours plus internship required if pursued separately. Application must be made and approved by both the School of Law and the Graduate School. No student may complete the M.P.A. program in less than 12 months.

- ment, with particular emphasis on personal, civil, and political liberties. The administrative process with particular emphasis on public law relating to the powers and procedures of administrative agencies having powers of adjudication and rule making.
- *3360. **United States Foreign Policy (3:3:0).** Examines the patterns and processes that shape U.S. foreign policy.
3361. **International Politics (3:3:0).** Introduction to global issues, actions and processes: north-south relations, post-cold war issues, the role of the state, and leading theories of international relations.
3363. **International Organization (3:3:0).** A comparative study of the major organizations of the League of Nations and the United Nations; approaches to peaceful settlement of disputes, collective security, disarmament, regional organizations, and the future of world order.
3364. **Comparative Foreign Policy (3:3:0).** Surveys theories that connect domestic politics with foreign policy and applies them to a variety of countries.
3365. **War and Security (3:3:0).** Considers the basic problem in international relations; how to survive. How do countries attempt to secure themselves against foreign threats?
3366. **International Political Economy (3:3:0).** Explores interaction of politics and economics in trade, investment, finance, and development.
3368. **Transnational Issues (3:3:0).** Survey of current politics of human rights, migration, environment, and technological change.
3371. **Comparative Politics (3:3:0).** The primary institutions (e.g., parties, groups, executives, legislatures) and processes (e.g., voting, instability) of politics as well as relevant social structures are viewed in various national settings. Questions of how and why to compare also are considered.
3372. **Governments of Russia and the Commonwealth of Independent States (3:3:0).** Examination of the politics, governments, and cultures of Russia and the republics of the former Soviet Union.
3373. **Governments of Western Europe (3:3:0).** Political culture, party systems, institutions, and behavior in selected countries of Western Europe. Primary attention paid to France, Germany, and Italy. Comparison between European and American political systems will be emphasized.
3374. **Governments of Mexico and the Caribbean (3:3:0).** Culture and constitutional development, ideologies, and functions of political parties and pressure groups in Mexico and selected countries of Central America and the Caribbean. Special attention will be given to problems of nationalism, revolution, and interaction with foreign powers and corporations.
3375. **South American Governments (3:3:0).** The government and politics of countries such as Argentina, Bolivia, Brazil, Chile, and Peru. Includes consideration of special problems such as land tenure and terrorism.
3376. **Asian Governments and Politics (3:3:0).** Political culture, party systems, political structure, policy-making, and foreign policy in selected Asian countries. Primary attention focused on Japan, China, and South Korea.
3378. **Middle Eastern Governments and Politics (3:3:0).** Major political institutions in the nations of the Middle East; the impact of Islam on the Ottoman Empire; nationalism, constitutionalism, parliaments, parties, and governments in Turkey, Egypt, Syria, Lebanon, Iraq, Jordan, Saudi Arabia, Iran, and Israel.
4397. **Practicum in Politics (3).** Prerequisite: Consent of instructor. Practical experience integrated with academic study of politics through study programs or work experience. Credit or no credit. (May be repeated once for credit.)
4399. **Individual Studies (3).** Prerequisite: 15 hours of political science and consent of instructor. Independent research under the guidance of a staff member. (May be repeated once for credit.)

Graduate Courses

5100. **Colloquium in Political Science (1:1:0).** Prerequisite: Consent of instructor. Presentations of current research and discussions of the political science faculty by department and visiting faculty. Credit-no credit. May be repeated.
5200. **Teaching College Political Science (2:2:0).** Prerequisite: Consent of instructor. Strategies and innovations in teaching political science at the college level, including supervised teaching. May be repeated and taken as independent study. Credit-no credit. Does not count toward minimum degree requirements.
5321. **Seminar in Political Behavior (3:3:0).** Current research on mass political behavior, including public opinion, political socialization, and voting behavior. Topics vary each semester. May be repeated for credit.
5322. **Pro-Seminar in American Politics (3:3:0).** Advanced study in subjects relevant to an understanding of how the political process is affected by the environment of politics.
5324. **The Executive (3:3:0).** Study of the executive branch of government in the United States, with particular emphasis on the presidency.
5325. **The United States Congress (3:3:0).** An examination of the Congress, from formal organization, member recruitment, and theories of representation, to Congressional reform, policy-making, and interbranch relations.
5327. **Selected Topics in American Government and Politics (3:3:0).** Problems in American government and politics. Varying topics from semester to semester.
5330. **Ancient and Medieval Political Theory (3:3:0).** Political ideas of the great thinkers in the Western world from the time of the Golden Age of Greece until the rise of modern political thought in the 16th century.
5335. **Modern Political Theory (3:3:0).** Major political thinkers beginning with the 16th century and ending with Fascism.
5339. **Seminar in Political Theory (3:3:0).** Examination of ideas and concepts such as liberty, authority, justice, equality, and nationalism.
5356. **Judicial Behavior (3:3:0).** Political analysis of actors in the judicial decision-making arena.
5360. **Pro-Seminar in International Relations (3:3:0).** Survey of contending theories of world politics, focusing on those that emphasize the role of power and interest in shaping state behavior.
5361. **Interdependence and World Order (3:3:0).** Survey of contending theories of world politics focusing on those that emphasize interdependence, democratization, transnationalism, nonstage actors, and the potential for system transformation.
5363. **International Organization (3:3:0).** Theoretical examination of the rise of global, regional, and functional international organizations and their role in the solution of economic, social, environmental, and political problems.
5365. **Special Topics in International Relations (3:3:0).** Intensive research on topics in international relations. Subjects vary.
5367. **International Political Economy (3:3:0).** An exploration of the interaction of international politics and international economic trends. The course surveys the theories in the field, particularly as they relate to the political economy of trade, foreign investment, finance, and development.
5369. **International Security Studies (3:3:0).** This course examines how states maintain their security in a dangerous world.
5370. **Pro-Seminar in Comparative Politics (3:3:0).** Critical survey of the major theories and literature in comparative politics, the logic of cross-national and cross-cultural inquiry, and the major concepts and approaches.
5371. **Area Studies in Comparative Politics (3:3:0).** The culture and political system of a major geographical area like Western Europe, Latin America, or Asia. topics vary each semester. May be repeated for credit.
5376. **Selected Topics in Comparative Government (3:3:0).** Studies in comparative politics, with topics varying from semester to semester.
5378. **Politics of the Developing Areas (3:3:0).** Substantive and theoretical-methodological issues in the study of the development process, emphasizing the political aspects of development.
5380. **Data Management (3:3:0).** This course covers locating and using data, including creating, accessing, and merging data files, preparing data for analysis, and dealing with data problems. Graded credit / no credit.
5381. **Research Design (3:3:0).** Design and execution of political research.
5382. **Data Analysis (3:3:0).** Techniques of analyzing political data, including descriptive and inferential statistics and computer applications. Concurrent registration in 5382 lab required.
5383. **Advanced Quantitative Research Methods in Political Science (3:3:0).** Prerequisite: POLS 5382 or equivalent. Extensions of the least squares model to such techniques as regression and diagnostics, structural equations, factor analysis and/or time series, and computer programs applicable to political data.
5396. **Research Practicum in International Relations (3:3:0).** Prerequisite: Consent of instructor. Organized professional

research on major issues in international relations. May be repeated twice for credit.

5397. **Research Practicum in Comparative Politics (3:3:0)**. Prerequisite: Consent of instructor. Organized professional research on major issues in comparative politics. May be repeated twice for credit.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Public Administration (PUAD)

(To interpret course descriptions, see pg. 10.)

Graduate Courses

5100. **Colloquium in Public Administration (1:1:0)**. Prerequisite: Consent of instructor. Discussion of current issues in public administration led by department and visiting faculty. Credit-no credit.
5320. **Program Evaluation and Quantitative Analysis (3:3:0)**. Prerequisite: Consent of instructor. Introduction to the design, logic, and politics of research methods appropriate for the evaluation of policies and programs before, during, and after their implementation.
5321. **Advanced Quantitative Methods in Public Policy and Administration (3:3:0)**. Prerequisite: Consent of the instructor. Quantitative methods and approaches for analyzing public policy questions and data, including inferential statistics and the use of computer-based statistical programs.
5326. **Information Technology in Public Administration (3:3:0)**. The role of information and communication systems are examined as well as applications used by public administrators. Emphasis is placed on understanding the systemic issues facing the application of information technology in the public sector.
5331. **U.S.-Mexico Border Administration (3:3:0)**. Discussion of the history, politics, and social problems of the U.S.-Mexico borderlands, with an emphasis on the policy challenges posed by regional integration.
5333. **Environmental Policy and Administration (3:3:0)**. Analysis of the formulation, implementation, and evaluation of environmental and natural resources policy, emphasizing theoretical foundations, political contexts, and principles of administering environmental policies.
5334. **Health Care Policy and Administration (3:3:0)**. Prerequisite: Consent of instructor. Analysis of the formulation, implementation, and evaluation of health care policy and service delivery, emphasizing skills and knowledge in policy-making, management, and decision-making.
5335. **Management of Nonprofit Organizations (3:3:0)**. Study of the third sector and the administration of nonprofits, including laws, boards, personnel, volunteers, finances, grant writing, fundraising, marketing, and planning.
5337. **Public Organization Theory (3:3:0)**. The major political and administrative theories applicable to public sector organizations are examined. Contemporary trends in organization theory and public management are emphasized.

5340. **Seminar in Public Administration (3:3:0)**. Prerequisite: Consent of instructor. Critical survey of the field of public administration.
5341. **Public Policy Theory and Process (3:3:0)**. Introduction to competing theoretic explanations of U.S. public policy making. Course will explore interactions between institutional actors, logic of administrative structure and delegated authority, and bureaucratic discretion.
5342. **City Management (3:3:0)**. The political implications and administrative functions of city government are examined. Contemporary issues of municipal management are emphasized.
5343. **Public Personnel Administration (3:3:0)**. Prerequisite: Consent of instructor. Description and analysis of the personnel function in public agencies.
5344. **Public Budgeting (3:3:0)**. Political aspects of the budgetary process as the central mechanism for public resource allocation and executive planning.
5345. **Administrative Ethics (3:3:0)**. Prerequisite: Consent of instructor. Considers applications of ethical systems and thinking in public organizations. Par-

ticular emphasis on the ethical dilemmas caused by administrative discretion and defining the public interest.

5346. **Public Financial Management (3:3:0)**. Prerequisite: PUAD 5344 or consent of instructor. An in-depth study of government finance function with emphasis on fund structure, financial reporting, and related management practices including cash, debt, risk, and inventory management.
5347. **Internship in Public Administration (3:3:0)**. Prerequisite: Consent of instructor. Service assignment in a public agency to enhance professional skills for students in the Masters in Public Administration program. Graded pass-fail and may be repeated for credit.
5348. **Selected Topics in Public Administration (3:3:0)**. Special studies on subjects in public administration. Topics will vary from semester to semester.
5352. **Public Policy Analysis (3:3:0)**. Introduction to analytic tools for evaluating public policies; examines policy choices given resources and informational constraints. Topics include risk assessment, cost-benefit analysis, and market failures.

Department of Psychology

Faculty

Ruth Hipple Maki, Chairperson

Horn Professor: C. Hendrick; *Professors:* Clopton, D. Cogan, R. Cogan, Delucia, Durso, S. Hendrick, R. Maki, W. Maki, Marshall, McGlynn, Richards, and Winer; *Associate Professors:* Cook, Epkins, Harter, Mumma, Robitschek, and Taraban; *Assistant Professors:* Bleckley, Borrego, Cohen, Garos, Hardin, Jones, Larsen, Morgan, and Reich.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Psychology
- Master of Arts in Experimental Psychology
- Doctor of Philosophy in Clinical Psychology
- Doctor of Philosophy in Counseling Psychology
- Doctor of Philosophy in Experimental Psychology

The advanced degree programs in experimental psychology offer concentrations in cognitive/applied cognitive psychology, human factors, and social psychology. The clinical and counseling doctoral programs are fully accredited by the American Psychological Association. The Human Factors program is accredited by the Human Factors and Ergonomics Society. A combined B.A.-M.A. degree is also offered. The B.A. is in Psychology and the M.A. is in Experimental Psychology with a specialization in Human Factors.

Undergraduate Program

The undergraduate psychology curriculum is designed to provide a core of knowledge of the subject matter in experimental, theoretical, and applied psychology. Sufficient curricular

flexibility is provided to permit a student to emphasize the acquisition of useful skills for later life, both vocational and personal; prepare for a graduate degree program in psychology or related fields; or both.

All undergraduate psychology majors must complete the following core program: PSY 1300, 3401, and 3400 or MATH 2300.

All majors must select at least one course from each of the following five areas:

1. Cognitive and Physiological Bases of Behavior: PSY 3317, 3327, 4323, or 4324;
2. Personality, Social, and Abnormal Bases of Behavior: PSY 3304, 3306, 3341, or 4305;
3. Developmental Bases of Behavior: PSY 3318, 4301, 4310, or 4330;
4. Applications: PSY 3334, 4302, 4320, 4321, 4326, 4327, 4334, 4342, 4343, or 4380;
5. Additional Topics in Psychology: PSY 2301, 2305, 3301, 3305, 3310, 3398, 4000, 4300, 4316, 4322, 4325, 4331, 4332, 4336, 4344, or 4384.

The required number of hours for the major is 34, including 2 writing intensive (WI) courses in psychology (PSY 3317, 3401, and 4336 are always WI; other courses are WI on a rotating basis). At least 21 hours of the total credits towards the major must be from 3000-4000 level courses. Transfer students who major in psychology must complete at least 9 credit hours in psychology at Texas Tech. **All psychology majors must have a minor.**

Students wishing to major in some field other than psychology but minor in psychology must complete at least 18 credit hours in psychology, including PSY 1300 and at least three courses numbered at the 3000 or 4000 level. Transfer students who minor in psychology must complete at least 6 credit hours in psychology at Texas Tech.

Teacher Education. See the “Teacher Education” section (p. 51) of this catalog and consult the College of Education for current teacher certification requirements.

Grades below C in psychology courses will not be acceptable for fulfilling major, minor, or teacher certification requirements.

Psychology majors and minors may take 6 credits of correspondence courses in psychology and have these credits count towards the major or minor *without* any permission from the department. These 6 credits can be taken at any point during completion of the bachelor’s degree. However, taking *more* than 6 credits of correspondence course in psychology *will* require written permission from a psychology faculty advisor or the departmental chair.

In addition to offering regularly structured courses, the department provides opportunities to participate in various research and service activities of faculty members. These are particularly valuable for the student who intends to pursue a career in psychology. Interested students should confer with an advisor or any of the faculty with whom they come into contact. Such activities may contribute to the completion of major and/or minor requirements through enrollment in PSY 4000 during the junior and senior years. Six hours of PSY 4000 may be counted toward the major and 12 hours may be counted toward the degree.

Graduate Program

The advanced degree programs encompass a number of specialties within clinical, counseling, and experimental psychology. The clinical and counseling doctoral programs are fully accredited by the American Psychological Association. Both are based on a scientist-practitioner model. The experimental program offers masters and doctoral degrees. Students may concentrate in social, cognitive/applied cognitive, or human factors. The human factors specialty is accredited by the Human Factors and Ergonomics Society and offers a combined B.A.-M.A. degree in addition to the M.A. and Ph.D.

Admission to a graduate program in psychology requires the recommendation of the department as well as the approval of the Graduate Dean. Admission to degree programs is competitive and decisions on admission normally are made each spring for the following fall semester. Application instructions may be obtained from the web site www.psychology.ttu.edu or by contacting the department. Students who are not officially approved for a degree program may not enroll in courses with a practicum component. Students may not take courses with a practicum component toward a minor in psychology without approval of the instructor.

Psychology Curriculum

		FIRST YEAR	
	<i>Fall</i>		<i>Spring</i>
PSY 1300	3	ENGL 1302	3
ENGL 1301	3	Oral Communication	3
MATH 1300 (or above)	3	American History	3
American History	3	Political Science	3
Political Science	3	Technology & Applied Science	3
TOTAL	15	TOTAL	15
		SECOND YEAR	
	<i>Fall</i>		<i>Spring</i>
Minor Elective	3	Foreign Language	5
Foreign Language	5	Minor Elective	3
Natural Science	4	Natural Science	4
MATH 2300	3	PSY-Group 2 (P)	3
Health & Physical Fitness†	1	Psychology Elective	3
TOTAL	16	TOTAL	18
		THIRD YEAR	
	<i>Fall</i>		<i>Spring</i>
Foreign Language	3	Foreign Language	3
PSY 3401	4	Minor Elective	3
English Literature	3	English Literature	3
PSY-Group 3 (D)	3	PSY-Group 1 (C-P)	3
Minor Elective	3	Humanities††	3
TOTAL	16	TOTAL	15
		FOURTH YEAR	
	<i>Fall</i>		<i>Spring</i>
Psychology Elective	3	Psychology Elective	3
PSY-Group 4 (App.)	3	Psychology Elective	3
PSY-Group 5 (Add.)	3	Minor Elective	3
Minor Elective	3	Humanities††	3
Health & Physical Fitness†	1	Visual and Performing Arts	3
Visual and Performing Arts	3	TOTAL	15
TOTAL	16		

Choose from Core Curriculum requirements.

PSY 3401 is always writing intensive. Another writing intensive psychology course is also required.

† Select from health and physical fitness section of the Arts and Sciences General Degree requirements.

†† Some humanities classes will also count toward the multicultural requirement.

Psychology (PSY)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1300. **General Psychology (3:3:0) [PSYC 2301].** Introduction to fundamental concepts in psychology. Emphasis on the physiological, social, and environmental determinants of behavior. (Honors section offered.)
- 2301. **Child Psychology (3:3:0) [PSYC 2307, 2313].** A study of the developmental processes and environmental factors that shape the personality and affect the achievement of the child.
- 2305. **Adolescent Psychology (3:3:0) [PSYC 2308, 2309, 2310].** A review of approaches to the understanding of the social behavior and development of the adolescent. Physical, mental, and emotional growth and adjustment are covered.
- 3301. **An Introduction to the Psychology of the Arts (3:3:0).** An introduction to various psychological perspectives on artistic production and appreciation.
- 3304. **Introduction to Social Psychology (3:3:0).** Prerequisite: PSY 1300. Study of individual experience and behavior in relation to social stimulus situations. Survey of experimental work and reports on current problems.
- 3306. **Personality (3:3:0).** Prerequisite: PSY 1300. Principles of normal personality structure.
- 3310. **Psychology and Religion (3:3:0).** Prerequisite: PSY 1300. Examines historical perspectives on the psychology of religion, the experience of religion and spirituality from a psychological perspective, and the relations between psychology and religion.
- 3317. **The Psychology of Learning (3:2:2).** Prerequisite: PSY 3401. A critical survey of methods, results, and interpretations of human and animal studies of learning processes. The laboratory paradigms will highlight principles discussed in lecture. (Writing Intensive)
- 3318. **The Development of Children’s Thinking (3:3:0).** Prerequisite: PSY 1300. Considers cognitive development from infancy to adulthood with attention to topics such as spatial cognition, concepts and categories, problem-solving, and language.
- 3327. **Introduction to Physiological Psychology (3:3:0).** Prerequisite: PSY 1300. Introduction to neuroanatomy, electrophysiological measuring techniques, and the mechanisms of receptor and effector systems. A study of the relationships between behavior and the physiological substrate.
- 3334. **Introduction to Professional Psychology (3:3:0).** Prerequisite: PSY 1300. Introduction to current practices of clinical and counseling psychologists, including clinical, diagnostic, and intervention strategies. Survey of career opportunities, professional issues, and ethical problems.

3341. **Close Relationships (3:3:0)**. Prerequisite: PSY 1300. Social psychology theory and research on topics in close relationship literature, including attitudes toward love and sexuality, friendship, intimacy, power, conflict, and divorce.
3398. **Ethnic Minority Psychology (3:3:0)**. Prerequisite: PSY 1300 and junior standing. Focus is on the psychosocial aspects that impact the four predominant ethnic minority populations in the United States. This course may be used to fulfill the multicultural requirement.
3400. **Statistical Methods (4:3:2)**. Prerequisite: PSY 1300 or Epsy 3330. Introduction to descriptive and inferential statistics. Emphasis is placed on application to psychological research problems and an introduction to computer functions.
3401. **Research Methods (4:3:2)**. Prerequisite: PSY 1300; corequisite: PSY 3400 or MATH 2300. Survey of research methods in psychology. Emphasis on critical aspects of experimentation such as designing, conducting, and critiquing experiments, as well as interpreting and communicating results. (Writing Intensive)
4000. **Individual Problems Course (V1-6)**. Prerequisite: PSY 1300 and consent of instructor. Independent work under the individual guidance of a faculty member. May be repeated for up to 12 hours credit, only 6 of which may count toward fulfillment of the major in psychology.
4300. **Psychology of Human Sexual Behavior (3:3:0)**. Prerequisite: Junior standing. Study of human sexual behavior from a psychosocial viewpoint with emphasis on contemporary research methods and findings. (W S 4302)
4301. **Developmental Psychology (3:3:0)**. Prerequisite: PSY 1300. An advanced study of the process of development through consideration of data, theories, and contemporary research issues.
4302. **Service Learning in Psychology (3:1:8)**. Prerequisite: Consent of instructor and senior standing. Provides undergraduate psychology majors with an opportunity to earn credit doing supervised service in the community. May be repeated one time for credit toward overall degree requirements.
4305. **Abnormal Psychology (3:3:0)**. Prerequisite: PSY 1300 and junior standing. Personality deviations and maladjustments; emphasis on clinical descriptions of abnormal behavior, etiological factors, manifestations, interpretations, and treatments.
4310. **Abnormal Child Psychology (3:3:0)**. Prerequisite: PSY 1300 and junior standing. Description, classification, assessment, treatment, and research methods pertaining to behavioral and emotional disorders of childhood and adolescence.
4316. **History of Psychology (3:3:0)**. Prerequisite: PSY 1300 and junior standing. A survey of the historical development of modern psychology.
4320. **Psychoanalytic Theory and Research (3:3:0)**. Prerequisite: PSY 1300 and junior standing. From readings in psychoanalytic theory, a hypothesis will be chosen and tested by the group. The results will be discussed with psychoanalysts. Topics will vary. (Writing Intensive)
4321. **Interviewing Principles and Practices (3:3:0)**. Prerequisite: PSY 1300. Review of interviewing principles. Emphasis on skills that will apply directly to interview situations, such as industrial, clinical, and vocational counseling. Demonstration, recordings and discussion.
4323. **Perception: Theories and Applications (3:3:0)**. Prerequisite: PSY 1300. Survey of methods and findings in perception. Emphasis on demonstrations of perceptual phenomena; theories of visual perception (cognitive and ecological); applications. Topics include illusions, depth, motion.
4324. **Cognition (3:3:0)**. Prerequisite: PSY 3401. Introduction to cognitive psychology, including perception, attention, memory, language, problem-solving, decision-making, and the development of expertise.
4325. **Drugs, Alcohol, and Behavior (3:3:0)**. Prerequisite: PSY 1300. Survey of psychological factors involved in drug use and an introduction to chemotherapy used in treatment of mental illness.
4326. **Human Factors Psychology (3:3:0)**. Prerequisite: PSY 3401. Introduction to methods and findings in human factors psychology. Applications of psychological research to designs of machines, environments, and tasks.
4327. **Human Performance Psychology: Cognition, Stress, and Fatigue (3:3:0)**. Prerequisite: PSY 3401. Overview of human performance psychology, including topics such as attention, stress, and fatigue. Addresses application of research to health psychology and human factors.
4330. **Psychology of Lifespan Development and Aging (3:3:0)**. Prerequisite: Sophomore standing. Designed to give an overview of the physiological, cognitive, social-role, and motivation changes that occur with age from a psychological development viewpoint.
4331. **Social Psychology of Groups (3:3:0)**. Prerequisite: PSY 3304. Social psychology theory and research on topics in group dynamics, including group structure, influence, conflict, performance, decision making, and leadership.
4332. **Health Psychology (3:3:0)**. Prerequisite: PSY 3401. Introduces students to the contributions of psychology as a discipline to the understanding of health and illness.
4334. **Introduction to Counseling and Psychotherapy (3:3:0)**. Prerequisite: PSY 1300. Survey of current practice and theory in counseling and psychotherapy. Consideration of the research support for counseling and psychotherapy as an agent of change of behavior.
4336. **Research in Personality and Social Psychology (3:2:2)**. Prerequisite: PSY 3401, 3400 or MATH 2300, and junior standing. In-depth examination of selected substantive research areas in experimental personality and social psychology. Current research literature and design and execution of empirical studies. (Writing Intensive)
4342. **Practicum In Peer Mentoring (3:1:7)**. Prerequisite: PSY 1300. Application required. A closely supervised individual experience in the delivery of services to a multiethnic population. Placement site: University Counseling Center. May be repeated once for a total of 6 credits.
4343. **Language and Literacy Research and Applications (3:2:2)**. Prerequisite: PSY 3318 or 4324. Integration of the study of language, reading, and comprehension with research and tutoring experiences.
4344. **Cognitive Science (3:3:0)**. Prerequisite: Junior or senior standing. The consideration of multidisciplinary issues from cognitive psychology, artificial intelligence, neuroscience, linguistics, philosophy, and education. Appropriate for majors and nonmajors.
4384. **Forensic Psychology (3:3:0)**. Prerequisite: PSY 3401 and 4305. Introduces students to the interface of psychology and law with a focus on forensic psychology (e.g., forensic psychological assessment, expert testimony).
4380. **Intermediate Statistics for Psychologists (3:3:0)**. Prerequisite: PSY 3400 or MATH 2300. Second course in psychological statistics recommended for students planning to attend graduate school. Includes probability, correlation and regression, basic parametric and nonparametric inferential statistics.

Graduate Courses

5001. **Problems in Psychology (V1-6)**. Prerequisite: 12 advanced hours of psychology and prior permission of instructor. Independent work under individual guidance of a staff member.
5002. **Advanced Practicum in Counseling and Clinical Psychology (V1-6)**. Prerequisite: PSY 5316 or PSY 5318 and prior permission of instructor. Supervised practice in psychodiagnostics and psychotherapy with selected cases. Emphasis on a wide variety of experience. May be repeated.
5003. **Practicum in Human Factors (V3-6)**. Prerequisite: PSY 5370, 5372, 5380, and prior consent of the human factors program coordinator. Supervised practice in the profession of human factors with selected sites on or off campus. Emphasis is on real-world settings. May be repeated.
5004. **Doctoral Internship in Counseling and Clinical Psychology (V1-6)**. Prerequisite: By arrangement with department chairperson. Full-time supervised internship in an appropriate facility. Enrollment required four times to complete one calendar year.
5101. **Colloquium in the Teaching of Psychology (1:2:0)**. An overview of teaching methods as applied to the teaching of Psychology in the college classroom. Graded pass-fail.
5303. **Developmental Psychopathology (3:3:0)**. Prerequisite: Consent of instructor. An examination of psychopathology in children, with consideration of the developmental course of various psychological disorders through childhood and adolescence.
5304. **Practicum in Intelligence Testing (3:3:0)**. Prerequisite: Consent of instructor. A review of the historical and theoretical bases of intelligence testing in addition to instruction and supervised practice in scoring, interpreting, and reporting results from individual intelligence tests.
5306. **Seminar in Contemporary Professional Issues (3:3:0)**. Prerequisite: Consent of instructor. A survey of the employment

- practices and prevailing legal and ethical standards in contemporary professional psychology.
5308. **Vocational Psychology (3:3:0)**. Prerequisite: Consent of instructor. Review of theories, assessment tools, and interventions in vocational psychology including the integration of vocational issues into psychotherapy.
5309. **Clinical Neuropsychology (3:3:0)**. Prerequisite: PSY 5304, 5338, and doctoral standing in psychology. Foundational course in brain-behavior relationships, neuropathology for neuropsychologists, neuropsychological assessment, and other clinical applications.
5310. **Seminar in Child Assessment (3:3:0)**. Prerequisite: PSY 5303 and consent of instructor. A review of the procedures used in a comprehensive child assessment and the integration of this information for diagnosis and report writing.
5311. **Introduction to Psychotherapeutic Intervention and Management (3:3:0)**. Prerequisite: Consent of instructor. Didactic introduction to psychotherapy procedures plus a practicum element.
5312. **Introduction to Child and Adolescent Psychological Treatment (3:3:0)**. Prerequisite: Consent of instructor. Introduction to empirically-based treatment approaches pertaining to children, adolescents, and families, with a focus on case formulation and treatment planning.
5314. **Projective Testing (3:3:0)**. Prerequisite: Second-year graduate status in clinical-counseling psychology or consent of instructor. A survey of projective assessment with emphasis on administration, scoring, and interpretation of the Rorschach.
5315. **Objective Personality Assessment (3:3:0)**. Prerequisite: Graduate standing in the department, permission of instructor, and PSY 5338. Survey of objective personality and psychodiagnostic assessment including supervised practicum experience and methodological, empirical, theoretical, cultural, and ethical issues.
5316. **Introduction to Counseling Psychology (3:3:0)**. Prerequisite: Admission to counseling psychology doctoral program or consent of instructor. Professional identity, research themes and strategies, and ethical standards of counseling psychology. Exploration of theories and techniques of counseling.
5317. **Behavioral Assessment (3:3:0)**. Corequisite: PSY 5002 and consent of instructor. Principles of behavioral assessment including idiographic and time series analysis, cognitive / behavioral case formulation, and outcome evaluation. Practicum application to adults.
5318. **Introduction to Clinical Psychology (3:3:0)**. Prerequisite: Admission to clinical psychology doctoral program. Supervised experience in interviewing. A study of different approaches to psychotherapy with adults.
5321. **Nonparametric Statistical Analysis Techniques for Psychological Research (3:3:0)**. Includes one, two, and k sample designs plus measures of association. Some coverage of single case studies.
5322. **Family Psychology (3:3:0)**. Prerequisite: PSY 5002 or 5311. An introduction to the field of family psychology and therapy.
- Ideas and techniques of the major approaches to family psychology and therapy.
5323. **Group Counseling and Psychotherapy (3:3:0)**. Prerequisite: Prior permission of instructor. Designed to provide theories of approaches to group work and a personal experience with group processes. Various points of view will be studied.
5326. **Human Motivation: A Social Psychological Approach (3:3:0)**. Prerequisite: Consent of instructor. Examination of motivation from a social psychological perspective. Includes consideration of theoretical frameworks of motivation and application to a wide variety of research areas.
5327. **Seminar in Social Cognition (3:3:0)**. An examination of research and theory on the mental activities that underlie social information processing and behavior.
5328. **Seminar in Social Psychology (3:3:0)**. Prerequisite: PSY 3304. Contemporary attitude theory and research; systematic theory in social psychology; social structure and personality; the psychology of social movements and current research trends.
5330. **Attitudes and Attitude Change (3:3:0)**. Prerequisite: PSY 3304 or equivalent. Advanced study of the formation, organization, and change of social attitudes. Emphasis on current theory and research.
5331. **Small Group Behavior (3:3:0)**. Prerequisite: PSY 3304. Advanced study of the nature and origin of small groups and interaction processes. Emphasis on data obtained from empirical studies rather than theoretical or logical analysis.
5332. **Constructivist and Narrative Therapies (3:3:0)**. Prerequisite: PSY 5338 or equivalent. Introduces constructivist and narrative approaches to psychotherapy. Including theoretical bases, empirical research, clinical applications, training/supervision issues, and therapist development.
5333. **Cognitive Behavioral Therapy (3:3:0)**. Prerequisite: PSY 5002 and 5318 or 5316. A critical analysis of the major concepts of psychological intervention approaches derived from contemporary learning and cognitive theory.
5334. **Theories and Techniques of Psychotherapy (3:3:0)**. Prerequisite: PSY 5316. Consideration of theories of vocational development and counseling. Discussion of professional issues and problems related to the area of counseling psychology.
5335. **Psychology of Trauma and Abuse (3:3:0)**. Prerequisite: Graduate standing and consent of instructor. Seminar examining theoretical models, empirical research, and professional issues related to effects of trauma and abuse, recovery processes, and psychotherapy.
5336. **Child and Adolescent Development (3:3:0)**. A survey of the theoretical foundations of modern child psychology; psychoanalytic theories, social learning theories, cognitive-developmental theories, and comparative ecological theories, research strategies and appropriate models of development.
5337. **Counseling Women (3:3:0)**. Prerequisite: Graduate standing in the department or permission of instructor. Seminar focuses on women's mental health,
- feminist therapy, and issues and strategies for specific problems and types of clients.
5338. **Seminar in Psychopathology (3:3:0)**. Prerequisite: Graduate standing in the department or consent of instructor. A survey of theoretical perspectives and research findings concerning the causes, diagnosis, and treatment of psychopathology.
5340. **Automaticity and Control in Social Behavior (3:3:0)**. Prerequisite: PSY 3304 or equivalent. Exploration of the automatic and controlled aspects of social behavior and thought across several areas of social psychology.
5345. **Research Seminar in Clinical and Counseling Psychology (3:3:0)**. Prerequisite: PSY 5347. Survey of methods and approaches to research in these areas.
5347. **Advanced Correlational Methods and Factor Analysis (3:3:0)**. Prerequisite: Consent of instructor. Comprehensive survey of multivariate analysis including multiple correlation and factor analysis and other correlational techniques. Review of analysis of covariance.
5348. **Advanced Multivariate Analysis for Psychologists (3:3:2)**. Prerequisite: PSY 5347. Covers topics in multivariate analysis including canonical correlation, multiway frequency tables, MANOVA, profile analysis, discriminant analysis, logistic regression, and time series analysis.
5350. **History and Systems of Psychology (3:3:0)**. The nature of psychological systematics and theory construction, including cultural and other factors influencing system building; consideration of major systems from the Hellenic period to the present.
5352. **Seminar in Learning Theory (3:3:0)**. An examination of the general areas of learning and memory with particular attention on current theory and data.
5354. **Seminar in Perception: Theories and Applications (3:3:0)**. Theoretical and applied issues in perception. Emphasis on demonstrations of perceptual phenomena (e.g., illusions, motion perception), theories of visual perception, and discussions of human-factors literature.
5356. **Seminar in Cognition (3:3:0)**. A survey of the research and theory on human mental activities such as attention, memory, concepts, language processing, problem solving, and reasoning.
5357. **Seminar in Psycholinguistics (3:3:0)**. Current models of language, reading, and comprehension with attention to topics such as syntax, prepositional representation, metacognition, decoding, beginning reading instruction, and related computational models.
5360. **Structural Equation Modeling for Psychologists (3:3:0)**. Prerequisite: PSY 5347 and 5380 or equivalent. Advanced statistics course focusing on structural equation modeling, confirmatory factor analysis, and path analysis.
5370. **Human Factors Psychology (3:3:0)**. Survey of topics in human factors including human-machine interaction, visual performance, and transportation. Emphasis on presenting solutions to practical design problems and discussing applied literature.

5372. **Human Factors Methodology (3:3:0).** Overview of human factors methodology including task analysis, usability evaluation and its role in human-computer interaction, assessment of risk, human reliability, and error.
5376. **Stress and Fatigue in Human Performance (3:3:0).** Overview of theory and research concerning the effects of stress and fatigue on human performance including changes in information processing, strategy, and state.
5377. **Behavioral Medicine (3:3:0).** Prerequisite: PSY 5338 or equivalent. Introduces graduate students in the applied social sciences to the contributions of psychology to the understanding of health and illness.
5379. **Human-Computer Interaction (3:3:0).** Fundamentals of human-computer interaction including user interface design, usability and usability methods, cognition and user psychology, user-centered design, and understanding how designers think.
5380. **Experimental Design (3:3:0).** Prerequisite: Consent of instructor. Logical principles governing sound experimentation: conventional designs using analysis of variance. Introduction to complex analysis of variance designs and trend tests.
5382. **Psychopharmacology of Psychoactive Drugs (3:3:0).** Prerequisite: PSY 3327 or equivalent. Survey of neurophysiological and psychopharmacological effects of psychoactive drugs, including issues of treatment of mental illness and substance abuse.
5384. **Psychology and the Law (3:3:0).** Survey of the interface between psychology and law including topics in forensic psychology, expert testimony, and psychologists' influence in policy legislation.
5385. **Life Span Development: Psychobiological and Cognitive Processes in Aging (3:3:0).** Prerequisite: Consent of instructor. Study in theory and research involving changes in cognitive and physiological processes in adults with emphasis on middle-aged as well as older individuals.
5396. **Multicultural Counseling (3:3:0).** Prerequisite: PSY 5002 or 5311. Impact of privilege and culture (race, gender, sexual orientation, religion, disability, etc.) on individual experience and implications for culturally competent practice.
5398. **Ethnic Minority and Community Interventions (3:3:0).** Course focuses on research and clinical issues related to mental health services for ethnic minority populations and establishing community prevention-intervention programs.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Department of Sociology, Anthropology, and Social Work

Faculty

Doyle Paul Johnson, Chairperson

Professors: Curry, Dennis, E. Johnson, P. Johnson, Peek, and Tsai; *Associate Professors:* Dunham, Elbow, Hall, Koch, Paine, Roberts, and Schneider; *Assistant Professors:* Cannon, House, Lowe, Morrow, Rafalovich, Ramirez, and Walter; *Instructor:* Phelps; *Adjunct Faculty:* Stein and Way; *Visiting Faculty:* Marshall-Gray.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Anthropology
- Bachelor of Arts in Social Work
- Bachelor of Arts in Sociology
- Master of Arts in Anthropology
- Master of Arts in Sociology

In addition, the department participates in the Latin American and Iberian Studies program leading to the Bachelor of Arts degree. The department also participates in the women's studies, urban studies, ethnic studies, environmental studies, family life studies, religion studies, Asian studies, and substance abuse studies minor programs. The minimum number of hours required for majors in all baccalaureate programs in the department is a total of 125 hours.

Undergraduate Program

Sociology Program. The Sociology Program includes most of the major substantive areas of the discipline, ranging from interpersonal relations in families and elsewhere to the growth of cities and complex organizations to international relations. The department also offers a criminology concentration for sociology majors who wish to specialize in this area. Areas of faculty expertise include criminology

and delinquency, marriage and the family, minority relations, gender, gerontology, social psychology, international development, medical sociology, sociology of religion, social research methods, and social theory. A major or minor in sociology is beneficial to students planning careers in a variety of areas, including business, law and law enforcement, international development, medicine, and social work. Courses in sociology fulfill Core Curriculum requirements in the social and behavioral sciences in Arts and Sciences and the university.

A student majoring in sociology must complete 30 hours in sociology; 18 hours should be advanced. A maximum of 9 hours of transfer credit may be accepted for the major.

Specific course requirements are as follows:

1. SOC 1301, 3391, 3392, and 4395.
2. Either SOC 3393 or 3394. Students expecting admission to graduate work in sociology should take both of these courses.

Criminology Concentration. Sociology majors who wish to specialize in the study of criminology and receive the notation "Criminology Concentration" on their transcripts are required to complete five three-hour courses (15 hours) with a grade of C or better from two groups of courses as specified below.

1. Three **core courses** as follows, all of which must be taken: SOC 3327, 3329, and 4325
2. Two **alternate courses** to be chosen from among the following: ANTH 2305, 4343, PSY 4384, SOC 3368, 3383, and 4327

A student minoring in sociology must complete 18 hours of sociology, including SOC 1301. No more than 6 hours of transfer credit will be accepted for the minor.

Students must receive a grade of C or better in each sociology course if they wish it to count toward a major or minor in sociology or in the criminology concentration.

The minimum prerequisite that is recommended for all advanced courses is SOC 1301 or consent of instructor, unless otherwise indicated in the course description. Freshmen and sophomores who wish to take an advanced course are required to obtain the consent of the instructor in writing.

Teacher Education. Consult the College of Education section of this catalog for teacher certification requirements.

Anthropology Program. The Anthropology Program reflects the broad scope of the discipline, including the four areas of sociocultural and physical anthropology, archaeology, and linguistics. Well-equipped laboratories promote research in archaeology and physical anthropology. The Summer Field School in Archaeology and field trips in Texas and the surrounding region are a highlight of the curriculum. Sociocultural anthropology includes special emphasis on the multicultural U.S. and on Latin America.

A student majoring in anthropology must complete 31 semester hours in anthropology, including ANTH 2100, 2300, 2301, 2302 (or 1301), 3304 or 4305, 3345, 3305 or 3351, and 3310 or 3311. A maximum of 9 hours of transfer credit may be accepted for the major. With prior departmental approval, 3 advanced hours in related disciplines may be counted toward the major. A minor in anthropology consists of 18 hours, with at least 6 hours in upper-level courses. No more than 6 hours of transfer credit will be accepted for the minor. A grade of C or better must be received in each anthropology course by those working for a major or minor in the subject. No more than 6 hours of individual studies or field courses may be credited to the major.

Anthropology courses provide distribution credit in three areas of Arts and Sciences: humanities, natural science, and social and behavioral sciences. Courses so indicated give humanities or natural science credit; some

others give social and behavioral sciences credit. In addition, anthropology courses fulfill a variety of humanities and social science requirements in other colleges of the university. Students in these colleges should check with advisors in their major departments to learn which anthropology courses will fulfill their college and Core Curriculum requirements.

Social Work Program. The degree program in social work is accredited at the baccalaureate (B.A.) level by the Council on Social Work Education. The curriculum is based on the generalist social worker model and the application of an ecosystems and strengths perspective. The generalist model of social work practice does not attempt to educate the graduate for a specific social work job or field of employment; instead, our graduates are prepared to work in a wide variety of social service settings with diverse populations and their problems. The program is designed to prepare the graduate for entry into social work at the beginning level of professional social work practice in public, private, and voluntary social agencies. The curriculum may serve as a preparatory foundation for those interested in and qualified to continue their study at the master's degree level.

The social work curriculum covers the areas of social services and policy (S W 2301 and 4311), human behavior and the social environment (S W 3311, 3312, and 3331), social work practice (S W 3332, 3333, and 3334), evaluation and research (S W 3339), and an educationally directed field practicum (S W 4340 and 4611). The curriculum is based in the liberal arts; humanities; and social, behavioral, and biological sciences, including one semester (4 hours) of human biology. The overall curriculum is comprised of the specific Core Curriculum requirements of the university, as enhanced by the College of Arts and Sciences.

Along with a major of 36 semester hours, social work majors generally complete a minor in sociology. The content for the minor in sociology will consist of 18 semester hours of required and elective courses (obtain list from advisor) taken from three specific content areas. Students able to demonstrate that a different minor in the area of human behavior will more appropriately supplement their career goals may have a different minor approved by the social work faculty advisor. Students may see the social work advisor for a list of possible alternative minors. Students selecting an alternative minor will have adjunct course requirements in sociology (see advisor for options). Only when the student's minor is other than sociology or anthropology will the adjunct requirements be necessary. Regardless of minor selected, SOC 1301 is a prerequisite for S W 2301.

Individuals intending to go into social work and who are entering the university as freshmen or transfer students with less than 32 hours should declare sociology as their major on their admissions application. Students should take the prerequisite of SOC 1301, Introduction to Sociology, during the first year but must take it prior to

enrollment in the first social work courses. Students will normally begin the social work curriculum in the sophomore year taking S W 2301 and 3311 in the fall semester and S W 3312 and 3331 in the spring semester. Application for admission to the social work degree program will occur at the end of the semester in which S W 3311 is taken.

Individuals wishing to change their majors to social work and who are currently enrolled in the university must have completed 30 semester hours. Students should complete the prerequisite SOC 1301 and at the first available opportunity enroll in S W 2301 and 3311. At the end of that semester, they should complete the application for admission to the social work degree program. Individuals transferring (with more than 32 semester hours) from a junior college or a four-year institution should declare social work as a major on their admissions application. Individuals transferring into the social work program without having taken any social work courses should follow the procedure described in the information relating to change of majors. Individuals transferring to the social work program will be limited to a maximum of 9 semester hours of social work transfer courses if taken in a CSWE accredited program (S W 3333 and 3334 must be taken at Texas Tech). The minimum time for completion of the sequence of social work courses is 5 semesters.

Requirements for Application to Major in Social Work

A student must complete 30 semester hours of college or university course work from the following Core Curriculum requirements of the university:

- 15 semester hours from English, mathematics (recommend MATH 1320 or 1330 and 2300), U. S. history, and political science.
- 15 semester hours from foreign languages, oral communication, technology and applied sciences, fine arts, humanities, and natural sciences (the course in human biology may be selected from BIOL 1402, ANTH 2300 and 2100, ZOOL 2403, or an equivalent course).

In addition to the above requirements, a student must:

- Have satisfactorily completed SOC 1301.
- Have completed S W 2301 and 3311 with a minimum grade of C.
- Have a cumulative GPA of 2.5 (students with a GPA of 2.0 to 2.49 may be provisionally admitted but must receive at least a B in either S W 2301 or 3311).

The social work division provides a variety of courses useful to individuals with career plans in the human services areas or related fields. The courses will provide the student with an introduction to the field of social work and the social welfare system, the human behavior content required of human service workers, research and evaluation skills needed, and social welfare policy analysis skills. Students interested in social work as a minor will enroll in 18 semester hours. The following courses are required but substitution may be neces-

sary: S W 2301 (Introduction to the Social Welfare Institution); S W 3311 (Human Behavior and the Social Environment I); S W 3312 (Human Behavior and the Social Environment II); S W 3331 (Social Work Practice With Diverse Populations) or S W 3332 (Social Work Practice: Interaction Skills); S W 3339 (Social Work Research and Evaluation); and S W 4311 (Social Policy and Social Welfare Legislation). Some social work practice courses (S W 3333 and 3334) and field practicum courses (S W 4340 and 4611) are restricted to social work majors only.

Anthropology (ANTH)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1301. Understanding Multicultural America (3:3:0).** Cultural diversity in the U.S. as studied by anthropologists. Ethnographic descriptions of African-Americans, Hispanics, Native Americans and other groups. (Fulfills the state standard requirement in multicultural education for education majors.)
- 2100. Physical Anthropology Laboratory (1:0:3).** Corequisite: ANTH 2300. The study of human and nonhuman primary biodiversity via skeletal biology and evolution concepts. Other topics include anthropometrics, diet surveys, genetics, and exercises designed to explore human biodiversity issues.
- 2300. Physical Anthropology (3:3:0) [ANTH 2301].** Corequisite: ANTH 2100. Topics covered include human genetics, health, diet, and issues of human and nonhuman primate evolution. This course along with ANTH 2100 satisfies the College of Arts and Sciences Core Curriculum natural science requirement.
- 2301. Introduction to Archaeology (3:3:0) [ANTH 2302].** Introduces archaeology and what it has told us about our past, from the earliest beginnings to the birth of civilization.
- 2302. Cultural Anthropology (3:3:0) [ANTH 2351].** The rich complexity of peoples and cultures in the world as studied by anthropologists. Discussion of basic concepts such as ethnography, ethnocentrism, kinship systems, gender, and culture exchange. (Honors section and Spanish language section offered in some semesters.)
- 2305. Forensic Anthropology (3:3:0).** An introductory lecture course covering forensic anthropology. Topics include skeletal biology, forensic archaeology, age/sex identification, DNA and bone trauma, and courtroom and ethical responsibilities of the forensic anthropologist.
- 3300. Anthropology and Contemporary Life (3:3:0).** An anthropological approach to topics of current interest in American culture. Content varies. Topics have included anthropology and literature, the writings of Carlos Castañeda, evolution vs. creation, and sex and gender. May be repeated for credit.
- 3304. Global Forces and Local Peoples (3:3:0).** Prerequisite: ANTH 2302 or consent of instructor. Anthropological perspective on critical problems facing humanity: the aftermath of colonialism, the fate of

Graduate Program / Anthropology and Sociology

The graduate degree programs are designed to provide broad training for students who wish to enter a Ph.D. program, prepare for undergraduate or community college teaching, or pursue a non-teaching career for which M.A. level training in sociology or anthropology is appropriate and useful. Both programs emphasize training in basic theory and methods. Both degrees may be pursued through either the thesis or nonthesis plan.

Students choosing the thesis plan in sociology are required to take 30 hours of course work (including 2 required courses in theory and 2 required courses in methods) plus 6 hours of thesis credit. They are also required to complete a thesis that is acceptable to the student's departmental thesis committee and demonstrate proficiency in a computer language. Students may petition the Graduate Committee to substitute another organized course from within the department for one of the required theory and/or methods courses. Students choosing the nonthesis plan are required to take 36 hours of course work (including 1 course in theory, 2 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 and to take a comprehensive examination on an approved topic in their last semester of study.

The sociology program allows course work specialization in such areas as family, criminology and deviance, social psychology, social change, minority relations, demography, urban problems, medical sociology, gerontology, and sociology of religion. Six of the 30 hours required may be taken as a minor outside the department. Selection of a minor requires approval of the graduate committee. In the sociology program, in lieu of a foreign language, each student is required to demonstrate proficiency in computer analysis of data. A grade of B or better is required for graduate credit.

The anthropology core curriculum requires courses in the following four basic subfields: archeology, biological anthropology, linguistics, and cultural anthropology. The minimum requirements are 30 hours of course work plus 6 hours of thesis credit. Students in the anthropology program are encouraged to use the minor to develop an area of emphasis either within the department (such as linguistics or sociology) or outside (such as biology, Latin American and Iberian studies, or museum science). A grade of B or better is required for graduate credit.

For both the thesis and the nonthesis plans in anthropology a final examination is required. In the sociology program the final examination in the thesis plan involves at least one of the various areas listed above. In the nonthesis plan the examination includes course work taken, the work experience outside the department, and the topic of the formal paper.

Decisions on the program of study, specific courses, and thesis topics are made through consultation with the graduate advisor in each program and other faculty members as appropriate on the basis of the individual student's background, interests, and objectives. With departmental approval requirements may be amended for individuals with exceptional qualifications, or additional courses may be required for applicants with inadequate undergraduate preparation.

General admission requirements are those established by the Graduate School. The best preparation is an undergraduate major in the same field, either sociology or anthropology, or equivalent. However, students from other fields are also encouraged to apply. More specific information regarding admission procedures or other aspects of the graduate programs may be obtained from either the sociology or the anthropology graduate advisor.

- indigenous peoples, changing family systems, and the reassertion of ethnic identity.
3305. **Anthropological Linguistics (3:3:0).** A survey of the origins and development of human language, phonological and grammatical characteristics of languages, and distribution and relationship of languages and language families.
3306. **Women in Culture and Society (3:3:0).** A comparative study of sex and gender in human society; biological and cultural factors that influence women's roles, status, and their contributions to cultural institutions. Counts toward women's studies minor. (W S 3306)
3310. **Human Evolution (3:2:3).** Prerequisite: ANTH 2300 or consent of instructor. Study of human origins and evolution as a mammal, primate, and bioculturally adapting species. Emphasizes principles in evolution and systematics and recent discoveries in paleoanthropology.
3311. **Human Variation (3:2:3).** Prerequisite: ANTH 2300 or consent of instructor. ANTH 3310 is not a prerequisite. Study of human heredity, biodiversity, and adaptations. Survey of the physical and genetic variations of modern populations throughout the world.
3312. **Primate Behavior (3:3:0).** A survey of the biological and behavioral diversity of nonhuman primates. Emphasizes issues concerning evolution, social organizations, and conservation of prosimians, anthropoids, and hominoids.
3314. **Human Ecology and Adaptation (3:3:0).** Prerequisite: ANTH 1301 or 2300 and 2100, or consent of instructor. Survey of human biological adaptability, the dual inheritance of genes and culture, human survival, emerging infectious disease.
3315. **Health, Medicine, and Culture (3:3:0).** The anthropology of health; concepts of illness, health, and aging in different cultures, including the role of the healer in the Third World. Recommended for health preprofessionals.
3317. **Anthropology, Epidemiology, and Global Health (3:3:0).** Prerequisite: ANTH 1301 or 2300 and 2100, or consent of instructor. Introduction to communicable-disease epidemiology; covers theory and methods, transmission, surveillance and control, emerging infectious diseases.
3323. **Religion and Culture (3:3:0).** A cross-cultural examination of religious phenomena including belief systems, sacred symbols, ritual, shamanism, and revitalization movements. Emphasis is on nonwestern religions. Provides humanities credit in Arts and Sciences.
3325. **Anthropological Folklore (3:3:0).** The role of folklore not only as entertainment but as explanation and validation of ways of life: myth, parable, legend, proverbs, riddles, and fairy tales. Gives humanities credit in Arts and Sciences.
3331. **Indians of North America (3:3:0).** The experience of Native American peoples from their discovery of the New World to their present status. Incorporates historical and ethnographic approaches; selected case studies.
3332. **Peoples of Latin America (3:3:0).** The anthropology of Latin America: the high cultures of prehispanic times, the conquest and colonial periods, and the tribal and peasant peoples of today, including such groups as Amazonian tribesmen, Andean peasants, and Chicanos. Recommended for Latin American and Iberian Studies students.
3340. **Topics in Old World Archaeology (3:3:0).** Through archaeology, examines the ancient civilizations of Egypt, Mesopotamia and the Indus Valley, and China in successive semesters. May be repeated twice when topics vary.
3341. **Laboratory Archaeology (3:0:3).** Provides hands-on training in processing and analysis of archaeological materials in the laboratory and exposure to other aspects of archaeological research centered in the lab.
3343. **Maya Archaeology (3:3:0).** A survey of ancient Maya prehistory and archaeology with emphasis on religion, world view, iconography, and hieroglyphic writing.
3345. **North American Archaeology (3:3:0).** Prerequisite: ANTH 2301 or consent of instructor. A study of the archaeological background of aboriginal Americans with a particular interest in artifacts and art and the architecture of past civilizations.
3346. **Ancient Civilizations of Middle and South America (3:3:0).** Prerequisite: ANTH 2301 or 3304 or 3345 or consent of instructor. The origins, development, and cultural achievements of the great civilizations of Middle and South America: the Incas, Aztecs, Mayas, and their predecessors. Gives humanities credit in Arts and Sciences.

3347. **Texas Prehistory (3:3:0)**. Prerequisite: ANTH 2301 or consent of instructor. A comprehensive survey of 12,000 years of human activity in Texas; the major prehistoric sites and findings of archaeological studies.
3348. **Introduction to Historical Archaeology (3:3:0)**. Introduces students to the methods and theories of historical archaeology. The course will focus on the post-1492 era in North and South America.
3351. **Language and Culture (3:3:0)**. An inquiry into the interrelations of language and other aspects of culture; languages as reflecting or actively molding human perception and experience. Gives humanities credit in Arts and Sciences.
3371. **Peoples of the Southwest (3:3:0)**. A survey of this area's cultural heritage, including prehistoric and contemporary Indian peoples, and the immigrant Anglo, Hispanic, and other cultural groups of recent times.
4000. **Individual Problems in Anthropology (V1-3)**. Prerequisite: ANTH 1301, 2300, 2301, or 2302 plus advanced standing and consent of instructor prior to registration. May be repeated for credit.
4305. **Doing Ethnography: Method and Theory (3:3:0)**. Prerequisite: ANTH 2302 or consent of instructor. The history of research in cultural anthropology, development of methodological and theoretical approaches, and the exploration of ethnographic fieldwork and writing.
4341. **Archaeological Methods and Techniques (3:2:3)**. Prerequisite: ANTH 2301 or consent of instructor. A presentation of the methods and techniques, such as field reconnaissance and site excavation, laboratory analysis, and reporting used by archaeologists to determine and define the ancient human past.
4343. **Human Skeletal Biology and Forensic Techniques (3:3:0)**. Prerequisite: ANTH 3310 or 3311. Intensive study of skeletal biology emphasizing subadult and adult morphological variation. Includes analysis of paleopathology, trauma, age sex, and stature estimation.
4345. **Paleopathology (3:3:0)**. Prerequisite: ANTH 2300, 2100, and 4343, or consent of instructor. This course offers students an appreciation of the dynamic nature of human bone as it relates to the health of prehistoric populations.
4347. **Evolution Medicine (3:3:0)**. Prerequisite: ANTH 2300 and 2100 or consent of instructor. Examines human evolutionary biology; biocultural context of health, illness, medicine, and reservoir-vector studies of human infectious diseases.
4372. **Society and Culture of Mexico (3:3:0)**. Mesoamerican culture history, emphasizing Indians villagers, migrants to the cities, and other groups studied by anthropologists. Study of the cultural processes that have created modern Mexico. Taught in Spanish some semesters
4642. **Field Archaeology (6:2:8)**. Prerequisite: ANTH 2301 and 4341 or consent of instructor. A summer session field school providing instruction in basic archaeological field techniques, including site survey, test excavations, record keeping, mapping, and collection documentation.

Graduate Courses

5301. **Exploring Human Diversity (3:3:0)**. Human evolution and prehistory, world languages, and cultural diversity in the postmodern world. A one-semester graduate level introduction to the field for teachers and the general public.
5305. **Doing Ethnography: Method and Theory (3:3:0)**. The history of research in cultural anthropology; development of methodological and theoretical approaches, and the exploration of ethnographic fieldwork and writing.
5310. **Primate Behavior (3:3:0)**. A survey of the biological and behavioral diversity of nonhuman primates. Emphasizes issues concerning evolution, social organization and conservation of prosimians, anthropoids and hominoids.
5311. **Human Origins (3:2:2)**. A comprehensive examination of hominid evolution with emphasis on current discoveries, interpretations, and theories. Seminar on selected topics.
5312. **Human Diversity (3:2:2)**. Survey of biological variation and the processes producing it in human populations and races; seminar in selected topics. Laboratory emphasizing research approaches to current problems.
5313. **Human Skeletal Biology and Forensic Anthropology (3:3:0)**. Prerequisite: Graduate standing in anthropology, biology, museum science, or consent of instructor. Analysis of human skeletal remains for legal purposes. Methods of identification, techniques of recovery and examination, facial reconstruction, report writing, limits of inference, expert testimony.
5314. **Human Ecology and Adaptation (3:3:0)**. Survey of human biological adaptability, the dual inheritance of genes and culture, and human survival.
5317. **Anthropology, Epidemiology, and Global Health (3:3:0)**. Introduction to communicable-disease epidemiology; covers theory and methods, transmission, surveillance and control, emerging infectious diseases.
5322. **Social Anthropology (3:3:0)**. Seminar in contemporary social anthropology. Selected topics in kinship, social, and political organization; warfare and conflict resolution; and ritual and symbolism.
5323. **Topics in Cultural Anthropology (3:3:0)**. May be repeated for credit.
5341. **Method and Theory in Archeology (3:2:2)**. An intensive survey of the development and present status of method and theory in archeology.
5343. **Topics in Anthropological Archeology (3:3:0)**. Examination of either a currently important methodological topic in archeology or the archaeological knowledge extant from a site or geographic unit. May be repeated for credit. Also offered as a summer field course.
5345. **Paleopathology (3:3:0)**. Prerequisite: Consent of instructor. This course offers students an appreciation of the dynamic nature of human bone as it relates to the health of prehistoric populations.
5347. **Evolution Medicine (3:3:0)**. Examines human evolutionary biology; biocultural context of health, illness, and medicine; and reservoir-vector studies of human infectious diseases.

5349. **Field Studies on Infectious Disease Ecology, Surveillance, and Control (3:3:0)**. Prerequisite: Consent of instructor. Summer session field school providing instruction and experience in the field of epidemiology of infectious diseases, emphasizing original research in the developing world.
5352. **Ethnolinguistics (3:3:0)**. Survey of the nature of the interrelationships between language and culture.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.

Social Work (S W)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

2301. **Introduction to the Social Welfare Institution (3:3:0) [SOCW 2361]**. Prerequisite: SOC 1301 or consent of instructor. Introduction to the social welfare system: An examination of society's response to human needs and social problems through development of voluntary and governmental social services.
3311. **Human Behavior and the Social Environment I (3:3:0)**. Prerequisite or corequisite: SW 2301. A systems, ecology, and strengths perspective for examining the person-environment-in-interaction with emphasis on systemic-related behaviors, populations-at-risk, and diversity. (Writing Intensive)
3312. **Human Behavior and the Social Environment II (3:3:0)**. Prerequisite: SW 3311. A systems, ecology, and strengths perspective for understanding human behavior with emphasis on interaction between biological, social, emotional, and cultural systems across the life span.
3331. **Social Work with Diverse Populations (3:3:0)**. Prerequisite: S W 2301 and 3311; corequisite: SW 3312. Integrated approach to theory, values, and skills of social work practice with culturally diverse populations. Emphasizes empowering vulnerable populations to fulfill their potential. Social work majors only.
3332. **Social Work Practice: Interaction Skills (3:3:0)**. Prerequisite: SW 2301, 3311, 3312; corequisite: SW 3333. Foundation course in theory and principles of interviewing and professional relationship-building skills for generalist social workers.
3333. **Social Work Practice: Macro Systems (3:3:0)**. Prerequisite: S W 3311; corequisite: SW 3332. Examination of knowledge base and application of intervention skills for generalist social work practice with organizations and communities. Social work majors only.
3334. **Social Work Practice: Micro Systems (3:3:0)**. Prerequisite: SW 3332 and 3333. Examination of knowledge base and application of intervention skills for generalist social work practice with individuals, families, and small groups. Social work majors only.
3339. **Social Work Research and Evaluation (3:3:0)**. Prerequisite or corequisite: MATH 2300 or SOC 3391 or consent of instructor. Introduction to the cycle and process of social work knowledge building through the scientific approach. Emphasis on designs for evaluation of programs or individual practice.

4311. **Social Policy and Social Welfare Legislation (3:3:0)**. Prerequisite: Senior standing. In-depth analysis of the process of social policy and social legislation as it pertains to the field of social welfare and social service delivery systems.
4340. **Social Work: Field Placement Integrative Seminar (3:3:0)**. Prerequisite: SW 3334 and corequisite: SW 4611. A seminar designed to increase the integration of social work knowledge and skills used in the student's individual practice of social work. Social work majors only.
4611. **Social Work: Field Experience (6:0:30)**. Prerequisite: SW 3334; corequisite: SW 4340. A closely supervised individual experience in the practice of social work knowledge, methods, and skills in a welfare or related agency. Pass-fail. Social work majors only. Professional liability insurance required.

Sociology (SOC)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1301. **Introduction to Sociology (3:3:0) [SOCI 1301]**. Human group behavior, influence on the individual, and relationships of individuals to each other as members of groups.
1320. **Current Social Problems (3:3:0) [SOCI 1306]**. Problems in basic social institutions as marriage and the family, community, economy, government, education, health and welfare, recreation, etc.
2331. **The Sociology of Marriage (3:3:0) [SOCI 2301]**. History, present status, and current problems of the marriage institution. (W S 2331)
3324. **American Minority Problems (3:3:0)**. Sociological analysis of the major racial and ethnic groups in the present United States.
3325. **Gendered Lives (3:3:0)**. Study of the gendered nature of society, emphasizing the experiences of women in such areas as family, health, and the economy. (W S 3325)
3327. **Sociology of Law and Policing (3:3:0)**. Examines social forces affecting the development and current operation of criminal law and policing. Special attention given to contemporary issues concerning each.
3329. **Sociology of Corrections (3:3:0)**. Prerequisite: SOC 1301. Introduction to U.S. corrections systems. Sociological examination of trends and issues in prisons, parole, probation, and community corrections.
3331. **Sociology of the Family (3:3:0)**. Changing family life styles, mate roles, parent-child relationships, adoption, abortion, population control, technical-industrial impact on American family unit. (W S 3331)
3332. **Sociology of Bureaucracy (3:3:0)**. Governmental, business, and industrial bureaucracies in international perspective with an emphasis on internal structure, relationship between organization and society, and their impacts on human behavior.
3337. **Inequality in America (3:3:0)**. Inequality as expressed in occupational, class, ethnic, and sexual hierarchies is examined from varying sociological perspectives. (W S 3337)
3348. **Sociology of China and Japan (3:3:0)**. A sociological approach to the peoples and institutions of China and Japan. Emphasis is placed on comparing Chinese and Japanese ways of life vis-à-vis the American way of life.
3352. **Technology and Society (3:3:0)**. Explores the interrelationships between technology and society, emphasizing the impacts of technology on society and social factors contributing to the development and diffusion of technology.
3368. **Sociology of Deviance (3:3:0)**. Study of different forms of deviant behavior in Western societies, emphasizing the social relativity of deviance and theories that attempt to explain it. Examples of topics include tattooing, drug abuse, topless dancing, pedophilia, and mental illness.
3383. **Alcohol, Drugs, and Society (3:3:0)**. Analysis of social factors related to the use and abuse of alcohol and other drugs.
3391. **Introduction to Social Research I (3:3:0)**. Nature of research process; elementary problems of design; data collection and analysis; interpretation of research.
3392. **Introduction to Social Research II (3:3:0)**. Prerequisite: SOC 3391. Nature of research process; elementary problems of design; data collection and analysis, interpretation of research.
3393. **Development of Sociological Theory (3:3:0)**. Emergence of systematic sociological theory out of social philosophy; evolution of sociology as a discipline in the late 19th century.
3394. **Contemporary Sociological Theories (3:3:0)**. Review of selected current perspectives on social behavior, such as functionalism and systems theory, conflict and critical theory, symbolic interactionism, rational choice, sociology of emotions, structuration theory, feminist theory, and postmodern perspectives. Special attention given to linkages between micro and macro levels of the social world.
4307. **Individual Studies in Sociology (3)**. Prerequisite: Consent of instructor and high scholastic achievement. Independent study. May be repeated for credit.
4311. **Sociology of the Person (3:3:0)**. Prerequisite: SOC 1301. Effects of group membership on individual attributes and behavior; focuses on the influence of experience in primary groups and positions in social structure.
4316. **Ageing and Society (3:3:0)**. Theory and research on aging: covering demographic, socio-cultural, economic, individual, and social factors.
4325. **Criminology (3:3:0)**. Crime and deviant behavior as a social process and their regulation in a democratic society.
4327. **Juvenile Delinquency (3:3:0)**. Delinquency is reviewed as a form of deviant behavior. Attention is given to prevalent theories of causation, distribution, and frequency of delinquency, and the treatment, prevention, and control of delinquent patterns of behavior.
4331. **Religion and Society (3:3:0)**. The sociological study of religious groups and beliefs. The reciprocal relationships between religious institutions and society.
4362. **Cities and City Life (3:3:0)**. The modern city in its ecological, cultural, and social aspects.
4381. **Sickness, Health, and Society (3:3:0)**. The sociological study of the medical institution and its interrelationship with other societal institutions. Differential definitions of health and illness.
4382. **The Sociology of Mental Illness (3:3:0)**. Analysis of the problems of mental health and illness from the sociological perspective. Study of sociological approaches to the definition of mental illness; the social epidemiology of mental illness, problems of recognizing and defining conditions of mental illness, and hospital and community treatment of mental illness.
4395. **Senior Seminar (3:3:0)**. Prerequisite: Senior standing. A capstone course for sociology majors that integrates, extends, synthesizes, and applies sociological knowledge.

Graduate Courses

5303. **Seminar in Contemporary Sociological Theory (3:3:0)**. Study of contemporary approaches to society, including conflict theory, functionalism, symbolic interaction, and ethnomethodology.
5308. **Seminar in the Origins of Social Theory (3:3:0)**. Development of sociological theory in the nineteenth and early twentieth centuries. Topics may vary, but emphasis usually will be on the work of Marx, Durkheim, and Weber.
5311. **Seminar in Criminology (3:3:0)**. Critical review of theory and research on selected topics in criminology.
5312. **Seminar in Urban Problems (3:3:0)**. Extensive analysis of the process and consequences of urbanization, with emphasis upon causation and critiques of proposed solutions.
5313. **Seminar in Minority Relations (3:3:0)**. American and world patterns of inter-ethnic relations are covered with emphasis on recent and current trends.
5315. **Seminar in Social Change (3:3:0)**. Linear and cyclical theories; analysis of the idea of progress, stage theories, dialectical materialism, and the lag hypothesis.
5316. **Seminar in Social Gerontology (3:3:0)**. Theory and research on aging, covering demographic, sociocultural, economic, individual, and societal factors. Interdisciplinary aspects are stressed.
5320. **Social Psychology: Symbolic Interactionism (3:3:0)**. Central ideas of social psychology are analyzed and integrated in a contemporary model of symbolic interactionism, with focus on affect.
5325. **Seminar in Deviant Behavior (3:3:0)**. Critical review of current theory and research in deviance.
5327. **Seminar in Demography (3:3:0)**. Theory and skills of population analysis including use of census data in sociological and social science research.
5331. **Field Research (3)**. Individual research project off campus, covering entire term or longer. Research plans must be approved in advance by the student's major advisor. May be repeated for credit with permission.
5332. **The Research Organization (3:3:0)**. Participation in campus-based organized research project. Required at least once

of research assistants; open to other students.

5334. **Quantitative Methods in Sociology (3:3:0).** Prerequisite: Undergraduate introduction to quantitative methods. Decision making skills (from test selection to inferences from data) for quantitative analysis in sociology.
5336. **Seminar in Family Change (3:3:0).** Analysis of how the family institution has changed, in relation to other institutions and society in general. Family is treated as both a dependent and independent variable.
5381. **Seminar in Medical Sociology (3:3:0).** Theory and research on conceptions of health, illness, and medical care from the sociological perspective.
5382. **Seminar in Psychiatric Sociology (3:3:0).** An examination of theories of mental illness, the commitment process, mental hospitals, mental health professions, and alternative treatment programs.
5384. **Seminar in the Sociology of Religion (3:3:0).** Examination of the religious institution focusing on its sociological meaning, organizations, presence as a force in western society, and relationship to other social institutions.
5394. **Seminar in Sociological Research Methods (3:3:0).** An examination of the research process including problem formation, case selection, data collection, and data organization.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**



University Library

Rawls College of Business

About the College

The Rawls College of Business offers educational programs in all areas of business while advancing knowledge through research, providing community service, and supporting the development of business in the global economy. Fulfilling these objectives creates a stimulating learning environment for the student and expands the frontiers of knowledge.

The baccalaureate and master's programs in business administration and accounting are fully accredited by the AACSB International, the national accrediting organization for business and management programs.

Degree Programs

The college offers programs leading to the following degrees:

- Bachelor of Business Administration
- Master of Business Administration
- Master of Science with a major in Business Administration
- Master of Science in Accounting
- International Master of Business Administration
- Doctor of Philosophy with a major in Business Administration

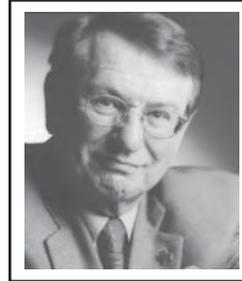
Dual-Degree/Joint Programs

- Bachelor of Business Administration/Bachelor of Science in Architecture
- Bachelor of Business Administration/Bachelor of Science in Agricultural and Applied Economics
- Bachelor of Science in Agribusiness
- Master of Business Administration/Master of Architecture
- Master of Business Administration/Master of Science (Environmental Toxicology)
- Master of Business Administration/Master of Science (Personal Financial Planning)
- Master of Business Administration/Doctor of Medicine
- Master of Business Administration/Master of Arts (Foreign Language)
- Master of Business Administration/Doctor of Jurisprudence
- Master of Science in Accounting/Doctor of Jurisprudence
- Master of Science (Business Administration)/Master of Science (Personal Financial Planning)

At the undergraduate level, students may major in accounting, economics, finance, general business, international business, management, management information systems, marketing, and petroleum land management. Joint majors with programs in other colleges include agribusiness, general business/agricultural and applied economics, and business/architecture.

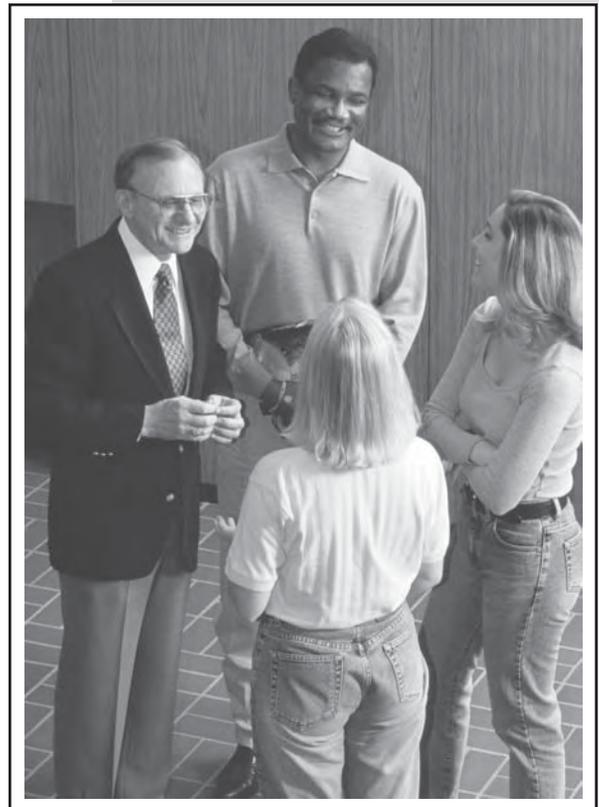
Accelerated Program: Joint B.B.A.—Master's

This is an accelerated program leading to a bachelor's in business administration and a master's in business administration or accounting. The program is designed for academically outstanding undergraduate students who wish to complete a master's degree at Texas Tech. Completion of this program can enhance starting salaries and career advancement.



Allen McInnes, PhD
Dean

101 Business Administration
Box 42101
Lubbock TX 79409-2101
www.ba.ttu.edu



The accounting joint B.B.A.-M.S. in Accounting (M.S.Acct.) is a 150-hour program that is designed for students who plan to take the CPA exam and have a professional career in accounting.

Students should apply to the graduate component of the program during their junior year. Graduate course work cannot be taken prior to acceptance. Application materials are available in the Rawls College of Business Graduate Services Center. Admitted students will combine undergraduate and graduate courses during the final semester of their undergraduate work.

Dual-Degree, Joint Programs

B.B.A. and B.S. in Architecture. This dual-degree program is designed to provide a broad background for a variety of careers in business, government, architecture, and building-related industries with particular 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.

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.

B.S. in Agribusiness. This distinctive Bachelor of Science joint program prepares students for careers in agribusiness by providing a curriculum that includes courses designed

to develop interpersonal and communication skills, business-economics skills, technical-quantitative skills, and ethics. Courses in international business equip students for the world economy and provide marketability for a wide range of careers. This is a joint program administered by the College of Agricultural Sciences and Natural Resources and the Rawls College of Business. See the College of Agricultural Sciences and Natural Resources section of this catalog for a full program outline.

Faculty

Horn Professors: Conover, J. Hunt, S. Hunt, and Westfall; **Professors:** L. Anderson, Blair, Boal, Burns, Clancy, Dowell, Duhan, Dukes, Freeman, Goebel, Hein, Hoffman, Howell, Lampe, Macy, Mann, McInnes, Nichols, Pasewark, Ricketts, Sears, R. Sorensen, Viator, Wetherbe, Whitehead, Wilcox, Wilkes, and Yadav; **Associate Professors:** Bravoco, Bremer, Browne, Dunne, Durrett, Jones, Krefting, Laverie, Malone, Masselli, Mercer, Phillips, and Ritchey; **Assistant Professors:** Antony, Arnett, Brigham, Buchheit, Burkman, Cooney, Cyree, Davis, English, Giambatista, Koch, Lin, Lightner, McDonald, Robinson, Sherif, Song, Szyliowicz, Walden, and Washington; **Instructors:** Allen, D. Anderson, Brown, Busby, DeBord, Faver, Flamm, Giddens, Hankins, Harper, Hoover, Hughes, Janamanchi, Kelley, Lynn, McInturff, McWhorter, Nix, Payne, Ramirez, Schiermeyer, Schuetzeberg, P. Sorensen, Trotter, and Whitebread.

Undergraduate Program

Honors College for Business Majors. Students from all areas of the Rawls College of Business may enter the Honors College. Students with high grade point averages are encouraged to apply for admittance into this prestigious program. Honors sections are usually offered in the following business courses: ACCT 2300, 2301, 3304, 3307, FIN

3320, MGT 3370, 3373, 4373, 4374, 4377, 4378, 4379, and MKT 3350.

Lower Division Curriculum. The Lower Division requirements should be completed during the freshman and sophomore years. All students wishing to major in business are classified as COBA (College of Business Administration) until completion of the Lower Division Business Core (IS 1300, ENGL 1301, 1302, MATH 1330, 1331, 2345, ACCT 2300, 2301, ISQS 2340, and ECO 2301, 2302) with grades of C or higher and attainment of a minimum 2.75 adjusted cumulative Texas Tech GPA. Upon the attainment of these minimum requirements, application may then be made to the Undergraduate Services Center for a specific major. Admission to the lower division COBA designation does not assure admission to any upper division major in the Rawls College of Business. Note that the minimum GPA for any major may increase due to limited space availability.

Mathematics Requirement. A mathematics course must be taken each enrollment until the math requirement is finished since both MATH 1330 and 1331 must be completed with grades of C or higher before taking some of the required sophomore business courses.

Foreign Language Requirement. Any student who is admitted to the university without two years of high school credit (8th through 12th grades) in the same foreign language must complete two semesters of a single foreign language in college. The college-level foreign language courses will replace free electives in the B.B.A. program.

Prelaw Studies. Students interested in attending law school after graduation may pursue any of the regular programs offered.

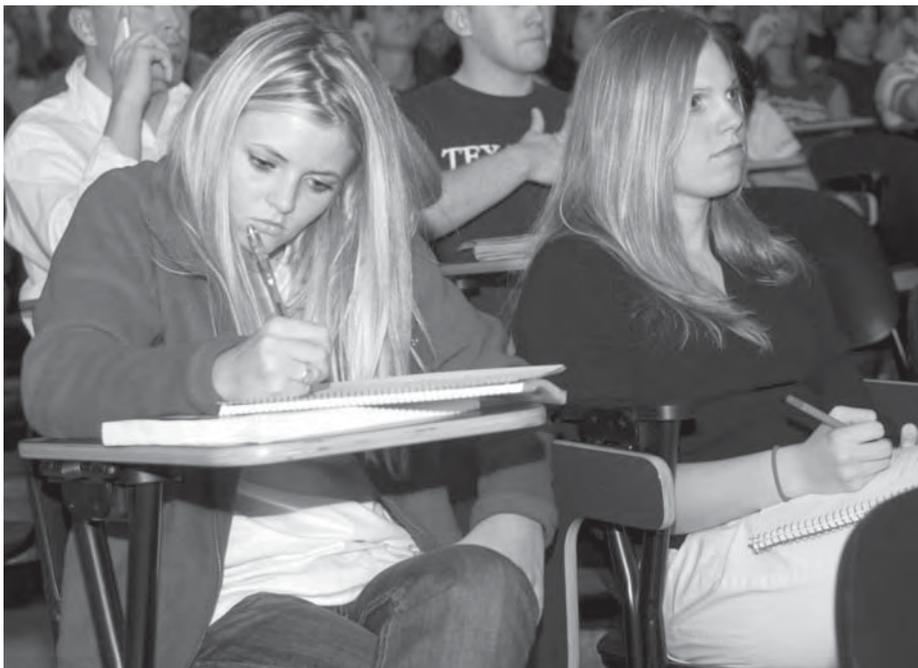
Minors

Minor for Non-Business Students. The requirements for a minor for students in other colleges are as follows:

- Must have a minimum 2.75 adjusted cumulative Texas Tech GPA to declare a minor.
- All prerequisites must be met prior to taking each course.
- A minimum grade of C is needed to complete minor requirements.
- All junior and senior level business courses, with the exception of BLAW 3391, must be taken at Texas Tech University.
- Correspondence courses cannot be used in the minor.

Finance Minor -24 hours

- ACCT 2300 Financial Accounting. (Prerequisite: Sophomore standing or at least a C in any college level mathematics course and adjusted 2.75 GPA)
- ACCT 2301 Managerial Accounting. (Prerequisite: ACCT 2300 and adjusted 2.75 GPA)
- MATH 2345 Introduction to Business Statistics. (Prerequisite: At least a C in college-level mathematics)
- ACCT 3304 Intermediate Accounting I. (Prerequisite: At least a C in ACCT 2301)
- FIN 3320 Corporation Finance I. (Prerequisite: ECO 2301, 2302, ACCT 2301, MATH 2345, and a minimum adjusted 2.75 GPA)
- FIN 3321 Financial Statement Analysis. (Prerequisite: FIN 3320 with at least a grade of C or may be taken concurrently if GPA is 3.25 or higher)



FIN 3323	Principles of Money, Banking, and Credit. (Prerequisite: FIN 3320 or concurrent)
FIN 4324	Investments. (Prerequisite: FIN 3320 with at least a grade of C)

Finance Minor for Agricultural and Applied Economics Majors-21 hours

In addition to AAEC 3401, 4303, and 4316, the following courses will complete a finance minor:

ACCT 2300	Financial Accounting. (Prerequisite: Sophomore standing, C or better in any college level mathematics course, and adjusted 2.75 GPA)
ACCT 2301	Managerial Accounting. (Prerequisite: ACCT 2300 and adjusted 2.75 GPA)
ACCT 3304	Intermediate Accounting I. (Prerequisite: At least a C in ACCT 2301)
FIN 3320	Corporation Finance I. (Prerequisite: ECO 2301, 2302, ACCT 2301, MATH 2345, and a minimum adjusted 2.75 GPA)
FIN 3321	Financial Statement Analysis. (Prerequisite: FIN 3320 with at least a grade of C or may be taken concurrently if GPA is 3.25 or higher)
FIN 3323	Principles of Money, Banking, and Credit. (Prerequisite: FIN 3320 or concurrently)
FIN 4324	Investments. (Prerequisite: FIN 3320 with at least a grade of C)

General Business Minor-18 Hours

ACCT 2300	Financial Accounting. (Prerequisite: Sophomore standing, C or better in any college level mathematics course, and adjusted 2.75 GPA)
ACCT 2301	Managerial Accounting. (Prerequisite: ACCT 2300 and adjusted 2.75 GPA)
MATH 2345	Introduction to Business Statistics. (Prerequisite: At least a C in college-level mathematics)
FIN 3310	Foundations of Finance. (Prerequisite: ACCT 2301 and a minimum adjusted 2.75 GPA)
MKT 3350	Introduction to Marketing. (Prerequisite: ECO 2301 or AAEC 2305 or ECO 2305 and a minimum adjusted 2.75 GPA)
MGT 3370	Organization and Management. (Prerequisite: A minimum adjusted 2.75 GPA)

General Business Minor for Chemical Engineering Majors-18 Hours

Grades of A or B in the following minor, plus ECO 2301 and 2302 and computer competency, provide a background for Chemical Engineering majors to pursue a Master of Business Administration degree. Credit-by-examination and correspondence courses are not accepted to meet requirements.

ACCT 2300	Financial Accounting. (Prerequisite: Sophomore standing, C or better in any college level mathematics course, and adjusted 2.75 GPA)
ACCT 2301	Managerial Accounting. (Prerequisite: ACCT 2300 and adjusted 2.75GPA)
BLAW 3391	Business Law I. (Prerequisite: A minimum adjusted 2.75 GPA)
FIN 3320	Corporation Finance I. (Prerequisite: ECO 2301, 2302, ACCT 2301, MATH 2345, and a minimum adjusted 2.75 GPA)
MKT 3350	Introduction to Marketing. (Prerequisite: ECO 2301 or AAEC 2305 or ECO 2305 and a minimum adjusted 2.75 GPA)
MGT 3370	Organization and Management. (Prerequisite: A minimum adjusted 2.75 GPA)

Management Minor-18 Hours

MGT 3370	Organization and Management. (Prerequisite: A minimum adjusted 2.75 GPA)
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Three additional management courses chosen from MGT 3374, 3376, 3379, 4371, 4372, 4375, and 4397. Two courses chosen from ACCT, BLAW, FIN, ISQS, MGT, and MKT.

Management Information Systems Minor-21 Hours

ISQS 2341	Business Computer Programming. (Prerequisite: ISQS 2340 or an approved course on introduction to computers and a minimum adjusted cumulative 2.75 GPA). Grade of A or B required.
ISQS 3346	Advanced Application Programming Techniques. (Prerequisite: An A or B in ISQS 2341 and a minimum 2.5 GPA)
ISQS 4383	Special Topics in ISQS. (Prerequisite: An A or B in ISQS 2341 and a minimum 2.5 GPA)
ISQS 3348	Data Base Management Systems. (Prerequisite: An A or B in ISQS 2341 and a minimum 2.5 GPA)
ISQS 3349	Introduction to Data Communication Systems. (Prerequisite: An A or B in ISQS 2341 and a minimum 2.5 GPA)
ISQS 4348	Systems Analysis. (Prerequisite: A grade of C or better in ISQS 3348)
ISQS 4349	Information Systems Design. (Prerequisite: A grade of C or better in ISQS 4348)

Marketing Minor-18 Hours

MKT 3350	Introduction to Marketing. (Prerequisite: ECO 2301 or AAEC 2305 or ECO 2305 and a minimum adjusted 2.75 GPA)
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Three additional marketing courses chosen from MKT 3352, 3353, 3356, 4351, 4354, 4358, 4359, and 4360.

Two courses chosen from ACCT, BLAW, FIN, ISQS, MGT, and MKT.

Graduation Requirements

The Bachelor of Business Administration degree will be awarded to all students who fulfill the following minimum requirements:

- Satisfactory completion of all courses and minimum hours as outlined for each major.
- A minimum Texas Tech adjusted 2.0 GPA.
- Completion of the last 30 hours following official admission into the Rawls College of Business.

Application for Graduation. At least one year before the proposed graduation date, application for the degree must be made through the Undergraduate Services Center. Graduation is attained by fulfilling the requirements for a B.B.A. degree using an eligible catalog edition. It is the student's responsibility to fulfill all catalog requirements.

Admission of Transfer Students

Students planning to take their first two years of work at a junior or community college should follow the lower division degree plan. A maximum of 66 hours can be accepted provided none of the courses are vocational, career, or upper division courses (with the exception of BLAW 3391).

Courses that are acceptable from a four-year institution are the lower division requirements, junior-senior level economics courses (except ECO 3323 and 4332), and free electives plus the following upper division core: FIN 3320, ISQS 3344, MGT 3370, MKT 3350, and BLAW 3391. The last 30 hours must be taken while registered in the Rawls College of Business.

Students transferring from any institution must have at least a cumulative 2.75 GPA or higher on (a minimum of 12) hours taken at 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 may be accepted on a pass-fail basis. Official transcripts from all institutions are needed before the acceptance of transfer credit.

Students requesting permission to transfer from another college at Texas Tech must have a 2.75 adjusted cumulative GPA or higher on a minimum of 12 credit hours and must bring a copy of all transcripts to the Undergraduate Services Center prior to being officially admitted to the Rawls College of Business. A student is officially admitted to the college by a formal transfer completed by the Undergraduate Services Center. Upper division business and economics courses will be used in the degree program if the student had an adjusted cumulative 2.75 GPA when the courses were taken and the B.B.A. lower division business core was completed.

The last 30 hours prior to graduation must be taken while enrolled in the Rawls College of Business.

General Standards and Requirements

Accreditation. The AACSB International prescribes that at least 50 percent of the total hours in the undergraduate program must be in General Education courses. At least 50 percent of the business credit hours required for the business degree must be earned at the institution awarding the degree.

Catalog Selection. Students will use the catalog issued for the year in which they were first officially admitted to the Rawls College of Business or a more recent catalog if approved. However, if they later transfer to another institution or another college at Texas Tech, they will use the catalog in effect when they are readmitted to the Rawls College of Business. For these purposes, a catalog expires after seven years.

Correspondence Courses. Free electives and lower division non B A or noneconomics courses may be taken by correspondence, up to a maximum of 18 hours. Lower division business core, upper division core and major courses and requirements are excluded. A correspondence course should not be used for graduation when completed during the student's last semester.

Course Load. The normal course load for a semester is 15 to 19 hours. The maximum load for a semester is 19 hours (8 hours for a summer term). Correspondence courses are included in a student's course load. The maximum course load for students on probation is 16 hours.

Course Prerequisites. Prerequisites are governed by the catalog in effect when the course is taken.

Grades of Incomplete. Grades of Incomplete must be removed at Texas Tech University, not by transfer credit.

Ineligible Registrations. The Rawls College of Business reserves the right to drop any ineligibly registered student from a course for reasons such as lower division-upper division rule infractions and lack of prerequisites including required GPAs. Courses taken ineligibly are not used in the degree program.

Nondegree Students. A nondegree form must be signed in the Undergraduate Services Center before registration. The nondegree status will continue until a written request for a change has been approved by the Undergraduate Services Center. All prerequisites and academic regulations based on GPA, such as probation and suspension, apply to nondegree students. Courses taken while in the nondegree status may not be used as part of a degree program.

Pass-Fail. Only free electives are eligible for the pass-fail option. No free elective in a student's major area may be taken pass-fail (e.g., accounting course for an accounting major) even if major courses have been completed, nor can a course be taken pass-fail that could be used for a group A or B requirement unless that group has been satisfactorily completed. Pass-fail hours are excluded in determining eligibility for the Dean's Honor List and President's Honor Roll.

Probation and Suspension. See the section of the catalog entitled "Academic Status" concerning probation and suspension policies.

Requirements to Declare an Upper Division Major. The Rawls College of Business curriculum consists of two parts: A lower division and an upper division. The lower division requirements should be completed during the freshman and sophomore years. All students who wish to major in business are classified as prebusiness majors (COBA designation) until completion of the lower division business core with grades of C or higher, and attainment of a minimum 2.75 adjusted cumulative Texas Tech GPA. Upon attainment of the minimum requirements, application may be made to the Undergraduate Services Center for a specific business major. Admission to the prebusiness major (the lower division COBA designation) does not assure admission to any upper division major in the college. Students must meet minimum GPA requirements in effect when a major is declared. Note that the minimum GPA for any major may increase due to limited space availability.

Second Undergraduate Degree. No second bachelor's degree is conferred until the candidate has completed at least 24 semester hours (exclusive of credit by exam) after admission for the second degree. Students must be ap-

proved by the Undergraduate Services Center to seek a second degree.

Study Abroad. Students requesting permission to study abroad in business programs must have a minimum 2.75 adjusted Texas Tech GPA. Please check with the International Business programs office for specific program requirements.

Summer Work. Course work to be taken at other institutions must be approved by a Rawls College undergraduate advisor. Credit from other institutions is not calculated into the student's Texas Tech GPA.

Services

Advising. Each undergraduate student in the college is provided with an academic advisor located in the Undergraduate Services Center on the second floor of the BA building. Advisors have the expertise and capability to provide the necessary guidance during each student's degree program and are aided by a computerized degree audit to ensure accuracy.

Upper division students should maintain contact with an advisor in the Undergraduate Services Center concerning degree requirements, and with faculty advisors for help in selecting courses to achieve career objectives.

Graduate Program / Business Administration

Admission to graduate degree programs offered through the Rawls College of Business is based on grade point average on the last 60 hours of undergraduate work, test scores (e.g., GMAT), and individual profile. No thesis is required in any of our master's degree programs. As part of the comprehensive evaluation process for graduation, a master's student must successfully complete one of the following as approved by their specific area of concentration: A final comprehensive examination, a capstone course, or a project. These requirements must be completed in one of the last two semesters preceding graduation with a grade of B or better. Students may be directed to enroll in a specific section. The following graduate degree programs are available:

Master of Business Administration. The college's M.B.A. program is designed to provide a broad background for multiple careers in business, government, and related activities with particular emphasis on developing managerial perspective, analytical tools, and skills. The program is sufficiently flexible to permit more depth in at least one academic area.

M.B.A. students may expect to complete the program in 16 months. Students possessing any undergraduate degree are invited to apply. M.B.A. students are expected to complete their tool course requirements first.

A joint venture of the School of Medicine and the college offers a concentration in health organization management. This program is accredited by the Accrediting Commission for Education in Health Services Administration (ACEHSA) and includes a certificate in addition to the M.B.A. degree. The M.B.A. health organization management program prepares master's students with varying levels and types of work experience for post-graduate managerial roles within the health care industry, especially within medical group practices and other ambulatory care organizations.

International Master of Business Administration. The I.M.B.A. is a broad-based program designed for training students in the dynamic global economy. In addition to M.B.A.-like classroom experiences, the program requires competence in a foreign language and experience abroad.

Master of Science in Accounting. This M.S.A. program is designed to prepare graduates for professional careers in the practice of accounting. Concentrations are available in auditing/financial reporting and taxation. Graduates are prepared for professional service in a wide variety of fields. Most accept entry-level positions in public accounting and private industry.

Master of Science With a Major in Business Administration. This degree produces specialists in one of the following areas of business: finance, management information systems, operations management, or business statistics. The student will take from 18 to 21 semester hours of course work in a specialty area, up to 6 semester hours of tool and quantitative courses, and 9 to 12 semester hours of electives usually in a concentration from one of the other specialty areas. Normally the student may expect to complete the program within one to two years depending on prior preparation.

Doctor of Jurisprudence—Master of Business Administration. The college, in association with the School of Law, offers a program that enables the student to earn both the Doctor of Jurisprudence and Master of Business Administration degrees in approximately four years of full-time academic work. A student without a business background may complete both degrees with 112 hours of law and business courses (a net saving of 24 credit hours from the total hours necessary if the degree programs were pursued separately). The first year of study is taken in the School of Law. Application must be made to and approved by both the School of Law and the College of Business Administration.

Doctor of Jurisprudence—Master of Science in Accounting. The college, in association with the School of Law, offers a program that enables students to earn simultaneously both the Doctor of Jurisprudence and Master of Science in Accounting degrees. In many cases, the student in this program will be able to save numerous semester credit hours in comparison to those needed to complete both degrees separately. Application must be made to and approved by both the School of Law and the Rawls College of Business.

(continued on next page)



Joint Doctor of Medicine—Master of Business Administration.

The college, in association with the School of Medicine in the Texas Tech University Health Sciences Center, offers a program that gives students the opportunity to earn both the M.D. and the M.B.A. Students must be admitted to both the School of Medicine and the M.B.A. program with a concentration in health organization management. The program may be completed in four years.

Joint Bachelor of Business Administration—Master's Programs in Business Administration. These programs lead to a B.B.A. and a master's degree (either an M.B.A, M.S., or M.S.A.); a maximum of 9 semester hours of graduate work may apply to the B.B.A. and the other master's degrees. The total number of credit hours required for both degrees will vary depending on the program. The program is designed for academically outstanding undergraduate students who wish to complete a master's degree while at Texas Tech.

Students should apply and be accepted to the graduate component of the program before the first semester of their senior year. Application materials are available in the Graduate Services Center (BA 252) of the college. Upon successful completion of the required undergraduate courses plus 6-9 hours of designated graduate work, the B.B.A. degree will be granted (except for the B.B.A. and M.S.Acct. program which grants both degrees simultaneously). The final portion of graduate work will be completed during the fifth year.

Joint Master of Science—Master of Business Administration.

The college, in association with other colleges and schools, offers programs that enable students to obtain selected M.S. degrees and the M.B.A. Applications should be made through and approved by the respective colleges involved in these programs: the College of Human Sciences (M.S. in Personal Financial Planning) and the College of Arts and Sciences (M.S. in Environmental Toxicology). These joint programs require 22 to 24 fewer hours than if both degrees were pursued separately.

Master of Architecture—Master of Business Administration.

Students pursuing a M.Arch. degree may begin taking selected

business courses once admitted into the graduate program in architecture. These courses become part of the M.Arch. degree and the M.B.A. degree.

Application for this program is made through the college and the Graduate School.

Master of Arts in Foreign Language—Master of Business Administration.

The college in association with the College of Arts and Sciences offers a joint program in French, German, and Spanish. This program is designed to save 24 semester credit hours in comparison to the total credit hours if the degrees were pursued separately. Application must be made to and approved by both the College of Arts and Sciences and the Rawls College of Business.

Doctor of Philosophy with a Major in Business Administration. This degree is offered with first-field and second-field specializations in accounting and taxation, finance, management, marketing, management information systems, operations management, and business statistics. The program has three emphases for the student: to provide a broad, integrated knowledge of business; to develop specialized knowledge in at least two fields; and to develop research skills. Examinations must be passed to show competency in linear algebra and calculus as soon after commencement of the program as possible. By completing course work with a minimum grade of B, students must satisfy requirements in advanced statistics and micro- and macro-economics early in the program. No requirement exists for a foreign language. The student who is successful continuously at each step in progress should complete degree requirements in four years of full-time study beyond the master's degree.

The Rawls College of Business requires that its master's program students maintain at least a 3.00 cumulative GPA. Doctoral students must maintain a 3.20 cumulative average. The GPA is computed on all graduate courses included on the degree program. Students falling below these averages will be subject to probationary action. To graduate, master's students must make at least three hours credit with a grade of A above a 3.00 cumulative GPA on all graduate courses in the program.

Lower Division Curriculum

FIRST YEAR			
Fall		Spring	
MATH 1330, Intro. Math. Anal.	3	MATH 1331, Intro. Math. Anal.	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
POLS 1301, American Gov't. Org.	3	HIST 2301, Hist. U.S. Since 1877*	3
Laboratory Science*†	4	Laboratory Science*†	4
(PLM majors take GEOL 1401 or GEOL 1301 & 1101)		Visual and Performing Arts*†	3
HIST 2300, Hist. of U.S. to 1877*	3	Plus Foreign Language for Int'l. Business majors	
TOTAL	16	TOTAL	16

SECOND YEAR			
Fall		Spring	
ACCT 2300, Fin. Acct.	3	ACCT 2301, Man. Acct.	3
ISQS 2340, Intro. Info. Sys. Bus.	3	MATH 2345, Intro. Stats. Bus.	3
ECO 2301, Prin. Economics I	3	ECO 2302, Prin. Economics II	3
POLS 1301, Amer. Govt., Org.*	3	POLS 2302, Amer. Pub. Pol.*	3
Humanities (Foreign Lang. for Int'l. Business majors, PHIL 2320 for 150-Acct.)*† (Multicultural course)*	3	Elective (Non B A or Non Eco.) or ISQS 2341 for MIS majors or Foreign Language for Int'l. Business majors*	3
TOTAL	15	TOTAL	15

* These are the only courses not requiring a grade of C or higher.
 † Choose from Core Curriculum requirements.

Upper Division Curriculum

Junior and senior level business and economics courses may be taken upon admission to the upper division of the college. Admission to upper division will be granted upon completion of the lower division business core with grades of C or higher and attainment of a minimum 2.75 cumulative Texas Tech GPA. Upon attainment of these minimum requirements, application may then be made to the Undergraduate Services Center for a specific major. Admission to the lower division COBA designation does not assure admission to any upper division major in the Rawls College of Business. Note that the minimum GPA for any major may increase due to limited space availability.

Accounting Major

The primary objective of the undergraduate accounting program is to prepare students for accounting positions at the entry level in public accounting, government, industry, and other organizations in the public and private sectors. A major in accounting is also excellent preparation for law school or graduate school. A 2.75 adjusted cumulative Texas Tech GPA is required to declare accounting as a major. 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 course in ethics. The B.B.A. in accounting includes 18 hours of accounting beyond introductory. Students who plan to take the CPA exam are encouraged to apply to the 150-hour M.S.A. program. Students in the 150-hour M.S.A. program should take PHIL 2320 as one of their undergraduate electives.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermed. Acct. I	3	ACCT 3305, Intermed. Acct. II	3
ACCT 3307, Income Tax Acct.	3	MKT 3350, Intro. to Marketing	3
Economics Course**	3	ACCT 3315, Acct. Systems	3
ISQS 3344, Intro. Prod. & Oper.	3	FIN 3320, Corp. Fin. I	3
MGT 3373, Managerial Comm.	3	MGT 3370, Organiz. & Mgt.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	MGT 4380, Strategic Management	3
ENGL 3365, Prof. Rept. Writing* or COMS 3358	3	Nonaccounting Electives†#	9
ACCT 3306, Prin. Cost & Mgr. Acct.	3	TOTAL	12
ACCT 4301	3		
Nonaccounting Elective#	3		
TOTAL	15		

Minimum hours required for graduation—120.
 * This course does not require a grade of C or higher.
 ** Any upper level economics course except ECO 3323 and 4332.
 # These courses may be business (except accounting) or nonbusiness.
 † Students going into the 150-hour program will have 18 hours of major courses, 9 hours of nonaccounting electives, and PHIL 2320. Elective hours may be adjusted to meet minimum hour requirement of 120.

150-Hour Accounting Major

The primary objective of the 150-hour program is to prepare students for careers in public accounting, consulting, industry, and other organizations and is recommended for students who want to become certified public accountants. After admission to the 150-hour program, students must select a concentration from auditing-financial reporting or taxation. The program may differ if the student elects to participate in an internship. The appropriate graduate faculty accounting advisor should be consulted for approval of the graduate program prior to the seventh semester. Upon completion of all requirements for the M.S.Acct. degree, the B.B.A. degree will be granted. Students may also consider the 150-hour M.B.A. program.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermed. Acct. I	3	ACCT 3305, Intermed. Acct. II	3
ACCT 3307, Income Tax Acct.	3	MKT 3350, Intro. to Marketing	3
Economics Course**	3	ACCT 3315, Acct. Systems	3
ISQS 3344, Intro. Prod. & Oper.	3	FIN 3320, Corp. Fin. I	3
MGT 3373, Managerial Comm.	3	MGT 3370, Organiz. & Mgt.	3
Nonaccounting Elective†	3	Nonaccounting Elective	3
TOTAL	18	TOTAL	18

FOURTH YEAR			
Fall		Spring	
ACCT 4301, Prin. of Auditing	3	Graduate Courses	6
BLAW 3391, Business Law I	3	TOTAL	6
ACCT 3306, Prin. Cost & Mgr. Acct.	3		
Nonaccounting electives*	6		
ENGL 3365, Prof. Rept. Writing	3		
TOTAL	18		

Minimum hours required for graduation—150. Elective hours may vary to meet requirements.
 * These are the only courses not requiring a grade of C or higher. Courses may be business (except accounting) or nonbusiness and can be taken pass/fail. If not already fulfilled, the multicultural requirement should be completed with an elective.
 ** Any upper level economics course except ECO 3323 and 4332.
 † If PHIL 2320 is not taken as a humanities elective it needs to be taken here.

Economics Major

THIRD YEAR			
Fall		Spring	
ECO 3311, Intermed. Macroecon.	3	BLAW 3391, Business Law I	3
FIN 3320, Corp. Fin. I	3	ECO 3312, Intermed. Econ. Theory	3
MGT 3370, Organiz. & Mgt.	3	ECO 3323, Prin. Money, Bank. & Cr. or FIN 3323	3
MKT 3350, Intro. to Marketing	3	MGT 3373, Managerial Comm.	3
ISQS 3344, Intro. Prod. Oper. Mgt.	3	Group A**	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ECO 4323, Monetary Theory	3	MGT 4380, Strategic Management	3
Group A**	3	Free Electives*	9
Group B†	6	TOTAL	12
Elective (Non B A or Non Eco.)*	3		
TOTAL	15		

Minimum hours required for graduation—120.
 * These are the only courses not requiring a grade of C or higher and may vary in number to meet 120 hour requirement.
 ** Group A—Choose two courses from ECO 3320, 4332 (or FIN 4328), FIN 4323, 4325, 4326, and 4329.
 † Group B—Choose two courses from ECO 3322, 3324, 3326, 3330, 3333, 3336, 4305, 4314, 4331, 4333, 4334, MGT 4372, or remaining Group A courses.

Accelerated Economics B.B.A./Master's

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR			
Fall		Spring	
ECO 3311, Intermed. Macroecon.	3	BLAW 3391, Business Law I	3
FIN 3320, Corp. Fin. I	3	ECO 3312, Intermed. Econ. Theory	3
MGT 3370, Organiz. & Mgt.	3	ECO 3323, Prin. Money, Bank. & Cr. or FIN 3323	3
MKT 3350, Intro. to Marketing	3	MGT 3373, Managerial Comm.	3
ISQS 3344, Intro. Prod. & Oper.	3	Group A**	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ECO 4323, Monetary Theory	3	MGT 4380, Strategic Management	3
Group A**	3	Graduate Courses	9
Group B (3 hours)†	3	TOTAL	12
Free Elective *	6		
TOTAL	15		

* These are the only courses not requiring a grade of C or higher.
 ** Group A—Choose two courses from ECO 3320, 4332 (or FIN 4328), FIN 4323, 4325, 4326, and 4329.
 † Group B—Choose one course from ECO 3322, 3324, 3326, 3330, 3333, 3336, 4305, 4314, 4331, 4333, 4334, MGT 4372, or remaining Group A courses.

Finance Major

The goal of this major is to enhance leadership potential by providing a high-quality and thorough education as preparation for careers in banking, business finance, investment management, and real estate.

THIRD YEAR			
Fall		Spring	
ACCT 3304, Intermed. Acct. I	3	ECO 3311, Intermed. Macroecon.	3
BLAW 3391, Business Law I	3	FIN 3321, Fin. Statement Anal.	3
FIN 3320, Corp. Fin. I	3	FIN 3323, Money, Bank, Credit	3
MGT 3370, Organiz. & Mgt.	3	MGT 3373, Managerial Comm.	3
MKT 3350, Intro. to Marketing	3	Group B†	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ECO 3320, Managerial Eco.	3	FIN 4330, Corp. Fin. II	3
FIN 4324, Investments	3	MGT 4380, Strategic Management	3
ISQS 3344, Intro. Prod. Oper. Mgt.	3	Elective (Non B A or Non Eco.)*	3
Group A**	6	Group A**	3
TOTAL	15	TOTAL	12

Minimum hours required for graduation—120.
 For those students with a cumulative GPA of 3.25 or higher, FIN 3321 may be taken concurrently with FIN 3320 in the first semester of the junior year, which will permit students to take finance major courses earlier.
 * This is the only course not requiring a grade of C or higher. Elective hours may vary to meet 120 hour requirement.
 ** Group A—Choose three courses from FIN 3332, 3334, 4323, 4325, 4326, 4327, 4328, 4329, 4333, 4336, and 4383.
 † Group B—Choose one course from ACCT 3305, 3306, 3307, 3315, BLAW 3393, ECO 3312, 3322, 3324, 3330, 3333, 4323, 4331, FIN 4382, MKT 3356, or remaining Group A courses.

Finance-Real Estate Emphasis

While all real estate courses and most other business courses offered at Texas Tech University can be used to partially satisfy 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	
ACCT 3304, Intermed. Acct. I	3	ECO 3311, Intermed. Macroecon.	3
BLAW 3391, Business Law I	3	FIN 3321, Fin. Statement Anal.	3
FIN 3320, Corp. Fin. I	3	FIN 3323, Prin. Money, Bank, Credit	3
MGT 3370, Organiz. & Mgt.	3	ISQS 3344, Prod. & Oper. Mgt.	3
MKT 3350, Intro. to Marketing	3	MGT 3373, Managerial Comm.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
ECO 3320, Managerial Eco.	3	FIN 4330, Corp. Fin. II	3
FIN 4324, Investments	3	MGT 4380, Strategic Management	3
Group A**	6	Group A**	3
Elective (Non B A or Non Eco.)*	3	Group B†	3
TOTAL	15	TOTAL	12

Minimum hours required for graduation—120.
 * This is the only course not requiring a grade of C or higher. Elective hours may vary to meet 120 hour requirement.
 ** Group A—Choose three courses from FIN 3332, 3334, 4329, 4333, 4336 and BLAW 3393.
 † Group B—Choose one course from AAEC 4303, CTEC 1312, 2301, ECO 3324, FIN 1307, 4382, GEOG 3351, PHIL 4320, POLS 3324, and SOC 4362 or remaining Group A courses.

Accelerated Finance B.B.A./Master's

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR					
Fall			Spring		
ACCT 3304, Intermed. Acct. I	3	ECO 3311, Intermed. Macroecon.	3	ECO 3311, Intermed. Macroecon.	3
BLAW 3391, Business Law I	3	FIN 3321, Fin. Statement Anal.	3	FIN 3321, Fin. Statement Anal.	3
FIN 3320, Corp. Fin. I	3	FIN 3323, Prin. Money, Bank, Credit	3	FIN 3323, Prin. Money, Bank, Credit	3
MGT 3370, Organiz. & Mgt.	3	ISQS 3344, Intro. Prod. Oper. Mgt.	3	ISQS 3344, Intro. Prod. Oper. Mgt.	3
MKT 3350, Intro. to Marketing	3	MGT 3373, Managerial Commun.	3	MGT 3373, Managerial Commun.	3
TOTAL	15	TOTAL	15	TOTAL	15

FOURTH YEAR					
Fall			Spring		
ECO 3320, Managerial Eco.	3	MGT 4380, Strategic Management	3	MGT 4380, Strategic Management	3
FIN 4324, Investments	3	Graduate Courses	9	Graduate Courses	9
Group A**	3	TOTAL	12	TOTAL	12
Undergraduate Free Elective*	3				
FIN 4330, Corp. Fin. II	3				
TOTAL	15				

* This is the only course not requiring a grade of C or higher.
 ** Group A—Choose one course from FIN 3332, 3334, 4323, 4325, 4326, 4327, 4328, 4329, 4333, 4336, and 4383.

General Business Major

THIRD YEAR					
Fall			Spring		
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3	BLAW 3391, Business Law I	3
FIN 3320, Corp. Fin.	3	MGT 3373, Managerial Comm.	3	MGT 3373, Managerial Comm.	3
ISQS 3344, Prod. & Oper. Mgt.	3	Major Courses†	9	Major Courses†	9
MGT 3370, Organiz. & Mgt.	3	TOTAL	15	TOTAL	15
MKT 3350, Intro. to Marketing	3				
TOTAL	15				

FOURTH YEAR					
Fall			Spring		
Major Courses†	9	MGT 4380, Strategic Mgt.	3	MGT 4380, Strategic Mgt.	3
Elective (Non B A or Non Eco.)*	3	Advanced Course†	3	Advanced Course†	3
Free Elective*	3	Free Electives*	6	Free Electives*	6
TOTAL	15	TOTAL	12	TOTAL	12

Minimum hours required for graduation—120.
 * These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120 hour requirement.
 ** Any upper level economics course except ECO 3323 and 4332.
 † Major Courses—Choose 21 hours from at least three of the following areas: ACCT, ECO, FIN, ISQS, MGT, MKT not used to fulfill another requirement. At least 9 hours must be senior level courses.

General Business Major—International Emphasis

THIRD YEAR					
Fall			Spring		
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3	BLAW 3391, Business Law I	3
FIN 3320, Corp. Fin.	3	FIN 3323, Prin. Money, Bank, & Cr.	3	FIN 3323, Prin. Money, Bank, & Cr.	3
ISQS 3344, Prod. & Oper. Mgt.	3	MGT 3373, Managerial Comm.	3	MGT 3373, Managerial Comm.	3
MGT 3370, Organiz. & Mgt.	3	*Elective (Non B A or Non Eco.)*	3	*Elective (Non B A or Non Eco.)*	3
MKT 3350, Intro. to Marketing	3	#Group A	3	#Group A	3
TOTAL	15	TOTAL	15	TOTAL	15

FOURTH YEAR					
Fall			Spring		
FIN 4328, Internat. Finance	3	MGT 4380, Strategic Management	3	MGT 4380, Strategic Management	3
MGT 4375, Int'l Management	3	Group A#	3	Group A#	3
MKT 4358, Int'l Marketing	3	Group B†	3	Group B†	3
Free Electives*	6	Free Elective*	3	Free Elective*	3
TOTAL	15	TOTAL	12	TOTAL	12

Minimum hours required for graduation—120.
 * These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120 hour requirement.
 ** Any upper level economics course except ECO 3323 and 4332.
 # Group A—Choose two courses from ECO 3333, 4331, GEOG 3358, 3363, 3364, 4305, HIST 3353, 3354, 3374, 3382, 3384, 3392, 4383, 4394, POLS 3361, 3363, 3366, 3373, 3374, 3375, 3376, 4364, and I B 3361, 4383.
 † Group B—Choose one additional junior or senior level course in ACCT, B A, FIN, ISQS, MGT, or MKT.

Accelerated General Business B.B.A./Master's

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Corp. Fin.	3	MGT 3373, Managerial Comm.	3
MGT 3370, Organiz. & Mgt.	3	Advanced Courses†	9
ISQS 3344, Prod. & Oper. Mgt.	3	TOTAL	15
MKT 3350, Intro. to Marketing	3		
TOTAL	15		

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
Major Courses†	9	MGT 4380, Strategic Management	3
Free Electives*	6	Graduate Courses	9
TOTAL	15	TOTAL	12

* These are the only courses not requiring a grade of C or higher.
 ** Any upper level economics course except ECO 3323 and 4332.
 † Advanced Courses—Choose 18 hours from at least three of the following areas: ACCT, ECO, FIN, ISQS, MGT, MKT not used to fulfill another requirement. At least 9 hours must be senior level courses.

International Business Major

The goal of the undergraduate program in international business is to provide understanding of and experience with international environments and business practices. The foreign language requirement and recommended overseas study periods enhance the depth and breadth of this understanding.

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
Study Abroad Semester	12	BLAW 3391, Business Law I	3
(May also be done in spring of 3rd year or fall of 4th year)		FIN 3320, Corp. Fin.	3
I B 3105, Cross-Cultural Mgt. Skills		MGT 3370, Org. & Management	3
Should be taken prior to Study Abroad Semester		MGT 3373, Managerial Comm.	3
		MKT 3350, Intro. to Marketing	3
		Directed Elective#	1
		TOTAL	16

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
FIN 3323, Prin. Money, Bank., & Cr.	3	FIN 4328, Int'l. Finance	3
ISQS 3344, Prod. & Oper. Mgt.	3	MGT 4380, Strategic Management	3
MGT 4375, Int'l Management	3	MKT 4358, Int'l. Marketing	3
Group A*	6	Group B**	3
Directed Elective#	1	Directed Elective#	1
TOTAL	16	TOTAL	13

Minimum hours required for graduation—122.
 Students interested in the International Business major are required to complete the equivalent of three semesters of a single foreign language while in the lower division and then make application for the major. The humanities requirement will be satisfied with completion of the foreign language.

* Group A—Choose two courses from ACCT 4314, GEOG 3358, 3363, 3364, 4305, HIST 3353, 3354, 3374, 3382, 3384, 4383, 4393, 4394, I B 3361, 4382, 4383, POLS 3361, 3363, 3366, 3373, 3374, 3375, 3376, and 4364.
 ** Group B—Choose one course from ECO 3333 and 4331.
 # Directed Electives—One-hour semesters of International Business Language labs.

Management Major

The undergraduate management program provides high quality preparation for a wide range of managerial careers. It provides the broadest background of any of the business disciplines for understanding and managing organizations and behavior in these systems. Students may group courses to emphasize their particular interest.

General management is particularly suited for management training programs sponsored by many larger firms and entry level positions in smaller firms. These programs serve as the first step up the management ladder. A 2.75 or higher adjusted cumulative Texas Tech GPA is required to declare management as a major.

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Corp. Fin.	3	ISQS 3344, Intro. Prod. & Oper. Mgt.	3
MGT 3370, Organiz. & Mgt.	3	MGT 3376, Organizational Behavior	3
MGT 3373, Managerial Comm.	3	MGT 3379, Adv. Org. & Management	3
MKT 3350, Intro. to Marketing	3	Group A†	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
Group A†	6	MGT 4380, Strategic Management	3
Group B††	3	Free Electives*	6
Electives (Non B A or Non Eco.)*	3	Group A†	3
Free Elective*	3	TOTAL	12
TOTAL	15		

Minimum hours required for graduation—120.
 * These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120 hour requirement.
 ** Any upper level economics course except ECO 3323 and 4332.
 † Group A—Choose four courses from MGT 3374, 4370, 4371, 4372, 4375, 4376, and 4397.
 †† Group B—Choose one additional junior- or senior-level business course, provided it is not used to fulfill another requirement.

Honors Program in Management (HRPM)

The HRPM specialization is a joint program of the Honors College and the area of management in the College of Business Administration. As an honors specialization leading to a B.B.A. degree, students have the option of the general management program or selecting a concentration in applied leadership, entrepreneurship, or health organization management. A minimum 3.25 adjusted Texas Tech GPA is required to declare HRPM.

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Corp. Fin.	3	ISQS 3344, Intro. Prod. & Oper. Mgt.	3
MGT 3370, Organiz. & Mgt.	3	MGT 3376, Org. Behavior	3
MGT 3373, Managerial Comm.	3	Group A†	3
MKT 3350, Intro. to Marketing	3	Group B††	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
Group B††	6	MGT 4380, Strategic Management	3
Group C#	6	Group C#	3
Elective (Non B A or Non Eco.)*	3	Free Electives*	6
TOTAL	15	TOTAL	12

Minimum hours required for graduation—120.
 * These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120 hour requirement.
 ** Any upper level economics course except ECO 3323 and 4332.
 † Group A—Choose one course from MGT 3374 or 3379.
 †† Group B—Choose three courses from MGT 4373, 4374, 4377, 4378, 4379, 4384, 4387, 4388, and 4389.
 # Group C—Choose three courses from MGT 4370, 4371, 4372, 4375, 4376, 4381, 4382, 4397, remaining Group A or Group B courses, or any other honors seminars, not used to fulfill another degree requirement.

**Accelerated Honors Program in Management (HRPM)
B.B.A./Master's**

The HRPM specialization is a joint program of the Honors College and the area of management in the Rawls College of Business. It is a "pre-M.B.A." program and prepares students for pursuing a master's degree within the college and provides a seamless transition from undergraduate to graduate status. Students have the option of the general management program or selecting a concentration in either applied leadership, entrepreneurship, or health organization management. Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR			
Fall		Spring	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Corp. Fin.	3	ISQS 3344, Prod. & Oper. Mgt.	3
MGT 3370, Organiz. & Mgt.	3	MGT 3376, Org. Behavior	3
MGT 3373, Managerial Comm.	3	Group A†	3
MKT 3350, Intro. to Marketing	3	Group B††	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
Group B††	3	MGT 4380, Strategic Management	3
Group C#	6	Graduate Courses	9
Elective (Non B A or Non Eco.) *	3	TOTAL	12
TOTAL	12		

- * This is the only course not requiring a grade of C or higher.
- ** Any upper level economics course except ECO 3323 and 4332.
- † Group A—Choose one course from MGT 3374 or 3379.
- †† Group B—Choose two courses from MGT 4373, 4374, 4377, 4378, 4379, 4384, 4387, 4388, and 4389.
- # Group C—Choose two courses from MGT 4370, 4371, 4372, 4375, 4376, 4381, 4382, 4397, remaining Group A or Group B courses, or any other honors seminars, not used to fulfill another degree requirement.

Management Information Systems (MIS) Major

The Information Systems and Quantitative Sciences (ISQS) area has a major field called Management Information Systems (MIS). The MIS graduate is prepared to be the liaison person between managers and computers and is therefore in great demand by industry. A 2.75 adjusted cumulative Texas Tech GPA is required to enroll in ISQS 2341. An A or B in ISQS 2341 and a 2.75 adjusted Texas Tech GPA is required to declare an MIS major. ISQS 2341 should be taken instead of a lower division elective.

THIRD YEAR			
Fall		Spring	
FIN 3320, Corp. Fin.	3	BLAW 3391, Business Law I	3
ISQS 3346, Adv. Appl. Prog. Tech.	3	ISQS 3344, Prod. & Oper. Mgt.	3
ISQS 4383, Special Topics in ISQS	3	ISQS 3349, Intro. Data Comm. Sys.	3
MGT 3373, Managerial Comm.	3	ISQS 3348, Data Base Mgt. Sys.	3
MKT 3350, Intro. Marketing	3	Elective (Non B A or Non Eco.)*	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
Jr./Sr. Economics or Comp. Sci.	3	ISQS 4349, Info. Sys. Des.	3
ISQS 4347, MIS Seminar	3	ISQS 4350, Info. Sys. Proj. Mgt.	3
ISQS 4348, Systems Anal.	3	MGT 4380, Strategic Mgt.	3
MGT 3370, Org. and Mgt.	3	Elective (Non B A or Non Eco.)*	3
Restricted Elective†	3	TOTAL	12
TOTAL	15		

- Minimum hours required for graduation—120.
- * These are the only courses not requiring a grade of C or higher. Elective hours may vary to meet 120 hour requirement.
- ** Any upper level economics course except ECO 3323 and 4332 or any upper level computer science course.
- † Restricted Elective—ISQS 4382 or other with written approval.

**Accelerated Management Information Systems (MIS)
B.B.A./Master's**

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR			
Fall		Spring	
FIN 3320, Corp. Fin. I	3	BLAW 3391, Business Law I	3
ISQS 3346, Adv. Appl. Prog. Tech.	3	ISQS 3344, Intro. Prod. & Oper. Mgt.	3
ISQS 4383, Special Topics in ISQS	3	MGT 3370, Org. & Management	3
MGT 3373, Managerial Comm.	3	ISQS 3348, Database Mgt. Sys.	3
MKT 3350, Intro. to Marketing	3	Elective (Non B A or Non Eco.)*	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
Jr./Sr. Economics Course**	3	ISQS 4349, Info. Sys. Des.	3
ISQS 4347, MIS Seminar	3	ISQS 4350, Info. Sys. Proj. Mgt.	3
ISQS 4348, Systems Anal.	3	Graduate Courses	9
MGT 4380, Strategic Management	3	TOTAL	15
TOTAL	12		

- * This is the only course not requiring a grade of C or higher.
- ** Any upper level economics course except ECO 3323 and 4332.

Marketing Major

The goal of the undergraduate program in marketing is to enhance leadership potential by providing a high quality and thorough educational experience in preparation for careers in marketing. The required marketing courses and the major elective courses allow the breadth and depth in marketing and related subject areas.

THIRD YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	ISQS 3344, Intro. Prod. & Oper. Mgt.	3
FIN 3320, Corp. Fin. I	3	Group A†	9
MGT 3370, Organiz. & Mgt.	3	Group B††	3
MGT 3373, Managerial Comm.	3	TOTAL	15
MKT 3350, Intro. to Marketing	3		
TOTAL	15		

FOURTH YEAR			
Fall		Spring	
Jr./Sr. Economics Course**	3	MGT 4380, Strategic Management	3
Group A†	6	Group A†	3
Free Elective*	3	Group B††	3
Elective (Non B A or Non Eco.)*	3	Free Elective*	3
TOTAL	15	TOTAL	12

- * These are the only courses not requiring a grade of C or higher.
- ** Any upper level economics course except ECO 3323 and 4332.
- † Group A—Choose six courses from MKT 3352, 3353, 3356, 4351, 4354, 4358, 4359, 4360, and 4383.
- †† Group B—Choose two additional junior- or senior-level business courses provided they are not used to fulfill another requirement.
- Minimum hours required for graduation—120.

Accelerated Marketing B.B.A./Master's

Upon admission to the graduate program, the student should stay in contact with the Graduate Services Center concerning the graduate portion of the program. The B.B.A. degree will be granted upon completion of the following requirements and the master's degree will be granted after completion of the remaining graduate courses.

THIRD YEAR			
Fall		Spring	
BLAW 3391, Business Law I	3	ISQS 3344, Intro. Prod. & Oper. Mgt.	3
FIN 3320, Corp. Fin. I	3	Group A†	9
MGT 3370, Organiz. & Mgt.	3	Economics course**	3
MGT 3373, Managerial Comm.	3	TOTAL	15
MKT 3350, Intro. to Marketing	3		
TOTAL	15		

FOURTH YEAR			
Fall		Spring	
Group A†	6	Group A†	3
Free Electives*	6	Graduate Courses	9
MGT 4380, Strategic Mgt	3	TOTAL	12
TOTAL	15		

- * These are the only courses not requiring a grade of C or higher.
- ** Any upper level economics course except ECO 3323 and 4332.
- † Group A—Choose six courses from MKT 3352, 3353, 3356, 4351, 4354, 4358, 4359, 4360, and 4383.

Petroleum Land Management Major

The goal of the undergraduate program in petroleum land management is to enhance leadership potential by providing a high quality and thorough educational experience in preparation for a career as a petroleum landman. A petroleum landman is involved in obtaining the legal rights to explore for and produce natural resources and has a responsibility for managing and maintaining these mineral rights. Petroleum Land Management majors must take GEOL 1303 and 1101 to fulfill one of their lower division laboratory science requirements.

THIRD YEAR			
Fall		Spring	
Jr./Sr. Economics Course**	3	BLAW 3391, Business Law I	3
FIN 3320, Corp. Fin.	3	GEOL 3323, Environ. Geol.	3
MGT 3370, Organiz. & Mgt.	3	Group A†	3
MGT 3373, Managerial Comm.	3	Group B††	3
MKT 3350, Intro. to Marketing	3	MGT 4385, Petroleum Land Mgt.	3
TOTAL	15	TOTAL	15

FOURTH YEAR			
Fall		Spring	
GEOL 4324, Geol. of Hydrocarbons	3	MGT 4380, Strategic Management	3
ISQS 3344, Prod. & Oper. Mgt.	3	Group B††	3
Group A†	3	Free Elective*	6
Group C+	3	TOTAL	12
Free Elective*	3		
TOTAL	15		

Minimum hours required for graduation—120.

* These are the only courses not requiring a grade of C or higher.

** Any upper level economics course except ECO 3323 and 4332.

† Group A—Choose two courses from MGT 3374, 3376, 3379, 4372, and 4375.

†† Group B—Choose two courses from BLAW 3393, FIN 3332, 3334, 4333, and 4336.

+ Group C—Choose one course from GEOG 3300, 3303, 3335, PETR 2301, and RWFM 4403.

Accounting (ACCT)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 2300. Financial Accounting (3:3:0) [ACCT 2301].** Prerequisite: 2.75 adjusted cumulative GPA, sophomore standing, and a C or better in any college-level mathematics course. Concepts and terminology of accounting and financial reporting for modern business enterprises and the relationships between accounting information and business activities.
- 2301. Managerial Accounting (3:3:0) [ACCT 2302].** Prerequisite: 2.75 adjusted cumulative GPA and ACCT 2300. Uses of accounting information for planning decisions about products and services, activities and processes, suppliers and customers, organizational subunits, and time periods as these relate to organizations in a changing environments.
- 3304. Intermediate Accounting I (3:3:1).** Prerequisite: C or higher in ACCT 2301. Net income concepts, corporations, current assets, and investments.
- 3305. Intermediate Accounting II (3:3:1).** Prerequisite: C or higher in ACCT 3304 and 2.5 adjusted Texas Tech GPA. Fixed assets, liabilities and reserves, interpretation and analysis of financial statements, application of funds, cash flow statement, reorganizations, and price level impact on financial statements.
- 3306. Principles of Cost and Managerial Accounting (3:3:1).** Prerequisite: C or higher in ACCT 3304, MATH 2345, and 2.5 adjusted Texas Tech GPA. A study of principles and techniques of accounting information systems for organizations.
- 3307. Income Tax Accounting (3:3:0).** Prerequisite: C or higher 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 (3:3:1).** Prerequisite: C or higher in ACCT 2301. The theories, procedures, and techniques of accounting information systems for organizations.
- 4301. Principles of Auditing (3:3:1).** Prerequisite: ACCT 3305 and 3315. An introduction to the theory and practice of auditing, emphasizing auditor decision making through a cycle approach to an audit engagement.

- 4302. Public Sector Accounting (3:3:0).** Prerequisite: C or higher in ACCT 3304. Application of accounting principles to selected governmental and not-for-profit organizations, including state and local governments, universities, hospitals, and other public sector entities.
- 4303. Advanced Accounting Theory (3:3:0).** Prerequisite: ACCT 3305. In-depth discussion and analysis of selected topics in financial accounting. Broadens the students' knowledge of topics introduced in ACCT 3304 and 3305 and covers new topics as they emerge in practice. Concentrates on the applicability of important promulgated accounting standards.
- 4304. Advanced Accounting Problems (3:3:0).** Prerequisite: ACCT 3305. Accounting for corporate business combinations and the preparation of consolidated financial statements. The accounting and reporting problems associated with partnerships and foreign operations are also discussed.
- 4305. Internal Auditing (3:3:1).** Prerequisite: ACCT 3305 and 3315. Extension and application of general auditing concepts to internal auditing in both private and public sectors.
- 4306. Advanced Accounting Systems (3:3:0).** Prerequisite: ACCT 4301 or 4305. An analysis of the effects of information technology on the control and maintenance of accounting information systems.
- 4307. Advanced Income Tax Accounting (3:3:0).** Prerequisite: C or higher in ACCT 3304 and 3307. Study of taxation of corporations, partnerships, estates, gifts, and trusts.
- 4308. Advanced Internal Auditing (3:3:1).** Prerequisite: ACCT 4301 or 4305. A further extension of audit concepts and techniques to internal auditing. Emphasis is placed on cases in sampling, statistics, and EDP technology.
- 4309. Advanced Cost and Managerial Accounting (3:3:1).** Prerequisite: ACCT 3306. A study of advanced cost and managerial topics and an overview of contemporary issues in management accounting.
- 4310. Petroleum Accounting (3:3:0).** Prerequisite: C or higher in ACCT 3304. Accounting for the production, refining, and distribution of oil and gas with emphasis upon production.
- 4314. International Accounting (3:3:0).** Prerequisite: ACCT 3304 or consent of instructor. Study of the accounting issues affecting organizations operating in a global economy.
- 4381. Individual Problems in Accounting (3).** Prerequisite: Consent of instructor. For students with high academic achievement who are interested in enhancing their degree program by pursuing individual research or study under the guidance of an accounting faculty member.
- 4382. Internship in Accounting (3).** Prerequisite: Approval prior to employment. This course permits students to apply the concepts, principles, and techniques learned in the classroom. Up to 3 hours of internships can be applied toward a degree program. Must be taken pass-fail.

Graduate Courses

- 5302. Current Accounting Theory (3:3:0).** Prerequisite: ACCT 3305. Examination of current accounting literature, such as pronouncements of the Financial Accounting Standards Board.
- 5303. Accounting Systems Management and Control (3:3:1).** Prerequisite: ACCT 4301. A study of control implications and control integration into the systems analysis, design, and implementation process, emphasizing information technology.
- 5304. Federal Income Taxation of Corporations and Shareholders (3:3:1).** Study of corporate tax problem areas, including liquidations, formations, collapsibility, dividends, and "Subchapter S" treatments.
- 5305. Accounting Research and Communication (3:3:1).** Prerequisite: Student must be enrolled in M.B.A., M.S., or Ph.D. accounting program. Written and oral communication of the results of individual studies of selected accounting topics.
- 5306. International Taxation (3:3:1).** Study of taxation of individual and business entities operating outside the States and foreign entities operating in the States.
- 5308. Federal Income Tax Law for Partnerships (3:3:1).** Analysis of accounting by partnerships and other pass-through entities including LLCs. Focus is on economic and tax consequences for investors operating business or investment activities through partnerships and other pass-through entities.
- 5309. Special Entity-Ownership Accounting Issues (3:3:0).** Prerequisite: ACCT 3305 or equivalent. A study of the accounting and reporting problems associated with selected entities or types of ownership, including partnerships and consolidated financial statements.
- 5310. Seminar in Public Sector Accounting (3:3:0).** Prerequisite: A grade of C or higher in ACCT 3304. An advanced seminar in accounting-

- related problems of public sector entities such as federal, state, and local governments, hospitals, universities, and other public institutions.
5311. **Individual Study in Accounting (3)**. Prerequisite: Consent of instructor. Directed individual study of advanced accounting problems varying with the need of each student. May be repeated for up to 9 hours credit if subject matter differs.
5312. **Development of Financial Accounting Thought (3:3:0)**. Prerequisite: ACCT 5302 or equivalent. Advanced financial accounting theory. Trace historical thinking to current thought and examine potential future developments.
5314. **Issues in Cost and Managerial Accounting (3:3:1)**. Prerequisite: ACCT 3306 or equivalent. Current issues in cost and managerial accounting.
5315. **Estate and Gift Taxation (3:3:1)**. Intensive study of federal taxation of the estate and trust entities and the transfer of property rights through gifts and bequest.
5317. **Seminar in Controllershship (3:3:0)**. Prerequisite: ACCT 5314 or consent of instructor. Seminar in controllershship and accounting policy.
5318. **Income Tax Research and Planning (3:3:1)**. Fundamental procedures in research of income tax subject areas, such as property transactions, employment contracts, etc. Principles involved in necessary planning of actions for a desired tax result.
5319. **Auditing Theory and Practice (3:3:1)**. Prerequisite: ACCT 4301. A study of advanced concepts, theories, and techniques applied to external financial, governmental, and internal audit engagements.
5320. **Internal Audit Theory and Practice (3:3:1)**. Prerequisite: ACCT 3305 and 3315. Extension and utilization of audit concepts and techniques with emphasis on application in internal audit departments.
5323. **Advanced Topics in Financial Reporting (3:3:0)**. Prerequisite: ACCT 3305. Advanced study of selected topics in financial reporting.
5324. **Issues in International Accounting (3:3:0)**. Prerequisite: ACCT 5401 or equivalent. Current issues in international accounting.
5327. **Advanced Income Taxation Accounting (3:3:0)**. Prerequisite: A grade of A or B in ACCT 3304 and 3307. Study of advanced income tax affecting business and investment.
5330. **Electronic Commerce Systems Control and Assurance (3:3:0)**. Prerequisite: ACCT 5303. Issues surrounding strategic accounting information systems with a focus on electronic commerce systems.
5331. **Management and Control of Integrated Business Processes (3:3:0)**. Prerequisite: ACCT 5401. Management and control of activities that support business operations and controlled integration of e-business applications with ERP systems. Nonaccounting majors only.
5335. **Advanced Integrated Accounting Systems (3:3:0)**. Prerequisite: ACCT 5303. Advanced integrated accounting systems with a focus on enterprise resource planning systems and their application.

5401. **Financial and Managerial Accounting (4:4:0)**. This course examines financial accounting: The objectives, structure, and substance of financial reports; and management accounting: The use of accounting in the management of an organization.
6300. **Colloquium in Accounting Research (3)**. Prerequisite: Admission to doctoral program. Studies in selected areas of accounting research. Topics will vary by semester.
6301. **Contemporary Approaches to the Development of Accounting Theory (3:3:0)**. Prerequisite: ACCT 5302 or equivalent. Recent contributions in the development of accounting theory and hypotheses including scientific methods, measurement theory, communication theory, operationalism, and other disciplines.
6303. **Seminar in Accounting Information Systems (3:3:0)**. Prerequisite: ACCT 5330 and 5335 or consent of instructor. Seminar in accounting information systems.
6314. **Contemporary Issues in Cost and Managerial Accounting (3:3:0)**. Prerequisite: ACCT 5314. Graduate seminar introducing contemporary issues such as human asset accounting, social accounting, international management accounting issues, and behavioral science and accounting.
6318. **Seminar in Tax Research Methodology (3)**. Graduate seminar in tax research method.
6319. **Seminar in Auditing (3:3:0)**. Prerequisite: Either ACCT 5319 or 5320, or consent of instructor. A study of the historical, theoretical, and conceptual framework of auditing extended to current societal and professional issues.

Business Administration (B A)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1101. **Fundamentals of Business Professionalism (1:1:0)**. Integration of fundamental business principals from multiple disciplines and concepts of business professionalism and ethical behavior.
4000. **Directed Experience (V1-6)**. Prerequisite: Consent of instructor and Dean of the College. Enhance the student's classroom knowledge through internships, projects in the workplace, mentoring experiences, and other approved experiences.
4182. **Business Administration Internship (1)**. Prerequisite: Consent of instructor. Enhance the student's knowledge within fields of business specialization through application of concepts, principles, and techniques learned in the classroom.
4381. **Individual Problems in Business Administration (3)**. Prerequisite: Senior standing, 3.0 GPA in major, 2.75 adjusted cumulative GPA, and written consent of instructor prior to registration. Independent problem research under guidance of a faculty member. Student should register for section appropriate to the academic area in which the work will be done.

4382. **Internship in Business Administration (3)**. Prerequisite: At least 6 hours of professional courses (excluding core courses) to be determined by the area faculty; other minimum standards determined by area; written approval form contains specific requirements for participation. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom. A maximum of 3 hours may be earned (with approval by faculty internship advisor prior to employment) by internships toward a degree program.
4383. **Special Topics in Business (3:3:0)**. Prerequisite: Determined by area. May be repeated once for credit by faculty approval only with no duplication of topic.

Graduate Courses

5380. **Directed Experience (3:3:0)**. Prerequisite: Admission to the MBA program. Students enhance their classroom knowledge through the rigorous analysis of internships, global filled experiences, mentoring experiences, and other approved experiences. May be repeated for credit for up to 9 hours if subject matter differs.
5382. **Internship in Business Administration (3:3:0)**. Minimum standards determined by area. Written approval form required. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom. May be repeated for credit.
5395. **Practicum in Higher Education for Business (3)**. Prerequisite: Consent of instructor. Supervised practice in teaching of business and administrative subjects.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Business Law (BLAW)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3391. **Business Law I (3:3:0)**. Prerequisite: Minimum 2.75 adjusted cumulative GPA. Nature and source of law, courts and procedure, contracts, Texas law of separate and community property.
3393. **Real Estate Law (3:3:0)**. Rights in land, classification of estates, acquisition and creation of property rights, titles, and common conveyances.
4330. **E-Business and Cyber Law (3:3:0)**. Prerequisite: BLAW 3391. Study of the legal issues surrounding electronic commerce and other computer law matters.
4392. **Business Law II (3:3:0)**. Prerequisite: BLAW 3391. Second course in business law. Law of negotiable instruments, business organizations, partnership and corporation sales, with emphasis on subject matter appearing frequently in the CPA law examination.

Graduate Courses

5290. **Legal, Regulatory, and Ethical Environment of Business (2:2:0)**. This course examines the legal, regulatory, and ethical issues that arise in the conduct of busi-

ness to develop a capacity for recognizing and dealing with such issues.

5330. **E-Business Law (3:3:0)**. Prerequisite: BLAW 5290 or 3391. Study of the legal issues surrounding electronic commerce.

5392. **Advanced Business Law (3:3:0)**. Prerequisite: BLAW 3391 or 5290. Second course in business law. Emphasis on subject matter appearing frequently in the CPA law examination.

Finance (FIN)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1307. **Personal Financial Planning and Investing (3:3:0) [BUSI 1307]**. Emphasis on elements that should be considered before investing in real estate, insurance, personal property, and securities. Introduction to the operation of securities markets.

3310. **Foundations of Finance (3:3:0)**. Prerequisite: ACCT 2301 and a 2.75 GPA. 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.

3320. **Corporation Finance I (3:3:0)**. Prerequisite: ECO 2301, 2302, ACCT 2301, MATH 2345, and a minimum 2.75 GPA. An introductory survey of corporation finance covering financial mathematics, capital budgeting, sources of funds, financial analysis, and working capital decision.

3321. **Financial Statement Analysis (3:3:1)**. Prerequisite: FIN 3320 with a grade of C or higher or may be taken concurrently if GPA is 3.25 or higher. The analysis and interpretation of financial statement reports. Effective financial statement evaluation examined from the perspective of managers, investors, and creditors. Proforma statement development for effective financial management.

3323. **Principles of Money, Banking, and Credit (3:3:0)**. Prerequisite: FIN 3320 or concurrent. A basic course, including consideration of monetary standards, organization and functioning of the commercial banking system and the Federal Reserve System, problems of money, prices, and credit control. Recent monetary and banking trends are emphasized.

3332. **Real Estate Fundamentals (3:3:0)**. Prerequisite: FIN 3320 with a grade of C or higher. Introduction to property law, finance, valuation, investment analysis and brokerage. Operations of the real estate market and the study of urban land use, including urban growth, city structure, and land use planning.

3334. **Real Estate Finance and Investments (3:3:0)**. Prerequisite: FIN 3320 with a grade of C or higher. Mechanisms of real estate financing, sources of funds and financial institutions, governmental agencies. The framework for urban real estate investment decisions by individuals and institutions. Use of financing techniques, leverage, risk analysis and control, and taxation.

4182. **Internship in Business Administration (1)**. Prerequisite: at least 6 hours of professional courses to be determined by the area. This course permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom. Must be taken pass-fail.

4323. **Management of Financial Institutions (3:3:1)**. Prerequisite: FIN 3320, 3321, and 3323. Operation and management policies of depository financial institutions. Commercial bank management is stressed. Examines internal operation, regulation, and supervision of institutions studied. Problems and cases.

4324. **Investments (3:3:0)**. Prerequisite: FIN 3320 with a grade of C or higher. Overview of various investment media and markets associated with them. Emphasis on fundamental and technical analysis, sources of information, and the efficient markets concept.

4325. **Principles of Portfolio Management (3:3:0)**. Prerequisite: FIN 4324 and ACCT 3304. Advanced study of selecting and combining securities into a portfolio. Includes setting investment goals, diversification and risk reduction, capital market theory, and portfolio selection models.

4326. **Student-Managed Investment Fund (3:3:0)**. Prerequisite: FIN 4324 and consent of instructor. Advanced application of the process of selecting securities as well as forming and managing a portfolio involving real money. Focus is on managing risk and return. May be repeated for credit.

4327. **Derivative Securities and Markets (3:3:0)**. Prerequisite: FIN 3320. Course studies risk allocation function of derivative financial securities and markets from the perspective of market users. It includes hedging and trading strategies, pricing relationships, and the roles of government/private regulation.

4328. **International Finance (3:3:0)**. Prerequisite: FIN 3320 and 3323. A study of the international monetary system in its theoretical and institutional setting. The position of an individual business firm in conducting international trade; procedures in financing international transactions.

4329. **Money and Capital Markets (3:3:0)**. Prerequisite: FIN 3320 and 3323. Determinants of savings and investments, interest rates, flow of funds, portfolio selection, and security pricing. Studies of various money and capital markets and government impacts on markets.

4330. **Corporation Finance II (3:3:1)**. Prerequisite: FIN 3320, 3321, and ACCT 3304. Advanced study of corporation finance topics including capital budgeting, risk, cost of capital, capital structure, and dividend policy. Cases may be used.

4333. **Real Estate Appraisal (3:3:0)**. Prerequisite or corequisite: FIN 3332 or 3334. Appraisal and valuation techniques applied to residential, commercial, and industrial property.

4336. **Urban Land Development (3:3:0)**. Prerequisite or corequisite: FIN 3332 or 3334. The land conversion process including feasibility analysis, market and merchandising targets, site selection,

design, construction, and financial analysis. Land use controls, planning, and environmental constraints.

4381. **Individual Problems in Finance (3)**. Prerequisite: Senior standing, minimum 3.0 GPA in major, minimum adjusted cumulative GPA of 2.75, and consent of instructor. Independent problem research under guidance of a faculty member.

4382. **Internship in Finance (3)**. Prerequisite: Faculty advisor approval and at least 6 hours of professional courses (excluding core courses) to be determined by the area faculty. This course permits students to apply the concepts, principles, and techniques learned in the classroom. Up to 3 hours of internships (with approval prior to employment) can be applied as a free elective toward a finance major. Must be taken pass-fail.

4383. **Special Topics in Finance (3:3:0)**. Prerequisite: Consent of instructor. Examination of specialized problems in such topics as working capital management, capital budgeting, cost of capital, commodity and financial future investment, and small business finance. May be repeated once for credit as topic varies.

Graduate Courses

5320. **Financial Management I (3:3:0)**. Prerequisite: ACCT 5300 or equivalent. Survey of financial management covering financial mathematics, capital budgeting, sources of capital, and financial analysis. Emphasis on working capital management.

5321. **Financial Management Case Analysis (3:3:1)**. Prerequisite: FIN 5421 or equivalent. In-depth analysis of financial decision-making in areas of capital budgeting, risk, capital structure, financial analysis, dividend policy, mergers, financial failure. Case studies and computer financial models are used.

5325. **Seminar in Security Analysis and Investments (3:3:1)**. Prerequisite: FIN 5421 or equivalent. Evaluation of various investment media (stocks, bonds), investment analysis (both fundamental and technical analysis), and the concept of efficient markets and market risk.

5326. **Seminar in Portfolio Theory and Management (3:3:1)**. Prerequisite: FIN 5325. New developments in portfolio theory. Efficient markets and capital asset pricing model. Evaluation and management of portfolios.

5327. **Student-Managed Fund (3:3:0)**. Prerequisite: FIN 5325 or equivalent and consent of instructor. Advanced application of the process of selecting securities, and forming and managing a portfolio involving real money. Focus is on managing risk and return. May be repeated for credit.

5328. **Options and Futures (3:3:1)**. Prerequisite: FIN 5421 or equivalent. Role of financial options and futures in hedging of financial risk. Develops relationships between options, futures, interest rates, and underlying assets.

5329. **The Money and Capital Markets (3:3:1)**. Prerequisite: ACCT 5401 or any 5000-level finance course. Determination of saving-investment, demand for funds, theory of interest rates, portfolio

- selection, security pricing. Examination of money markets, bond markets, mortgage markets, tax-exempt markets.
5331. **Seminar in Management of Financial Institutions (3:3:1).** Prerequisite: ACCT 5401 or any 5000-level finance course. Economic role of financial institutions; development of financial institutions. Emphasis on operations, regulation, and structure of the commercial banking system. Coverage of other financial institutions.
5333. **The U.S. Financial System in a Global Environment (3:3:0).** Prerequisite: ACCT 5401 or any 5000-level finance course. Introduction to operations, mechanics, and structure of the financial system. Financial institutions, money and capital markets, financial instruments, regulations, monetary policy, international financial system.
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 (3:3:0).** Prerequisite: FIN 5421 or equivalent. This course investigates issues in corporate financial management for multinational firms; including foreign exchange forecasting and risk management, multinational capital budgeting, multinational capital structure, and international financial markets.
5345. **Real Estate Analysis (3:3:0).** A survey of the law, valuation, and financing of real estate, including secondary market analysis. Also, investigation into investment property ownership, feasibility, cash flow, and return calculations.
5421. **Financial Management Concepts (4:4:0).** Prerequisite: ACCT 5401 or concurrent, ISQS 5345 or concurrent. Essential financial management concepts with applications to financial decision making in organizations. Special emphasis on cases and computer financial models.
6122. **Research Seminar in Finance (1:1:0).** Seminar in current research topics and methodology in finance. Should be taken by doctoral students each semester of the program.
6331. **Foundations of Finance (3:3:0).** Prerequisite: Consent of instructor. Doctoral seminar focusing on the foundations of finance theory.
6332. **Seminar in Financial Engineering (3:3:0).** Prerequisite: Consent of instructor. Doctoral seminar covering theoretical and empirical elements of security returns and derivatives.
6333. **Seminar in Investment Theory (3:3:0).** Prerequisite: Consent of instructor. Doctoral seminar covering the major theories and empirical studies that have been developed in the investment area of finance.
6334. **Seminar on Financial Institutions and Regulations (3:3:0).** Prerequisite: Consent of instructor. Develops the Theory of Financial Institutions. Examines how, both theoretically and empirically, financial institutions and financial regulations have evolved over time.
6335. **Seminar in Financial Institutions and Markets (3:3:0).** Prerequisite: Consent of instructor. Doctoral seminar on theories and empirical evidence in the area of financial institutions and markets.

6336. **Empirical Research in Corporate Finance (3:3:0).** Prerequisite: Consent of instructor. Survey of corporate finance empirical research including capital structure, agency theory and corporate governance, dividend policy, information asymmetry and signaling, corporate restructuring, and research methodology.

Information Systems and Quantitative Sciences (ISQS)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

2340. **Introduction to Information Systems in Business (3:3:0)** [COSC 1401, BCIS 1405]. Prerequisite: A 2.75 adjusted cumulative GPA and at least a C in any college-level mathematics course. Survey of information systems.
2341. **Business Computer Programming (3:3:1).** Prerequisite: ISQS 2340 and a 2.75 adjusted cumulative Texas Tech GPA. Business problem solving using a programming language. The student is expected to demonstrate a basic competency in using the language to solve several problem situations.
3343. **Management Science and Operations Research I (3:3:0).** Prerequisite: MATH 2345. Developing and understanding business decision tools and models to be applied to the managerial decision process.
3344. **Introduction to Production and Operations Management (3:3:1).** Prerequisite: ISQS 2340 MATH 2345, and a minimum 2.75 adjusted cumulative GPA. An overview of the production and operations function in organizations with examples of the application of computer and quantitative skills to management problems. Both design and operating problems are discussed.
3345. **Applications of Distributed Systems (3:3:1).** Prerequisite: Minimum grade of C in ISQS 3346 and 3347. Should be taken concurrently with ISQS 3348. Must be completed prior to taking senior level ISQS courses. Managerial and technical aspects of distributed system architectures. Protocols and capacity considerations, client/server development tools, data warehouses, open systems, groupware, and applications frameworks.
3346. **Advanced Application Programming Techniques (3:3:1).** Prerequisite: An A or B in ISQS 2341 and a 2.5 adjusted Texas Tech GPA. Application of data structures in solving business problems. Students are required to work on projects involving the writing of large programs that use appropriate data structures and techniques.
3347. **Data Structures and Programming Languages (3:3:1).** Prerequisite: An A or B in ISQS 2341 and a 2.5 adjusted Texas Tech GPA. Introduces students to a structured programming language. Introduces algorithmic analysis, string processing, recursion, data structures, file processing techniques, and bulk storage devices.
3348. **Data Base Management Systems (3:3:1).** Prerequisite: Minimum grade of A or B in ISQS 2341 and a 2.5 GPA. Basic

concepts of data base management systems; recent developments in the area of data base systems. Students develop a prototype data base application of their own.

3349. **Introduction to Data Communication Systems (3:3:1).** Prerequisite: Minimum grade of A or B in ISQS 2341 and a 2.5 GPA. Introduction to the concepts and terminology of data communications, network design, and distributed information systems. Emphasis on management of equipment, architectures, and transmission alternatives.
4347. **MIS Seminar (3:3:0).** Prerequisite: Minimum grade of C in ISQS 3348. Topics may include system maintenance, system security, intelligent systems, enterprise integration, and other contemporary topics. May be repeated once for credit.
4348. **Systems Analysis (3:3:1).** Prerequisite: ISQS 3348. Methods for analyzing information needs and specifying application system requirements, the development life cycle and the life cycle phases leading to the determination of system requirements.
4349. **Information Systems Design (3:3:1).** Prerequisite: ISQS 4348. Introduces the skills needed to develop a physical design and implement an operational system from the logical design of systems analysis.
4350. **Information Systems Project Management (3:3:1).** Prerequisite: ISQS 4348. Methods for management of software development projects; procurement and financial control; career and professional considerations.
4381. **Individual Problems in Information Systems and Quantitative Sciences (3).** Prerequisite: Consent of instructor. For students with high academic achievement who are interested in enhancing their degree programs by pursuing individual research or study under the guidance of an ISQS faculty member.
4382. **Internship in Information Systems and Quantitative Sciences (3).** Prerequisite: Approval prior to employment. This course permits students to apply the concepts, principles, and techniques learned in the classroom. Up to 3 hours of internships can be applied toward a degree program. Must be taken pass/fail.
4383. **Special Topics in Information Systems and Quantitative Sciences (3:3:0).** Prerequisite: Minimum grade of A or B in ISQS 2341 and a 2.5 GPA. Examines specialized problems relating to information systems and quantitative sciences. May be repeated once for credit as topic varies.

Graduate Courses

5137. **Information Technology for Managers (1:1:0).** Prerequisite: Proficiency in computer skills. The course examines information technology in organizations and the strategic use of information systems.
5237. **Computer Skills for Business and Management (2:1:2).** This course develops basic personal computer skills needed in business management using selected packages of spreadsheets, word processing, database, Internet e-mail, World Wide Web, and groupware.

5240. **Business Systems Analysis and Knowledge Management (2:2:0)**. Prerequisite: ISQS 5137 and MKT 5360. Understanding the ways in which information flows through organizations and is used by executives and line employees. Knowledge management and its use for competitive advantage.
5242. **Decision Theory and Management Science (2:2:0)**. Prerequisite: ISQS 5137, ISQS 5345. Role of management science in decision making; deterministic optimization models; modeling with networks; stochastic decision models as paradigms for management risk; models for coping with uncertainty; and applications.
5243. **Production and Operations Management (2:2:0)**. Prerequisite: ISQS 5137, ISQS 5345. This course examines the fundamentals of production and operations management in manufacturing and service organizations from a problem and quantitative models perspective.
5338. **Information Technology for E-Business (3:3:1)**. E-commerce technology and business environment. E-commerce planning and implementation, Internet technologies, Multimedia on the Web. Web-based databases. Designing and building e-commerce site.
5340. **Business Systems Analysis and Decision Making (3:3:0)**. Prerequisite: ISQS 5137 and MKT 5360. The use of information, management information systems, decision theory, and knowledge management to improve business processes and decisions for sustainable competitive advantage.
5341. **Business Problem Solving and Information Technology (3)**. Develops business problem solving skills using logic information technology. A programming language will be used to reinforce skills to solve business problems.
5343. **Operations Management and Management Science (3:3:0)**. Prerequisite: ISQS 5345. Fundamentals of the operations management function from a managerial perspective utilizing a quantitative models approach.
5345. **Statistical Concepts for Business and Management (3:3:0)**. Statistical applications using the personal computer, with emphasis on proper presentation and interpretation of statistics in managerial settings. Topics include descriptive statistics, graphical methods, estimation, testing, regression, forecasting, and quality control.
5347. **Advanced Statistical Methods (3:3:0)**. Prerequisite: ISQS 5345 or equivalent. Discrete and continuous probability distributions, maximum likelihood, statistical models for learning, prediction, and decision making in business.
5348. **Applied Distribution-Free Statistics in Business (3:3:0)**. Prerequisite: ISQS 5345 or consent of instructor. Distribution-free statistical techniques of inference from non-normal populations and tests of nonparametric hypotheses applied to business problems.
5349. **Regression Analysis (3:3:0)**. Prerequisite: ISQS 5347 or equivalent. Foundations and major topics of regression analysis, model formulation, and methods to deal with standard and nonstandard regression applications in business.
6337. **Business Programming Languages (3:3:0)**. Prerequisite: ISQS 5341. Concepts of data structures and file processing as they relate to information systems. Emphasis on structured and object-oriented program design using JAVA.
6338. **Database Concepts (3:3:0)**. Prerequisite: ISQS 5341 and ACCT 5401. Model organization data and business rules, logical and physical design of relational databases, data warehousing, data mining, and data administration.
6339. **Database Application Development (3:3:0)**. Prerequisite: ISQS 6338 or corequisite: ISQS 6337. Creation of working database application from concept to implementation. Build and populate and efficient relational database instance. Enforcement of business rules, client/server tradeoffs.
6340. **Decision Support Systems (3:3:0)**. Prerequisite: 6338. Theories of decision making, DSS software and design, artificial intelligence in DSS, executive information systems, and institutionalization and behavioral factors.
6341. **Data Communications and Network Management (3:3:0)**. Prerequisite: ISQS 5341. Concepts and terminology of data communications, network design, client-server architecture, distributed information systems with focus on communications architecture, and management.
6342. **Strategic Uses of Information Systems Technology (3:3:0)**. Prerequisite: ISQS 6341, or B.B.A. degree in MIS. Focuses on state-of-the-art telecom technologies as well as their applications to solve business problems and/or create strategic advantage.
6343. **Advanced Telecommunications Network Management (3:3:0)**. Prerequisite: ISQS 6341 or B.A. in MIS or equivalent knowledge. Design and management of telecommunication network for security, efficiency, durability, and profitability.
6347. **Advanced Experimental Statistics (3:3:0)**. Prerequisite: ISQS 5347 or consent of instructor. Foundations of experimental design; factorial structures; nesting structures; fixed, mixed, and random effects; ANACOVA; and business applications.
6348. **Applied Multivariate Analysis (3:3:0)**. Prerequisite: ISQS 5347 or consent of instructor. Multivariate methods for business research, including classification, visualization, testing, clustering, and latent structure.
6349. **Advanced Business Forecasting (3:3:0)**. Prerequisite: ISQS 5347 or consent of instructor. Forecasting methods for business and econometrics. Smoothing; autocorrelations; spectra autoregressive, MA, and ARMA models; Box-Jenkins and REGARMA models.
7338. **Advanced Systems Analysis (3:3:0)**. Prerequisite: ISQS 6338, MGT 5371, FIN 5320 or 5421. Methods for analyzing information needs and specifying application system requirements. Included are applications development strategies, business process reengineering, object-oriented analysis, and CASE tools.
7339. **Advanced Information Systems Design (3:3:0)**. Prerequisite: ISQS 7338. Technological and managerial aspects of system design and implementation. Explores state-of-the-art systems design techniques including object-oriented and event-oriented design.
7340. **Management of Information Systems (3:3:0)**. Prerequisite: ISQS 7338 or 7339 as a corequisite. Study of information systems; their design, implementation, and contribution to management planning, decision-making and control. Capstone course for M.S.B.A.-MIS and Telecom-net; grade of A or B required.
7341. **Seminar in MIS Research and Methods (3:3:0)**. Prerequisite: Doctoral standing or consent of instructor. Seminar covering current MIS research methods and issues.
7342. **Advanced Topics in MIS (3:3:0)**. Prerequisite: Consent of instructor. Topics include system construction, system maintenance, artificial intelligence, expert systems, enterprise integration, international issues in MIS, and other contemporary topics. May be repeated one time.
7346. **Seminar in Cognitive and Behavioral MIS Research (3:3:0)**. Prerequisite: Doctoral standing or consent of instructor. Seminar covering cognitive and behavioral MIS research.
7347. **Seminar in Managerial and Organizational MIS Research (3:3:0)**. Prerequisite: Doctoral standing or consent of instructor. Seminar covering managerial and organizational MIS research.

International Business (I B)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3100. **Language Workshops (1:2:0)**. Prerequisite: Consent of director. Business language and cultural workshops taught in a foreign language. May be repeated for 3 hours credit.
3105. **Cross-Cultural Management Skills (1:1:0)**. Prerequisite: Consent of instructor. Overview of essential management skills for successful international business enterprises. Includes cross-cultural business techniques, topics, current issues, and theories.
3361. **Exporting and Market Entry (3)**. Prerequisite: At least a C in MKT 3350. Develops a basic understanding of international trade emphasizing exports and their associated documentation. Takes a structured approach to determine which country markets to enter and how to understand the importing and internal trading requirements of those countries.
4382. **Internship in International Business (3:3:0)**. Prerequisite: Consent of instructor. Permits students to enhance their knowledge within their field of specialization through application of concepts, principles, and techniques learned in the classroom.
4383. **Special Topics in International Business (3:3:0)**. Prerequisite: Consent of instructor. Examines specialized problems relating to international business such as exporting, international trade, etc. May be repeated once for credit as topic varies.

Management (MGT)*(To interpret course descriptions, see pg. 10.)***Undergraduate Courses**

3370. **Organization and Management (3:3:0)**. Prerequisite: Minimum 2.75 adjusted cumulative GPA. The management function; basic principles, concepts, and practices in the operation of organizations.
3373. **Managerial Communication (3:3:1)**. Prerequisite: Junior standing, ISQS 2340, a C or better in ENGL 1301 and 1302, and a 2.75 GPA. The application of oral and written communication principles to managerial situations; an overview, simulation, and analysis of the communication process in the business environment.
3374. **Personnel Administration (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Principles and methods in general personnel management and work force maintenance.
3376. **Organizational Behavior (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Focuses on managerial and employee attitudes and behavior. Topics include performance, job satisfaction, motivation groups, and task design.
3379. **Advanced Organization and Management (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Study of the design and management of organizations in considerable depth beyond the basic course.
4370. **Consulting to Entrepreneurial Organizations (3:3:0)**. Prerequisite: A 2.5 adjusted Texas Tech GPA, FIN 3320, MKT 3350, MGT 3370, 3373, and BLAW 3391. Field experience in small business counseling involving problem solving and applications of business management principles.
4371. **Health Organization Management (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Designed to provide an overview of the health care system and its managerial, social, behavioral, and economic aspects from an organizational viewpoint.
4372. **Labor Relations (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. A study of labor union development, organization, leadership, and operational techniques. Consideration of collective bargaining issues and procedures.
4373. **Leadership Concepts and Skills (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; and HPM, MGT, or PLM majors or Honors College student. Behavior and managerial practices with emphasis on organizational contexts.
4374. **International Entrepreneurship (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; and HPM, MGT, or PLM majors or Honors College student. Focuses on how entrepreneurs and firms recognize and fulfill opportunities for wealth creation in an international context.
4375. **International Management (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher or ECO 3333. Exploration of organization and management issues in international enterprise.
4376. **Entrepreneurship (3:3:1)**. Prerequisite: A 2.50 adjusted Texas Tech GPA and MGT 3370 with a grade of C or higher. Introduces concepts and skills associated with wealth creation. Examines managerial processes and strategies in emerging, growing, and revitalizing firms.
4377. **Managing the Entrepreneurial Family Business (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; and HPM, MGT, or PLM majors or Honors College student. Exploration of major issues and strategies for initiating, building, and managing a family business.
4378. **Clinical Aspects of Health Organization Management (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; and HPM, MGT, or PLM majors or Honors College student. Managerial implications of the natural history of disease, epidemiology, and health policies and their relevance to modern health care organizations.
4379. **Managed Care Aspects of Health Organization Management (3:3:0)**. Prerequisite: MGT 4378; 3.0 adjusted Texas Tech GPA; and HPM, MGT, or PLM majors or Honors College student. Fundamental issues surrounding today's managed care organizations and their impact on stakeholders.
4380. **Strategic Management (3:3:0)**. Prerequisite: Business students who have completed BLAW 3391, ISQS 3344, FIN 3320, MKT 3350, MGT 3370, and 3373 with grades of C or higher and are in their final semester. Strategy is an integrative course focusing on an organization's pursuit of superior economic performance by deciding what business to be in and how to compete.
4381. **Individual Problems in Management (3)**. Prerequisite: Consent of instructor. For students with high academic achievement who are interested in enhancing their degree program by pursuing individual research or study under the guidance of a management faculty member.
4382. **Internship in Management (3)**. Prerequisite: Approval prior to employment. This course permits students to apply the concepts, principles, and techniques learned in the classroom. Up to 3 hours of internships can be applied toward a degree program.
4383. **Special Topics in Management (3:3:0)**. Prerequisite: Consent of instructor. Examines specialized problems relating to management. May be repeated once for credit as topic varies.
4384. **Managing Conflict and Negotiations (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; and HPM, MGT, or PLM majors or Honors College student. Develop the skills necessary to manage organizational stakeholders effectively. Emphasizes negotiation skills.
4385. **Petroleum Land Management (3:3:0)**. Spring seminar required of and open only to petroleum land management majors.
4387. **History of Management Thought: Honors Seminar in Management (3:3:0)**. Prerequisite: A 3.0 adjusted Texas Tech GPA and HPM, MGT, or PLM ma-
- jors or Honors College student. Offers interdisciplinary perspective on development of management knowledge.
4388. **Change and Innovation Processes (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher; 3.0 adjusted Texas Tech GPA; and HPM, MGT, PLM majors or Honors College student. Focuses on understanding and managing innovation and change processes.
4389. **Honors Senior Internship in Management (3:3:0)**. Prerequisite: HPM major. Under joint faculty-employer supervision, the student will intensively interrelate an experiential workplace component with an integrative written thesis.
4397. **Management and the Business Environment (3:3:0)**. Prerequisite: MGT 3370 with a grade of C or higher. Study and cases in social responsibility, business ethics, and other problems in the external environment of the business organization.

Graduate Courses

5192. **Global Management Strategies (1:1:0)**. Corequisite: MGT 5391. Study of global strategy formulation and implementation.
5306. **HOM I: Medical Aspects (3:3:0)**. Prerequisite: Consent of instructor. Focuses on the implications for the management of health care organizations of medical issues such as the natural history of disease, epidemiology and health policies. (HOM 5306)
5307. **HOM II: Managed Care Organizations (3:3:0)**. Prerequisite: MGT 5306 or consent of instructor. Examines fundamental and contemporary issues in the organization and management of managed health care organizations.
5308. **HOM III: Medical Groups and Ambulatory Care (3:3:0)**. Prerequisite: MGT 5307 or consent of instructor. An organization-based view of the health care system emphasizing the provision of health care to populations via medical group practices and ambulatory care organization.
5309. **HOM IV: Current Aspects in Healthcare (3:3:0)**. Prerequisite: MGT 5308 or consent of instructor. Analyzes and evaluates selected contemporary problems, issues, and trends in healthcare management.
5371. **Managing Organizational Behavior and Organizational Design (3)**. Examines management of individual, interpersonal, group and intergroup relations, organizational design, and the organization's role in a rapidly changing environmental and global context.
5372. **Leadership and Team-Building Skills (3:3:1)**. Prerequisite: MGT 5371. Emphasizes cognitive, skill, and experiential-practicum learning applied to ongoing leadership and organizational problems.
5373. **Entrepreneurship (3:3:0)**. Prerequisite: MGT 5376, ACCT 5401 and MKT 5360, or consent of instructor. Introduces concepts and skills associated with wealth creation. Examines managerial processes and strategies in emerging, growing, and revitalizing firms.
5374. **Negotiation and Conflict Management Skills (3:3:1)**. Prerequisite: MGT 5371. Emphasizes negotiation skills and strat-

- egy development for managing organizational stakeholders.
5375. **Organization Theory (3:3:0)**. Prerequisite: MGT 5371. A study of basic organization theory concepts and application of these concepts to the analysis and structure of organizations.
5377. **Human Resource Management (3:3:0)**. Prerequisite: MGT 5371. Examination of the principles and methodology of personnel administration with emphasis on manpower planning, selection, development, and evaluation.
5378. **Managing the Entrepreneurial Family Business (3:3:0)**. Prerequisite: MGT 5371. Management and business issues involved in running family firms. Emphasis is on entrepreneurial family firms.
5379. **Global Entrepreneurship (3:3:0)**. Prerequisite: MGT 5371. Exploration of organization and management issues in global enterprise.
5381. **Managing Innovation and Change (3:3:0)**. Prerequisite: MGT 5371. This course focuses on understanding organization innovation and change and applying this knowledge to managing innovation and change processes.
5384. **International Management (3:3:0)**. Prerequisite: MGT 5371. Comparative analysis of domestic, international, and multinational business operations, and the significance for organization and management.
5391. **Strategic and Global Management (3:3:0)**. Prerequisite: Completion of core and tool courses in M.B.A. or M.S.A. program. Global and local strategy formulation and implementation of corporate, business, and functional strategies. MBA/MSA capstone course.
5476. **Executive Skills (4:2:4)**. Prerequisite: Admission to the MBA program. Develop self-awareness of personal at-

tributes and goals, enhance personal development, and impart skills needed to function as future executives.

6305. **Individual Study in Management (3)**. Prerequisite: Consent of instructor. Directed individual study of advanced management topics varying with the need of each student. May be repeated for credit.
6315. **Current Management Issues (3)**. Prerequisite: Consent of instructor. Study and integration of current management issues. May be repeated for credit.
6375. **Advanced Organization Behavior (3:3:0)**. Prerequisite: Doctoral student status or consent of instructor. A seminar which explores research and conceptual foundations of behavioral science and the role and contributions of microorganizational concepts in organization design and functioning.
6380. **Colloquium in Management Research (3:3:0)**. Prerequisite: Doctoral standing. Study of problems related to management for the individual student. Studies in selected areas of management research. May be repeated for credit.
6381. **Seminar in Advanced Management Topics (3)**. Organized seminar on specific advanced management topics in the areas of management of strategy, organizational studies, personnel and human resources management, or international business. May be repeated for credit.
6392. **Advanced Organization Theory (3:3:0)**. Prerequisite: Doctoral student status or consent of instructor. A seminar which explores the fundamental macro theories and concepts of organization design and functioning.
6395. **Advanced Strategic Management (3:3:0)**. Prerequisite: Doctoral student status or consent of instructor. A seminar which systematically examines the theoretical and empirical research literature on strategic management content and process.

Marketing (MKT)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3350. **Introduction to Marketing (3:3:0)**. Prerequisite: ECO 2301 (AAEC 2305 or ECO 2305 for nonbusiness majors) and minimum 2.5 GPA. Marketing structures and agencies; motives and buying habits; types of middlemen, marketing institutions, and channels; current marketing practices; marketing of industrial and consumer goods.
3352. **Consumer Behavior (3:3:0)**. Prerequisite: At least a C in MKT 3350. The buyer as a problem solver; buying decision processes; factors influencing behavior; principles, theories, and models; behavioral research techniques.
3353. **Marketing Channels and Distribution Systems (3:3:0)**. Prerequisite: At least a C in MKT 3350. An analysis of policies, decisions, and planning related to distribution channels for consumer and industrial goods.
3356. **Marketing Research and Analysis (3:3:1)**. Prerequisite: At least a C in MKT 3350 and MATH 2345. Scientific marketing research methods; emphasis on col-



lection, analysis, and interpretation of data as applied to the solution of marketing problems.

4351. **Retail Marketing (3:3:0)**. Prerequisite: ACCT 2300 and at least a C in MKT 3350. Comprehensive introduction to an evaluation of retailing with emphasis on profit elements, pricing and merchandising policies, inventory and merchandising control.
4354. **Market Promotion (3:3:0)**. Prerequisite: MKT 3352. Management of the promotional mix of advertising, personal selling, and sales promotion. Emphasizes the interaction and coordination of these three elements and relates them to the other components of the firm's marketing strategy.
4358. **International Marketing (3:3:0)**. Prerequisite: At least a C in MKT 3350. A survey of international marketing principles, cultural differences, world markets, and political constraints.
4359. **Sales Management (3:3:0)**. Prerequisite: At least a C in MKT 3350. Problems and methods of organization and administration of sales departments, sales operations, sales control, sales promotion, and sales policies.
4360. **Marketing in E-Business Environments (3:3:0)**. Prerequisite: At least a C in MKT 3350. Overviews the Internet and marketing-related technological developments. Primary focus is on strategic issues in creating market advantages in electronic commerce.
4381. **Individual Problems in Marketing (3)**. Prerequisite: Consent of instructor. For students with high academic achievement who are interested in enhancing their degree program by pursuing individual research or study under the guidance of a marketing faculty member.
4382. **Internship in Marketing (3)**. Prerequisite: At least 6 hours of approved marketing courses and approval prior to employment. Internship must include at least 8 consecutive calendar weeks of full-time employment; compensation must be commensurate with the work assignment for the entire internship.
4383. **Special Topics in Marketing (3:3:0)**. Prerequisite: Consent of instructor. Examines specialized problems relating to marketing. May be repeated once for credit as topic varies.

Graduate Courses

5350. **Marketing Foundations (3:3:0)**. An examination of marketing functions and the institutions which perform them, choice of criteria for marketing strategy decisions, marketing structural relationships, and the role of marketing. May not be taken for credit after MKT 5360.
5355. **Research Design (3:3:0)**. A survey of quantitative methods for and issues in the analysis of marketing data.
5356. **Marketing Research for Decision Makers (3:3:1)**. Prerequisite: ISQS 5345, MKT 5360. Marketing research methods with emphasis on data collection and analysis for solving marketing problems.
5358. **Business-to-Business Marketing (3:3:0)**. Prerequisite: MKT 5360. Designed to provide an overview of the many diverse facets of business-to-business marketing. Specific topics include selling to large businesses, buyer-seller relationships, supply-chain management, strategic alliances, and the effect of the Internet on business-to-business marketing.
5359. **Individual Study in Marketing I (3:3:2)**. Prerequisite: Consent of instructor. Directed individual study of advanced marketing problems varying with the need of the particular student. Can be repeated for credit if subject matter is different.
5360. **Marketing Concepts and Strategies (3:3:0)**. This course examines marketing functions, the institutions which perform them, and the study of marketing planning, strategy, and tactics. Includes the organization, execution, and control of the marketing effort.
5361. **Marketing Administration (3:3:0)**. Prerequisite: MKT 5360 or equivalent. A study of marketing planning and strategic issues related to marketing efforts.
5362. **Multinational Marketing (3:3:0)**. Prerequisite: MKT 5360. A survey of international marketing principles, cultural differences, world markets, and political restraints.
5363. **E-Marketing (3:3:0)**. Prerequisite: MKT 5360 or equivalent. Use of the Internet and related technologies to enhance marketing functions and processes so that organizations can function more effectively in a digital, networked economy.
5367. **Behavior in Markets (3:3:0)**. Prerequisite: MKT 5360 or equivalent. A study of marketing management's use of a broad range of behavioral information in establishing marketing policy and strategy.
5368. **Macromarketing (3:3:0)**. Prerequisite: MKT 5360 or equivalent. An examination of the various macro-environments within which the marketing manager works: the institutional environment, the social environment, the political-legal environment, and the cultural-behavioral environment.
6352. **Marketing Thought (3:3:0)**. Prerequisite: Advanced graduate standing and consent of instructor. Evaluation of the contribution of marketing scholars to marketing thought, including the development of problems, theory, and principles.
6353. **Marketing Theory (3:3:0)**. Prerequisite: Advanced graduate standing and consent of instructor. A philosophy of science approach to the study of marketing theory and the components of marketing theory: hypotheses, law-like generalizations, empirical regularities, laws, models, and scientific explanations.
6355. **Theory Testing (3:3:0)**. An in-depth examination of measurement issues, including latent constructs and data-gathering procedures in marketing.

College of Education

About the College

The College of Education is devoted to promoting excellence and equity through scholarship, research, and reflective practice in education. The college provides degree and certification programs for both undergraduate and graduate students who plan careers in education. For many individuals, this means a future in teaching. College faculty work closely with public school personnel and practitioners in the field to design programs that will prepare leading educators for the 21st century.

The college prepares teachers who will become certified to teach in elementary schools (from the early childhood years to grade four), at the middle level (from grades four to eight), and in secondary schools (from grades eight to twelve). The college offers degree programs leading to certificates in middle level education, bilingual education, special education, and science. In addition, a variety of advanced degrees and certificates are available.

The College of Education is accredited by the State Board for Educator Certification, the Southern Association of Colleges and Schools, and the National Council for Accreditation of Teacher Education. Texas Tech University holds membership in the American Association of Colleges for Teacher Education. The teaching certificate earned at Texas Tech is accepted in a majority of the states in the nation through reciprocity agreements.

Programs in the college are housed in two departments. The Department of Curriculum and Instruction offers undergraduate programs leading to initial teaching certificates and graduate programs in bilingual education, curriculum and instruction, elementary education, language literacy, and secondary education. The Department of Educational Psychology and Leadership offers graduate programs in counselor education, educational leadership, educational psychology, higher education, instructional technology, and special education.

All students interested in becoming teachers or pursuing graduate programs in education should visit the college website for further information (www.educ.ttu.edu).

Educator Certification

The preparation of teachers and the provision of knowledge and skills for teachers seeking advanced certificates are important functions of Texas Tech University at both the undergraduate and graduate levels. The coordination of the educator certification programs is a responsibility of the College of Education.

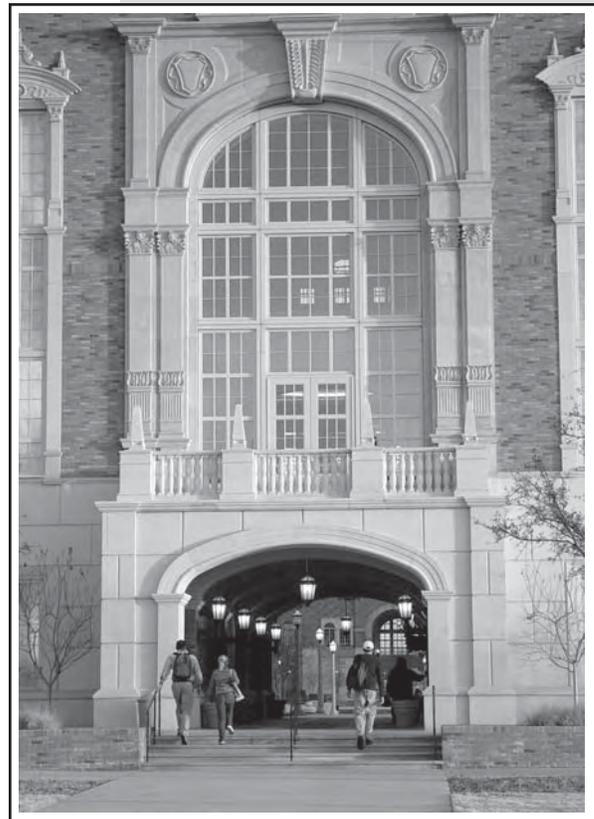
Initial Teaching Certificates

Texas Tech University reports to the U. S. Department of Education passing rates on licensing exams taken by students seeking initial teaching certificates. The certification rate for students taking their exams in 2001-2002 was 93 percent.



Sheryl Santos, PhD
Dean

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Certification at the Undergraduate Level

The College of Education prepares students for a variety of teaching certificates. For a list of available certificates, please see the college web site (www.educ.ttu.edu/certification).

Students preparing to teach in secondary schools (grades eight to twelve) will generally complete an academic major in Agricultural Sciences and Natural Resources, Arts and Sciences, Visual and Performing Arts, or Human Sciences, with additional courses in professional education required for certification. Students interested in teaching composite science (certified to teach all sciences in grades eight to twelve) may complete a multidisciplinary science major through the College of Education or an academic major in one of the science teaching fields. Students preparing to teach grades four to eight will complete a multidisciplinary studies major in the College of Education. Those who wish to become bilingual education teachers and special education teachers will seek a multidisciplinary studies degree through the College of Education with emphasis on their teaching fields. See the College of Education web site (www.educ.ttu.edu) for degree and certification information. Students seeking early childhood certification do so through a degree in the College of Human Sciences. Students wishing to teach young children, pre-kindergarten through grade four, will enroll in the early childhood program.

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 the College of Education web site for additional information (www.educ.ttu.edu).

Degree and Teacher Certification Programs. Degree and teacher certification programs are two distinct programs. Freshmen or transfer students are admitted by an appropriate college to a degree program leading to a bachelor's degree. Eligible students at the junior level are admitted to a teacher certification program that leads to a Texas teaching certificate. The certification program culminates with the state-mandated Texas Examinations of Educator Standards (TExES) exams. Students must pass all appropriate TExES exams for certification, but not for the bachelor's degree. Language-related certification also requires passage of the Texas Oral Proficiency Test (TOPT).

Admission to the Teacher Certification (Education) Program. Admission to College of Education certification programs is open to all individuals on the basis of academic preparation, achievement, and availability of space in the program selected. When there are more qualified applicants than can be instructed adequately by the available faculty or accommodated in available facilities, the college will control enrollment in specific programs by limiting the admission of new students. The number of students accepted into the under-

graduate early childhood, middle-level education, all-level education, secondary education, and career and technology programs is limited. Therefore, admission into a teacher education program is competitive and based on GPA and other criteria. A complete description of eligibility requirements is available in the Educator Certification Office in the College of Education. (Entrance criteria may be subject to change.)

Admission to a college degree program does not ensure admission to an upper-division teacher certification program. Students seeking teacher certification may apply to a certification program through an admission process. Application forms are available on the College of Education web site (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. A minimum of 60 semester hours including current enrollment with an acceptable scholastic GPA. Students seeking early childhood certification must have a 2.70 or better overall GPA. Students seeking all other certificates (middle-level, secondary, career and technology, and all-level) must have a 2.50 or better overall GPA.
2. College level skills in reading, oral and written communication, critical thinking, and mathematics.
3. Possess such personal and social qualities, and physical and mental health to indicate a fitness for the education profession.
4. Admission to upper division teacher education programs will be subject to additional entrance criteria depending on availability of space in the program selected.

No otherwise qualified student will be denied admission to a degree program, certification program, or student teaching because of race, religion, national origin, age, gender, or disabling condition.

Under some circumstances a student may be requested to leave a certification program. Such a request can be initiated by the college or by the student. Due process will be observed during this time.

Individuals who lack the minimum GPA due to extenuating circumstances may also apply for admission to teacher education. The Admission Committee will review each such request.

Transferability. Developmental courses (e.g., basic-introductory reading and mathematics courses) and vocational courses (auto mechanics, nursing) will not transfer for degree or certification programs. Courses with D grades may or may not transfer, depending on Coordinating Board, university, and college guidelines.

Certification Plan. Any undergraduate student working toward a teacher's certificate should file a certification plan in the College of Education after 60 hours or, for transfer students, during the first semester of attendance at Texas Tech. The student's advisors will assist in completing the certification plan. The requirement for filing a certification plan applies regardless of the degree sought, the subject that the student expects to teach, or the level (early childhood, middle-level, secondary, or all-level) at which he or she expects to be certified. Degree plans and certification plans are not to be confused because they may be two separate documents. The degree plan is to be filed in the office of the student's academic dean, whereas the certification plan must be filed in the College of Education.

Certification plan forms must be obtained from the College of Education. Once the form is secured, the student is responsible for consulting with the appropriate advisors to complete the plan.

Admission to Student Teaching. Completing 12 semester hours in the student teaching semester, including all-day student teaching for one full semester, is required for certification. Normally a student will take the student teaching course in a single semester during fall or spring of the senior year. Because student teaching requires the majority of the student's time during the semester, the student should plan to register only for student teaching and the co-requisite capstone education course required. Any request for an additional course with student teaching must be approved by the Certification Officer. The following are prerequisites for admission to student teaching:

1. The applicant must have completed all course work prior to student teaching. Exceptions to this rule can be granted under some circumstances with permission from a College of Education advisor.
2. Each student, unless enrolled in agricultural science, family and consumer science, 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, or music must consult their department chairperson regarding the proper time to file this application.
3. The student must have a grade point average of 2.5 or higher in professional education courses, in the teaching field(s) for middle-level and secondary teaching. Students seeking early childhood certification must have a 2.7 or higher overall GPA. Students seeking middle-level, secondary, and all-level certificates must have a 2.5 or higher overall GPA.
4. The student must be able to speak and understand the English language sufficiently to use it easily and readily in conversation and teaching.

5. The student must possess such personal and social qualities and physical and mental health to indicate a fitness for the education profession.
6. The student must have met all other criteria that may be established for the teacher certification program.

Under some circumstances a student may be requested to leave a student teaching placement. Such a request can be initiated by the college, by the student, or by the school district. Due process will be observed in considering whether an alternate placement will be made or the student teaching experience terminated.

TEXES and TOPT Exams. All persons who have completed teacher training programs and are candidates for initial Texas certification (i.e., those who do not hold a current valid Texas teaching certificate) must pass proficiency tests – Texas Examinations of Educators Standards (TEXES) – in their fields of certification. All candidates for initial teacher certification must pass a test on pedagogy and professional responsibilities at the appropriate level and a content specialization test in each area for which certification is sought. The Texas Oral Proficiency Test (TOPT) is also required of individuals seeking language related certificates. A fee is associated with all such examinations. To be eligible to take the exams, a student must request a bar code and complete a registration process on line. Students will find information about the exams and access to the registration process at www.educ.ttu.edu/certification/TEXES/. Students should also consult the web site for exam testing dates, dates to take practice exams, and test preparation opportunities.

Recommendation for Teacher Certification. An individual who has maintained the levels of performance stated as prerequisites for admission to student teaching; who has demonstrated the knowledge, dispositions, and skills to teach; and who has completed student teaching or an internship successfully is eligible to apply for the appropriate teaching certificate. The student must apply online to the State Board for Educator Certification at www.sbec.state.tx.us. The state requires that applicants complete a fingerprint criminal background check before they may be certified. There is a fee charged by the state for the certification process. Upon completing all requirements, including the appropriate TEXES examinations, the student is recommended for certification by the College of Education. The Texas Oral Proficiency Test (TOPT) is also required of individuals seeking language related certificates. The college has a rapid recommendation procedure explained on the COE web site (www.educ.ttu.edu).

While completing the requirements, a student must maintain a 2.5 GPA in the professional education courses and a 2.5 GPA in the teaching field(s). Grades of D are not acceptable in the professional education courses or in the teaching field(s). An acceptable overall GPA is required (2.7 for early childhood; 2.5 for middle-level, secondary, all-level, and career and technology).

Post-Baccalaureate Certification Programs

Post baccalaureate programs designed to meet initial certification requirements for teaching in early childhood, middle-level, and secondary schools are available. Students must have a bachelor's degree. Those seeking a certificate to teach children from early childhood to grade four must have a 2.7 grade point average for their last 60 hours of undergraduate course work. Those seeking all other certificates must have a 2.5 GPA in their last 60 hours. Although the professional certification programs require work at the graduate level, it should be noted that these programs are not coincidental with degree programs. The state-mandated TEXES test is required for persons who complete certification programs. For guidance concerning professional certification, the student should consult with a certification advisor. Students wishing to pursue post-baccalaureate certification must also apply to the Texas Tech University Graduate School. Upon acceptance to the Graduate School, students will contact a graduate certification advisor in the College of Education and file a certification plan. The provisions in previous sections pertaining to admission to student teaching, TEXES and TOPT exams, and recommendation for teacher certification also apply to post-baccalaureate candidates. Students should expect to complete field experiences as part of their program requirements. Information about all certification matters may be found at www.educ.ttu.edu.

Students who become certified on the graduate level sometimes complete an internship of one year rather than complete a semester of student teaching. To be eligible for an internship, a post-baccalaureate student must meet eligibility requirements for student teaching, become employed as a classroom teacher by a school district in Texas, and enroll in a 3 semester credit hour course each semester. For more information on internships, contact the college coordinator of field experiences or view www.educ.ttu.edu/clinicalexperiences.

Programs Offering Advanced Certification

Supplemental certificates are available for teachers holding an initial teaching certificate. Students may seek advanced certification in bilingual education, English as a second language, gifted and talented, generic special education, and visual impairment. Details are available on the college web site under the appropriate program area. The bilingual and English as a second language certificates are available through the bilingual program area (www.educ.ttu.edu/edbl). Supplemental certificates in generic special education, visual impairment, and gifted and talented are available through the special education program area (www.educ.ttu.edu/edsp).

Professional certification programs are offered in these areas: principal, superintendent, counselor, educational diagnostician, master reading teacher, and professional reading specialist. Some certificates may be

combined with graduate programs leading to master's degrees or doctoral degrees in the related program areas. Admission criteria for these certification programs are set by the program area faculty in which they are housed. For admission information and details about the programs, please see the college web site for the appropriate program area. Principal and superintendent certificates are housed in the educational leadership program. Counselor certification is offered in the counselor education program. The educational diagnostician certificate is offered in the special education program, and the language literacy program offers 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 (Texas Examination of Educator Standards) exam. The registration process is explained on the college web site (www.educ.ttu.edu). When students have completed all requirements, they may apply for their certificate online with the State Board for Educator Certification (www.sbec.state.tx.us).

Residency Requirements for Doctoral Degrees

As noted elsewhere, 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 from program to program. 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 course work, 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 nine weeks each while earning at least 9 hours of graduate credit during the summer session.
- A full summer session of twelve weeks, earning 12 hours of graduate credit plus the completion of at least 12 hours of graduate credit during the adjacent spring or fall semester.
- A combination of 21 hours of graduate credit completed during a 12-month period plus at least 3 additional hours of graduate credit completed in an immediately preceding or subsequent full semester or summer session.

- Nine semester hours in each of the regular semesters and at least 6 hours in the preceding or subsequent summer (for students holding half-time graduate assistantships or students involved for no more than half-time in other work closely related to doctoral study).

The proposal for doctoral study (degree plan), including the plan for meeting the residency requirements, should be submitted to the Graduate School well in advance of the proposed residency period.

Department of Curriculum and Instruction

Faculty

Margaret Johnson, Chairperson

Horn Professor: Skoog; *Professors:* Santos and Simpson; *Associate Professors:* Benavides, Button, Cooper, Geer, Hovey, Janisch, M. Johnson, Midobuche, Morgan-Fleming, Sheets, and Thomas; *Assistant Professors:* Akrofi, Anderson, Atcheson, Fives, Halsey, Hamman, H. Johnson, Lesley, McMillan, Myers, Price, Spears, Todd, Watson, and Wilhelm; *Instructors:* Duke, Lupton, McLaren, Pratt, Sowder, Stocks, and Talkmitt.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Multidisciplinary Studies
- Bachelor of Science in Multidisciplinary Science
- Master of Education in Bilingual Education
- Master of Education in Curriculum and Instruction
- Master of Education in Elementary Education
- Master of Education in Language Literacy Education
- Master of Education in Secondary Education
- Doctor of Philosophy in Curriculum and Instruction

Within the curriculum and instruction doctoral program, course work is available in the support areas of bilingual education, elementary education, language literacy, math/science, and secondary education (see next page).

Undergraduate Program

Multidisciplinary Studies

Middle-Level Education. This degree is designed primarily for individuals seeking teacher certification in grades four to eight. Students may choose certification in English language arts, social studies, English language arts/social studies, and math/science. Students should consult with an advisor in the college to determine which degree plan best suits their career aspirations. Degree plans leading to the different certificates will include subject area course work and a sequence of four semesters of professional education courses (including the student teaching semes-

ter). Courses in middle level education include field experiences scheduled outside of class time.

Bilingual Education. This degree is designed to prepare those who wish to be certified as an early childhood generalist and as a bilingual generalist teacher of children from early childhood to grade four. The degree includes course work in Spanish and certification requires passing the Texas Oral Proficiency Test in Spanish as well as TExES exams. Students complete four semesters of professional education work that includes field experiences in elementary and in bilingual settings in area schools. The program consists of 139 semester credit hours.

Special Education. Students wishing to become certified as an early childhood generalist (early childhood to grade four) and as an all-level special education teacher for children from early childhood to grade twelve will seek a degree with a specialization in special education. Students complete four semesters of professional education work with field experiences in elementary and in special education settings. The program consists of 139 semester credit hours.

Multidisciplinary Science

Secondary Science Education. The multidisciplinary science major is administered in this department. Individuals completing this major – both the baccalaureate requirements and the certification requirements – are eligible for certification to teach all sciences grades eight to twelve in Texas. This major requires 57 to 61 semester hours in science. All individuals in this major are required to complete CHEM 1107, 1108, 1307, 1308, PHYS 1103, 1104, 1306, 1307, GEOL 1101, 1102, 1303, 1304, BIOL 1403 1404, ATMO 1300, ASTR 1300, and 1100. Students will choose an area of emphasis from among the sciences (biology, chemistry, geosciences, physics or life and earth sciences) and complete additional course work. Students seeking certification must minor in secondary education. Students not seeking certification must have a minor in an area other than education. The minimum number of hours required for a major in multidisciplinary science is a total of 129. Students should consult advisors so that prerequisites and other requirements may be met in a timely manner. Two semesters of foreign language are considered leveling work for this program, unless waived because of two years of high school foreign language.

Program Requirements

Core Curriculum Requirements. The university has established Core Curriculum requirements for all students. These requirements will ensure breadth in each academic program. Students should consult their academic advisor regarding specific course requirements. Students are urged to seek advisement prior to their first enrollment to avoid losing credit. Students may find a listing of Core Curriculum requirements in the Undergraduate Academics section of the catalog.

Advisory Program. The advisory program is designed to provide aid to each student in planning and completing the appropriate degree and teacher certification program.

The academic advisor is responsible for (1) assisting the student in planning a program and in updating degree plans, (2) helping the student in selecting the proper areas of certification and/or teaching fields, and (3) advising the student in meeting admission and retention standards of teacher education and student teaching.

Degree and Teacher Certification Programs. Degree and teacher certification programs are two distinct programs. Freshmen and transfer students are admitted to a degree program in the college that leads to a Bachelor of Science 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 TExES exams. Students must pass all appropriate certification exams of the Texas Examination of Education Standards. These exams are required only for the certification and not for the bachelor's degree. Language-related certification also requires passage of the Texas Oral Proficiency Test. A fee is associated with all such examinations.

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. Students seeking teacher certification may apply to a certification program through an admission process. Application forms are available on the college web site (www.educ.ttu.edu). The middle-level program and special education programs accept applications once a year in the spring for the fall semester. Bilingual education students and multidisciplinary science students 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 advisor or see the web site. To be considered for admission to teacher certification programs, students must meet the following minimum prerequisites:

1. A minimum of 60 semester hours including current enrollment with an acceptable scholastic GPA. Students seeking bilingual education or special education certificates must have a 2.70 or better overall GPA. Students seeking middle level or multidisciplinary science certificates must have a 2.50 or better overall GPA.
2. College level skills in reading, oral and written communication, critical thinking, and math.
3. Possess such personal and social qualities, and physical and mental health to indicate a fitness for the education profession.
4. Admission to upper division teacher education programs will be subject to additional entrance criteria depending on availability of space in the program selected.

No student meeting these prerequisites will be denied admission to a degree program, certification program, or student teaching because of race, religion, national origin, age, gender, or disability. 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. Individuals who lack the minimum GPA due to extenuating circumstances may also apply for admission to teacher education. The Admission Committee will review each request.

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. Course work in professional education and advanced courses in particular academic specializations or teaching fields are usually taken in the junior and senior years.

Professional Education. Teacher education programs in the College of Education are field-based. Students will complete observations and activities in public school settings. These field experiences may require time in addition to class time to complete.

Student Load. The maximum load for a student in the College of Education is 18 semester hours. No student will be permitted to enroll in more than 18 semester hours, including work taken by correspondence, without written approval from the department chair or associate dean. During the student teaching semester, the maximum load is 12 semester hours—9 to 12 hours of student teaching plus any co-requisite education course. Requests to take more than 12 hours must be approved by the certification officer.

Length of Degree Program. The Bachelor of Science degree can be completed in approximately eight semesters. The multidisciplinary studies major requires 126-139 hours, and the multidisciplinary science major requires 129

hours. A student may be required to attend either one summer term or a ninth semester to complete all requirements. Assistance in completing the degree and certification plan is provided by advisors in the College of Education. An Intent to Graduate form should be filed with an advisor one year prior to graduation.

Pass-Fail Option. Courses used to meet stated degree plan requirements may not be taken pass-fail. Up to 13 hours of courses that are taken as free electives to total 133 hours and are not used to meet any other degree requirement may be taken pass-fail. Courses that are designated pass-fail by departmental policy rather than student choice do not count in the 13-hour limit on elective courses that may be taken pass-fail. A student on probation is not allowed the pass-fail option.

Transferability. Developmental courses (e.g., basic or introductory reading and math courses) and vocational courses (auto mechanics, nursing) will not transfer for degree or certification programs. Courses with a grade of D may not be used for any course on a student's certification plan.

Please see the previous pages regarding educator certification for information on the Texas Examination for Educator Standards, recommendations for teacher certification, and admission to student teaching.

Graduate Program / Curriculum and Instruction

Post-Baccalaureate Initial Teaching Certification. Post-baccalaureate programs designed to meet initial certification requirements for teaching in early childhood (early childhood to grade four), middle level (grades four to eight), and secondary schools (grades eight to twelve) are available. The state-mandated TExES test is required for persons who complete certification programs. For guidance concerning professional certification, the student should consult with an advisor or the university certification officer and the program coordinators of the various programs. Information on post-baccalaureate programs leading to certification is available on the college web site (www.educ.ttu.edu). Although post-baccalaureate certification course work may be applied to master's degrees in elementary education and secondary education, gaining admission to degree programs requires an additional admissions process. Additional information on post-baccalaureate certification may be found on the college web site.

Bilingual Education. A master's degree in this program area is available with a concentration in either bilingual education or English as a second language (ESL). Students may choose a 36-semester-hour plan that includes core courses and specialty concentrations and features a choice among offerings in language literacy, linguistics, anthropology, and English. The 30-semester-hour plan includes core and specialty courses, electives from a range of selections,

and a 6-hour thesis. Students may seek supplemental certificates in bilingual education or English as a second language within requirements for the master's degree. More information and application forms are available at www.educ.ttu.edu/edbl.

Curriculum and Instruction. The program area of curriculum and instruction offers a master's degree and a doctor of philosophy degree. The master's degree is designed to meet the diverse needs of professional educators in elementary, secondary, and post-secondary education. Thesis and non-thesis options are available. The doctor of philosophy (Ph.D.) degree may be completed with support areas in bilingual education, elementary education, language and literacy, math/science and secondary education. Students may also focus on other areas of interest such as curriculum studies, social studies education, and diversity studies. Additional information and application forms are available at www.educ.ttu.edu/edci.

Elementary Education. The master's program in elementary education is designed for students interested in concentrating on the fundamentals of reflective practice with an emphasis in social studies, mathematics, and science education. Thesis and non-thesis options are available. Students enrolled in a post-baccalaureate certification program should meet with a faculty advisor to develop a master's degree plan that will in-

clude certification course work. Information about the program and application forms can be found at www.educ.ttu.edu/edel.

Language Literacy Education. The language literacy program area offers a master's degree in language literacy with two options. The first option addresses many of the requirements of the Master Reading Teacher certificate program. The second option focuses on the Professional Reading Specialist Certification and supplies a strong foundation for later doctoral work. The master's degree requires 36 hours of graduate work. See www.educ.ttu.edu/edll for additional information and application materials. Thesis and nonthesis options are available.

Secondary Education. Two basic degree plans are available. The 36-semester-hour plan (without a thesis) includes a 21-semester-hour concentration in educational foundations and secondary education as well as 15 hours in a minor concentration. The minor may be taken in a teaching field. The 30-semester-hour plan (with a thesis) includes a major concentration of 18 semester hours, a 6-hour minor concentration, and a thesis (6 hours). Students enrolled in a post-baccalaureate certification program should meet with a faculty advisor to develop a master's degree plan that will include certification course work. See the secondary education web site (www.educ.ttu.edu/edse) for more information and application materials.

Education Minor. Students seeking secondary certification may minor in secondary education. The following courses may be used by students who complete student teaching as undergraduates: EDSE 4000 (9 to 12 hours); 4310; 4311; 4320, 4351, 4360, or 4376; 4322, and EDLL 4382. The following sequence of courses may be used by students **not** completing student teaching on the undergraduate level: EDSE 2300; 4310; 4311; 4320, 4351, 4360, or 4376; 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 a College of Education academic advisor.

Bilingual Education (EDBL)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3205. **Bilingual Programs and Language Issues at the Middle Level (2:2:0).** Corequisite: EDSP 3205. Overview of bilingual programs, issues, and second language research related to middle level students. Field experience required.
3332. **Foundations of Bilingual Studies (3:3:0).** Overview of history, philosophy, assessment processes, research, and legal aspects related to bilingual education.
3334. **Dual Language and Cognitive Development in Bilingual Programs (3:3:0).** Skills, attitudes, psycholinguistic knowledge related to first and second language acquisition. Field experience required.
3336. **Instruction and Management in Bilingual and Multilingual Settings (3:3:0).** Developing instruction and management skills in bilingual and multilingual classrooms.
3337. **Content Area Development for English as a Second Language Populations (3:3:0).** Adapting the school curriculum for English as a second language (ESL) students with emphasis on developing appropriate teaching materials for content areas.
3338. **Methods for Teaching English Language Learners (3:3:0).** Rationale, theories, and goals of a comprehensive curriculum program for English language learners.

Graduate Courses

5332. **Foundations of Bilingual Education (3:3:0).** Overview of curriculum, assessment process, teaching strategies, research, and legislation related to bilingual education.
5333. **Teaching the Multicultural-Multilingual Student (3:3:0).** Strategies and techniques for teaching and working with the multicultural-multilingual student.
5334. **First and Second Language Acquisition (3:3:0).** First and second language acquisition and development as related to bilingual education and the teaching of English as a second language.
5336. **Instructional and Management Issues in Bilingual Education ESL (3:3:0).** A survey of issues relating to classroom instruction and management for language minority students.

5337. **Teaching Strategies for ESL and Content-Area Teachers of Limited English Proficient Students (3:3:0).** Provides an instructional framework for material development and teaching approaches to limited English proficient students.
5338. **Methods of Teaching English as a Second Language to PreK-12 Students. (3:3:0).** Study of rationale, theories, and goals of a comprehensive ESL curriculum program in compliance with public school needs and standards of the State of Texas.
5393. **Internship in Bilingual Education (3).** Experience in various roles in bilingual education.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Educational Curriculum and Instruction (EDCI)

Undergraduate Courses

3320. **Middle Level Curriculum and Philosophy (3:3:0).** An overview of sociological, historical, and philosophical foundations of the middle school movement. Focus is on unique characteristics of a middle school interdisciplinary curriculum and instruction. Field experience required.
3325. **Honors Seminar: Trends and Issues in Educational Policy and Practice (3:3:0).** A seminar course that involves the analysis and synthesis of current trends in educational policy and practices.
3361. **Teaching Social Studies at the Middle Level (3:3:0).** Social studies curriculum principles and development, organization of materials, instructional techniques, and evaluation process unique to middle level social studies. Field experience required.
3370. **Teaching Mathematics at the Middle Level (3:3:0).** This course emphasizes the content, learning and instruction, assessment, and professional development in teaching middle-school mathematics. Field experience required.
3375. **Teaching Science at the Middle Level I (3:3:0).** Prerequisite: Junior standing. A field-based course emphasizing teaching methods and techniques, lesson organization, assessment, and classroom management. Field experience required.
4325. **Classroom Organization and Management for the Middle Level (3:3:0).** This course emphasizes theories of teaching and learning with a focus on classroom organization and management techniques for grades 4-8. Accompanies student teaching.
4362. **Service Learning and Community Literacies (3:3:0).** Methods of teaching principles and practices in citizenship through service learning. Course includes a required field component.
4370. **Middle-Level Mathematics: Knowledge, Practice, and Theory (3:3:0).** This course emphasizes the content, instructional strategies, and mathematical processes in teaching middle-school mathematics. Field experience required.
4375. **Teaching Science in the Middle Level II (3:3:0).** Prerequisite: EDCI 3375 and senior standing. Methods in teaching the unifying concepts of science, inquiry techniques, assessment, lab safety, and

classroom management with a required field component. Field experience required.

Graduate Courses

5001. **Advanced Education Workshops in Curriculum and Instruction (V1-6).** Advanced workshop activities in curriculum and instruction. Topics may vary.
5306. **Seminar in Curriculum and Instruction (3:3:0).** Recent research, trends, and issues in curriculum and instruction. May be repeated for credit.
5310. **Instructional Theory and Design (3:3:0).** Applications of contemporary educational theory and design procedures to secondary education, including models of teaching, enhancement of self-concept, and adolescent needs and interests.
5320. **Curriculum Theory: Foundations (3:3:0).** Fundamental bases for curriculum development.
5321. **Curriculum Theory: Design and Development (3:3:0).** Principles of curriculum needs assessment, design, implementation, and evaluation.
5333. **Improving the Teaching of Thinking (3:3:0).** Provides an instructional framework for teaching specific thinking skills and for developing and nurturing the teaching of skillful and reflective thinking in all content areas (K-12).
5335. **Models of Teaching (3:3:0).** Selected models of or approaches to teaching are described, demonstrated, and practiced. Emphasis is placed on expanding the repertoire of teaching skills.
5380. **Action Research I (3:3:0).** Fundamentals of quantitative and qualitative design. Students write a literature review and design an original action research project.
5381. **Action Research II (3:3:0).** Prerequisite: EDCI 5380 and consent of instructor. Fundamentals of quantitative and qualitative design. Students implement an action research project, collect data, and report results.
6000. **Master's Thesis (V1-12).**
6306. **Advanced Seminar in Curriculum and Instruction (3:3:0).** Critical analysis and design of research in selected curriculum areas. May be repeated for credit.
6320. **Curriculum Theory: Inquiry (3:3:0).** Antecedents of contemporary curriculum paradigms; relationships among curriculum, instruction, and society; tactics and models of curriculum analysis and criticism.
6393. **Advanced Practicum in Curriculum and Instruction (3:3:0).** A supervised laboratory or field experience in a curricular area; includes assessment, planning, instruction, and evaluation. May be repeated for credit.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Elementary Education (EDEL)

Undergraduate Courses

2191. **Projects in Elementary Education (1:0:2).** Exploratory experiences in educational programs through the elementary school level. May be repeated for credit. Must be taken pass-fail.

2300. **Schools, Society, and Diversity (3:3:0).** Historical, philosophical, sociological, and ideologic foundations of education: Purposes and roles of schools in a pluralistic society. Contemporary issues and reform trends in American public schools.
3099. **Independent Study (V1-3).** Prerequisite: Junior standing and consent of instructor. Independent study of special aspects or topics of elementary education. May be repeated for up to 3 hours credit.
4000. **Student Teaching 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 an elementary classroom of an accredited school. Course graded credit (CR) or no credit (NC).
4330. **Capstone Course (3:3:0).** This course emphasizes diagnostic teaching and learning, philosophies of education, current issues, classroom organization, professional portfolios, and teacher assessment. Accompanies student teaching.
4360. **Teaching Social Studies (3:3:0).** The design and organization of content, materials, and instructional strategies for social studies programs in elementary schools. Field-based course.
4370. **Teaching Mathematics (3:3:0).** Application of content, materials, and instructional strategies in teaching elementary school mathematics. Field-based course.
4375. **Teaching Science (3:3:0).** The methodology of teaching appropriate science learning experiences to elementary school children. Field-based course.
4393. **Internship in Elementary Education (3:1:3).** Prerequisite: Admission to teacher education. Directed experiences in various roles at the elementary level.
4394. **Internship in Elementary Education (3:1:3).** Prerequisite: EDEL 4393 and admission to teacher education. Directed experiences in various roles at the elementary school level.

Graduate Courses

5002. **Advanced Education Workshops in Elementary Education (V1-6).** A maximum total of 6 hours of credit may be earned either simultaneously or in different semesters.
5360. **Developing Social Studies Programs in Elementary Education (3:3:0).** Objectives, patterns, and principles of organization of social studies in the elementary schools.
5370. **Developing Mathematics Programs in Elementary Education (3:3:0).** The development of arithmetic and its educative function in the elementary school curriculum.
5375. **Developing Science Programs in the Elementary School (3:3:0).** Methods and materials for helping children develop an understanding of their natural and physical environments.
6306. **Studies in Elementary Education (3:3:0).** Trends in modern elementary education.
6360. **Studies in Social Studies Education (3:3:0).** Prerequisite: EDEL 3360 or 5360. In-depth studies of research and instructional practices pertaining to social studies education. May be repeated for credit.

6370. **Studies in Mathematics Education (3:3:0).** Prerequisite: EDEL 4370 or 5370. In-depth studies of research and instructional practices pertaining to mathematics education. May be repeated for credit.
6375. **Studies in Science Education (3:3:0).** Prerequisite: EDEL 4375 or 5375. In-depth studies of research and instructional practices pertaining to science education. May be repeated for credit.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Language Literacy (EDLL)

Undergraduate Courses

3350. **Children's Literature (3:3:0).** Texts appropriate for children under 15, including standards of evaluation and criteria for selection. Includes field experiences.
3351. **Foundations of Reading Instruction (3:3:0).** Prerequisite: Junior standing. Overview of reading development, methods of reading instruction, scope and sequence of programs. Field-based course.
3352. **Language Literacy Acquisition (3:3:0).** Study of the acquisition and development of language learning; study of curriculum, instruction, and exemplary classroom practices that foster literacy development. Field-based course.
3353. **Reading at the Middle Level (3:3:0).** Selection of materials and methods for understanding and developing reading requirements, skills, and strategies for middle level students in grades 4-8. Field experiences required.
4349. **Adolescent Literature (3:3:0).** Study of classic and current adolescent literature, selection of materials, and methods for use in middle and secondary level classrooms. Field experiences required.
4350. **Language Arts at the Middle Level (3:3:0).** Study of the attitudes, content knowledge, and pedagogy appropriate to the language arts at the 4-8 grade levels. Field experiences required.
4380. **Literacy in the Content Areas (3:3:0).** Understanding literacy in the content areas and planning instruction to promote content learning. Field experiences required.
4381. **Literacy in the Content Areas for Middle Level (3:3:0).** Understanding literacy in the content areas and planning instruction to promote learning of students in grades 4-8.
4382. **Reading and Writing in the Secondary Classroom (3:3:0).** Developing literacy practices to learn in content area disciplines aimed at grades 8-12.

Graduate Courses

5340. **Foundations of Reading Instruction (3:3:0).** Prerequisite: EDLL 5351 or concurrent enrollment. Psychological and research bases of reading instruction. A foundations course.
5341. **Literacy in Secondary Content Area Classrooms (3:3:0).** Reading and writing to learn in content area disciplines intended for secondary students in grades 8-12.
5342. **Assessment in Reading (3:3:0).** Prerequisite: EDLL 5340, 5344, 5351, or consent

- of instructor. Examines the use of both formal and informal assessment measures as a means to provide information useful for evaluating student performance and planning instruction.
5343. **Practicum in Language Literacy (3:3:0).** Prerequisite: EDLL 5340, 5344 and 5351 or consent of instructor. Must be taken concurrently with EDLL 5342. Provides an opportunity to work in instructional settings to assist children in their reading development. Student achievement is considered through instructional strategies and assessment procedures.
5344. **Content Area Literacy (3:3:0).** Prerequisite: EDLL 5340, undergraduate equivalent, or consent of instructor. Theoretical and research bases, issues, strategies, and methods related to learning from print in all content fields.
5345. **Early Literacy (3:3:0).** Theoretical bases, procedures, techniques, and materials for early literacy instruction.
5346. **Understanding, Valuing, and Assessing Language Learners (3:3:0).** Examines a constructivist framework as a foundation for understanding language and literacy development in elementary classrooms.
5348. **Applied Linguistics and the Teaching of Literacy (3:3:0).** Prerequisite: Previous reading courses or consent of instructor. A study of reading as communication with applications of linguistics to the reading classroom.
5350. **Developing Language Arts Programs in Elementary Education (3:3:0).** Applications of research findings and modern theory to teaching and organizing the language arts in the elementary school.
5351. **Children's Literature for Teachers and Librarians (3:3:0).** Literature for children in elementary and middle school; selection, use and organization. Includes nonprint media. Appropriate for English or language arts majors.
5352. **Portfolio Assessment in Reflective Teaching (3:3:0).** Theory and technique for student portfolio assessment (observation, anecdotes, tests, reading and writing samples). Must have access to classroom students K-12.
5353. **Reading and the Middle-Level Student (3:3:0).** Selection of materials and methods for understanding and developing reading requirements/strategies/skills of middle school/level students in grades 4-8.
5355. **Developing Writing Programs in K-12 Classrooms (3:3:0).** Application of in-depth studies of research and instructional practices in the teaching of writing to guide development of effective writing programs.
5356. **Problems, Trends, and Issues in Teaching Adolescent Reading (3:3:0).** Investigation of current problems, trends, and issues in the teaching adolescent readers in middle and secondary schools. May be repeated for credit.
5357. **Early Detection in Reading (3:3:0).** Assessment of and intervention with children during daily literacy lessons. (First of two courses).
5358. **Early Literacy Intervention (3:3:0).** Assessment of young children and initial intervention based on ongoing reading and writing assessment.

5393. **Internship in Language Literacy Education (3)**. Prerequisite: Advanced graduate classification in education. Experiences in the various roles of language literacy education.
6000. **Master's Thesis (V1-6)**.
6341. **Problems, Trends, and Issues in Literacy Teaching and Learning (3:3:0)**. Study of selected problems, trends, and issues related to literacy teaching and learning. Topics will vary. May be repeated for credit as topic varies.
6344. **Trends and Issues in Content Area Literacy (3:3:0)**. An in-depth study of trends and issues in content area literacy instruction in elementary and secondary schools. Designed especially for in-service teachers.
6347. **Research Seminar in Literacy (3:3:0)**. In-depth analysis and synthesis of contemporary research in literacy development and instruction.
6349. **Adolescent Literature (3:3:0)**. Study of current literature for middle and secondary level students (grades 7-12); selection of material and strategies appropriate for adolescents.
6350. **Studies in Language Arts (3:3:0)**. Prerequisite: EDLL 3352 or EDLL 5350. In-depth studies of research and instructional practices pertaining to elementary language arts. May be repeated for credit.
6351. **Studies in Literature for Children or Adolescents (3:3:0)**. Prerequisite: EDLL 3350 or EDLL 5351. In-depth studies of research and instructional practices pertaining to children's literature. May be repeated for credit.
6353. **Investigations in Literacy (3:3:0)**. Theoretical bases and research perspectives on literacy learning and instruction. An in-depth analysis of historically important research.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Secondary Education (EDSE)

Undergraduate Courses

2192. **Projects in Secondary Education (1)**. Arranged experiences as a tutor and/or teacher's aide in a secondary school. May be repeated for credit. Must be taken pass-fail.
2300. **Schools, Society, and Diversity (3:3:0)**. Historical, philosophical, sociological, and ideologic foundations of education; purposes and roles of schools in a pluralistic society. Contemporary issues and reform trends in American public schools.
4000. **Student Teaching in the Secondary School (V1-12)**. Prerequisite: Meet admission standards to student teaching. Supervised teaching involving a period of major responsibility for instruction in an accredited secondary school. Course graded credit (CR) or no credit (NC).
4310. **Learning, Cognition, and Instructional Design (3:3:0)**. Environmental, social, developmental, and cognitive factors influencing learning in adolescence; application of learning theory to classroom environment and instructional design for adolescent learners. Field experiences required.
4311. **Curriculum Planning, Development, and Evaluation (3:3:0)**. Foundations and principles of curriculum planning, development, implementation, and evaluation in secondary schools; issues in curriculum development. Field-based course.
4320. **Instructional Methods (3:3:0)**. Strategies for teaching evaluation and classroom management. Field-based course.
4322. **Diversity and the Classroom Learning Environment (3:3:0)**. Organization of social and academic systems in the classroom that are responsive to student learning styles, students' ethnic and cultural backgrounds, and students with special needs. Field-based course.
4330. **Capstone for Secondary Students (3:3:0)**. This course is taught with student teaching and focuses on instructional management, organization for teaching, student assessment, and political and ethical dimensions.
4351. **Teaching Grammar, Composition, Spelling, and Listening (3:3:0)**. Preparation for teaching grammar, usage, punctuation, composition, spelling, critical thinking, and listening in secondary schools. Field-based course.
4360. **Teaching the Social Studies in the Secondary School (3:3:0)**. Methods, techniques, and evaluation procedures appropriate to teach various subjects in the area of social studies. Includes supervised practice in the selection of materials, visuals, and microteaching. Field-based course.
4376. **Methods in Science Teaching (3:3:0)**. Focus on the curriculum, methods, and materials related to science instruction in the secondary schools. Field-based course.
4393. **Internship in Secondary Education (3:1:3)**. Prerequisite: Admission to teacher education. Directed experiences in various roles at the secondary level.
4394. **Internship in Secondary Education (3:1:3)**. Prerequisite: EDSE 4393 and admission to teacher education. Directed experiences in various roles at the secondary school level.
4399. **Individual Study (3)**. Prerequisite: 9 hours of education and consent of instructor. Independent study focusing on curriculum development and teaching strategies.

Graduate Courses

5305. **Issues and Reform in American Secondary Schooling (3:3:0)**. Purpose, role, contemporary issues, and reform trends in American secondary schooling. Historical, philosophical, sociological, and ideological foundations of education. Examination of multiple contexts that influence schooling and roles of teaching.
5307. **Seminar in Secondary Education (3:3:0)**. Trends and issues in modern secondary education.
5320. **Developing Curricula in Secondary Schools (3:3:0)**. Foundations, principles, and issues of curriculum in secondary level schools.
5322. **Managing Secondary School Learning Environments (3:3:0)**. Planning, organization, and implementation of social and academic systems in the classroom. The course is designed to examine critically

research-based perspectives on conditions that must be created in order to develop a culturally responsive classroom learning environment.

5331. **Improvement of Instruction in the Secondary School (3:3:0)**. A study of teaching behaviors, styles, and strategies. Instructional theories and various models of teaching are examined.
5377. **Science Curriculum and Instruction (3:3:0)**. A study of evolving science curriculum with emphasis on innovative practices, methodology, organization for instruction, and evaluation.
6000. **Master's Thesis (V1-6)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Department of Educational Psychology and Leadership

Faculty

Gerald Parr, Chairperson

Horn Professor: Bradley; *Professors:* Hartmeister, Koenig, Lan, Murray, and Parr; *Associate Professors:* Burley, Butner, Cejda, Claudet, Crooks, Duemer, Griffin-Shirley, Kelley, Lock, Marbley, Maushak, Olivarez, Price, Runnels, and Shonrock; *Assistant Professors:* Davidson, Hendricks, Klinker, Layton, Leechtenberger, Mendez-Morse, Nes, Shen, Stevens, White, and Zhang

About the Program

The Department of Educational Psychology and Leadership offers course work at the undergraduate level in educational psychology and special education. The department offers study in the following graduate degree programs:

- Master of Education in Counselor Education
- Master of Education in Educational Leadership
- Master of Education in Educational Psychology
- Master of Education in Higher Education
- Master of Education in Instructional Technology
- Master of Education in Special Education
- Doctor of Education in Counselor 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 Higher Education

Graduate Program

The department offers programs leading to professional certificates and associated supplemental certificates. Information on admission standards, program requirements, and other matters concerning graduate programs in the department may be obtained

from the department office or the Office of Graduate Education and Research in the College of Education. Information is also available online at www.educ.ttu.edu.

Counselor Education. The college offers both a master's and a doctoral program in counselor education. The master's program consists of 48 semester hours and offers two tracks or majors: school counseling and agency counseling. The doctoral program offers one major in counselor education. The master's and doctoral programs are approved by the Council for Accreditation of Counseling and Related Educational Programs. Applicants must complete the Counselor Education Application Packet available at www.edu.ttu.edu.

Students desiring to obtain only the professional certificate in school counseling must have a master's degree in education from an accredited university and be admitted to the Graduate School and the counselor education program. A maximum of 18 graduate semester hours may be accepted for transfer credit toward certification provided the courses are no more than 6 years old and are equivalent to courses taught at Texas Tech. No transfer hours will be allowed for practica (EPCE 5360), internship (EPCE 5094), or techniques (EPCE 5357). In addition to completing the program successfully, the applicant must have two years teaching experience, a valid teaching certificate, and pass a TExES examination administered by the State Board for Educator Certification. Additional information is available at www.educ.ttu.edu/epce and in the department office.

Educational Leadership. The Educational Leadership Program offers a Master of Education (M.Ed.) and a Doctor of Education (Ed.D.) degree in educational leadership. Graduate programs are also offered for principal and superintendent professional certificates. Degree programs and certification programs have different requirements, but many courses will apply to both and are explained online at www.educ.ttu.edu/edld.

Educational Psychology. Students enrolled in the educational psychology program earn a master's and/or doctoral degree with a variety of areas of emphasis (e.g. history and/or philosophy of education, learning and motivation, human development, multicultural education, and research, measurement, and statistics). A minimum of 36 semester credit hours is required for the Master of Education degree. Students pursuing a master's degree can do so with or without a thesis. A minimum of 93 semester credit hours is required for the Doctor of Education degree. Applicants to either program must first apply to and be cleared by the Graduate School before being reviewed and approved by the educational psychology faculty. Admission to a master's program does not constitute later admission to a doctoral program. Applicants without a strong background in psychology may be required to complete leveling courses before unconditional admission to the program. For more information, see the program web site at www.educ.ttu.edu/epsy.

Higher Education. Higher education students come from a variety of fields and types of higher education institutions. To prepare leaders for the higher education enterprise, the program delivers teaching, research, and professional development services to students, institutions of higher education, and other academic disciplines.

Students working on a master's degree may pursue either non-thesis or thesis options. The master's program consists of two tracks or majors: higher education administration (36 semester hours) and student affairs (39 semester hours).

The Higher Education Program offers two doctoral degrees. The Doctor of Education (Ed.D.) is designed for the advanced student who wishes to achieve a superior level of competency in his or her professional field with emphasis on practice and leadership. Under the direction of their advisor, students may select a focus in community college leadership, university administration, or student affairs. Students can focus their study in university administration, community college leadership, or student affairs. The Doctor of Philosophy (Ph.D.) is designed for the advanced student who wants to acquire the ability to contribute to the knowledge base of teaching, education, and leadership through a thorough grounding in the conduct of research. The Ph.D. will prepare students for professional careers as institutional researchers and planners; administrators with an orientation towards research, sponsored programs, or grant proposal writing; program assessment-evaluation specialists; research associates; and faculty members.

Both doctoral degrees require the completion of 93 credit hours beyond the baccalaureate. As part of the credit hour requirements, candidates for both the Ed.D. and the Ph.D. are

required to demonstrate proficiency in independent research in higher education, culminating in the completion of a dissertation.

For further information, see the program web site at www.educ.ttu.edu/edhe.

Instructional Technology. The instructional technology program offers both master's and doctoral degrees. The goal of the program is to prepare specialists in the field of instructional design and technology. Instructional technology students come from a variety of backgrounds, including public school education, higher education, and the private sector. Graduate programs include a foundation of educational research and educational psychology as well as an in-depth study of instructional design and educational technology applications. Several online courses are offered and an online master's degree is available.

The doctoral program requires 83 credit hours plus a dissertation beyond a bachelor's degree. Doctoral program graduates often enter the field of higher education as professors, instructional designers, and technology specialists.

The master's program requires 39 credit hours beyond a bachelor's degree. Two areas of emphasis are available: educational computing and distance education. Graduates often accept positions as technology specialists in public education, as consultants or developers of instructional materials in the private sector, or as community college instructors or technology specialists.

For more information, see the program web site at www.educ.ttu.edu/edit.

Special Education. In conjunction with the state of Texas, the special education program provides for course work in the certification

Education Building



areas of generic special education, educational diagnostician, and visual impairment. An additional certification in orientation and mobility is also available. Students in the graduate special education program are prepared to work with individuals with disabilities in a variety of settings, including the public schools, higher education, and the private sector. A post-baccalaureate degree to obtain generic special education certification is also available. To be certified in the state of Texas, students must pass the TExEs examination for their area.

A minimum of 36 hours is required for the master's degree. Additional hours are required for certain certificates, including educational diagnostician. Students may select to write a thesis or complete the non-thesis route. The Doctor of Education degree requires a minimum of 93 graduate hours.

Specific areas of interest within the Special Education Program include autism, emotional disturbance, learning disabilities, mental retardation, orientation and mobility, and visual impairment.

A majority of the courses in the master's program in special education are available online. A few of the educational diagnostician courses are offered through interactive television (ITV) and require the student to make arrangements through the College of Education and the university's digital video network to secure end-point site approval. When locations do not have adequate technological capability, students will not be able to obtain permission to enroll in those courses. Students living within a one-hour commute of the Texas Tech Lubbock campus will be required to attend these courses on campus and no ITV connection will be provided.

Courses in the doctoral core are generally available in the summer sessions to accommodate those employed in the public school system. These 15 hours are traditional on-campus classes. The remainder of the program can be completed through distance education with a residency requirement.

Special Education Program applicants for the post-baccalaureate, certification, or master's program must complete an application that can be found in the *Special Education Program Handbook*. Acceptance to the master's program does not guarantee later acceptance to the doctoral program. Doctoral applicants must complete a separate application that also appears in the handbook.

See www.educ.ttu.edu for additional information. For information about the undergraduate Bachelor of Science degree in multidisciplinary studies leading to a special education certificate, refer to the appropriate section under the Division of Curriculum and Instruction.

Counselor Education (EPCE)

(To interpret course descriptions, see pg. 10.)

Graduate Courses

5001. **Advanced Workshop in Counseling (V1-6)**. Prerequisite: Consent of instructor. Workshop and field experience assignments in counseling-related activities. A maximum of 6 hours of credit may be earned.
5094. **Internship in Counseling (V1-3)**. Prerequisite: Admission to counselor education program; EPCE 5360.
5350. **Ethical, Legal, and Professional Issues in Counseling (3:3:0)**. Prerequisite: EPCE 5353 or 5358. Survey of objectives, principles, and practices in counseling in the educational and community setting. Must be taken during the first 12 hours of counseling classes.
5352. **Child Counseling (3:3:0)**. Prerequisite: EPCE 5364. Admission to the counselor education program or consent of instructor. Philosophy, principles, and practices of counseling children and young adolescents in school and community settings.
5353. **Introduction to Community Counseling (3:3:0)**. Overview of the activities of community counseling, nature of specific populations, program development and evaluation, planning for client services, and public policy issues.
5354. **Group Counseling (3:3:0)**. An overview of the principles, practices, and approaches to group counseling in school and community settings.
5355. **Introduction to Career Counseling (3:3:0)**. Overview of career theories, assessment procedures, techniques, and counseling processes used with adolescents and adults in school and community settings.
5357. **Techniques of Counseling (3:3:0)**. Prerequisite: EPCE 5364 and 5353 or 5358. Theory, simulation, and practice of counseling techniques used in school and community agency settings.
5358. **Comprehensive School Counseling Programs (3:3:0)**. Prerequisite: Admission to the counselor education program or consent of instructor. This course is designed to equip participants with skills and knowledge to develop, implement, manage, and assess components of a comprehensive developmental school counseling program.
5360. **Practicum in Counseling (3)**. Prerequisite: Admission to Graduate School, admission to the counseling program, and completion of 12 hours of counseling courses including EPCE 5353 or 5358 and 5354, 5357, 5364, 5366, 5367, 5370, 5371, and EPSY 5356. Assignment in a school or community agency setting for supervised experiences in counseling. May be repeated for credit.
5364. **Theories of Counseling (3:3:0)**. Theories and paradigms of counseling.
5366. **Dysfunctional Behavior (3:3:0)**. Prerequisite: EPCE 5364 and 5353 or 5358, or consent of instructor. Overview of dysfunctional behavior, analysis of dysfunctional behavior in educational and counseling settings.
5367. **Family Counseling Applied to School Settings (3:3:0)**. Prerequisite: EPCE 5364 and 5353 or 5358 or consent of instructor. Family counseling applied to school settings. Theory, simulation, and practice of techniques used in family counseling applied to school and community agencies.
5369. **Seminar in Counseling (3:3:0)**. Prerequisite: Departmental approval required. A critical investigation of counseling topics related to school and community agencies. Repeatable as topic varies.
5370. **Ethical and Legal Issues in Counseling (3:3:0)**. Prerequisite: EPCE 5364 and 5353 or 5358. An investigation of legal and ethical issues in the counseling profession. Focus on schools and community agencies.
5371. **Counseling Diverse Populations for Licensed Professional Counselor (3:3:0)**. Prerequisite: EPCE 5364 and 5353 or 5358. The course provides an overview of counseling theory as it applies to diverse groups including gender, geriatric, racial, ethnic, and exceptionality issues.
5372. **Addictions: An Overview for School and Community Counselors (3:3:0)**. This basic course provides an overview of addictions theory, issues, and practice. The course's focus is on community and school counseling.
5374. **Applied Principles and Practices of Play Therapy-Counseling I (3:3:0)**. Prerequisite: EPCE 5357, 5364, EPSY 5331 strongly recommended. This course includes an overview of essential elements and principles of play therapy including theories, techniques, modalities, and environments. The course features a practicum element during which students conduct play therapy sessions under supervision of the instructor.
5375. **Applied Principles and Practices of Play Therapy-Counseling II (3:3:0)**. Prerequisite: EPCE 5374 or consent of instructor. Advanced theories, techniques, modalities, and environments of play therapy amplified by supervised experience with children in playrooms.
6001. **Advanced Study of Special Topics in Counselor Education (V1-6)**. Prerequisite: Consent of instructor and admission to doctoral program in counselor education. An organized course to foster in-depth study of a current topic in counselor education. Course work will focus on one major current topic. May be repeated for credit.
6094. **Doctoral Internship in Counseling (V1-3)**. Prerequisite: Admission to Ed.D. program in counseling, completion of all course work including practica and supervision, and consent of instructor. Supervised employment or field experience in a school or community agency setting. May be repeated for credit.
6335. **Advanced Counseling Theory and Techniques (3:3:0)**. Prerequisite: EPCE 5357, 5364, and admission to doctoral program in counseling. Analysis of major approaches to counseling with integration of the techniques in clinical practice.
6350. **Doctoral Seminar in Counseling (3:3:0)**. Prerequisite: Admission to doctoral counseling, consent of instructor, EPSY 5381 or equivalent. Special topics in counseling covering both research and practice. May be repeated for credit.

6354. **Advanced Theory and Practice of Group Leadership (3:3:0).** Prerequisite: EPCE 5354, 5364, and consent of instructor. Survey of major theoretical paradigms and their application in leading small groups. Supervised practice to integrate theory and application.
6360. **Advanced Practicum in Counseling (3).** Prerequisite: Admission to Graduate School, admission to the counseling program, completion of all EPCE 5000 level practica, and consent of instructor. Supervised laboratory and field experience in schools and community agencies. Emphasis on integration of theory and practice. May be repeated for credit with the instructor's consent.
6366. **Advanced Practicum in Counselor Education and Supervision (3).** Prerequisite: Admission to the Graduate School, full status admission to the counseling program, completion of all EPCE 5000 level practica, EPCE 6360 and 6335, and consent of instructor. Emphasis on supervision theory, training, and experience in the supervision of counselors.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Educational Leadership (EDLD)

Graduate Courses

5001. **Advanced Education Workshops in Teaching and Administration (V1-6).** Prerequisite: Consent of instructor. Advanced workshop activities and experiences in administration. A maximum total of 6 hours of credit may be earned either simultaneously or in different semesters.
5306. **School-Based Leadership (3:3:0).** This course examines the major theories, concepts, and empirical findings related to school-based leadership.
5310. **Instructional Supervision (3:3:0).** Principles, planning, organizations, and processes of supervision in both elementary and secondary schools.
5330. **Staff Development (3:3:0).** Principles and procedures of organizing programs of school improvement through comprehensive and ongoing staff development.
5340. **Educational Law (3:3:0).** Introduction to the legal aspects of educational organizations, focusing on the school building level and emphasizing the rights and responsibilities of students, teachers, and administrators.
5350. **School Personnel and Fiscal Management (3:3:0).** Introduction to the concepts of fiscal and human resource management with an emphasis on site-based decision making.
5351. **Communication for School Leaders (3:3:0).** The study and application of interpersonal communication theory and research as related to organizational, social, and environmental contexts. Individual conferencing, informational and employment interviewing, and group dynamics, are included.
5361. **Process of Educational Change (3:3:0).** A study of the knowledge base of change management in education. Application of the cognitive understandings to national change models and local settings.
5380. **The School Superintendent and Educational Governance (3:3:0).** Prerequisite: Admission to superintendent certification program. Prepare educational leaders for the national, state, and local aspects of school district governance in the 21st century.
5381. **School District Resource Management (3:3:0).** Prerequisite: Admission to superintendent certification program. Critical analysis of the business services of school districts, emphasizing planning, budgeting, resource management, fiscal operations, and accountability.
5382. **The Superintendency, Organizational Politics, and Legal Issues (3:3:0).** Prerequisite: Admission to superintendent certification program. Emphasis on political and legal knowledge, skill and competencies; also board and superintendent relationships, conflict resolution, communications, and community relations.
5391. **School and Community (3:3:0).** Explores the development of collaborative culture at school, enlist community support, and form partnerships with businesses, universities, and parents. Addresses improved communication among increasingly diverse members of the school staff, parents, students, community members, and media.
5392. **Mid-Management Internship in Education (3:3:0).** Prerequisite: The internship can only be taken as the final course in the mid-management certification program. Guided experience in mid-management administration and under the supervision and direction of a mid-management administrator and a University professor.
5394. **Superintendent Internship in Education (3).** Prerequisite: Admission to superintendent certification program. Guided experiences in central office administration under the supervision and direction of a central office administrator and a University professor. The internship can only be taken as the final course in the superintendent's certification program.
6001. **Advanced Study of Special Topics in Educational Administration (V1-6).** Prerequisite: Consent of instructor and admission to doctoral program. An organized course to foster in-depth study of a current topic in Educational Leadership. Course work will focus on one major current topic. May be repeated for credit.
6300. **Organizational Theory in Education (3:3:0).** Prerequisite: Admission to doctoral program. Theories and paradigms to determine implications for theory development, for research activities, and for practical applications.
6310. **Educational Leadership Ethics (3:3:0).** Exploration of philosophical platforms, ethical/intuitive decision-making processes, secular ethics, and the interplay between cultural and personal value shifts that impact educational leadership.
6321. **Educational Finance (3:3:0).** Prerequisite: Admission to doctoral program. The development and content of public school finance policy in the United States focusing on the fiscal, political, legal, and economic and normative dimensions.
6330. **Educational Leadership, Democracy, and Schools (3:3:0).** Exploration of democratic principles, philosophy, and past and present cultural influences on our democracy and schools.
6340. **Educational Policy and the Law (3:3:0).** Prerequisite: Admission to doctoral program. The interplay of the law and public policy emphasizing the relationship between legal decisions and educational practices from the perspectives of the governing board and central administration.
6341. **Legal Issues With Special Populations (3:3:0).** Prerequisite: EDLD 5340 or consent of instructor. Prepare educational leaders for legislative and litigating aspects of working with special populations.
6351. **Organizational Communication in Education (3:3:0).** Prerequisite: Admission to doctoral program. The study of organizational communication theory and research as related to theoretical issues, environments, and patterns in education. Organizational communication methodology and process are included.
6361. **Doctoral Seminar in Educational Administration (3:3:0).** Prerequisite: Admission to doctoral program. Advanced analysis and synthesis of research and practice concerning problems and issues in educational leadership. May be repeated for credit.
6380. **Contemporary Perspectives on Educational Leadership (3:3:0).** Post-modern theories and perspectives on educational leadership.
6385. **Research in Educational Administration (3:3:0).** Prerequisite: Admission to doctoral program. Survey of educational leadership research focusing on contemporary issues, techniques in research design and methodology (qualitative and quantitative), and grantsmanship.
6392. **Doctoral Internship in Educational Leadership (3:3:0).** Prerequisite: Admission to doctoral program and consent of instructor. The application of reflective practice to problems of leadership in a school setting. Expert practitioners and University professors coach students through a process of thinking about the definition and solution of problems as they develop and test plans for action.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Early Childhood Education (EDEC)

Undergraduate Course

4000. **Student Teaching in EC-4 Certification (V1-12).** Prerequisite: Attainment of admission standards to student teaching. Supervised teaching involving a period of major responsibility for instruction and learning in an early childhood classroom of an accredited school. Course graded credit (CR) or no credit (NC).

Graduate Courses

5310. **Application of Studies in Maturation and Learning to Early Childhood Education (3:3:0).** Study of the influence of environmental factors on the physical, emotional, social, and intellectual growth of young children.
5311. **Analysis and Design of Programs in Early Childhood Education (3:3:0).** Research study and laboratory observa-

tions to determine nature and need of school experiences for young children.

Educational Psychology (EPSY)

Undergraduate Courses

3190. **Special Topics in Educational Psychology (1)**. Study of specialized topics in educational psychology and foundations of education.
3331. **Adolescent Development: Applications for Middle-Level Classrooms (3:3:0)**. Study of physical, intellectual, social, and emotional development of and environmental influences on the development of young adolescents.
4399. **Individual Study (3)**. Prerequisite: Consent of instructor. Independent study of selected topics in educational psychology and the foundations of education.

Graduate Courses

5310. **Philosophy of Education (3:3:0)**. Major western social philosophies and their application to the field of education in the United States.
5314. **History of Education (3:3:0)**. A study of the development of Western education with emphasis on pedagogical leaders and reformers.
5323. **Cultural Foundations of Education (3:3:0)**. Analysis of linkages between school and community with special reference to the impact of the selection and allocation functions of schooling on minority groups.
5331. **Human Development in Education (3:3:0)**. Interrelationships of social and psychological development through the lifecycle and implications for teaching and learning.
5332. **Educational Psychology (3:3:0)**. Emphasis on the application of educational psychological principles to teaching at all levels.
5333. **Adolescent Learners (3:3:0)**. Environmental, social, developmental, and cognitive factors influencing learning in adolescence; application of learning theory to classroom environment and instructional design for adolescent learners.
5349. **Seminar in Educational Psychology (3:3:0)**. Research analysis and synthesis in the field of educational psychology. May be repeated for credit.
5356. **Principles of Educational and Psychological Measurement (3:3:0)**. Analysis and techniques of tests and measurements in educational settings—achievement tests, tests used in counseling and assessment of students.
5379. **Introduction to Educational Research (3:3:0)**. Introduction to the nature of research and its relationship to educational thought and practice. Focus on preparing research consumer.
5380. **Introduction to Educational Statistics (3:3:0)**. Introductory course in statistics with major emphasis on univariate measures for analyzing educational data.
5381. **Intermediate Educational Statistics (3:3:0)**. Prerequisite: EPSY 5380 or STAT 5302. Topics include multiple regression, analysis of variance and covariance, multiple comparison tests, and additional non-parametric tests.

5382. **Qualitative Research in Education (3:3:0)**. Study in theoretical perspectives informing qualitative research in education including relevant issues and methodological criteria.
5383. **Data Analysis With Statistical Software (3:3:0)**. Hands-on analysis of quantitative educational data using statistical software.
5385. **Foundations of Educational Research (3:3:0)**. Methods of educational research; methods of obtaining, processing, interpreting, and using significant educational data.
5389. **Individual Intelligence Testing (3:3:0)**. Use of individual appraisal instruments and techniques in educational evaluation of children, youth, and adults WISCIII, Stanford-Binet, K-ABC.
5393. **Internship in Education (3)**. Prerequisite: For counseling students, admission to counseling program and completion of practicum requirements. Supervised employment or field experience in an educational setting. May be repeated for credit.
6000. **Master's Thesis (V1-6)**.
6301. **Advanced Data Analysis (3:3:0)**. Prerequisite: EPSY 5381 or STAT 5303 or consent of instructor. Study of multivariate techniques for analyzing educational data, including such topics as multivariate regression, manova, discriminate analysis, and factor analysis.
6302. **Survey Research in Education (3:3:0)**. Prerequisite: EPSY 5381, 5385, or consent of instructor. The design and implementation of survey methodology in educational settings. Coverage of sampling techniques. Questionnaire design, analysis of data, and strategies for dissemination of findings to specific audiences.
6303. **Educational Measurement (3:3:0)**. Prerequisite: 3 hours of statistics. Study of psychometric theory, test and instrument development, and use of standardized instruments in educational research.
6304. **Qualitative Research Methods (3:3:0)**. Prerequisite: EPSY 5382. Study of qualitative methods used in educational research. Includes application and problems.
6305. **Qualitative Data Analysis in Education (3:3:0)**. Prerequisite: EPSY 6304. Study of methods used in the analysis of data gathered through qualitative research methods and of ways of reporting these research findings.
6332. **Advanced Educational Psychology (3:3:0)**. Emphasis on the research and theories of educational psychology and the evaluation and synthesis of psychology theories.
6349. **Doctoral Seminar in Educational Psychology (3:3:0)**. Prerequisite: Admission to doctoral program. Several topics in research and analysis in educational psychology. May be repeated for credit.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Higher Education (EDHE)

Graduate Courses

5001. **Seminar in Higher Education (V1-6)**. A special topics course designed to acquaint students with current research, theory, policies, and/or practices in higher education. May be repeated for credit.
5300. **The History of Higher Education in the United States (3:3:0)**. An examination of the development of the American system of higher education its origin, major characteristics, trends, and distinctive features.
5301. **American Higher Education (3:3:0)**. A comprehensive introduction to the basics of American higher education including facts and fundamental theoretical concepts on which to build future understandings and research.
5302. **Comparative Higher Education (3:3:0)**. A comparative study of systems of higher education throughout the world and their counterparts in the United States.
5303. **Critical Issues in Higher Education (3:3:0)**. An examination of perspectives on equity and access, excellence, and efficiency concerns in higher education.
5305. **Organization and Governance in Higher Education (3:3:0)**. An examination of organization theory, models, and policies; governance and management processes; and leadership perspectives and theory. A review of research and new conceptual perspectives.
5313. **The Community Junior College (3:3:0)**. An introductory course to acquaint students with the purposes, programs, people, organization, control, and resources of these colleges.
5315. **Community College Leadership (3:3:0)**. A study of different leadership styles, strategies, and theories applicable to the community college sector.
5321. **The Administration of Higher Education (3:3:0)**. Examines administration of higher education at institution and unit level. Addresses organizational culture and behavior, as well as management and leadership studies.
5322. **Institutional Planning in Higher Education (3:3:0)**. An examination of the current models and theories used to develop strategies for organizational planning, including an analysis of internal assumptions and the external environment.
5323. **Development and Finance in Higher Education (3:3:0)**. A study of the requirements for a sound institutional development program, including mission and objectives, budgeting, organization and planning. Relationships with constituencies and proposal preparation is analyzed.
5324. **Higher Education and the Law (3:3:0)**. A study of constitutional, statutory, and case law concerning public and private college and university boards, administrators, faculty, and students.
5332. **Student Services in Higher Education (3:3:0)**. Focuses on the theoretical bases of the profession, roles and models for practice and competencies, and techniques of student services.
5333. **Issues in Student Affairs (3:3:0)**. Prereq-

quisite: EDHE 5332 or consent of instructor. Current issues in the administration of student affairs programs and activities on college and university campuses in the United States.

5334. **College Student Development (3:3:0).** This course will provide an in-depth study of developmental theories that are unique to college-aged students. Implications for practice will also be included.
5335. **The American College Student (3:3:0).** This course will examine the changing demographics and characteristics of college students. Research on college students will be reviewed to determine the impact of college on students.
5341. **Assessment of Student Outcomes in Higher Education (3:3:0).** An examination of the philosophy and practice of assessment and evaluation in higher education.
5342. **College Teaching (3:3:0).** An exploration of the nature of college teaching and the teaching-learning process, including a review of major issues and problems.
5343. **College and University Curriculum (3:3:0).** Issues, problems, and basic considerations in curriculum development. The structure of knowledge. Developments and trends in liberal education, the disciplines, and professional education.
- 5393, 5394. **Internship in Higher Education (3 each).**
6000. **Master's Thesis (V1-6).**
6310. **Higher Education Research Seminar (3:3:0).** A series of seminars dedicated to the development of student research proposals, Manuscripts, and grant applications. The seminars bridge the gap between theory and practice. May be repeated for credit.
6311. **Higher Education Ph.D. Research Seminar (3:3:0).** A seminar dedicated to the development of conceptual and theory-based research of Ph.D. students. May be repeated for credit.
6325. **Policy Analysis and Issues in Higher Education (3:3:0).** Examines the relationship between colleges and universities and policies developed by boards and governments. Explores prevalent issues facing higher education from a policy perspective.
6370. **Capstone Seminar (3:3:0).** Integrates the Ph.D. experience and prepares graduates for entry into the profession. Students will develop a portfolio, conference research paper, and a reflection paper.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Educational Instructional Technology (EDIT)

Undergraduate Courses

2318. **Computing and Information Technology (3:3:0).** Use of computers as productivity tools, societal and ethical implications, and applications and related technology in society.
3318. **Applications of Technology in Elementary Education (3:3:0).**

Graduate Courses

5000. **Special Topics in Instructional Technology (V1-3).** Covers special design-

ated topics in instructional technology. May be repeated for credit.

5316. **Foundations of Instructional Technology (3:3:0).** Overview of the field of instructional technology including the design, development, utilization, management, and evaluation of instructional systems.
5317. **Instructional Design Foundations (3:3:0).** Technological advances in instruction with emphasis in instructional systems design; and a broad overview of the field of instructional technology.
5318. **Introduction to Small Computers in Education (3:3:0).** Introduction to computers for educators. Includes computer terminology, operations, overview of applications, hardware, and software. Hands-on experience with small computers included.
5320. **Educational Network Applications (3).** Computer applications for school-based networks. Issues of instructional support, design, and administration will be discussed.
5321. **Computer Programming for Educators (3:3:0).** Prerequisite: EDIT 5318 or consent of instructor. Overview of instructional programming using a high level object oriented language to develop educational software. Best practice and design will be modeled.
5322. **Authoring Systems for Educational Software (3:3:0).** Explores computer authoring languages and systems, including hypermedia systems, and their application to the design of instructional programs.
5325. **Planning and Developing Instructional Media (3:3:0).** Production and use of visual instructional media. Includes visual design, photographic techniques, video production, and computer graphic presentations.
5326. **Instructional Software Design (3:3:0).** Prerequisite: EDIT 5318 or consent of instructor. An in-depth study of instructional software design and development. Principles and procedures for creating sound instructional software will be investigated. Evaluation and usability methodologies will be explored.
5330. **Computers, Critical Thinking, and Problem Solving in the Content Areas (3:3:0).** Prerequisite: EDIT 5317 or 5318 or consent of instructor. Surveys research and strategies for using computers to promote higher order thinking and problem solving in all content areas. Includes software identification, use, and evaluation.
5341. **Curriculum Applications of the Internet (3:3:0).** Prerequisite: EDIT 5340 or consent of instructor. Integration of the Internet and World Wide Web into the K-12 curriculum, focusing on the use of the resource for communication, information access, and instructional delivery.
5342. **Authoring Tools for Internet Instruction (3:3:0).** Explores authoring tools with an emphasis on proper instructional design to deliver effective and appropriate Internet based instructions.
5370. **Foundations of Distance Education (3:3:0).** Overview of the field of distance education including history, research, technologies, and related design models.

5380. **Principles and Practice for Video Based Distance Learning (3:3:0).** Prerequisite: EDIT 5318 or consent of instructor. Evaluation, selection, and administration of video based distance learning systems, emphasizing legal, ethical, and access issues. Strategies for creating effective distance learning environments.
5390. **On-line Distance Learning (3:3:0).** Web-based teaching in K-12, adult, and higher education. Includes instructional design, instructional management, and related issues.
5395. **Administration of the Educational Technology Program (3:3:0).** Prerequisite: EDIT 5318 and 5319 or consent of instructor. Covers organization and management of computer resources; selection and acquisition of computer hardware and software.
5397. **Practicum in Educational Technology (3:3:0).** Prerequisite: EDIT 5318, 5319, or consent of instructor. Supervised experience in an educational setting which requires the application of competencies such as teaching, management, supervision, and administration.
6000. **Master's Thesis (V1-6).**
6317. **Advanced Instructional Design: Theory and Practice (3:3:0).** Prerequisite: EDIT 5317 or EDCI 5310. This seminar explores the theory and practice of instructional design in-depth. Product development, research, and evaluation of instructional design models are included.
6322. **Research in Instructional Technology (3:3:0).** Prerequisite: EDIT 5318 and EPSY 5380 or consent of instructor. Review of research on instructional technology, use of computers for research data analysis, and designing research on instructional technology.
6325. **Multimedia Production for Instruction (3:3:0).** Explores design and delivery of individualized instruction and information retrieval via modern multimedia systems.
6380. **Distance Education: Trends, Issues, Research (3:3:0).** Prerequisite: EDIT 5370, 5380, or consent of instructor. Students will identify and evaluate relevant literature to synthesize theories, trends, issues, and concerns related to the field of distance education.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Special Education (EDSP)

Undergraduate Courses

3205. **Learning and Special Populations (2:2:0).** Examines the psychological, sociological, and educational implications of both high and low incidence populations of exceptionality for middle level classrooms. Field-based experience required.
3300. **Exceptional Children and Youth (3:3:0).** Major categories of exceptionalities; psychological, sociological, and educational implications of exceptionality. Field-based experience required.
3302. **Assessment and Program Planning for Exceptional Children (3:3:0).** Appraisal instruments and techniques used by relevant disciplines in determining educational placement and programming for

- exceptional children. Field-based experience required.
3303. **Methods for Teaching Students With Mild Disabilities (3:3:0).** This course gives preservice teachers a foundation in best practice in methodology for teaching basic academic skills, social skills, and content area subjects to students with mild disabilities including modifications to regular education curricula. Field-based experience required.
4304. **Methods for Teaching Students With Severe Disabilities (3:3:0).** Curricular adaptations and additions for students with severe and profound disabilities. Emphasis on functional communication, physical management, and training for independent living and employment, stressing community integration. Field-based experience required.
4305. **Behavior Management for Students With Disabilities (3:3:0).** Behavioral management strategies for addressing the conduct at school, at home, and in the community of infants, toddlers, children, and youth who have disabilities and the conduct of their families. Field-based experience required.
- Graduate Courses**
5093. **Internship in Special Education (V1-3).** Prerequisite: Consent of instructor.
5094. **Advanced Internship in Special Education (V1-3).** The arranged internship gives students practical experience in an area of specialization.
5095. **Internship for Diagnosticians (V1-3).** This arranged internship provides experiences in educational diagnostics.
5300. **Exceptional Children and Youth (3:3:0).** Major categories of exceptional children and youth; psychological, sociological, and educational implications of exceptionality.
5301. **Educational Appraisal of Exceptional Children (3:3:0).** Appraisal instruments and techniques employed by relevant disciplines in determining appropriate educational placement and programming for exceptional children.
5303. **Applied Behavior Analysis in Special Education (3:3:0).** Use of applied behavior analysis in special education programs. Included are techniques for observing and recording behavior testing intervention, effects, and use in learning environment.
5304. **Instructional Strategies for Teaching Students With High Incidence Disabilities (3:3:0).** Provision of knowledge of various models of instruction and strategies related to education of learners with varying disabilities, including materials development and evaluation.
5306. **Instructional Strategies for Teaching Students With Low Incidence Disabilities (3:3:0).** Strategies for teaching students with severe disabilities utilizing a critical skills model curriculum aimed at teaching appropriate functional skills across the domains.
5307. **Problems and Trends in Special Education (3:3:0).** Current problems and future trends in the field of special education.
5308. **Authentic Assessment for Students with Exceptionalities (3:3:0).** Authentic appraisal strategies and techniques to document the strengths and needs of students with exceptionalities in a naturalistic setting.
5310. **Gifted and Talented Children and Youth (3:3:0).** Psychological, sociological, and educational implications of higher level intelligence and intellectual ability as well as various talents.
5312. **Creativity and the Gifted and Talented (3:3:0).** Psychological foundations of creativity especially as they apply to gifted children, how to assess and nurture creativity, and establish an environment conducive to creativity.
5320. **Children and Youth With Low Incidence Disabilities (3:3:0).** The characteristics and psychological, sociological, and educational implications of severe disabilities including mental retardation, autism, serious emotional disturbance, dual sensory impairment, and multiple disabilities.
5330. **Children and Youth With High Incidence Disabilities (3:3:0).** The characteristics and psychological, sociological, and educational implications of mild disabilities including learning disabilities, behavior disorders, and mild mental retardation.
5380. **Programs and Services for Individuals With Visual Impairments (3:3:0).** Introduction to educational programs and services for students with visual impairments, including history, developmental characteristics, psychological needs, and legislation.
5381. **Instructional Strategies for Individuals With Visual Impairments (3:3:0).** Strategies for teaching and adapting instruction in content areas, independent living, career-vocational, P.E., and leisure. Includes a theoretical framework, assessment strategies, and research applications.
5382. **Communication Skills for Individuals With Visual Impairments (3:3:0).** Knowledge and skills in reading and writing the literary Braille code, Nemeth mathematics code, and format. Overview of other codes and basic signing skills for nonverbal communication.
5383. **Anatomy and Functions of the Visual System (3:3:0).** Structure and function of the eye, causes and implications of eye conditions, clinical and functional vision assessments, relationship to other disabilities, and neurological aspects of visual impairment.
5384. **Basic Orientation and Mobility Skills (3:3:0).** Prerequisite: EDSP 5300. Exploration of space in the home and school environment and the wider community according to individual needs; appreciation and understanding of professional mobility instruction programs.
5386. **Intermediate Orientation and Mobility Training for Multihandicapped and Blind (3:3:0).** Prerequisite: EDSP 5384. Development of teaching skills in orientation and mobility in semi-independent settings with multihandicapped and blind students.
5387. **Advanced Orientation and Mobility Training for Multihandicapped and Blind (3:3:0).** Prerequisite: EDSP 5386. Advanced orientation and mobility teaching techniques for travel in independent settings for multihandicapped and blind students.
5388. **Programs and Services for Students With Dual Sensory Impairments (3:3:0).** Psychological, sociological, and educational implications of dual sensory impairments in children and youth, including appropriate community, educational, and social services.
5389. **Methods and Materials for Teaching Students With Dual Sensory Impairments (3:3:0).** Curricular adaptation and additions for students with dual sensory impairments. Emphasis on functional communication, behavior management, and training for independent living and employment.
5390. **Seminar in Special Education (3:3:0).** Recent research practices and problem areas in special education. May be repeated for credit.
6000. Master's Thesis (V1-6).
6301. **Leadership Issues With Special Populations (3:3:0).** Prerequisite: Admission to doctoral program. Preparation of leaders in Special Education through analysis of research and critical issues, professional writing and speaking, and grant preparation. May be repeated for credit.
6303. **Physical and Psychological Aspects of Special Populations (3:3:0).** Preparation of graduate students to understand physical and psychological backgrounds of people with disabilities.
6304. **Preparing Leadership Personnel for Special Populations (3:3:0).** Course will prepare doctoral level students to develop a leadership and managerial style and to effectively develop, implement, and evaluate preservice and inservice programs for adults.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

College of Engineering



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Dean

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About the College

Engineering involves applying scientific and mathematical principles and knowledge to solve the technical problems that confront society. Students studying in the College of Engineering must develop an understanding of the forces at work within nature in order to learn to control and direct them. Engineering knowledge assists in achieving human goals, and humanity's advancement is the common objective of each program within the college. Students learn to become professionals and are expected to act responsibly and professionally.

Each academic program includes education in the basic sciences, mathematics, humanities, social sciences, and the technical knowledge needed to solve some of society's problems.

The college's primary goal is to educate students to fill leadership roles as professionals aware of technology and its economical and political role in the world. Therefore, we strive to produce technically competent graduates who solve problems, are able to communicate and work well with others, are sensitive to the needs of society, and are well-educated in the humanities as well as in the engineering disciplines.

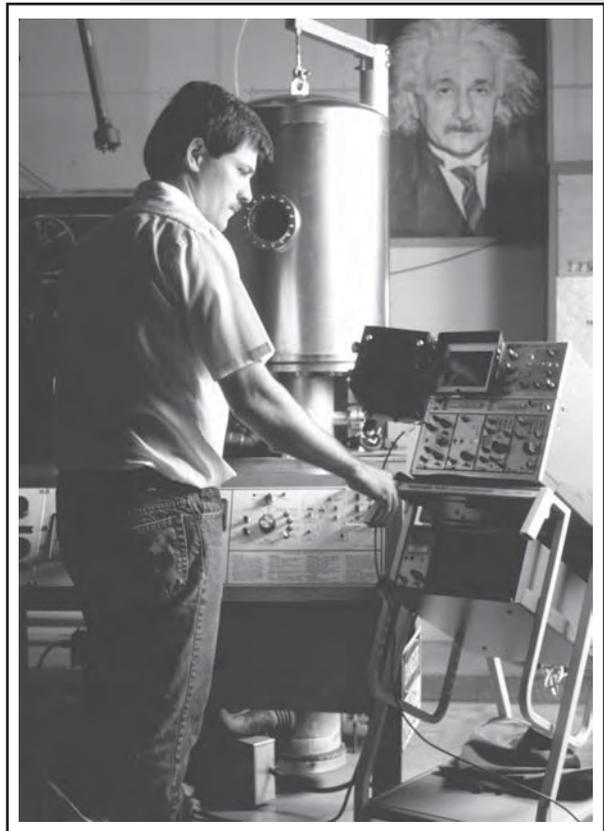


Undergraduate Program

The college historically produces quality graduates. One quality component is the requirement of a grade of C or better in all courses used in the degree plan. The college also monitors student retention on a regular basis and has developed various programs and tools to help students learn how to learn and to improve student retention.

One tool is the BRIDGE program that provides an analysis on how to learn and a refresher in mathematics. The optional program is designed for students in transition from high school to college. The typical cost is \$200. The optional mathematics review is \$30. The students are re-tested for mathematics placement. A strong interest and foundation in mathematics is desirable for students majoring in engineering, engineering technology, and computer science. It is strongly recommended that students have a mathematics SAT score of 500 or higher to pursue a major in the college. Students with scores less than 500 are able to graduate from the college and achieve success in industry. However, most of these students start at a junior college and rebuild their mathematics foundation.

The college provides an educational system that uses outcomes assessment. Examples of long-term outcomes are job placement and on-the-job success. The college has excellent job placement. Students will also experience other assessment and advisement based on outcomes as they complete their education. As part of assessment, all students in the college are required to take the mock FE exam before graduation. The capstone senior design course or sequence of courses offered by each department also is a measure of the integrated knowledge and ability of students. At this point, not only have students developed technical knowledge, but they have also learned to work as a professional team, valuing commitment and ethics and even advancing to a pattern of life-long learning.



The following Bachelor of Science degree programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc. (ABET): Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Physics, Industrial Engineering, Mechanical Engineering, and Petroleum Engineering. The three engineering technology programs—Construction, Electrical-Electronics, and Mechanical—lead to a Bachelor of Science in Engineering Technology degree and are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.

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 Engineering. The option of a nonABET accredited Bachelor of Science in Environmental Engineering is available to Master of Environmental Engineering students.

A degree in Computer Science is offered by the Computer Science Department, a program that supports teaching and learning in the areas of languages, systems, hardware, software, and related studies. Graduates are prepared to continue their formal study or work in a variety of industries.

The program leading to the degree of Bachelor of Science in Engineering Technology is designed for students whose basic aptitude and interests are in the application of established procedures to the solution of technical problems. An engineering technology program leads to a degree preparing students for technical careers in such fields as applied design, construction, operations, maintenance, quality control, or sales. Curriculum outlines and course descriptions are given in this catalog under the Department of Engineering Technology.

For the student wishing to obtain a broad-based general degree, the Bachelor of Arts degree is offered by the College of Engineering. This degree is not intended as preparation for entry into the practice of engineering but offers the student an engineering base along with flexibility to pursue other professional programs, such as medicine and law.

Degree Programs

Undergraduate Degrees. The College of Engineering offers the following professional engineering curriculum, each leading to the degree of Bachelor of Science in the respective engineering fields: chemical, civil, computer, electrical, industrial, mechanical, petroleum, and engineering physics. The computer science curriculum leads to the Bachelor of Science degree with a major in computer science. Engineering technology curriculum with specializations in construction, electrical-electronics, and mechanical technology leads to the degree of Bachelor of Science in Engineering Technology. A cooperative program between the Colleges of Engineering and Architecture leads to a degree from both entities. The Civil Engineering Department coordinates the program for the College of Engineering.

The College of Engineering is divided into instructional departments that offer course work and supervise the degree programs. These departments are presented in special tables on the following pages along with a descriptive list of the courses offered by each department.

The courses listed in individual curriculum tables are prescribed for the various degrees. The course arrangement for the freshman, sophomore, junior, and senior years is the recommended sequence of courses, whether students begin them in the summer or during the long session. Before registration for each semester, a student should check course prerequisites carefully to include courses that are prerequisite to the ones for the following semester.

Dual-Degree Program. The College of Engineering has arranged with several other colleges and universities to provide students with the opportunity to earn dual degrees. The dual-degree program enables a student to study approximately three years at one of several institutions, earning credit for nonengineering courses. Generally, students can complete the course of study at Texas Tech within two full calendar years that leads to two degrees—one in engineering from Texas Tech University and one in a nonengineering major from the second institution. Upon completing specific requirements, degrees are awarded by both institutions. Schools currently participating in the program include Lubbock Christian University, McMurry University, Our Lady of the Lake University, Wayland Baptist University, West Texas A&M University, and Southwest Texas State University. In addition, there are dual degree programs between architecture (College of Architecture) and civil engineering and between mathematics (College of Arts and Sciences) and computer science.

150-Hour Dual Degree. The College of Engineering also provides a 150-hour dual degree that allows students eligible for graduate school to earn both a B.S. and a M.S. degree with approximately 150 hours. Students are allowed to use graduate work that closely matches the subject requirements of the undergraduate degree to substitute for undergraduate courses. Students should contact their department for details about the curriculum. Students interested in this program must apply to the Graduate School prior to taking graduate courses. Early planning and contact with the department advisors is essential because in some cases students may be able to connect undergraduate research experience to their thesis work in graduate school.

Bachelor of Arts Degree. The college offers a Bachelor of Arts degree for students who are interested in a liberal arts background with strong emphasis in science and technology. This degree can be used as the background for those interested in the professional programs of medicine, dentistry, or law. With one to two additional years of study, the student can also obtain a Bachelor of Science degree in an accredited engineering program. Prospective students should make inquiries in the dean's office concerning requirements, opportunities,

and limitations of the Bachelor of Arts degree. Each student studying toward the Bachelor of Arts degree offered by the College of Engineering is expected to develop, in consultation with a faculty advisor, a degree program that meets their individual needs. Each program must meet the following minimum requirements for this degree.

	<i>Semester Hours</i>
1. English	15
2. Mathematics	12
(beyond college algebra and trigonometry)	
3. Chemistry 1307, 1308, 1107, 1108	8
4. Physics 1408, 2401	8
5. American History 2300, 2301	6
6. Political Science 1301, 2302	6
7. Social or Behavioral Sciences	6
8. Humanities**	3
9. Oral Communication	3
10. Fine Arts**	6
11. Visual & Performing Arts	3
12. Engineering*	42
Engineering Technology, and Advanced Science	
13. Free Electives	10
Minimum Total	128
* At least 24 hours of engineering courses must be completed.	
** Multicultural and performing arts (as required).	

The student's program should be developed no later than the first semester of the junior year and must be approved by the dean of the College of Engineering. At least 27 hours of the engineering, engineering technology, and advanced science courses and 9 hours of the electives must be upper division courses. At least 24 hours of the engineering, engineering technology, and advanced science courses must be engineering courses. This degree program is not accredited by ABET.

A modification of the Bachelor of Arts degree to serve the needs of people who like to study engineering but who want to teach mathematics, science, and engineering at the high school level is listed as follows:

	<i>Semester Hours</i>
1. English 1301, 1302, 2311	9
2. Mathematics	12
(MATH 1351, 1352, 2350, 3350, or 3354)	
3. Chemistry 1307, 1308, 1107, 1108	8
4. Physics 1408, 2401	8
5. American History	6
6. Political Science 1301, 2302	6
7. Social or Behavioral Sciences EDSE 2300 ..	3
8. Humanities	3
9. Oral Communication	3
(CH E 2306 or PETR 3308)	
10. Visual & Performing Arts	3
11. Engineering*	42
(The following courses are recommended for engineering technology, and advanced science: C E 2301, 3302, 3303, 3305; E E 1305, PHYS 1305, or C S 1411; E E 3302 or GTEC 1312; I E 3341 or MATH 3342; and M E 3301 or minor in one of the engineering programs)	
12. Education	18
(EDSE 4310, 4311, 4320, 4322, 4382, 4399)	
Minimum Total	130
*At least 24 hours must be engineering	

Interdepartment Degree Plans. The College of Engineering offers a coordinated curriculum that leads to the awarding of two baccalaureate degrees from the college. At the present time, formal dual-degree plans are available between electrical engineering and computer science, mechanical engineering and computer science, and computer science and chemical engineering. Because of sequencing of courses and prerequisites, the

student should enter the program during the freshman year and follow the plan rigorously. Because of the increased number of hours required, a minimum of five years is needed to complete the program. For information on the dual degrees, please contact the departments of interest.

Second Degree. A student who has completed the requirements for a first bachelor's degree from the College of Engineering may acquire a second by completing the degree program for the second degree with the following restriction: at least 30 hours of the second degree requirements must be from courses not counted in attaining the first degree. The student must regain admission to enter the new degree program.

Cooperative Education. A Cooperative Education Program for engineering students is available within the dean's office. To participate in this program, students should contact the Director of Cooperative Education. Three parties are involved in the program: the college, the student, and the employer. These parties work together so that the student can learn and perform real-world engineering functions under the supervision of engineering professionals. This program consists of three work tours in industry alternated with semesters of course work at the university. Work assignments are related to academic and career goals with progressively responsible duties on the second and third tours. Students typically begin their first work tour after completion of their sophomore year and complete the third tour before the beginning of their senior year. Industry supervisors are expected to evaluate each student's work performance and education and share this evaluation information directly with the student. Information from this evaluation will be used confidentially to evaluate the effectiveness of the Texas Tech engineering program and the cooperative education program. Students must be registered for and meet the requirements of a qualifying cooperative education course during the semesters they are on tour in industry.

Minors. Students from other colleges or students outside their major department may elect to minor in an academic program of the College of Engineering. Each department will specify the required courses and number of hours that constitute a minor from their programs. Information on approved minors, if offered, is available from each department chair.

Students who are interested in attending medical school or graduate work related to medical research and engineering should consider the bioengineering minor listed with the Department of Chemical Engineering. A chief advantage of using an engineering degree with a premedical plan is that much professional opportunity exists for graduates who do not attend medical school.

Advanced Degrees in Engineering. Programs are available through the College of Engineering leading to Master of Science and Doctor of Philosophy degrees in the fields of computer science and chemical, civil, electri-

cal, industrial, mechanical, and petroleum engineering. In addition to these programs, the College of Engineering offers a Master of Engineering degree designed especially for practicing engineers desiring to continue their professional education.

Admission to the Graduate School is based upon an above average undergraduate record and satisfactory standing on the Graduate Record Examinations.

Dynamic Enrollment Management Plan (DEMP). The college uses a dynamic enrollment management plan to control quality and enrollments in upper-level classes. The set points of GPA and details of implementation vary by department. Some departments, for example, require a GPA of 2.5 or higher to continue into upper-level classes or to transfer into the department. Students should see their department advisor and understand the requirements for their major.

Because a strong interest and foundation in mathematics is desirable for students majoring in engineering, engineering technology, and computer science, the college strongly recommends that students have a mathematics SAT score of 500 or higher to pursue a major in the college. Although some students have entered the college with a mathematics SAT score of less than 500, most of them started at a junior college and rebuilt their mathematics foundation.

Community College Articulation Agreements. Students from community colleges generally transfer courses in English, history, political science, mathematics, and science to Texas Tech. Community colleges that adequately prepare students to study engineering have designated faculty who function as liaisons between their schools and the College of Engineering. Such cooperative arrangements provide students an opportunity to choose courses at the community college that are required by a specific major in the College of Engineering. Problems in transferring to Texas Tech are minimized by the student's early commitment to transfer to the College of Engineering. Current schools that have signed articulation agreements with the College of Engineering include Amarillo College, Clarendon College, Frank Phillips College, Midland College, and South Plains College.

General Standards and Requirements

The requirements for a degree from the College of Engineering include many courses that are common to all degree programs. Most of these courses are taught at the freshman and sophomore level. A specific curriculum has been established for each degree program and is given in detail on the following pages.

Core Curriculum Requirements. The university has established a set of core courses required for all students. These requirements ensure breadth in each academic program. Students should consult their faculty advisors or chairperson regarding specific requirements. Please note that these requirements are incorporated in the curriculum of each major

or specialization in the college. Students are urged to seek advisement prior to their first enrollment to avoid losing credit. A listing of Core Curriculum requirements is in the Undergraduate Academics section of this catalog.

Computer. All students in the college are expected to have access to a personal computer. Many instructors require students to transfer homework with e-mail. Some instructors also transfer information to students using the Internet. While computer facilities are available on campus, students do best when they have their own personal computer. Students should check with their respective department for hardware and software requirements.

Maximum Course Load. A student must get approval from the dean's office to take more than 19 hours during a fall or spring semester or more than 8 hours during a summer term. Students on academic probation are not allowed to take more than 16 hours during a fall or spring semester. Students who work should adjust their course load accordingly. Check with the dean's office for recommendations.

Credit by Examination. Credit for some engineering courses above the freshman level is available through departmentally prepared examinations. The student must present to the dean a written request to take the examination. The petition must state the extent and manner in which the student obtained competence in the subject. Upon approval by the dean, the petition should be presented to the chair of the department concerned for arrangements to take the examination.

Correspondence Courses. All correspondence work taken for a degree program requires written approval from the dean of the College of Engineering prior to registration. Correspondence courses taken from institutions other than Texas Tech must be certified by the Division of Outreach and Extended Studies as being equivalent to correspondence courses offered at Texas Tech.

Transfer Course Evaluation. Courses transferred from another institution will be evaluated for use in a given degree program. Each department evaluates transfer courses associated with courses taught in their department.

Grades for Transfer Courses. The highest grade for a repeated course, either at Texas Tech or another institution, will be the grade used to determine acceptance of the course for a degree program. Only courses with a grade of C or better will be accepted for use on an engineering degree plan.

Prerequisites. In scheduling courses, prerequisites and corequisites are mandatory.

Engineering Science Courses. All designated engineering science courses in a degree program should be taken as early as possible. The designated engineering science courses are C E 2101, 2301, 3302, 3303, 3305, CH E 3321, 3330, E E 3302, I E 3301, M E 3311, 2322, 3331, and 3370. The designated engineering technology science courses are GTEC 1312, 2351, and 2311.

Basic Science and Mathematics Requirements.

If a student receives advanced placement in a mathematics course (on the basis of high school mathematics classes, MAT, or SATM test scores) higher than the first required course in the particular degree program, the department may specify the replacement course. If not specified, the student has the option to take an additional higher level mathematics course or substitute up to 4 hours of basic science for 4 hours of mathematics (some programs may specify the substitute course). The student must take a minimum of 12 hours of mathematics and 12 hours of basic science as required by the degree program. To meet the Engineering Accreditation Commission of ABET requirements, a minimum of 32 hours of approved basic sciences and mathematics must be completed. The Technology Accreditation Commission of ABET requires a minimum of 24 hours of approved basic science and mathematics for students in the Department of Engineering Technology. The basic science and mathematics courses used for the substitution may or may not be required by the degree program. In any case, the student must meet the minimum number of hours required for graduation.

ROTC. Subject to the policies of the department and with the approval of the department chair, 3 hours of advanced ROTC credit may be counted for the general elective courses in engineering, computer science, and engineering technology degree programs.

Substitution of Courses. Any substitution of courses specified in a degree program requires the written approval of the chair of the student's major department and the dean of the College of Engineering. Degree credit for electives requires written approval by the chair of the department involved. A list of acceptable technical electives for a degree program can be obtained from the department. Courses considered remedial, duplicative, or inferior will not be accepted.

Grades of C. A grade of C or better is required for all courses included in the degree plan. If a student earns a D or F grade in a prerequisite to a required course, the student must retake the prerequisite course and complete a grade of C or better before enrolling in the required course.

Pass-Fail. All courses used to satisfy the degree program requirements must be taken for a grade. (The pass-fail option is not allowed.)

Scholarships. A student on departmental or college scholarship must be a full-time student to maintain his or her scholarship.

Engineering Undecided. A student registering as Engineering Undecided (ENUD) must select a major after completing 45 hours of academic credit. Exceptions to this rule will be reviewed on a case by case basis by the dean's office. Engineering Undecided is not a major.

E-COACH. Students can evaluate their interests toward a major by using the College of Engineering web site at www.coe.ttu.edu. Students can then select E-COACH under career mapping. From E-COACH, select ED DOCTOR and then the gray box for career and learning style assessment.

Application for Degree. A student must file an "Application for Degree" with the office of the dean of the College of Engineering at least one year before the anticipated date of graduation. Subsequently, the student will receive a list of courses and the number of credit hours that remain to be taken. Because they must meet all the requirements of a specific year's catalog, students must indicate the year's catalog under which they plan to graduate. This must be a year during which the student is registered in the College of Engineering, with the restriction that all requirements for an undergraduate degree must be completed within seven years of the date of the catalog chosen.

Engineering (ENGR)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

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.

Graduate Courses

- 5000. Special Topics in Engineering (V1-12).** Prerequisite: Graduate standing in engineering. Individual study of advanced interdisciplinary topics in engineering under the guidance of one or more members of the engineering faculty.
- 5340. Turbomachinery (3:3:0).** Working of a typical power plant. Components making up steam and gas turbines. Cycle performance and internal flow in turbines and forces generated.
- 5354. Creativity in Problem Solving (3:3:0).** The basic concept of creativity and means by which individuals and groups can develop more effective creative skills. Exercises to increase creative thinking and problem solving in individual and group settings.
- 5360. Fundamentals of Engineering Science (3:3:0).** An overview of physical, mathematical, and engineering concepts; including electronics, materials, statistics, C programming, digital logic, microprocessors, and project management.
- 5361. Device Characterization and Failure Analysis (3:2:3).** Characterization techniques for materials and devices. Failure analysis of analog and digital devices and systems. Reliability analysis and testing. Diagnostic instrumentation and data analysis techniques.
- 5362. Advanced Semiconductor Processing and Process Characterization (3:2:3).** Prerequisite: E E 5381. Stresses process flow, yield management, specific device processing steps, and process control. Packaging and back-end processing.
- 5363. Advanced Topics in Semiconductor Product Engineering I (3:1:6).** Prerequisite: Consent of instructor. Advanced industry-related project in the area of semiconductor product engineering.
- 5364. Advanced Topics in Semiconductor Product Engineering II (3:1:6).** Prerequisite: Consent of instructor. Advanced industry-related project in the area of semiconductor product engineering. A continuation of Advanced Topics I.
- 5365. Parametric and Functional Device Testing (3:2:3).** Prerequisite: E E 5384 and 5393. Fundamentals of semiconductor device chip and wafer testing. Parametric and functional tests, test philosophy, C programming for testing, and commercial wafer level testers.
- 6330. Master's Report (3).** Prerequisite: Graduate standing. Formal technical report on an interdisciplinary topic under guidance of faculty from one or more departments.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Graduate Program / Engineering

The College of Engineering offers programs of instruction and research leading to the *Master of Science* and the *Doctor of Philosophy* degrees with majors in Chemical, Civil, Computer Science, Electrical, Industrial, Mechanical, and Petroleum Engineering. A *Master of Science in Environmental Technology Management* degree and a *Master of Environmental Engineering* degree are offered in the Department of Civil Engineering. The Department of Industrial Engineering offers a *Master of Science in Systems and Engineering Management*. The general regulations governing the graduate programs at Texas Tech University apply to these degrees.

In addition to the above degree programs, work leading to the *Master of Engineering* degree is offered with the entire graduate faculty of the college participating.

The program leading to the Master of Engineering degree does not specify an area of specialization and does not require a thesis.

The program is designed primarily for practicing engineers. For such practicing engineers credit for graduate course work completed in residence at another accredited graduate school may be accepted for as much as one-half of the 36 semester hour requirement for the Master of Engineering degree. All work credited toward the degree must be completed within nine calendar years. Under certain circumstances, regular on-campus students may be admitted to the undifferentiated Master of Engineering degree program. (In such cases, the regular six-year time limit will apply.) In addition to the regulations governing admission to the Graduate School, a baccalaureate degree in engineering, or its equivalent, is required for entrance to the Master of Engineering program. The student may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the college.

Department of Chemical Engineering

Faculty

Gregory B. McKenna, Chairperson

Professors: Mann, McKenna, Riggs, and Tock; *Associate Professors:* Abbott, Hoo, Simon, and Weisner; *Assistant Professors:* Dai, Leggoe, and Vaughn.

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

The undergraduate B.S. degree requirements and the combined B.S. and M.S. degree requirements appear in the accompanying curriculum tables. In addition, the requirements for the joint B.S. degrees in chemical engineering and computer science are shown in the third curriculum table.

Undergraduate Program

Major objectives of the department during the next decade will be: (1) to provide students with a high quality education at both the undergraduate and graduate levels to enable them to adapt to a rapidly changing technical environment, (2) to produce graduates who will be productive throughout their careers in a wide range of industrial and professional environments, and (3) to develop graduates with a strong sense of ethics and professionalism and with the ability to succeed as both individual and team contributors.

Along with the degree of Bachelor of Science in Chemical Engineering, 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 polymers and materials and in bioengineering are offered by the department. A minor in chemistry or mathematics can also be earned with very few additional hours. An approved minor in business administration with a B.S.Ch.E. permits a student to enter the MBA program at Texas Tech with no additional leveling in business administration or economics courses.

A minor in chemical engineering consists of 18 or more hours in chemical engineering courses, including CH E 2410, 2421, 3315, 2321, 3322, and 3326. Prerequisites for all of these courses will be enforced.

The minor in polymers and materials consists of 18 hours, six of which must be taken outside of the student's major. Two courses are required: CH E 4344 Polymers and Materials Laboratory and a course in materials science and engineering (either CH E 3330, M E 3311, or MTEC 3441). The remaining four

courses should be selected from the following list:

CHEM 3306	Organic Chemistry II
CHEM 4310	Polymer Chemistry
CH E 4340	Polymer Processing
CH E 4341	Polymerization Engineering
CH E 4342	Polymer Physics and Engineering
CH E 4345	Dynamics of Polymeric and Nonlinear Fluids
CH E 4346	Polymer Viscoelasticity
E E 4381	VLSI Processing
M E 3328	Materials & Mechanics Laboratory
M E 4341	Materials in Design
M E 4344	Manufacturing Processes for Engineering Materials

The minor in bioengineering consists of a minimum of seven courses. Five courses are required:

BIOL 1403	Biology I
CHEM 3306/3106	Organic Chemistry II and Laboratory
CHEM 4303	Molecular Biochemistry
CH E 4363	Biochemical Engineering
CH E 4364	Chemical Engineering Applications in Biological Systems

In addition, either BIOL 1404 Biology II or CHEM 3313 Biochemistry Laboratory is required. One remaining course must be chosen from the following list:

BIOL 3320	Cell Biology
BIOL 3416	Genetics
MBIO 3400	Microbiology
MBIO 3401	Principles of Microbiology

Nonchemical engineering students wishing to obtain the minor in bioengineering are required to complete MATH 3350 or 3354 before taking CH E 4364 and are required to complete CH E 2410 and CH E 4323 (taking CH E 2410 before CH E 4323) before taking CH E 4363.

Premedical students who desire to minor in bioengineering are required to take eight courses. Six courses are required:

BIOL 1403	Biology I
BIOL 1404	Biology II
CHEM 3306/3106	Organic Chemistry II and Laboratory
CHEM 4303	Molecular Biochemistry
CH E 4363	Biochemical Engineering
CH E 4364	Chemical Engineering Applications in Biological Systems

In addition, premedical students should select two remaining courses from the following list:

BIOL 3320	Cell Biology
BIOL 3416	Genetics
MBIO 3401	Principles of Microbiology

Premedical students should also take the MCAT in the spring of the year in which application to medical school will be made.

The profession of chemical engineering combines the principles of physical and chemical sciences with the discipline of engineering to solve modern technological problems and be of effective service to society. The chemical engineer is largely responsible for the continual development of new processes and new products that have a direct impact on improving the quality of life and the environment. To this end, the department provides a

broad-based program with individual, academic, and professional counseling.

The importance of professionalism in engineering cannot be overemphasized. Chemical engineering students are presented with a code of professional behavior and ethics at each academic level and are required to adhere to it. Copies of these codes are available on request.

The senior-year courses, as indicated in the list of courses in chemical engineering, are taught as a year of professional practice. Professional behavior constitutes a significant portion of grade evaluation in these courses.

The chemical engineering curriculum is sufficiently general that upon completion the student is prepared for a career in any of the process industries that involve chemical transformations. Employment opportunities cover a wide spectrum that includes, among others, petroleum refining, petroleum production, plastics production, basic chemicals, petrochemicals, pharmaceuticals, metal production, textiles, semiconductors, and various biomedical and biological specialties. Many chemical engineers also are directly involved in the design of systems to minimize pollution of our environment or are active with governmental regulatory agencies that set environmental standards.

Continuing advances in the practice of chemical engineering include extensive use of computer simulation and computer control of chemical processes. The Department of Chemical Engineering at Texas Tech has well-established programs in both of these areas. All chemical engineering students must have access to a personal computer running the Windows operating system, including Microsoft Word, Microsoft Excel, and MatLab software. Many on-campus classes have their own Internet sites, and some classes are available only on the Internet. For this reason, access to an Internet provider is strongly recommended.

To be prepared for professional training as well as to practice chemical engineering professionally, it is essential that the prospective engineer have a good background in the physical sciences, namely mathematics, physics, and chemistry, in addition to the engineering sciences. Summer experience in a chemical processing industry is strongly recommended as part of the preparation for professional practice. To illustrate the application of engineering principles, visits to processing installations may be required as part of academic course work.

In accord with the Dynamic Enrollment Management Plan of the College of Engineering, the progress of each chemical engineering student is carefully monitored to ensure that all prerequisites for upper-level courses are satisfied, and that degree requirements will be met in a timely manner. A grade of C or better is required in any course applied toward the B.S.Ch.E. degree. The department uses outcome assessment to monitor quality. Students should expect periodic assessment

of technical competence beyond course grades. All seniors are required to pass a mock FE exam with a grade of 50 or better or pass C E 4101 with a grade of C or better prior to graduation.

Students earning a grade lower than a C in any course will be required to meet with their advisor before the start of the next semester. Any course or prerequisite completed with an unsatisfactory grade must be repeated. Students who have not achieved a C or better after two attempts (including withdrawals) in a course must reapply for admission to the program.

Students transferring into this department from other institutions or from another department at Texas Tech must have an overall 2.0 GPA or better, as well as a 2.0 GPA or better in all science, mathematics, and engineering courses. All grades assigned in the matriculation of these courses will be included in the computation of GPA.

In addition to scholarships offered through the university's Financial Aid Office and the College of Engineering, the Chemical Engineering Department also offers scholarships to qualified students.

The first table on this page 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.

The department also offers a combined Bachelor of Science and Master of Science curriculum in which completion of degree requirements leads to the award of two degrees. The 10-semester sequence of required courses is shown on the next page.

The next page also gives a 10-semester sequence for the joint chemical engineering and computer science B.S. degrees. The courses in the table are required and must be taken in the order shown. The remaining Core Curriculum requirements and chemistry electives can be taken as the student's load permits. Several substitutions are made in the B.S.Ch.E. curriculum: CS 1411 is substituted for CH E 1305, seven of the CS hours at the junior level or higher are substituted for CH E 3330 and for four hours of chemistry electives, and I E 3301 is counted toward the core curriculum Group and Individual Behavior requirement. Several substitutions are also made in the B.S.C.S. curriculum: CH E 2306 is substituted for ENGL 2311 and COMS 3358, CH E 3343 is substituted for the Math. Prob. & Stat. elective, CH E 3353/4153 are substituted for a computer science elective, CH E 4381 is substituted for a computer science elective, and two required CH E courses at the junior level or higher are substituted for the technical or professional development electives. Oral communication is included in CH E 2306 and 4555. Writing intensive courses include CH E 2306, 3232, 4232, and 4555.

Graduate Program / Chemical Engineering

The master's program is a structured program requiring five core courses (see graduate course descriptions). 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 course work, exclusive of thesis and seminar, are required for the master's degree. In addition, a final oral exam in defense of the completed thesis will be administered by the candidate's thesis committee.

The master's program may also be completed without a thesis. Entry into the nonthesis option must be approved by the departmental graduate committee. This program is intended for graduate students in the college-sponsored International Exchange program and for new students with more than five years industrial experience. Graduate students in this nonthesis option are required to take 36 credit hours of graduate course work, exclusive of semi-

nars. The course work for each student must meet approval of the department's graduate committee. Students must obtain approval from the department before registering for required graduate courses.

In addition to regulations established by the Graduate School, applicants for candidacy for the doctor's degree are required to demonstrate high proficiency in a single research area. Certification of the research proficiency will be based on a record of accomplished research that demonstrates the required level of competence in the research area. The record must be substantiated by published articles, final research reports, or papers presented at meetings of learned societies.

All master's students are required to register for CH E 5121, and doctoral candidates are required to register for CH E 7121 each long semester unless exempted by the chairperson. Seminar courses do not count toward fulfilling credit hour requirements.

Bachelor of Science in Chemical Engineering Curriculum

		FIRST YEAR	
	<i>Fall</i>		<i>Spring</i>
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calc. I*	3	MATH 1352, Calc. II	3
CHEM 1307 & 1107, Prin. of Chem. I**	4	CHEM 1308 & 1108, Prin. of Chem. II	4
CH E 1121, Chem. Eng. Seminar	1	CH E 1305, Eng. Anal.	3
TOTAL	11	PHYS 1408 Prin. of Phys. I***	4
		TOTAL	17
		SECOND YEAR	
	<i>Fall</i>		<i>Spring</i>
MATH 2350, Calc. III	3	MATH 3350, Adv. Math. for Engr. I	3
CHEM 3305 & 3105, Org. Chem. I	4	CH E 2306, Expos. Tech. Info.	3
CH E 2410, Intro. to Chem. Proc.	4	CH E 2421, Chem. Eng. Thermo. I	4
PHYS 2401, Prin. of Phys. II	4	TOTAL	10
TOTAL	15		
		THIRD YEAR	
	<i>Fall</i>		<i>Spring</i>
CH E 3315, Fluid Mechanics	3	CHEM 3308 & 3108, Phys. Chem. II	4
CH E 3326, Heat Transfer	3	CH E 3232, Transport Lab.	2
CH E 3322, Chem. Eng. Thermo. II	3	CH E 3330, Engr. Mat. Sci.	3
TOTAL	9	CH E 3341, Mass-Trans. Oper.	3
		CH E 3353, Process Control	3
		TOTAL	15
		FOURTH YEAR	
	<i>Fall</i>		<i>Spring</i>
CH E 4232, Unit Oper. Lab.	2	CH E 4153, Process Control Lab.	1
CH E 4323, Chem. Reaction Eng.	3	CH E 4555, Chem. Proc. Des. & Sim.	5
Chemical Engineering Elective	3	Chemical Engineering Elective	3
I E 3301 Eng. Econ. Anal.	3	TOTAL	9
TOTAL	11		
Critical-Path Hours—97			
Additional Requirements:			
American Government	6		
American History	6		
Visual and Performing Arts†	3		
Humanities/Multicultural††	3		
Chemistry Electives#	8		
Group or Individual Behavior†	3		

Minimum hours required for graduation—126.

* Students who are not adequately prepared for calculus must take appropriate courses (MATH 0301, 0302, 1320, 1321, 1350) before enrolling in MATH 1351.

** Students who are not adequately prepared for chemistry must take CHEM 1301 before enrolling in CHEM 1307.

*** Students who are not adequately prepared for physics must take PHYS 1304 before enrolling in PHYS 1408. A high school physics course and a year of calculus are recommended as adequate preparation.

† Choose from Core Curriculum requirements.

†† Select a course that is simultaneously listed in the humanities section of the Core Curriculum requirements and the section specifying courses that satisfy the multicultural requirement.

Must include two laboratory courses from approved sophomore or higher courses.

Curriculum for Combined Bachelor of Science and Master of Science in Chemical Engineering

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calc. I*	3	MATH 1352, Calc. II	3
CHEM 1307 & 1107, Chem. I**	4	CHEM 1308 & 1108, Chem. II	4
CH E 1121, Chem. Eng. Seminar	1	CH E 1305, Eng. Anal.	3
TOTAL	11	PHYS 1408 Prin. of Phys. I***	4
		TOTAL	17

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calc. III	3	MATH 3350, Adv. Math. for Engr. I	3
CHEM 3305 & 3105, Org. Chem. I	4	CH E 2306, Expos. Tech. Info.	3
CH E 2410, Intro. to Chem. Proc.	4	CH E 2421, Chem. Eng. Thermo. I	4
PHYS 2401, Prin. of Phys. II	4	TOTAL	10
TOTAL	15		

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
CH E 3315, Fluid Mechanics	3	CHEM 3308 & 3108, Chem. II	4
CH E 3326, Heat Transfer	3	CH E 3232, Transport Lab.	2
CH E 3322, Chem. Eng. Thermo. II	3	CH E 3330, Engr. Mat. Sci.	3
TOTAL	9	CH E 3341, Mass-Trans. Oper.	3
		CH E 3353, Process Control	3
		TOTAL	15

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
CH E 4232, Unit Oper. Lab.	2	CH E 4153, Process Control Lab.	1
CH E 4323, Chem. Reaction Eng.	3	CH E 4555, Chem. Proc.	5
Graduate Core Course+	3	Graduate Core Course+	3
I E 3301 Engr. Econ. Anal.	3	Graduate Core Course+	3
TOTAL	11	TOTAL	12

FIFTH YEAR			
<i>Fall</i>		<i>Spring</i>	
CH E 5121, Graduate Seminar	1	CH E 5121, Graduate Seminar	1
Graduate Core Course+	3	Graduate Elective Course++	3
Graduate Core Course+	3	Graduate Elective Course++	3
Graduate Elective Course++	3	CH E 6000, Master's Thesis	3
CH E 6000, Master's Thesis	3	TOTAL	10
TOTAL	13		

Critical-Path Hours—118

Additional Requirements:

American Government	6
American History	6
Visual and Performing Arts†	3
Humanities/Multicultural††	3
Chemistry Electives#	8
Group or Individual Behavior†	3

Minimum hours required for graduation—152.

* Students who are not adequately prepared for calculus must take appropriate courses (MATH 0301, 0302, 1320, 1321, 1350) before enrolling in MATH 1351.

** Students who are not adequately prepared for chemistry must take CHEM 1301 before enrolling in CHEM 1307.

*** Students who are not adequately prepared for physics must take PHYS 1304 before enrolling in PHYS 1408. A high school physics course and a year of calculus are recommended as adequate preparation.

† Choose from Core Curriculum requirements.

†† Select a course that is simultaneously listed in the humanities section of the Core Curriculum requirements and the section specifying courses that satisfy the multicultural requirement.

Must include two laboratory courses from approved sophomore or higher courses.

+ Choose from the five graduate core courses: CH E 5310, 5312, 5321, 5323, or 5343.

++ One graduate level elective must be a CH E course, the other two may be in any area of engineering, science, or mathematics.

Curriculum for Joint Bachelor of Science in Chemical Engineering and Computer Science

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. Coll. Rhetoric	3	MATH 1352, Calc. II	3
MATH 1351, Calc. I*	3	CHEM 1308 & 1108, Chem. II	4
CHEM 1307 & 1107, Chem. I**	4	PHYS 1408 Prin. of Phys. I***	4
CH E 1121, Chem. Eng. Seminar	1	C S 1412 Programming Princ. II	4
C S 1411, Programming Princ. I	4	TOTAL	15
TOTAL	15		

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calc. III	3	MATH 2360, Linear Algebra	3
PHYS 2401, Prin. of Phys. II	4	CHEM 3305 & 3105, Org. Chem. I	4
CH E 2410, Intro. to Chem. Proc.	4	CH E 2421, Chem. Eng. Thermo. I	4
C S 2413, Data Structures	4	C S 2382, Discrete Comp. Struct.	3
TOTAL	15	ENGL 1302, English II	3
		TOTAL	17

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 3350, Adv. Math. for Engr. I	3	CHEM 3308 & 3108, Phys. Chem. II	4
CH E 3315, Fluid Mechanics	3	CH E 2306, Expos. Tech. Info.	3
CH E 3322, Chem. Eng. Thermo. II	3	CH E 3341, Mass-Trans. Oper.	3
C S 2371, Intro. Digital Design	3	C S 2350, Com. Org. Assem. Lang.	3
TOTAL	12	TOTAL	13

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
CH E 3326, Heat Transfer	3	CH E 3232, Transport Lab.	2
C S 3361, Concepts Prog. Lang.	3	CH E 3343, Eng. Exp.	3
C S 3383, Theory Automata	3	CH E 3353, Process Control	3
Chemistry Elective#	4	C S 3352, Intro. Systems Program.	3
TOTAL	13	I E 3301, Eng. Economics	3
		TOTAL	14

FIFTH YEAR			
<i>Fall</i>		<i>Spring</i>	
CH E 4232, Unit Oper. Lab.	2	CH E 4153, Process Control Lab.	1
CH E 4353, Reactor Design	3	CH E 4381, Num. Methods	3
C S 3364, Design & Anal. Algor.	3	CH E 4555, Chem. Proc. Des. Sim.	5
C S 3365, Software Eng.	3	C S 3375, Comp. Architecture	3
TOTAL	11	TOTAL	12

Critical-Path Hours—137

Additional Requirements:

American Government	6
American History	6
Visual and Performing Arts†	3
Humanities/Multicultural††	3

Minimum hours required for graduation—155.

* Students who are not adequately prepared for calculus must take appropriate courses (MATH 0301, 0302, 1320, 1321, 1350) before enrolling in MATH 1351.

** Students who are not adequately prepared for chemistry must take CHEM 1301 before enrolling in CHEM 1307.

*** Students who are not adequately prepared for physics must take PHYS 1304 before enrolling in PHYS 1408. A high school physics course and a year of calculus are recommended as adequate preparation.

† Choose from Core Curriculum requirements.

†† Select a course that is simultaneously listed in the humanities section of the Core Curriculum requirements and the section specifying courses that satisfy the multicultural requirement.

Must include on laboratory course from approved sophomore or higher courses.

Chemical Engineering (CH E)*(To interpret course descriptions, see pg. 10.)***Undergraduate Courses**

1121. **Chemical Engineering Seminar (1:1:0).** Readings and discussion of the chemical engineering profession; history, ethics, career paths, and research opportunities.
1305. **Engineering Analysis I (3:2:3).** Synthesis and analysis of typical engineering problems emphasizing the use of computing tools, spreadsheet and compiler programming.
2306. **Exposition of Technical Information (3:1:6).** Prerequisite: ENGL 1302. Organization and presentation of experimental data, and research interpretation and conclusions. Computer-aided preparation of engineering reports. (Writing Intensive)
2410. **Introduction to Chemical Process (4:4:0).** Prerequisite: CHEM 1307, PHYS 1308, MATH 1351, ENGL 1301. Units and conversions, process variables, material and energy balances, process flow sheet analysis, phase equilibrium, elementary transient balances.
2421. **Chemical Engineering Thermodynamics I (4:4:0).** Prerequisite: CH E 2410; corequisite: MATH 2350. Properties of pure substances, ideal gas behavior, heat effects in industrial reactions, first and second law analyses, energy conversion and power cycles.
3232. **Chemical Engineering Transport Laboratory (2:0:6).** Prerequisite: CH E 3315 and 3326; corequisite: CH E 3341. Experiments in laminar and turbulent flow, fluid metering, energy transport, and mass separation operations; statistical analysis of data.
3315. **Fluid Mechanics (3:3:0).** Prerequisite: CHE 2411, and MATH 3350. Principles of momentum transport. Application to laminar and turbulent flow, metering, porous media, and settling.
3322. **Chemical Engineering Thermodynamics II (3:3:0).** Prerequisite: CHE 2421. Solution thermodynamics, phase and chemical equilibria, analysis of processes.
3325. **Intermediate Transport Phenomena (3:3:0).** Prerequisite: CHE 3315, CHE 3326. Study of advanced topics in transport phenomena including momentum transport in non-Newtonian coupling of momentum transport with heat and mass transport.
3326. **Heat Transfer (3:3:0).** Prerequisite: CHE 2421 and MATH 3350. Principles of energy transport. Application to heat conduction, convection, and radiation. Design and performance of heat exchangers and furnaces.
3330. **Engineering Materials Science (3:3:0).** Prerequisite: CH E 3322 or CHEM 3305 and 3307. Engineering properties of metals, ceramics, and polymers; molecular, crystal, and microstructure configurations; selection of materials for applications.
3341. **Mass-Transfer Operations (3:3:3).** Prerequisite: CHE 3322; Corequisite: CH E 3141. Theory and practice of mass transfer. Particular emphasis on the operations of distillation, absorption, and extraction.
3343. **Engineering Experimentation (3:3:0).** Prerequisite: Junior standing in physical science or engineering. Strategy in experimentation; planning efficient experiments; analysis of data and interpretation and presentation of results.
3353. **Process Control (3:3:0).** Prerequisite: CH E 3315 and 3326 and MATH 3350 or 3354. Study of the principles of process dynamics and control and their applications to feedback control.
4000. **Special Problems in Chemical Engineering (V1-6).** Prerequisite: Departmental approval. Individual studies in chemical engineering areas of special interest. May be repeated for credit.
4121. **Chemical Engineering Research Seminar (1:1:0).** Prerequisite: Senior standing in chemical engineering. External speakers focus on their current research in chemical engineering and related fields.
4153. **Process Control Laboratory (1:0:3).** Prerequisite: CHE 3353. Experiments with control equipment and the minicomputer. Professional practice course.
4232. **Unit Operations Laboratory (2:0:6).** Prerequisite: Senior standing or consent of instructor. Laboratory experiments illustrating the basic principles of unit operations. Includes instruction on experimental methods, equipment scale up, and technical communication. Professional practice course.
4323. **Chemical Reaction Engineering (3:3:0).** Prerequisite: CHE 3322 and 3326. An introduction to the kinetics of chemical conversion processes and the design of chemical reactors.
4331. **Corrosion Science and Engineering (3:3:0).** Prerequisite: Senior standing in engineering or consent of instructor. Study of corrosion management technologies.
4340. **Polymer Processing (3:3:0).** Prerequisite: CH E 3315, MATH 2350. Polymer processing and fabrication technology for thermoplastic and thermoset polymers: The science and art of manufacturing with plastic materials.
4341. **Polymerization Engineering (3:3:0).** Prerequisite: CHEM 2305 and MATH 2350. Polymerization reactions, mechanisms and kinetics, control of properties through reaction and processing, polymerization reactor and process design, degradation reactions.
4342. **Polymer Physics and Engineering (3:3:0).** Fundamentals of polymer science and engineering. Solution properties, chain conformation and molecular mass characterization. Rubber elasticity and viscoelastic behavior. Crystalline polymers and morphology.
4344. **Polymers and Materials Laboratory (3:1:6).** Corequisite: CH E 3330, ME 3311, or MTEC 3441. Synthesis and properties of materials including polymers, polymerization, transitions, phase separation, mechanical properties, and processing.
4345. **Dynamics of Polymeric and Nonlinear Fluids (3:3:0).** Prerequisite: CH E 3315. Observed phenomena in polymeric and multicomponent flow systems; viscometry and viscoelastic measurements for nonlinear fluids; rheological models; analytical solutions to flow problems; dimensional analysis.
4346. **Polymer Viscoelasticity (3:3:0).** Prerequisite: MATH 3350 and CH E 3330 or consent of instructor. Linear viscoelasticity, Boltzmann superposition, experimental methods, molecular theory, and mechanical properties of solid polymers.
4353. **Process Control (3:3:0).** Prerequisite: CHE 3323, 3341. Study of the principles of process dynamics and control and their applications to feedback control. Professional practice course.
4360. **Advanced Industrial Waste Treatment (3:3:0).** Prerequisite: Senior standing in chemical engineering or consent of instructor. Advanced methods for treating industrial wastes and remediating contaminated sites of increasing importance to industry and society.
4363. **Biochemical Engineering (3:3:0).** Prerequisite: CHE 4323. Introduction to biochemical reaction engineering and separations. Kinetics of biomass and product information, and substrate utilization. Biotransport phenomena, bioenergetics, downstream separation and purification processes.
4364. **Chemical Engineering Applications in Biological Systems (3:3:0).** Prerequisite: MATH 3350 or 3354. Transport phenomena and chemical reactions at the molecular and cellular level in biological systems.
4375. **Chemical Process Safety (3:3:0).** Prerequisite: CHE 2321 and 3226. Case studies in emergency response, hazard evaluation, accident investigation, toxic releases, atmospheric dispersion, fires and explosion types.
4371. **Energy Resources, Processing, and Utilization (3:3:0).** Prerequisite: Senior standing in science or engineering or consent of instructor. The cost, availability, and processing requirements of energy resources used by individuals and society.
4381. **Numerical Techniques for Chemical Engineering Problems (3:3:0).** Prerequisite: MATH 3350. Numerical methods for integration, solution of systems of algebraic equations, initial- and boundary-value problems, and optimization.
4384. **Process Dynamics and Automatic Control (3:3:0).** Prerequisite: CH E 3353. Study of the transient behavior of process systems; analysis methods; synthesis and simulation of digital control systems; process model-based control, optimization, and statistical process control.
4555. **Chemical Process Design and Simulation (5:3:6).** Prerequisite: CH E 3341, CH E 4323, IE 3301 or equivalent. Design of chemical processes and equipment using computer simulation, flow sheeting, optimization, and process synthesis techniques.

Graduate Courses

The master's program is a structured program requiring the five core courses denoted below by asterisks.

5000. **Advanced Topics in Chemical Engineering (V1-6).** Prerequisite: Approval of department chairperson. Individual study of topics of current interest under the guidance of a member of the staff. May be repeated for credit on different topics.

5121. **Graduate Seminar (1:1:0).** Discussions of chemical engineering research and its relationship to the philosophy and art of chemical engineering. Required of all chemical engineering graduate students. May be repeated for credit.
- *5310. **Advanced Chemical Engineering Techniques (3:3:0).** Application of ordinary and partial differential equations for solution of mass, momentum, and/or energy transfer and transport problems. Emphasis is on the mathematical analysis of unsteady state systems and chemical-reaction systems: models, solutions, and model validation.
- *5312. **Fluid Transport Principles and Analysis (3:3:0).** Fundamental relations governing mass, momentum, and energy transfer within fluids, with special emphasis on simultaneous transport, process applications, and numerical methods of analysis.
5314. **Process Dynamics and Automatic Control (3:3:0).** Study of the transient behavior of process systems: methods of analysis; synthesis and simulation of digital control systems; introduction to process model-based control, optimization, and statistical process control.
5316. **Linear Chemical Process Control Theory (3:3:0).** Prerequisite: CH E 4353, 5310, or equivalent. Linear systems theory is employed to analyze models of chemical and chemical-related processes and to design stable controllers.
5317. **Chemical Process Model-Based Control (3:3:0).** Prerequisite: CH E 5316 or equivalent. Different model descriptions of chemical and related processes are identified and analyzed for the synthesis of predictive, stable, and optimal control systems.
- *5321. **Advanced Chemical Engineering Thermodynamics (3:3:0).** In-depth study of fundamental laws of thermodynamics, property relations for pure material and mixtures, and phase and chemical equilibrium principles.
- *5323. **Digital Computation for Chemical Engineers (3:3:0).** The development of current numerical methods for application to modeling of chemical engineering systems. Primary emphasis is placed upon steady state and unsteady state chemical reaction systems.
5335. **Advanced Transport Phenomena (3:3:0).** Prerequisite: CH E 5312 and 5310 or consent of instructor. Tensor analysis; partial differential equations for multicomponent fluid mixtures; two phase flow problems; and interfacial transport.
5340. **Polymer Processing (3:3:0).** Polymer processing and fabrication technology for thermoplastic and thermoset polymers: The science and art of manufacturing with plastic materials.
5341. **Polymer Chemistry and Processing (3:3:0).** Polymerization reactions, mechanisms, and kinetics, large-scale synthesis, scope of polymer processing, and fabrication technology.
5342. **Polymer Physics and Engineering (3:3:0).** Fundamentals of polymer science and engineering. Solution properties, chain conformation and molecular mass characterization. Rubber elasticity and viscoelastic behavior. Crystalline polymers and morphology.
- *5343. **Reaction Kinetics (3:3:0).** Analysis and design of chemical reactor operations with multiple reactions; semibatch operations and other complex reactor configurations. Determination of kinetic parameters from operating data. Economic-based optimization, characterization and modeling of non-ideal reactors.
5344. **Polymers and Materials Laboratory (3:2:3).** Synthesis and properties of materials, including polymers, polymerization, transitions, phase separation, mechanical properties, and processing.
5345. **Dynamics of Polymeric and Nonlinear Fluids (3:3:0).** Observed phenomena in polymeric and multicomponent flow systems; viscometry and viscoelastic measurements for nonlinear fluids; rheological models; analytical solutions to flow problems; and dimensional analysis.
5346. **Polymer Viscoelasticity (3:3:0).** Linear viscoelasticity, Boltzmann superposition, experimental methods, molecular theory, and mechanical properties of solid polymers.
5360. **Advanced Industrial Waste Treatment (3:3:0).** Advanced methods for treating industrial wastes and remediating previously contaminated sites are of increasing importance to industry and to society. This course will detail the ways to evaluate the many proposed treatment methods. They will be evaluated in terms of science, engineering science, operability, costs, and credentials of the developer. Actual proposed processes will be used as examples.
5363. **Biochemical Engineering (3:3:0).** Introduction to biochemical reaction engineering and separations. Kinetics of biomass and product information and substrate utilization. Biotransport phenomena, bioenergetics, downstream separation, and purification process.
5364. **Chemical Engineering Applications in Biological Systems (3:3:0).** Prerequisite: MATH 3350 or 3354. Transport phenomena and chemical reactions at the molecular and cellular level in biological systems.
5615. **Topics in Process Engineering and Intelligent Control (6:3:9).** Newly developed concepts in the design, analysis, and control of chemical and biochemical processes, including advanced methods in chemical kinetics and catalysis, modeling, and intelligent control concepts.
5635. **Advanced Topics in Transport Phenomena (6:3:9).** Current research topics in transport phenomena, including turbulent flow characterization, atmospheric chemistry and transport, and rheology, with an emphasis on computational modeling.
5640. **Topics in Polymer and Materials Science (6:3:9).** Current research topics and laboratory experience in the area of polymers, composites, rheology, and materials science.
5660. **Advanced Bioengineering (6:3:9).** In-depth investigation of current topics of importance in bioengineering, including theoretical, experimental and computational methods for studying biological membranes and advanced bioprocess engineering.
6000. **Master's Thesis (V1-12).**
7000. **Research (V1-12).**
7121. **Doctoral Seminar (1).** Open discussions of recent advanced findings in any field of endeavor, with special attention to their relationship to the philosophy of chemical engineering. May be repeated for credit.
8000. **Doctor's Dissertation (V1-12).**

Department of Civil Engineering

Faculty

H. Scott Norville, Interim Chairperson

Horn Professor: Mehta; *Professors:* Borrelli, Fedler, Gregory, Kiesling, Letchford, Norville, Rainwater, J. Smith, Swift, Sweazy, and Thompson; *Associate Professors:* Jackson, Jayawickrama, Ramsey, D. Smith, and Vann; *Assistant Professors:* Budek, McEnery, Morse, Phelan, and Senadheera; *Research Assistant Professors:* Gill and McDonald.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Civil Engineering
- Bachelor of Science in Environmental Engineering
- Master of Science in Civil Engineering
- Master of Environmental Engineering
- Master of Science in Environmental Technology Management
- Doctor of Philosophy in Civil Engineering

The undergraduate requirements for the B.S. in Civil Engineering degree and the requirements for the Master of Environmental Engineering degree are given in the accompanying curriculum tables.

The mission of the department has three elements:

- To provide excellent instruction and design experiences essential for graduates to enter the practice of civil engineering and pursue lifelong professional development;
- To provide research opportunities for students that generate, communicate, and apply new knowledge for the betterment of society; and
- To foster a spirit of service and leadership among students and faculty and assist the public in addressing issues concerning using our resources, protecting our environment, and developing our infrastructure.

To accomplish the goals of the mission, faculty members established the following objectives based on input from our constituencies:

- To identify, reassess, and impart essential knowledge elements, tools, and skills necessary for civil engineering graduates to become successful engineers and lifelong learners;
- To continually strive to improve student performance and graduation rates;
- To encourage students to become licensed professional engineers;
- To provide a meaningful research experience for our students;
- To promote active and effective participation of students and faculty in service activities on campus and local, regional, and national levels;
- To balance faculty efforts among teaching, research, and service; and
- To instill pride and loyalty in our graduates that will result in a natural desire to support the department through service and monetary gifts.

As the desired outcomes of the program, the students will have:

- Ability to understand and apply mathematics, science, and engineering science to solve engineering problems;
- Ability to design modern engineering systems;
- Experience in working on multidisciplinary teams;

- Understanding of the importance of lifelong learning in professional practice;
- Ability to communicate by written, oral, and graphical means;
- Opportunities for undergraduate research experiences for as many students as possible within funding limitations;
- Leadership skills needed for professional practice and community service;

- Awareness of professional ethics expected in professional practice;
- A balanced view of the importance of academic endeavors, research, and professional and public service; and
- Membership and active participation in professional and honor societies such as ASCE, TSPE, Chi Epsilon, and Tau Beta Pi.

Undergraduate Program

The Civil Engineering Department supports the concept of the Dynamic Enrollment Management Plan and has adopted the following version of it. Prior to the third year of the curriculum shown below and before enrolling in subsequent civil engineering courses, each student must file an application for admission to the civil engineering degree program by submitting a degree plan. To obtain approval of the degree plan, students must acquire a C or better in all courses. To graduate, the student must maintain the above standards in subsequent courses, complete the specified minimum number of hours in each of these subject areas, and have a C or better in all degree program courses. Changes in the degree plan or exceptions to the above conditions require written approval of the chairperson of the Department of Civil Engineering. Forms and information pertaining to departmental regulations are available in the Department of Civil Engineering office.

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.

Bachelor of Science in Civil Engineering Curriculum

		FIRST YEAR	
		<i>Fall</i>	<i>Spring</i>
MATH 1351, Calc. I	3	MATH 1352, Calc. II	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
U.S. History	3	C E 1305, Engr. Anal. I	3
C E 1130, Civil Engr. Seminar I	1	PHYS 1408, Prin. of Phys. I	4
E GR 1307, Engr. Graphics	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1307, Prin. of Chem. I	3	CHEM 1108, Prin. of Chem. II (Lab.)	1
CHEM 1107, Prin. of Chem. I (Lab.)	1	TOTAL	17
TOTAL	17		
		SECOND YEAR	
		<i>Fall</i>	<i>Spring</i>
MATH 2350, Calc. III	3	MATH 3350, Math. for Engrs. I	3
PHYS 2401, Prin. of Phys. II	4	M E 2322, Eng. Thermo. I	3
C E 2301, Statics	3	C E 3303, Mech. of Solids	3
CTEC 2301, Surveying	3	C E 3305, Mech. of Fluids	3
POLS 1301, Amer. Govt., Org.	3	Statistics*	3
C E 2101, Construction Mats.	1	Technical Writing++	3
TOTAL	17	TOTAL	18
		THIRD YEAR	
		<i>Fall</i>	<i>Spring</i>
C E 3440, Struc. Anal. I	4	C E 3372, Water Sys. Des.	3
C E 3354, Intro. to Hydrology	3	C E 3341, Prin. of Struc. Des.	3
C E 3309, Envir. Engr. I	3	C E 3302, Dynamics	3
C E 3171, Envir. Engr. Lab.	1	E E 3302, Elec. Sys. Anal.	3
C E 3105, Mech. of Fluids Lab.	1	POLS 2302, Amer. Pub. Pol.	3
C E 3103, Mech. of Solids Lab.	1	TOTAL	15
C E 3321, Intro. to Geotech. Engr.	3		
C E 3121, Geotech. Engr. Lab.	1		
TOTAL	17		
		FOURTH YEAR	
		<i>Fall</i>	<i>Spring</i>
C E 4343, Des. Concr. Struct.	3	C E 4330, Des. Engr. Sys.	3
C E 4292, Engr. Ethics & Prof.	2	C E 4293, Engr. Law	2
I E 3301, Engr. Eco. Anal.	3	Elective (Oral Comm.)+	3
U.S. History	3	Elective (Humanities)†	3
C E 4361, Transport. Engr.	3	Elective (Humanities)†	3
Elective (Design)+	3	Elective (Design)+	3
TOTAL	17	TOTAL	17

Minimum hours required for graduation—135.

* Select from I E 3341 or MATH 3342.

† Humanities electives should satisfy multicultural and visual and performing arts requirements of the Core Curriculum. Obtain departmental approval before enrolling in courses to satisfy humanities electives.

+ Electives shall be selected as follows:

Design—choose from C E 4321, 4342, 4353, ENVE 4391, 4399.

Oral Communications—choose from Core Curriculum requirements or others approved by the department.

++ Select from ENGL 2311 or 3365, PETR 3308, I E 2331.

Graduate Program / Civil Engineering

For master's and doctoral degrees in civil engineering, students may choose one or more of several areas of specialization including environmental engineering, water resources engineering, structural engineering, wind engineering, engineering mechanics, geoenvironmental engineering, geotechnical engineering, and highway engineering.

Students with a baccalaureate degree in engineering may enter the graduate program by having their entrance credentials evaluated by both the Graduate School and the department. For applicants with a baccalaureate degree in science or mathematics, certain leveling courses in engineering normally are required. Persons entering the graduate program in civil engineering should consult with a graduate advisor.

Two general plans of study are available for the Master of Science degree: a 30-hour plan that includes 6 hours credit for the master's thesis and a 36-hour plan that includes 3 hours credit for the master's report. The decision regarding which plan to follow is made jointly by the student and faculty advisor.

The master's degree in environmental engineering is an ABET accredited freshman-to-master's degree program specializing in environmental engineering. It is a design-oriented program that culminates in a comprehensive design problem rather than a research-oriented thesis.

Students in the master's program in environmental technology management may choose one or more of six areas of specialization: environmental technology management, land quality, water quality, hazardous and toxic waste, solid waste, and air quality. Course selection will be from several engineering and science disciplines. Certain leveling courses may be required for students entering the environmental technology and management program with a baccalaureate degree in science, mathematics, or technology. For acceptance into the degree program, students must have their entrance credentials evaluated by both the Graduate School and the department. The required undergraduate course prerequisites are MATH 1351, 2350, BIOL 1403, CHEM 1307 & 1107, 1308 & 1108, and ECO 2301 or their equivalents. In addition, students should have the computer skills necessary to do the analytical work required in the program.

All graduate students are required to register for C E 5101, each long semester unless exempted by the chairperson. Seminar

courses do not count toward fulfilling credit hour requirements for the master's and doctoral programs.

Master of Environmental Engineering. The traditional path to becoming an environmental engineer involves completing the B.S.C.E. and M.S.C.E. (with environmental engineering specialization) degrees or B.S.Ch.E. and M.S.Ch.E. degrees. Although the traditional path produces graduates in high demand by employers, certain parts of the environmental engineering spectrum demand graduates with a more specialized degree program. The M.Env.E. program is a five-year "freshman-to-master's degree" program. The M.Env.E. program provides graduates with strong preparation in biology, chemistry, and environmental engineering. Students choosing the M.Env.E. degree are B.S.C.E. majors until formally admitted to the M.Env.E. program at the end of the second curriculum year. Students must pass the Graduate Record Examination and meet the university's graduate school admission requirements before enrolling in graduate level courses.

The specific educational objectives were established during the original development of the curriculum and program standards and may be stated as follows:

- The graduates of the M.Env.E. program will be prepared for environmental engineering practice through a curriculum that stresses design and application of engineering principles, rather than research.
- The inclusion of a broad background in biology, chemistry, and geology will make M.Env.E. graduates able to interact directly with environmental scientists in regulatory agencies, consulting firms, and industrial organizations.
- The M.Env.E. graduates will be attractive employees for petrochemical industries, as well as more traditional consulting and regulatory positions, through combining basic engineering principles with a strong environmental engineering foundation.

The Engineering Criteria 2000 established requirements for major focus areas and proficiencies to be included in an accredited program in environmental engineering. The major focus areas of water supply and resources, environmental systems modeling, environmental chemistry, wastewater management, solid waste management, hazardous waste management, air pollution control, and environmental health are included in specific advanced and graduate level courses within the curriculum. Further information about the curriculum and assessment procedures can be found at www.ce.ttu.edu.

Master of Environmental Engineering Curriculum

FIRST YEAR			
Fall		Spring	
MATH 1351, Calc. I	3	MATH 1352, Calc. II	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Ess. of Coll. Rhet.	3
E GR 1307, Engr. Graphics	3	C E 1305, Engr. Anal. I	3
CHEM 1307, Prin. of Chem. I	3	CHEM 1308, Prin. of Chem. II	3
CHEM 1107, Prin. of Chem. I (Lab.)	1	CHEM 1108, Prin. of Chem. II (Lab.)	1
POLS 1301, Amer. Govt. Org.	3	HIST 2300, U.S. Hist. to 1877	3
ENVE 1100, Env. Eng. Seminar	1	TOTAL	16
TOTAL	17		

SECOND YEAR			
Fall		Spring	
MATH 2350, Calc. III	3	PHYS 2401, Prin. of Phys. II	4
PHYS 1408, Prin. of Phys. I	4	CHEM 3306, Org. Chem. II	3
CHEM 3305, Org. Chemistry I	3	C E 3305, Mech. of Fluids	3
C E 2301, Statics	3	BIOL 1404, Biology II	4
BIOL 1403, Biology I	4	HIST 2301, U.S. Hist. Since 1877	3
TOTAL	17	TOTAL	17

THIRD YEAR			
Fall		Spring	
Statistics*	3	MATH 3350, Differential Equations.	3
ENVE 3314, Chemodynamics I	3	Elective****†	3-4
C E 3303, Mech. of Solids	3	C E 3372, Water Systems Design	3
C E 3354, Engr. Hydrology	3	Indiv.-Group Behavior Elective**	3
PETR 3308, Engr. Communication	3	Engineering Elective***	3
C E 3105, Mech. of Fluids Lab.	1	TOTAL	15-16
TOTAL	16		

FOURTH YEAR			
Fall		Spring	
Visual-Perf. Art Elective†	3	Env. Science Elective††	3
POLS 2302, Amer. Pub. Policy	3	Humanities Elective+	3
ENVE 4390, Water-Wastewater	3	ENVE 4391, Adv. Water Treat.	3
ENVE 4399, Municipal WWTreat.	3	Technical Elective##	3
C E 4363, Groundwater Hydrology	3	C E 5393, Unit Processes Lab.#	3
C E 4292, Eng. Ethics and Prof.	2	TOTAL	15
TOTAL	17		

FIFTH YEAR			
Fall		Spring	
ENVE 5303, Air Poll. Ctr. Sys.#	3	ENVE 5304, Envir. Law and Pol.#	3
ENVE 5305, Env. Sys. Design I#	3	ENVE 5306, Env. Sys. Des. II#	3
I E 5306, Safety Engineering#	3	C E 5364, Groundwater Transp.#	3
Technical Elective##	3	C E 5395, Solid and Haz. Waste#	3
Technical Elective##	3	Technical Elective##	3
TOTAL	15	TOTAL	15

Minimum hours required for graduation—160.

* Select I E 3341 or MATH 3342.

** I E 3301 strongly recommended, other courses from Core Curriculum with advisor approval.

*** Select upper level engineering course, such as C E 3321, 4385, ENVE 4311, or others with advisor approval.

† Core Curriculum F could be used to meet the multicultural requirement.

†† Select environmental science course such as GEOL 1303 and 1101, MBIO 3400, or others with advisor approval.

+ Core Curriculum E should be used to meet multicultural requirement if F (above) was not.

Graduate course.

Choose graduate technical electives from the following: CE 5327, 5360, 5361, 5362, 5368, 5383, 5385, 5397, 5398, or others with advisor approval.

Civil Engineering (C E)*(To interpret course descriptions, see pg. 10.)***Undergraduate Courses**

1130. **Civil Engineering Seminar I (1:0:2).** Introduction to the practice of civil engineering.
1305. **Engineering Analysis I (3:3:0).** Corequisite: MATH 1351. Formulation development and presentation of solutions to typical engineering problems. An introduction to numerical analysis and various computer techniques.
2101. **Construction Materials Laboratory (1:0:3).** Corequisite: CE 1305. Laboratory determination and interpretation of engineering properties of construction materials including steel, concrete, aluminum, wood, and masonry.
2301. **Statics (3:3:0) [ENGR 2301].** Corequisite: MATH 1352 and PHYS 1408. Equilibrium of particles and rigid bodies, friction, centroids, and moments of inertia.
3103. **Mechanics of Solids Laboratory (1:0:3).** Prerequisite: CE 3303. Laboratory measurements and observation of behavior of solid materials.
3105. **Mechanics of Fluids Laboratory (1:0:3).** Prerequisite: CE 3305. Experimental studies of fluid behavior.
3121. **Geotechnical Engineering Laboratory (1:0:3).** Corequisite: CE 3321. Laboratory determination and engineering evaluation of the physical properties of soils.
3171. **Environmental Engineering Laboratory I (1:0:3).** Corequisite: CE 3309. Performance of standard analytical methods used to measure water and wastewater quality. Evaluation of limits to data produced by standard methods.
3302. **Dynamics (3:3:0).** Prerequisite: CE 2301; corequisite: MATH 2350. A study of motions of particles and rigid bodies.
3303. **Mechanics of Solids (3:3:0).** Prerequisite: CE 2301. Theory of stress and strain in elastic and inelastic bodies subject to various conditions of loading.
3305. **Mechanics of Fluids (3:3:0).** Prerequisite: CE 2301. Hydrostatics; dynamics of viscous and nonviscous fluids; resistance to flow; flow in pipes and open channels.
3309. **Environmental Engineering (3:3:0).** Prerequisite: CHEM 1308 and CE 3305. Corequisite: CE 3171. Water and wastewater characteristics and system design for water and wastewater treatment. Introduction of techniques of solid hazardous waste management and air pollution control.
3321. **Introduction to Geotechnical Engineering (3:3:0).** Prerequisite: CE 3303. Physical properties of soils; theories of soil strength, consolidation, and settlement; soil stabilization; slope stability analysis; selected design topics.
3341. **Principles of Structural Design (3:3:0).** Prerequisite: CE 3440. Fundamental principles of structural design with consideration for the selection of materials and systems. Team approach to design; oral and written presentations.
3354. **Engineering Hydrology (3:3:0).** Prerequisite: CE 3305. Analysis and design methods related to the occurrence and distribution of surface and groundwater; precipitation, infiltration, runoff, and frequency analysis.
3372. **Water Systems Design (3:3:0).** Prerequisite: CE 3305, 3354; corequisite: CE 3105. Hydraulic analysis and design of municipal water distribution, storm-water collection, and wastewater collection systems. Oral and written presentations.
3440. **Structural Analysis I (4:3:3).** Prerequisite: CE 3303. Introduction to the analysis of statically determinate and indeterminate structures.
4000. **Special Studies in Civil Engineering (VI-6).** Individual studies in civil engineering areas of special interest. May be repeated for credit.
4101. **Application of Engineering Fundamentals(1:1:0).** Prerequisite: Students must be within two long semesters of graduation. Review of engineering courses in preparation for NCEES Fundamentals of Engineering Exam.
4292. **Engineering Ethics and Professionalism (2:2:0).** Prerequisite: Senior standing or consent of department chairperson. Principles and practice of engineering ethics and professionalism.
4293. **Engineering Law (2:2:0).** Prerequisite: Senior standing in engineering or consent of department chairperson. Engineering law as it relates to professional and industrial problems; legal aspects of contracts, specifications, and liabilities.
4321. **Geotechnical Engineering Design (3:3:0).** Prerequisite: CE 3321. Design principles and applications involving site investigation, soil improvement, bearing capacity, settlement analysis, lateral earth pressure, spread footings, pier and pile foundations, retaining walls.
4330. **Design of Engineering Systems (3:2:3).** Prerequisite: Senior standing, and either CE 4342 or CE 4343 or corequisite CE 4353 or 4309 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.
4331. **Special Problems in Civil Engineering (3).** Individual studies in civil engineering. May be repeated for credit.
4333. **Special Problems in Water Resources (3).** Individual studies in water resources. May be repeated for credit.
4340. **Structural Analysis II (3:3:0).** Prerequisite: CE 3440 or consent of instructor. Analysis of structures by matrix methods.
4342. **Design of Steel Structures (3:3:0).** Prerequisite: CE 2101 and 3341. A course in design of structural steel systems by the LFRD method.
4343. **Design of Concrete Structures (3:3:0).** Prerequisite: CE 2101 and 3341. A course in design of reinforced concrete systems by strength design methods.
4353. **Design of Hydraulic Systems (3:3:0).** Prerequisite: CE 3305. Design of open channel and pressure conveyance systems for water; includes introduction to use of HEC-2.
4361. **Transportation Engineering (3:3:0).** Prerequisite: CTEC 2301; corequisite: CE 3321, and senior standing or approval of instructor. Basic design and analysis concepts of highway systems; geometrics; intersection design; pavement design.
4363. **Groundwater Hydrology (3:3:0).** Prerequisite: CE 3354 or consent of instructor. Groundwater flow; well hydraulics, development, and management of groundwater resources; water quality; mathematical modeling with available software. Introduction to design of wells and well fields.

Graduate Courses

5101. **Civil Engineering Seminar (1:1:0).** Individual study of engineering problems of special interest and value to the student.
5310. **Numerical Methods in Engineering (3:3:0).** Prerequisite: MATH 3350 or consent of instructor. Numerical techniques for the formulation and solution of discrete and continuous systems of equilibrium, eigenvalue and propagation problems.
5311. **Advanced Mechanics of Solids (3:3:0).** Stress and strain at a point; theories of failure; unsymmetrical bending; curved flexural members; beams on continuous support; experimental and energy methods.
5313. **Theory of Elastic Stability (3:3:0).** Theory of the conditions governing the stability of structural members and determination of critical loads for various types of members and structural systems.
5314. **Theory of Plates and Shells (3:3:0).** Stress analysis of plates and shells of various shapes; small and large deflection theory of plates; membrane analysis of shells; general theory of shells.
5316. **Theory of Elasticity (3:3:0).** Analysis of stress and strain; equilibrium and compatibility equations; plane stress, plane strain, and axisymmetric problems; torsion of noncircular shafts; finite difference and finite element models; energy principles.
5317. **Boundary Element Method (3:3:0).** Integral transformations. Potential problems in two and three dimensions, two and three dimensional problems in elastostatics, coupling of boundary and finite element methods.
5318. **Finite Element Methods in Continuum Mechanics (3:3:0).** Prerequisite: CE 5310 and 5311 or consent of instructor. Theory of the finite element method-constant strain elements; plane stress or strain for axisymmetric problems; application to plates and shells, torsion, heat transfer and seepage problems.
5319. **Nonlinear Finite Element Analysis (3:3:0).** Nonlinear behavior of solids, geometric and material nonlinearities, Lagrangian and updated Lagrangian methods, Prandtl Reuss equations, and incremental elastic plastic analysis.
5321. **Advanced Soil Engineering I (3:3:0).** Prerequisite: CE 3321 or equivalent, or consent of instructor. Introduction to physio-chemical properties of soils; soil structure; soil classification; permeability; principle of effective stress; stress-deformation; stress paths and strength characteristics; partly saturated soils; advanced consolidation theory; secondary consolidation; field instrumentation.
5323. **Advanced Foundation Engineering (3:3:0).** Prerequisite: Computer programming skills and consent of instructor. Advanced foundation engineering theory and practice, bearing capacity, settlement analysis, piles and pile

- groups, drilled piers, wave equation analysis.
5325. **Soil-Structure Interaction (3:3:0)**. Prerequisite: CE 5310 and 5311 or consent of instructor. Numerical methods for beam on elastic foundation; piles and pile groups; laterally-loaded piers; slab on elastic foundation.
5326. **Analysis and Design of Earth Structures (3:3:0)**. Prerequisite: CE 5321 or consent of instructor. Principles of stability analysis and design as applied to earth dams, embankments, fills, cuts, and natural slopes; pore pressure considerations; initial and long-term stability.
5327. **Geotechnical Practice for Waste Disposal (3:3:0)**. Review of government regulations; risk assessment; site investigation techniques; design and installation of land fills; land treatment; toxic waste handling.
5331. **Advanced Work in Specific Fields (3)**. Nature of course depends on the student's interest and needs. May be repeated for credit.
5333. **Advanced Work in Water Resources (3)**. Individual studies in advanced water resources. May be repeated for credit.
5340. **Advanced Structural Analysis I (3:3:0)**. Prerequisite: Proficiency in basic structural analysis techniques and computer programming. Fundamentals and applications of modern methods of structural analyses using computers.
5342. **Advanced Design of Steel Structures (3:3:0)**. Prerequisite: CE 4342 or consent of instructor. Advanced design of structures, utilizing LRFD design concepts.
5343. **Advanced Reinforced Concrete Design (3:3:0)**. Prerequisite: CE 4343 or consent of instructor. Understanding advanced concrete design concepts and discussion of new concrete material technology.
5346. **Structural Dynamics I (3:3:0)**. Dynamic response of single and multidegree of freedom systems; modal analysis of lumped and continuous mass systems.
5347. **Structural Dynamics II (3:3:0)**. Prerequisite: CE 5346 or consent of instructor. Design consideration for structures subjected to time-varying forces including earthquake, wind, and blast loads.
5348. **Wind Engineering (3:3:0)**. Prerequisite: Consent of instructor. Understanding the nature of wind related to wind-structure interaction, and wind loads on structures. Design loads for extreme winds, tornadoes, and hurricanes.
5351. **Advanced Pavement Materials (3:3:0)**. Materials science, characterization, test methods, mix design, specifications and performance of pavement materials including aggregates, bituminous materials, and portland cement concrete.
5352. **Advanced Pavement Design (3:3:0)**. Analysis and design of flexible and rigid pavements; pavement type selection; loading; failure criteria and reliability; mechanistic pavement design; design exercises using existing methods.
5353. **Pavement Management Systems (3:3:0)**. Pavement distresses and evaluation, nondestructive testing, back-calculation of layer moduli, pavement performance models, pavement maintenance, rehabilitation, pavement management concepts, existing pavement management systems.
5360. **Open Channel Hydraulics (3:3:0)**. Channel geometry and parameters. Uniform and varied flow.
5361. **Surface Water Hydrology (3:3:0)**. Prerequisite: Consent of instructor. Advanced study of hydrologic cycle: hydrologic abstractions (evaporation and detention storage), surface runoff mechanisms, data analysis, hydrographs, separation, runoff routing, and frequency analysis.
5362. **Surface Water Modeling (3:3:0)**. Prerequisite: CE 5361 and consent of instructor. Theory and application of one-dimensional hydrodynamics models. Theory and application of watershed models.
5363. **Groundwater Hydrology (3:3:0)**. Prerequisite: Consent of instructor and computer programming skills. Study of sources and fates of contamination in groundwater. Mathematical modeling of reactive and nonreactive pollutant movement. Aquifer restoration strategy.
5364. **Groundwater Transport Phenomena (3:3:0)**. Prerequisite: Consent of instructor, computer programming skills. Study of sources and fates of contamination in groundwater. Mathematical modeling of reactive and nonreactive pollutant movement. Aquifer restoration strategies.
5365. **Storm Water Management and Erosion Control Theory (3:3:0)**. Theory and concepts of soil erosion are studied to develop predictive models related to storm runoff, including development of plans to reduce damage from storm events.
5366. **Water Resources Management (3:3:0)**. Prerequisite: Consent of instructor. Models and other technical elements of water resources systems in context of the political, social, and other environments in which they exist.
5368. **Surface Water Quality Modeling (3:3:0)**. Contaminant transport and fate in surface water. Engineering methods assessing surface water and transport for water and sediment quality. Modeling dissolved oxygen, chemicals, and water-borne substances.
5383. **Bioremediation of Wastes in Soil Systems (3:3:0)**. Factors impacting microbiological treatment of organic wastes in surface and subsurface soil environments will be examined for implications in system design and operation.
5385. **Microbial Applications in Environmental Engineering (3:3:0)**. Presents information regarding bacterial cell structure and microbial genetics, metabolism and the role of microbes in the design of treatment processes, and water/wastewater reuse issues.
5390. **Water and Wastewater Analysis (3:1:6)**. Prerequisite: Consent of instructor. Laboratory procedures for the physical, chemical, and biological examination of water, wastewater, and hazardous wastes. Interpretation of water quality data.
5391. **Advanced Water Treatment (3:3:0)**. Prerequisite: CE or ENVE 3309 or consent of instructor. Water chemistry and microbiology; design procedures for municipal water treatment; advanced methods for quality control, renovation, and reuse.
5392. **Conventional Wastewater Treatment Systems (3:3:0)**. Prerequisite: CE or ENVE 4309 or consent of instructor. Municipal wastewater treatment methods including suspended and attached growth biological systems, nitrification and denitrification, sludge stabilization, treated effluent and sludge disposal.
5393. **Unit Processes Laboratory (3:0:9)**. Prerequisite: CE 5392. Operation and evaluation of water and wastewater treatment units for water quality control.
5394. **Natural Systems for Wastewater Treatment (3:3:0)**. Examination of tertiary systems for municipal wastewater; natural systems (land application, wetlands, and aquaculture) and modular facilities incorporating unit operations, biological, and chemical processes.
5395. **Solid and Hazardous Waste Treatment (3:3:0)**. Prerequisite: Consent of instructor. Treatment and disposal of municipal and industrial solid and hazardous wastes.
5396. **Environmental Impact Analysis (3:3:0)**. Interdisciplinary approach to environmental analysis stemming from the National Environmental Policy Act; elements of impact-analysis and assessment methodologies.
5397. **Limnological Aspects of Environmental Engineering (3:2:3)**. Study of the biological phenomena and physical, chemical interactions that occur in fresh and marine surface waters with emphasis on water pollution control including water quality hazard assessment techniques.
5398. **Risk Management and Public Policy (3:3:0)**. Methods and principles of risk assessment will be examined. Incorporation of these findings into practical risk management programs meeting current policy requirements will be discussed.
6000. **Master's Thesis (V1-6)**.
6330. **Master's Report (3)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Environmental Engineering (ENVE)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1100. **Environmental Engineering Seminar (1:0:2)**. Introduction of first year and transfer students to the practice of environmental engineering.
3314. **Chemodynamics I (3:3:0)**. Prerequisite: CHEM 1308 and MATH 1352. Thermodynamics and kinetic principles underlying environmental engineering designs. Topics include Gibbs free energy, chemical potential, fugacity, vapor pressures, non-ideal solutions, and phase equilibrium.
3315. **Chemodynamics II (3:3:0)**. Prerequisite: ENVE 3314. Course is a continuation of ENVE 3314 with application and modeling of the processes presented in the first semester to real environmental engineering problems.
4311. **Environmental Systems Models (3:2:3)**. Prerequisite: MATH 3350. Application of various computer models used in the analysis and solution of environmental engineering problems involving air, water, and solid and hazardous wastes.
4390. **Water and Wastewater Analysis (3:1:6)**. Prerequisite: ENVE 3315 and consent of instructor. Laboratory procedures for

the physical, chemical, and biological examination of water, wastewater, and hazardous wastes. Interpretation of water quality data.

4391. **Advanced Water Treatment (3:3:0)**. Prerequisite: Consent of instructor. Water chemistry and microbiology; design procedures for municipal water treatment; advanced methods of quality control, renovation, and reuse.
4399. **Municipal Wastewater Treatment (3:3:0)**. Prerequisite: Consent of instructor. Characterization of municipal wastewaters and application of design procedures used to remove and dispose of criteria pollutants in wastewater.

Graduate Courses

5303. **Design of Air Pollution Control Systems (3:3:0)**. Engineering analysis procedures techniques for the selection, application, and operation of air pollution control methods in various operational situations.
5304. **Environmental Law and Policies (3:3:0)**. The legal structure (laws impacting water and air quality and solid-hazardous waste management) to control and manage the use of the environment is examined.
- 5305, 5306. **Environmental Systems Design I, II (3:2:3 each)**. Student teams evaluate a waste problem, select and develop a treatment alternative in a feasibility study, and then finalize their design selections in technical memorandums.
5310. **Principles of Environmental Technology and Management (3:3:0)**. The magnitude and impacts of the different waste streams produced by man and his activities on the various components of the environment will be examined.
5311. **Environmental Systems Models and Information Reporting (3:3:0)**. Research report will be prepared on the modeling of an environmental system of process. Course stresses the research report as well as modeling techniques.
5314. **Advanced Chemodynamics I (3:3:0)**. Prerequisite: Consent of instructor. Application of thermodynamic and kinetic principles to modeling and design of environmental engineering processes.
5399. **Advanced Municipal Wastewater Treatment (3:3:0)**. Prerequisite: Consent of instructor. Municipal wastewater quality parameters, effluent discharge requirements and applications of design procedures, facilities to treat waste water and process the removed solids.

Department of Computer Science

Faculty

Daniel E. Cooke, Chairperson

Professors: Barnes, Cooke, Gelfond, Marcy, and Sobolewski; *Associate Professors:* Desrosiers, Hernández, Lakhani, Lopez-Benitez, Mengel, and Temkin; *Assistant Professors:* Andersen, Denton, Leung, Pyeatt, Rushton, Shin, Sinzinger, Watson, and Zhuang; *Lecturers:* Helm, Moore, and Scott-Fleming.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Computer Science
- Master of Science in Computer Science
- Master of Science in Software Engineering
- Doctor of Philosophy in Computer Science

Undergraduate Program

Computer science is the theory, design, and analysis of algorithms for processing information and the implementations of these algorithms in hardware and software. There is an implied overall balance of emphasis between the hardware and software aspects of computer science. The analysis of trade-offs between hardware and software is a salient characteristic with an emphasis on efficiency and effectiveness. The result is the knowledge and skills necessary to analyze, design, implement, test, and maintain high quality, computer-based solutions to human problem-solving needs. The computer science curriculum also places a strong emphasis on writing, communication, professional skills, and ethical concerns. The objective is to prepare a graduate for a productive professional career with a broad-based understanding of the computing discipline.

The principles and foundations of computer science are learned through a synthesis of studies involving both course work and laboratories in areas, such as problem solving, software development paradigms, data structures, digital systems, algorithm analysis and design, discrete structures, programming languages, computer organization and architecture, software engineering, operating systems, artificial intelligence, networks, computer graphics, microprocessors, computer theory, and information retrieval. Additional supporting studies involve both course work and laboratories in mathematics, physics, chemistry, and technical writing. Computer ethics is an essential part of several courses.

All students entering the computer science degree program are expected to follow the sequence of courses shown in the curriculum table below and must satisfy the requirements of the Dynamic Enrollment Management Plan (DEMP) for computer science and the College of

Engineering. DEMP details are available from the department. Students demonstrating satisfactory performance may deviate from the specified sequence of courses only with the express approval of a computer science undergraduate advisor and only when such deviation is required to obtain a normal load of course work for the student. Students may take a course no more than three times unless they have written permission from the computer science chairperson.

Computer science majors are not required to have a minor field. However, many students choose to pursue a minor. Minors can be pursued in virtually any field of study offered at Texas Tech. The minor must consist of a minimum of 18 hours, with at least six of those hours at the 3000 or 4000 level. A minor may require additional hours of study, depending on the particular minor field.

Minors in Computer Science. A minor in computer science consists of C S 1411, 1412, 2413 and three the following courses: C S 2382, 3361, 3364, 3383.

Dual Degrees. Computer science is part of three dual-degree programs in which Bachelor of Science degrees can be earned in both computer science and another field. The electrical engineering and computer science (EECS) and chemical engineering and computer science (CHCS) dual-degree curriculum tables can be found under the listings for electrical engineering and chemical engineering, respectively. The mathematics and computer science (MACS) dual-degree curriculum table is listed on the following pages; this degree is administered through the College of Arts and Sciences and follows all requirements mandated for the Bachelor of Science degrees for both the College of Engineering and the College of Arts and Sciences. EECS and CHCS students are advised through the Departments of Electrical Engineering and Chemical Engineering, respectively; MACS students can choose to be advised in either the Department of Mathematics or Computer Science.

Combined Bachelor's and Master's Programs. The department offers two combined Bachelor of Science and Master of Science curricula. In both cases, completion of the degree requirements leads to the awarding of two degrees. In one curriculum, the degrees awarded are the Bachelor of Science in Computer Science and the Master of Science in Computer Science; in the other, the degrees are the Bachelor of Science in Computer Science and the Master of Science in Software Engineering.

Students choosing one of the combined degree programs would be initially admitted as pursuing a Bachelor of Science in Computer Science. The graduate component of the program would be added upon admission to the appropriate Master's degree by the Graduate School during the student's third year of study. Students must meet the university requirement to take the Graduate Record Examination as well as other graduate admission requirements of the department before enrolling in graduate-level courses.

Computer Science Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 1411, Programming Princ. I	4	C S 1412, Programming Princ. II	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, Amer. Gov. Org.	3	PHYS 1408, Princ. of Physics I	4
Core Curr. Elective*	3	Core Curr. Elective*	3
TOTAL	16	TOTAL	17
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 2413, Data Structures	4	C S 2350, Comp. Org. & Assy. L.	3
C S 2382, Disc. Struct.	3	C S 2371, Intro. Dig. Des.	3
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
PHYS 2401, Princ. Phys. II	4	ENGL 2311, Technical Writing	3
Core Curr. Elective*	3	CHEM 1307 & 1107, Princ. Chem. I	4
TOTAL	17	or BIOL 1403, Biology I	
		TOTAL	16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 3342, Stat. Eng. & Sci.	3	C S 3352, Intro. Sys. Prog.	3
C S 3361, Concepts. Prog. Lang.	3	MATH 3350 or 3354	3
C S 3364, Des. & Anal. Alg.	3	C S 3375, Comp. Arch.	3
C S 3383, Theory of Automata	3	C S 3365, Software Engineering	3
COMS 3358, Bus. & Prof. Comm.	3	Core Curr. Elective*	3
or PETR 3308, Engr. Comm.		TOTAL	15
TOTAL	15		
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 4311, Sr. Proj. Des.	3	C S 4312, Sr. Proj. Impl. Lab.	3
C S 4328, Scientific Computing	3	Computer Sci. Elective**	3
Computer sci. Elective**	3	C S 4352, Oper. Sys.	3
C S 4354, Con. Database Sys.	3	Core Curr. Elective*	3
Core Curr. Elective*	3	TOTAL	12
TOTAL	15		

Minimum hours for graduation—123.

* Courses needed to fulfill the university Core Curriculum requirements, including 3 additional hours of political science, 6 hours of U.S. History, 3 hours of humanities, 3 hours of visual and performing arts, and 3 hours of individual or group behavior electives. The 3-hour multicultural requirement must also be satisfied. For details, consult the Core Curriculum requirements.

** Computer Science electives: choose from any 3000 or 4000 level computer science courses that are not required for the C S major.



Graduate Program

Students who do not have a background in computer science are required to take a short series of undergraduate 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.

Master's Degree

Two general plans are available for the Master of Science degree: a 30-hour plan that includes 6 hours credit for the master's thesis and a 36-hour plan that is based solely on course work. The 36-hour plan is intended for graduate students in the college-sponsored International Exchange program and for new students with more than five years industrial experience who are maintaining a full-time career while working towards their graduate degree. Students who wish to use the 36-hour plan must obtain approval from the departmental Graduate Committee within their first semester of study.

The degree plan for students pursuing a Master of Science degree in computer science must include two theory courses (C S 5381, 5383, 5384) and two systems courses (C S 5352, 5375, 5368). Students choosing the 30-hour thesis plan must apply 6 hours C S 6000 and may apply 3 hours of C S 7000 credit toward their degree. Students choosing the 36-hour nonthesis option may not use C S 6000 or 7000 for credit towards their degree. Aside from these requirements and limitations, master's students may use any graduate level computer science course for credit towards their degree.

The degree plan for students pursuing a Master of Science in software engineering (SE) must include CS 5358, 5359, 5362, 5363, and 5364 as well as elective courses chosen from the following SE elective categories: SE Applications (CS 5355, 5356, 5357, 5369, 5376), SE Systems (CS 5352, 5375, 5377, 5379, 5380), and SE Topics (CS 5332, 5360, 5366). Students choosing the 30 hour thesis option must take 6 hours of C S 6000 as well as one elective course from SE Applications, one from SE Systems, and one from any SE elective category or substitute C S 7000. Students choosing the 36 hour nonthesis option may not use C S 6000 or 7000 towards their degree and must take two elective courses from SE Applications, two from SE Systems, and three from any SE elective category.

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. These requirements are additional to Graduate School regulations.

Dual-Degree Curriculum for Math-Computer Science

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 1411, Programming Princ. I	4	C S 1412, Programming Princ. II	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, Amer. Govt. Org.	3	PHYS 1408, Princ. Physics I	4
Core Curriculum Elective**	3	Personal Fitness and Wellness*	2
TOTAL	16	TOTAL	16
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 2413, Data Structures	3	C S 2350, Comp. Org. Assy. L.	3
C S 2382, Disc. Struct.	3	C S 2371, Intro. Dig. Des.	3
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
PHYS 2401, Princ. of Phys. II	4	CHEM 1307 & 1107, Princ. Chem. I	4
ENGL 2311, Technical Writing	3	or BIOL 1403, Biology I	
TOTAL	16	Core Curr. Elective**	3
		TOTAL	16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 3383, Theory of Automata	3	C S 3364, Des. & Anal. Alg.	3
C S 3361, Concepts. Prog. Lang.	3	C S 3372, Adv. Digital Des.	3
MATH 3354, Diff. Equations I	3	MATH 3360, Found. of Algebra I	3
Foreign Language Elective***	5	Foreign Language Elective***	5
Core Curr. Elective**	3	Core Curr. Elective**	3
TOTAL	17	TOTAL	17
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 3375, Computer Architecture	3	C S 3352, Intro. Sys. Prog.	3
MATH 3430, Comp. Tech. Sci.	4	C S 3365, Software Engineering	3
MATH 4342, Math. Stat.	3	MATH 4310, Intro. Num. Anal I	3
COMS 3358, Bus. & Prof. Com.	3	MATH 4343, Math. Stat.†	3
or PETR 3308, Engr. Comm.		Foreign Language Elective***	3
Foreign Language Elective***	3	TOTAL	15
TOTAL	16		
FIFTH YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 4311, Sr. Proj. Des.	3	C S 4312, Sr. Proj. Impl. Lab.	3
C S 4352, Operating Systems	3	Comp. Sci. Elective††	3
MATH 4350, Adv. Calculus	3	MATH 4312, Intro. Num. Anal. II†	3
MATH 4354, Diff. Equations II	3	Core Curr. Elective**	6
Core Curr. Elective**	3	TOTAL	15
TOTAL	15		

Minimum hours for graduation—159.

* Choose from Personal Fitness and Wellness requirements for the College of Arts and Sciences.

** Courses needed to fulfill the College of Arts and Sciences and the university Core Curriculum requirements, including 3 additional hours of political science, 6 hours of U.S. History, 3 hours of English literature, 3 hours of visual and performing arts, and 3 hours of individual or group behavior electives. The 3-hour multicultural requirement must also be satisfied. For details consult the Core Curriculum requirements and the College of Arts and Sciences General Degree requirements for a Bachelor of Science.

*** Refer to the General Degree requirements for the College of Arts and Sciences.

† MATH 4312 and 4343 are both recommended but a mathematics elective course can be substituted with approval of an advisor in the Department of Mathematics.

†† Computer Science electives: choose from any 3000 or 4000 level computer science courses that are not required for the MACS major.

Curriculum for Combined Bachelor of Science and Master of Science in Computer Science

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 1411, Programming Princ. I	4	C S 1412, Programming Princ. II	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, Amer. Gov. Org.	3	PHYS 1408, Princ. of Physics I	4
Core Curr. Elective*	3	Core Curr. Elective*	3
TOTAL	16	TOTAL	17
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 2413, Data Structures	4	C S 2350, Comp. Org. & Assy. L.	3
C S 2382, Disc. Struct.	3	C S 2371, Intro. Dig. Des.	3
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
PHYS 2401, Princ. Phys. II	4	ENGL 2311, Technical Writing	3
Core Curr. Elective*	3	CHEM 1307 & 1107, Princ. Chem. I	4
TOTAL	17	or BIOL 1403, Biology I	
		TOTAL	16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 3342, Stat. Eng. & Sci.	3	C S 3352, Intro. Sys. Prog.	3
C S 3361, Concepts. Prog. Lang.	3	MATH 3350 or 3354	3
C S 3364, Des. & Anal. Alg.	3	C S 3375, Comp. Arch.	3
C S 3383, Theory of Automata	3	C S 3365, Software Engineering	3
COMS 3358, Bus. & Prof. Comm.	3	Core Curr. Elective*	3
or PETR 3308, Engr. Comm.		TOTAL	15
TOTAL	15		
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
C S 4311, Sr. Proj. Des.	3	C S 4312, Sr. Proj. Impl. Lab.	3
C S 4328, Scientific Computing	3	Computer Sci. Elective**	3
Graduate Core Course†	3	C S 4352, Oper. Sys.	3
C S 4354, Con. Database Sys.	3	Core Curr. Elective*	3
Core Curr. Elective*	3	Graduate Core Course†	
TOTAL	15	TOTAL	12
FIFTH YEAR			
<i>Fall</i>		<i>Spring</i>	
Graduate Core Course†	3	Graduate Core Course†	3
Graduate Elective Course††	6	Graduate Elective Course††	6
C S 6000, Master's Thesis+	3	C S 6000, Master's Thesis+	3
TOTAL	12	TOTAL	12

Minimum hours for graduation—147.

* Courses needed to fulfill the university Core Curriculum requirements, including 3 additional hours of political science, 6 hours of U.S. History, 3 hours of humanities, 3 hours of visual and performing arts, and 3 hours of individual or group behavior electives. The 3-hour multicultural requirement must also be satisfied. For details consult the Core Curriculum requirements.

** Computer Science electives: Choose from any 3000 or 4000 level computer science courses that are not required for the C S major.

† Graduate Core Courses: Select two from C S 5381, 5383, 5384, and two from C S 5352, 5375, 5368.

†† Graduate Elective Courses: To be determined in consultation with a thesis or departmental graduate advisor.

+ Master's Thesis: The 6 hours for C S 6000 shown here are only a minimum number; some thesis projects due to their nature may require an earlier start and/or take longer to complete. Also, if pursuing a nonthesis option, substitute 12 additional hours of graduate elective courses to be determined in consultation with a computer science graduate advisor for the 6 hours of C S 6000. Nonthesis students must also pass the departmental Master's Comprehensive Examination.

Curriculum for Combined B.S. in Computer Science and M.S. in Software Engineering

FIRST YEAR			
Fall		Spring	
C S 1411, Programming Princ. I	4	C S 1412, Programming Princ. II	4
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
POLS 1301, Amer. Gov. Org.	3	PHYS 1408, Princ. of Physics I	4
Core Curr. Elective*	3	Core Curr. Elective*	3
TOTAL	16	TOTAL	17

SECOND YEAR			
Fall		Spring	
C S 2413, Data Structures	4	C S 2350, Comp. Org. & Assy. L.	3
C S 2382, Disc. Struct.	3	C S 2371, Intro. Dig. Des.	3
MATH 2350, Calculus III	3	MATH 2360, Linear Algebra	3
PHYS 2401, Princ. Phys. II	4	ENGL 2311, Technical Writing	3
Core Curr. Elective*	3	CHEM 1307 & 1107, Princ. Chem. I	4
TOTAL	17	or BIOL 1403, Biology I	
		TOTAL	16

THIRD YEAR			
Fall		Spring	
MATH 3342, Stat. Eng. & Sci.	3	C S 3352, Intro. Sys. Prog.	3
C S 3361, Concepts. Prog. Lang.	3	MATH 3350 or 3354	3
C S 3364, Des. & Anal. Alg.	3	C S 3375, Comp. Arch.	3
C S 3383, Theory of Automata	3	C S 3365, Software Engineering	3
COMS 3358, Bus. & Prof. Comm.	3	Core Curr. Elective*	3
or PETR 3308, Engr. Comm.		TOTAL	15
TOTAL	15		

FOURTH YEAR			
Fall		Spring	
C S 5362, Soft. Specs. & Des.	3	C S 5363, Soft. Proj. Mgt.	3
C S 4328, Scientific Computing	3	Computer Sci. Elective**	6
C S 4354, Con. Database Sys.	3	C S 4352, Oper. Sys.	3
Computer Science Elective**	3	Core Curr. Elective*	3
Core Curr. Elective*	3	TOTAL	15
TOTAL	15		

FIFTH YEAR			
Fall		Spring	
C S 5358, Software Studio I	3	C S 5359, Software Studio II	3
CS 5364, Soft. Qual. Assure. Test	3	Soft. Engr. Grad. Elective†	6
Soft. Engr. Grad. Elective†	3	C S 6000, Master's Thesis+	3
C S 6000, Master's Thesis+	3	TOTAL	12
TOTAL	12		

Minimum hours for graduation—150.

* Courses needed to fulfill the university Core Curriculum requirements, including 3 additional hours of political science, 6 hours of U.S. History, 3 hours of humanities, 3 hours of visual and performing arts, and 3 hours of individual or group behavior electives. The 3-hour multicultural requirement must also be satisfied. For details consult the Core Curriculum requirements.

** Computer Science electives: Choose from any 3000 or 4000 level computer science courses that are not required for the C S major.

† Software Engineering Graduate Elective Courses: To be determined in consultation with a thesis or departmental graduate advisor.

+ Master's Thesis: The 6 hours for C S 6000 shown here are only a minimum number; some thesis projects due to their nature may require an earlier start and/or take longer to complete. Also, if pursuing a nonthesis option, substitute 12 additional hours of graduate elective courses to be determined in consultation with a computer science graduate advisor for the 6 hours of C S 6000. Nonthesis students must also pass the departmental Master's Comprehensive Examination.

Computer Science (C S)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1300. Computers and Modern Society (3:2:2) [BCIS 1301, COSC 1301].** Survey of computers, their uses, and their impact on society. Brief introduction to computer programming and the use of word processor, spreadsheet, and data base application software. Credit may not be applied toward a computer science major or minor.
- 1303. Programming Language Proficiency in C/C++ (3:2:2).** Prerequisite: MATH 1320 and computer literacy. The course will focus on basic programming skills in the C/C++ language. This course cannot be used for a C S major or minor.
- 1405. Introduction to Computer Science (4:3:3) [COSC 1315, 1415, 1420, 1430].** Prerequisite: MATH 1350 or 1550 or equivalent. Procedural programming in C++. Discipline of computer science; analysis, design, implementation, debugging, and testing of software; computer ethics. Introduction to field for majors.
- 1411. Programming Principles I (4:3:3).** Prerequisite: MATH 1350 or 1550 or equivalent. Procedural programming in C++. Discipline of computer science; analysis, design, implementation, debugging, and testing of software; computer ethics. Introduction to field for majors.
- 1412. Programming Principles II (4:3:3) [COSC 1320].** Prerequisite: C S 1411. Object-oriented programming in C++ with emphasis on evaluation of alternative program design strategies. Class design, recursion, linked and dynamically allocated structures. (Honors section offered.)
- 2350. Computer Organization and Assembly Language Programming (3:3:0)[COSC 1319, 1334, 1419, 1434, 2325, 2425].** Prerequisite: C S 1412; corequisite: C S 2371. Computer organization and assembly language programming, system and data management macros.
- 2371. Introduction to Digital Design (3:3:0).** Prerequisite: PHYS 2401. Logic and computer design fundamentals, including design of combinational and sequential logic circuits, memory systems, I/O devices, and register transfer logic.
- 2382. Discrete Computational Structures (3:3:0).** Prerequisite: CS 1412 and MATH 1352. Sets, functions, algorithms, counting principles, logic foundations, graphs, Boolean algebra, and the foundations of the theory of computation.
- 2413. Data Structures (4:3:3).** Prerequisite: CS 1412. Comparative study of the interaction of data and procedural abstractions. Data structures, lists, stacks, queues, trees, graphs. Algorithms: searching, sorting, parsing, hashing, graph traversals. (Honors section offered.)
- 3352. Introduction to Systems Programming (3:3:0).** Prerequisite: CS 2350 or E E 3362. Design of various types of computer system software, including assemblers, loaders and monitors. Introduction to macro processors, compilers, and operating system features. Emphasis on relationships between machine architecture and software.
- 3361. Concepts of Programming Languages (3:3:0).** Prerequisite: CS 2413. Study of programming language design. The investigation and comparison of different programming language paradigms. Languages include Ada, Smalltalk, and Prolog.
- 3364. Design and Analysis of Algorithms (3:3:0).** Prerequisite: CS 2413, 2382 and MATH 2360. A theoretical course focusing on the design and analysis of computer algorithms.
- 3365. Software Engineering (3:3:0).** Prerequisite: C S 2413; CH E 3343, E E 3323, I E 3341, MATH 3342, or MATH 4342. Software engineering theory and practice. A semester-long software engineering project is designed and implemented by the class, acting as a large team. Software engineering ethics. (Writing intensive)
- 3368. Introduction to Artificial Intelligence (3:3:0).** Prerequisite: CS 2382. Broad treatment of the field. Algorithms and knowledge structures for varied application areas such as natural language processing, expert systems, game playing, machine vision, and automatic programming. Developments of programs and systems will use standard languages in artificial intelligence.
- 3375. Computer Architecture (3:3:0).** Prerequisite: CS 3372. Hardware design alternatives for a computer system to satisfy market requirements. Analysis of current systems.
- 3383. Theory of Automata (3:3:0).** Prerequisite: CS 2382. The relationship between language, grammars, and automata. Deterministic and nondeterministic machines. Pushdown automata and turing machines. Limits of computability.
- 3392. Computer Networks (3:3:0).** Prerequisite: CS 3352. Digital transmission fundamentals, local area networks, network protocols, and common Internet applications.

4000. **Special Topics in Computer Science (V1-6)**. Prerequisite: Advanced standing and departmental approval. Individual studies in computer science areas of special areas. May be repeated for credit.
4311. **Senior Project Design (3:3:0)**. Prerequisite: CS 3365, 3364, COMS 3358 or PETR 3308, and 12 additional hours of upper-division computer science course work and senior standing. For majors only. Further study of software engineering theory and practice. Projects are formulated and formally proposed; project completion will occur in CS 4312. (Writing Intensive)
4312. **Senior Project Implementation Laboratory (3:0:9)**. Prerequisite: CS 4311. Students will complete the projects begun in CS 4311. Acceptance testing of projects will be performed by the customer. Formal project presentations will be made upon completion. (Writing Intensive)
4328. **Scientific Computing (3:3:0)**. Prerequisite: MATH 3350 or 3354. Numerical techniques for interpolation, integration, and the solution of systems of algebraic and differential equations with special emphasis on hardware limitations.
4352. **Operating Systems (3:3:0)**. Prerequisite: CS 3352 and 3364. Survey of computer resource allocation and management techniques; multiprogramming, multiprocessing, and paging systems. The UNIX operating system will be studied in detail.
4354. **Concepts of Database Systems (3:3:0)**. Prerequisite: CS 3364. Overview of a database system and its components; physical organization of data; data models; relational databases; and query processing.
4379. **Parallel and Concurrent Programming (3:3:0)**. Multithreaded programming, data parallelisms, and message passing programming techniques are introduced. P-threads, MPI, and open MPI will be covered. Topics of application will be numerical algorithms familiar to senior-level students.
4391. **A I Robotics (3:3:0)**. Programming of artificially intelligent robots. Topics include sensing, navigation, path planning, and navigating with uncertainty.
4395. **Introduction to Computer Graphics (3:3:0)**. Prerequisite: CS 3364. Focus on basic principles and methods for designing, implementing, and applying graphics packages. Methods for manipulating and displaying two- and three-dimensional objects. Selected readings in current graphics literature and a major project are required.
4397. **Computer Game Design and Development (3:3:0)**. Prerequisite: CS 3364. Underlying science, technology, and art or computer games. Specific topics include design planning, interactive graphics, autonomous agents, multi-user interaction, and game engine construction.
4100. **Special Topics in Computer Science (V1-6)**. Prerequisite: Advanced standing and departmental approval. Individual studies in computer science areas of special areas. May be repeated for credit.
5303. **Foundations of Computer Engineering (3:3:0)**. An accelerated introduction to the fundamentals of computer engineering for students without a computer hardware background. Boolean algebra, digital logic, digital devices and functions, digital system design, computer architecture.
5320. **Principles of Computer Graphics (3:3:0)**. Techniques and methods for creating realistic images using graphic programming languages. Topics include visible surface determination rendering, surface modeling, and particle systems.
5321. **Virtual Reality Fundamentals (3:3:0)**. The course will cover fundamental principles of virtual reality and development of future virtual reality applications.
5323. **Computer Haptics (3:3:0)**. This course will provide a unified and complete background for the novel force-tactile feedback technology and its use in virtual reality simulations.
5328. **Scientific Computing (3:3:0)**. This course provides an overview of numerical methods that are essential to computing. Topics include matrix computations, statistical methods, numerical integration, and multiresolution methods.
5331. **Special Problems in Computer Science (3)**. Individual studies in advanced computer science and technology.
5332. **Special Topics in Software Engineering (3:3:0)**. Prerequisite: Consent of instructor. Studies in advanced software engineering.
5341. **Pattern Recognition (3:3:0)**. Traditional and current approaches to the general problem of recognizing patterns in images, signals, and other domains. Includes Bayes decision theory, supervised learning, and nonparametric techniques.
5352. **Advanced Operating Systems Design (3:3:0)**. Prerequisite: CS 3352 and 3364, equivalent, or consent of instructor. Topics on distributed operating systems, such as synchronization, communication, file systems, and memory sharing are discussed. Several programming projects are implemented.
5353. **Compiler Construction (3:3:0)**. Prerequisite: CS 3364, equivalent, or instructor consent. Implementation aspects of compiler construction, automata for formal grammar, semantics of procedural languages, automatic generation of parser, and assembly code generation. A prototype of a compiler is developed.
5355. **Real Time and Time Sharing Systems (3:3:0)**. Prerequisite: CS 3365, 3352, equivalent, or consent of instructor. Study of the functional needs in real time and time sharing systems. Basic techniques and display concepts, random-access fields, computer networks, simultaneous operations, multiprogramming, and multiprocessing.
5356. **Advanced Database Management Systems (3:3:0)**. Prerequisite: CS 3364, equivalent, or consent of instructor. Systems aspects of relational databases are emphasized. Topics include relational database design, index and access structures implementation and performance evaluation, query processing and optimization, transaction management, and concurrency control.
5357. **Multimedia Systems (3:3:0)**. Prerequisite: CS 3364, equivalent or consent of instructor. Multimedia digital audio processing; image and video data compression; and processing for multimedia presentations. Time-based media representation and synchronization; multimedia communication systems; and hypertext and programming.
5358. **Software Studio I (3:3:0)**. Prerequisite: CS 3365, equivalent, or consent of instructor. Capstone design and implementation experience of a major software project applying comprehensive software engineering techniques.
5359. **Software Studio II (3:3:0)**. Prerequisite: CS 3358. A continuation of software engineering projects begun in CS 3358.
5361. **Theory of Computing Languages (3:3:0)**. General language theory with emphasis on computing languages. Chomsky typology, syntactical and semantic specifications. Current research on translation of natural language instructions to machine instructions.
5362. **Software Specification and Design (3:3:0)**. Prerequisite: CS 3365, equivalent, or consent of instructor. Explores the nature of software development showing how analysis and design impact software construction and evolution. Topics include requirements analysis, architectural design, detailed design, software construction, and software evolution.
5363. **Software Project Management (3:3:0)**. Prerequisite: CS 3365, equivalent, or consent of instructor. Explores the principles of software project management and their effective application. Topics include project, risk, process, and resource management and improvement techniques.
5364. **Software Quality Assurance and Testing (3:3:0)**. Prerequisite: CS 3365, equivalent, or consent of instructor. In-depth study of methods and techniques in software quality assurance and testing. Topics include software total quality management, software metrics, unit testing, and integration testing.
5365. **Principles of Multiple-Processor Systems (3:3:0)**. Prerequisite: CS 3375, equivalent, or consent of instructor. Comprehensive introduction to the field of parallel and distributed computing systems. Algorithms, architectures, networks, systems. Theory and applications.
5368. **Intelligent Systems (3:3:0)**. Prerequisite: CS 3364 or consent of instructor. Comprehensive introduction to the field of artificially intelligent computer based systems. Theory and applications in artificial intelligence.
5369. **Web-based Software Systems (3:3:0)**. Prerequisite: CS 3365, equivalent, or consent of instructor. In-depth study of how to engineer Web-based software systems. Topics include process, development, testing, and performance issues.
5375. **Computer Systems Organization and Architecture (3:3:0)**. Prerequisite: CS 3375 or consent of instructor. Introduction to the architecture, organization,

Graduate Courses

5000. **Practicum of Computing (V1-3)**. Industrial training in an approved field of graduate studies. Can be used only as an additional requirement on degree program.
- 5301, 5302. **Foundations of Computer Science I, II (3:3:0 each)**. Prerequisite: Programming proficiency. An accelerated survey

and design of computer systems. Topics include processor, control and memory design, computer arithmetic, I/O, and a brief introduction to multiprocessors.

5376. **Communication Networks (3:3:0).** Networks in the context of parallel and distributed systems. Information theory applied to networks. Network topology. Problems and approaches in design, development, and management of communications networks.
5377. **Distributed Computing (3:3:0).** Prerequisite: C S 4352, equivalent, or consent of instructor. Introduction to distributed systems. Topics include communications, distributed operating systems, fault-tolerance, and performance issues. Case studies and term projects supplement this course.
5379. **Parallel Processing (3:3:0).** Prerequisite: C S 3364 and 3375 or consent of instructor. Introduction to parallel processing in theory, performance evaluation of parallel machine-algorithm ensemble, parallelization techniques of sequential codes, parallel algorithm design, and parallel API.
5380. **Fault-Tolerant Computer Systems (3:3:0).** Prerequisite: C S 3375 and I E 3341, equivalent, or consent of instructor. Introductory course to methodologies for specifying, designing, and modeling fault-tolerant computer systems. Includes fault classification, design techniques for fault detection and recovery, and reliability modeling techniques.
5381. **Analysis of Algorithms (3:3:0).** Prerequisite: C S 3364 or equivalent. Theoretical analysis of algorithms for sorting, searching, sets, matrices, etc.; designing efficient algorithms for data structures, recursion, divide-and-conquer, dynamic programming; nondeterminism, NP-completeness and approximation algorithms.
5383. **Theory of Automata (3:3:0).** Prerequisite: C S 3383, equivalent, or consent of instructor. Structured grammars, relation between grammars and automata, deterministic, and nondeterministic finite automata, push-down store, and linear-bounded automata, and Turing machines.
5384. **Logic for Computer Scientists (3:3:0).** An introduction to mathematical logic. The course includes proofs of several basic theorems and discusses the application of logic to different areas of computer science.
5388. **Neural Networks (3:3:0).** Neural network theory, models, and implementation. Applications to real-time systems, robotics, pattern recognition, computer vision, and event driven systems.
5391. **A I Robotics (3:3:0).** Programming of artificially intelligent robots. Topics include sensing, navigation, path planning, and navigating with uncertainty.
5392. **Reinforcement Learning (3:3:0).** Introduction to reinforcement learning and Markov decision processes and their applications for making optimal decisions.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctoral Dissertation (V1-12).**

Department of Electrical and Computer Engineering

Faculty

Jon G. Bredeson, Chairperson

Horn Professors: Kristiansen and Temkin; *Professors:* Bredeson, Chao, Cox, Gale, Giesselmann, Krile, Krompholz, Mitra, Parten, and Trost; *Associate Professors:* Baker, Dickens, Neuber, Nikishin, Nutter, Saed, Sari-Sarraf, and Zieher; *Assistant Professors:* Dallas, Karp, and Mankowski; *Adjunct Faculty:* Ishihara, Lu, Shkuratov, Storrs, and Woolverton.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Electrical Engineering
- Bachelor of Science in Computer Engineering
- Master of Science in Electrical Engineering
- Doctor of Philosophy in Electrical Engineering

Undergraduate Program

The mission of Texas Tech University is to provide the highest standard of excellence in higher education while pursuing continuous quality improvement, stimulating the greatest degree of meaningful research, and supporting faculty and staff in satisfying those we serve. The Department of Electrical and Computer Engineering supports the mission of the university through its undergraduate programs by providing students with appropriate curricula and educational experiences. The curricula remain current through continuing assessment by employers, alumni, faculty, and students. Students obtain a broad education necessary to understand the impact of electrical and computer engineering solutions in a global, societal, and environmental context. To accomplish the mission, the electrical and computer engineering faculty, with advice from students, alumni, and employers, endorse the following objectives:

Program Educational Objectives

In their first few years on the job, graduates of the Electrical Engineering or Computer Engineering programs at Texas Tech University should be able to:

- Combine the principles of electrical or computer engineering, physical sciences and mathematics to develop a body of knowledge and techniques for the solutions to important problems in a modern technological society.
- Begin the process to become a registered Professional Engineer.
- Be able to enter a graduate program of their choice.
- Function and communicate effectively, both individually and within multidisciplinary teams.
- Continue the process of life-long learning.

The result of the overall curriculum is to prepare graduates who are sensitive to the consequences of their work, both ethically and professionally, for productive professional careers.

Program Outcomes

To enable electrical engineering students to accomplish these objectives, the students are expected at the time of graduation to be able to:

- Design, analyze and solve electrical engineering problems in the areas of circuits and systems, electronics, communications, digital systems, microcontrollers, DSP engineering analysis and productivity software, basic electromagnetics, and at least two technical specialty areas chosen by the student.
- Identify, formulate, and solve practical electrical engineering problems.

To enable computer engineering students to accomplish these objectives, the students at the time of graduation are expected to be able to:

- Design, analyze, and solve computer engineering problems in the areas of circuits and systems, electronics, communications, digital systems, microcontrollers, general purpose software, system software, computer interfacing systems, and computer systems.
- Identify, formulate, and solve practical computer engineering problems.

To accomplish these objectives both electrical and computer students, at the time of graduation are expected to be able to:

- Design and conduct scientific and engineering experiments as well as analyze and interpret the resulting data.
- Have a strong, fundamental capability in oral and written communication
- Function and communicate effectively, both individually and within multidisciplinary teams.

In addition, the department will continue to strive to provide the educational environment for all students, regardless of ethnicity or gender, to succeed in accomplishing these objectives in an appropriate time period.

The fields of electrical and computer engineering are very broad and include a number of specialty areas. To allow students to become more familiar with these areas, the programs will offer a wide range of technical specialties consistent with the breadth of electrical and computer engineering and inclusive of recent developments in the field. An important contribution to accomplish these objectives is our five-course sequence of stand alone project laboratory courses.

In each of the project laboratory courses, students are given a brief description of a complex, open-ended project. The students, usually working in teams, are required to design, develop, construct, and evaluate a system to satisfy the requirements for the project. Faculty advisors evaluate the project on the basis of finished products, required written reports, and oral presentations. By its very structure the project laboratory sequence gives our students considerable experience in dealing with open-ended design problems. They also gain experience in working closely with others and in written and oral communication.

The material presented in the electrical and computer engineering lecture courses is incorporated in the project laboratory course sequence. The projects, however, are real-world problems that require students to go beyond the basic knowledge learned in the classroom. Through these experiences, students gain the technical maturity necessary to succeed in their chosen careers. In addition, the project laboratory courses address topics in engineering ethics and professionalism and help students develop the skills needed for lifelong learning.

The result of the overall curriculum is to prepare a graduate who is sensitive to the consequences of his or her work, both ethically and professionally, for a productive professional career. A broad educational background has been incorporated into this curriculum and personalized advising plays an important role in its implementation. The required undergraduate program is contained in the curriculum tables shown on the following pages.

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 engineering and other related disciplines allowing them to specialize at the senior level. If a student wishes, specific specialization options are available, including analog VLSI, MEMS, power; signal processing; communication systems; high frequency communications; control systems and digital systems.

Success in engineering courses is highly dependent on knowledge and skills in mathematics. It is strongly recommended that students have a minimum mathematics SAT score of 500, a minimum score of 23 on the mathematics ACT, or take mathematics courses at a junior or community college to be ready to take calculus classes at Texas Tech. Students will be responsible for arranging a course of study with an advisor's counsel and approval. Students whose high school courses include physics, chemistry, mathematics through analytical geometry, and at least two credits of a single foreign language are expected to follow the sequence of courses shown in the curriculum. However, students who lack credits in any of these areas of study in high school should consult with departmental advisors to determine a suitably adjusted first-year schedule.

The exceptionally well-prepared student should consult the section of this catalog on credit by examination. All students must satisfy the academic performance requirements of the Dynamic Enrollment Management Plan (DEMP), copies of which are available from the department. Any exception requires written approval by the chairperson of the department. Successful students in the department will meet all degree and prerequisite requirements with grades of C or better. After grades are posted for the current semester, students who have not met prerequisite requirements for any course will be dropped from that course by the department. It will be the responsibility of the student to add additional courses to maintain a full load. Students who have not achieved a C or better after a maximum of two attempts (including withdrawals) in a course must reapply for admission to the program. A faculty committee determined by the department will review individual cases of students requesting readmission to the department. Required courses taken more than twice will not apply toward the

degree without PRIOR written approval by the department. It is the responsibility of the student to seek written permission. Any student within nine semester hours of graduation may take courses for graduate credit. Students interested in a dual degree program or a minor should consult a faculty advisor.

A minor in electrical engineering consists of EE 2331, 2372, 3302, 3303, 3311, and 3362. A joint M.S.-B.S.E.E. 150-hour program is also available. Students interested in pursuing this degree should inform the academic advisor during the first semester of their junior year.

Graduate Program

Before being recommended for admission to a degree program, the student may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the department.

Electrical Engineering Curriculum

FIRST YEAR			
Fall		Spring	
MATH 1351, Cal. I	3	MATH 1352, Cal. II	3
CHEM 1307, Prin. of Chem. I*	3	E E 1305, Engr. & Comp. Prog.	3
CHEM 1107, Prin. of Chem. I (Lab.)	1	E E 2372, Mod. Dig. Syst. Des.	3
E E 1304, Intro. Engr.	3	ENGL 1302, Adv. Coll. Rhetoric	3
POLS 1301, Amer. Govt., Org.	3	Elective (History)	3
ENGL 1301, Ess. Coll. Rhetoric	3	TOTAL	15
TOTAL	16		
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math for Engr. I	3
E E 3302, Fund. of Elect. Engr.	3	E E 3311, Electronics I	3
*PHYS 1408, Prin. of Phys. I	3	E E 3331, Proj. Lab. I	3
E E 3362, Engr. Appr. to Dig. Des.	3	Elective (Prob. & Stat.)**	3
Elective (History)	3	Elective (Political Science)	3
TOTAL	16	E E 3303, Linear System Analysis	3
		TOTAL	18
THIRD YEAR			
Fall		Spring	
E E 3332, Proj. Lab. II	3	E E 3333, Proj. Lab. III	3
E E 3323, Prin. Comm. Sys.	3	E E 3341, Electromag. Theory I	3
PHYS 2401, Prin. Phys. II	4	E E 3353, Feedback Contr. Sys.	3
E E 3312, Electronics II	3	Elective (Math. or Science)	3
Elective (Hum. or Fine Arts)	3	Elective (O.E. or Vis. Perf. Arts)	6
TOTAL	15	TOTAL	18
FOURTH YEAR			
Fall		Spring	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
E E 3342, Electromag. Theory II	3	Elective (EE)	6
Elective (EE)	6	Elective (O.E.)	3
Elective (Oral Comm.)	3	Elective (Ind. Group Behavior)	3
TOTAL	15	TOTAL	15

Minimum hours required for graduation - 129.

Electives from the following categories must be selected from approved lists available from the Department of Electrical and Computer Engineering to ensure that ABET, General Education, departmental, and legislative requirements are satisfied: 1 political science, 2 history, 1 humanities 1 Visual and Performing Arts, 1 individual and group behavior, 1 oral communications, 1 basic science or math elective, 1 Prob. & Statistics, 4 electrical engineering, and 2 other engineering. Option courses include: Analog VLSI - EE 4310, EE 4314, EE 4321; MEMS - EE 4381, EE 4385, EE 4386; Power - EE 4343, EE 4344, EE 4391; Signal Processing - EE 4364, EE 4367; Communication Systems - EE 4323, EE 4325, EE 4361; High Frequency Communications - EE 4342, EE 4344, EE 4360; Control Systems - EE 4324, EE 4368; Digital Systems - EE 4314, EE 4375, EE 4382.

* Students who do not have high school credit for chemistry or physics must take CHEM 1301 and/or PHYS 1408 before those listed.

** Elective (Prob. & Statistics) - MATH 3342 or IE 3341

Computer Engineering Curriculum

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 1351, Cal. I	3	MATH 1352, Cal. II	3
CHEM 1307, Prin. of Chem. I*	3	C S 1412, Programming Princ. II	4
CHEM 1107, Prin. of Chem. I (Lab.)*1		E E 2372, Mod. Dig. Syst. Des.	3
E E 1304, Intro. Engr.	3	ENGL 1302, Adv. Coll. Rhetoric	3
C S 1411, Programming Prin. I	4	POLS 1301, American Govt. Org.	3
ENGL 1301, Ess. Coll. Rhetoric	3	TOTAL	16
TOTAL	17		

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calculus III	3	MATH 3350, Math for Engr. I	3
E E 3302, Fund. of Elect. Engr.	3	E E 3311, Electronics I	3
PHYS 1408, Prin. of Phys. I*	4	E E 3331, Proj. Lab. I	3
E E 3362, Engr. Appr. to Dig. Des.	3	Elective (Prob. & Stat.)**	3
C S 2413, Data Structures	4	Elective (History)	3
TOTAL	17	E E 3303, Linear System Analysis	3
		TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
E E 3334, Comp. Eng. Proj. Lab.	3	E E 3333, Proj. Lab. III	3
E E 3323, Prin. Comm. Sys.	3	E E 3341, Electromag. Theory I	3
E E 3312, Electronics II	3	C S 2382, Disc. Struct.	3
C S 3365, Software Engineering	3	C S 3352, Intr. Sys. Prog.	3
PHYS 2401, Prin. Phys. II	4	Elective (Political Science)	3
TOTAL	16	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
Elective (EE/CS)	3	C S 4352, Operating Systems	3
Elective (Hum. or Fine Arts)	3	Elective (EE/CS)	3
Elective (Oral Comm.)	3	Elective (Ind. Group Behavior)	3
Elective (History)	3	Elective (Vis. Perf. Arts)	3
TOTAL	15	TOTAL	15

Minimum hours required for graduation - 129.

Electives from the following categories must be selected from approved lists to ensure that ABET, General Education, departmental, and legislative requirements are satisfied: 1 political science, 2 history, 1 humanities, 1 Visual and performing arts, 1 individual and group behavior, 1 oral communications, 2 Elective (EE/CS) (Choose 2 from EE 4364, EE 4367, EE 4375, EE 4382, CS 3368, CS 3361, CS 3364, CS 3383, CS 4354, or CS 4395).

* Students who do not have high school credit for chemistry or physics must take CHEM 1301 and/or PHYS 1408 before those listed

** Elective (Prob. & Statistics) - MATH 3342 or IE 3341

Electrical Engineering-Computer Science Dual-Degree Curriculum

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 1351, Cal. I	3	MATH 1352, Cal. II	3
CHEM 1307, Prin. of Chem. I*	3	C S 1412, Programming Princ. II	4
CHEM 1107, Prin. of Chem. I (Lab.)*1		E E 2372, Mod. Dig. Syst. Des.	3
E E 1304, Intro. Engr.	3	ENGL 1302, Adv. Coll. Rhetoric	3
C S 1411, Programming Prin. I	4	POLS 1301, American Govt. Org.	3
ENGL 1301, Ess. Coll. Rhetoric	3	TOTAL	16
TOTAL	17		

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calculus III	3	MATH 3350, Math for Engr. I	3
C S 2413, Fund. C S II	4	C S 2382, Disc. Struct.	3
E E 3302, Fund. of Elec. Engr.	3	E E 3303, Linear Syst. Analysis	3
E E 3362, Engr. Appr. to Dig. Des.	3	Elective (Prob. & Stat.)**	3
PHYS 1408, Prin. of Phys. I*	4	Elective (Political Science)	3
TOTAL	17	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
E E 3331, Proj. Lab. I	3	E E 3341, Electromag. Theory I	3
E E 3311, Electronics	3	E E 3323, Prin. Comm. Sys.	3
PHYS 2401, Prin. of Phys. II	4	E E 3312, Electronics II	3
C S 3365, Software Eng.	3	C S 3361, Concepts Prog. Lang.	3
MATH 2360, Linear Algebra	3	Elective (Oral Comm.)	3
TOTAL	16	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
Elective (History)	3	E E 3353, Feedback Contr. Sys.	3
E E 3342, Electromag. Theory II	3	E E 3333, Proj. Lab. III	3
E E 3332, Proj. Lab. II	3	C S 3364, Des. & Anal. of Alg.	3
C S 3375, Machine Struc. & Org.	3	Elective (C S)	3
Elective (Other Engineering)	3	Elective (Vis. Perf. Arts)	3
TOTAL	15	TOTAL	15

FIFTH YEAR

<i>Fall</i>		<i>Spring</i>	
E E 4333 Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
C S 3352, Intro. Sys. Prog.	3	C S 4352, Operating Systems	3
Elective (Ind. Group Behavior)	3	C S 3383, Theory of Automata	3
Elective (History)	3	Elective (Hum. or Fine Arts)	3
TOTAL	12	TOTAL	12

Minimum hours required for graduation — 150

Electives from the following categories must be selected from approved lists available from the Department of Electrical Engineering or Computer Science to ensure that ABET, General Education, departmental, and legislative requirements are satisfied: 1 political science, 2 history, 1 humanities, 1 Visual and Performing Arts, 1 individual and group behavior, 1 computer science, and 1 other engineering.

* Students who do not have high school credit for chemistry or physics must take CHEM 1301 and/or PHYS 1408 before those listed.

** Elective (Prob. & Statistics) - MATH 3342 or IE 3341

150-Hour Combined Bachelor of Science and Master of Science in Electrical Engineering Curriculum

The combined Bachelor of Science in Electrical Engineering and Master of Science in Electrical Engineering degree program differs only in the final years; the first years are the same as the standard B.S. program. Electives must be selected from approved lists available from the department to ensure that ABET, Core Curriculum, departmental, and legislative requirements are satisfied.

FOURTH YEAR			
Fall		Spring	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
E E 3342, Electromag. Theory II	3	Elective (EE 5xxx)	3
Elective (EE)	3	Elective (EE 5xxx)	3
Elective (Oral Comm.)	3	Elective (O.E.)	3
Elective (EE 5xxx)	3	Elective (Ind. Group Behavior)	3
TOTAL	15	TOTAL	15

FIFTH YEAR			
Fall		Spring	
E E 5371, Engineering Analysis	3	Elective (EE 5xxx)	3
Elective (EE 5xxx)	3	Elective (EE 5xxx)	3
Elective (EE 5xxx)	3	E E 6000, Master's Thesis	5
E E 6000, Master's Thesis	1	TOTAL	11
TOTAL	10		

150-Hour Combined Bachelor of Science in Computer Engineering and Master of Science in Electrical Engineering Curriculum

The combined Bachelor of Science in Computer Engineering and Master of Science in Electrical Engineering degree program differs only in the final years; the first years are the same as the standard B.S. program. Electives must be selected from approved lists to ensure that ABET, General Education, departmental, and legislative requirements are satisfied.

FOURTH YEAR			
Fall		Spring	
E E 4333, Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
Elective (EE 5xxx)	3	C S 5xxx	3
Elective (Hum. or Fine Arts)	3	Elective (EE 5xxx)	3
Elective (Oral Comm.)	3	Elective (Ind. Group Behavior)	3
Elective (History)	3	Elective (Vis. Perf. Arts)	3
TOTAL	15	TOTAL	15

FIFTH YEAR			
Fall		Spring	
E E 5371, Engineering Analysis	3	Elective (EE 5xxx)	3
Elective (EE 5xxx)	3	Elective (EE 5xxx)	3
Elective (EE 5xxx)	3	E E 6000, Master's Thesis	5
E E 6000, Master's Thesis	1	TOTAL	11
TOTAL	10		

Electrical Engineering (E E)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1304. Introduction to Electrical and Computer Engineering (3:3:0).** Prerequisite: Score on the Mathematics Placement Examination (MPE) of 7, MATH 1350, 1550, or score on the MPE of 5 and MATH 1321. An introduction to computing and structured programming as applied to electrical engineering. Programming applications in electrical engineering.
- 1305. Introduction to Engineering and Computer Programming (3:3:0).** Prerequisite: Score on the Mathematics Placement Examination (MPE) of 7, MATH 1350, 1550, or score on the MPE of 5 and MATH 1321. An introduction to the fundamentals of electrical and computer engineering and its relation to science, mathematics, management, ethics, and society. Computing and structured programming.
- 2372. Modern Digital System Design (3:3:0).** Prerequisite: MATH 1351. An introduction to combinational and sequential digital systems.
- 3302. Fundamentals of Electrical Engineering (3:3:0).** Prerequisite: MATH 1352. Principles of electrical circuits and systems. DC, transient, and sinusoidal steady-state analysis.
- 3303. Linear System Analysis (3:3:0).** Prerequisite: E E 3302. Corequisite: MATH 3350. Concepts of signal and system analysis in time and frequency domains as applied to electric circuits. Stresses Laplace transform, Fourier series, and Fourier techniques.

Dual Bachelor of Science in Electrical Engineering and Computer Science Plus Master of Science in Electrical Engineering Curriculum

The dual Bachelor of Science in Electrical Engineering and Computer Science plus Master of Science in Electrical Engineering degree program differs only in the final years; the first years are the same as the standard B.S. program. Electives must be selected from approved lists available from the Department of Electrical Engineering or Computer Science to ensure that ABET, General Education, departmental, and legislative requirements are satisfied.

THIRD YEAR			
Fall		Spring	
E E 3331, Proj. Lab. I	3	E E 3341, Electromag. Theory I	3
E E 3311, Electronics	3	E E 3323, Prin. Comm. Sys.	3
PHYS 2401, Prin. of Phys. II	4	E E 3312, Electronics II	3
C S 3365, Software Eng.	3	C S 3361, Concepts Prog. Lang.	3
MATH 2360, Linear Algebra	3	Elective (Oral Comm.)	3
TOTAL	16	Elective (Vis. & Perf. Arts)	3
		TOTAL	18

FOURTH YEAR			
Fall		Spring	
Elective (History)	3	E E 3353, Feedback Contr. Sys.	3
E E 3342, Electromag. Theory II	3	E E 3333, Proj. Lab. III	3
E E 3332, Proj. Lab. II	3	C S 3364, Des. & Anal. of Alg.	3
C S 5375 or E E 5375, Struc. & Org.	3	Elective (C S 5xxx)	3
Elective (Ind. Group Behavior)	3	Elective (Hum. or Fine Arts)	3
TOTAL	15	TOTAL	15

FIFTH YEAR			
Fall		Spring	
E E 4333 Senior Proj. Lab. IV	3	E E 4334, Proj. Lab. V	3
C S 3352, Intro. Sys. Prog.	3	C S 4352, Operating Systems	3
Elective (EE 5xxx)	3	C S 3383, Theory of Automata	3
Elective (History)	3	Elective (E E 5xxx)	3
TOTAL	12	TOTAL	12

SIXTH YEAR			
Fall		Spring	
E E 5371, Engineering Analysis	3	Elective (EE 5xxx)	3
Elective (EE 5xxx)	3	Elective (EE 5xxx)	3
E E 6000, Master's Thesis	3	E E 6000, Master's Thesis	3
TOTAL	9	TOTAL	9

- 3311. Electronics I (3:3:0).** Prerequisite: E E 3302. Introduction to electronic devices, amplifiers, and electronic systems. Principles of electronic circuit design and analysis.
- 3312. Electronics II (3:3:0).** Prerequisite: E E 3311 and 3303, Phase III standing in electrical or computer engineering. For majors only or departmental consent. Integrated circuit amplifier design. Power and other special purpose amplifiers.
- 3323. Principles of Communication Systems (3:3:0).** Prerequisite: EE 3303, 3311, MATH 3342 or IE 3341, and Phase III standing in electrical or computer engineering. For majors only or departmental consent. Random processes and spectral densities. Fourier Transforms and linear systems concepts. Amplitude, phase angle, and pulse modulation communication systems.
- 3331. Project Laboratory I (3:0:9).** Prerequisite: ENGL 1302, CHEM 1307, PHYS 1408, EE 3362 and EE 3302. A laboratory course to accompany second-year basic courses in electrical or computer engineering.
- 3332. Project Laboratory II (3:0:9).** Prerequisite: EE 3303, 3311 3331 and phase III standing in electrical or computer engineering. For majors only or departmental consent. A laboratory course to accompany third-year basic courses in electrical engineering.
- 3333. Project Laboratory III (3:0:9).** Prerequisite: EE 3312, EE 3323, EE 3332, PHYS 2401 and Phase III standing in electrical engineering. For majors only or departmental consent. A laboratory course to accompany third-year basic courses in electrical or computer engineering.

- 3334. Computer Engineering Project Laboratory (3:0:9).** Prerequisite: EE 3303, 3311 3331, CS 2365 and phase III standing in computer engineering. For majors only or departmental consent. A laboratory course to accompany third-year basic courses in computer engineering.
- 3341. Electromagnetic Theory I (3:3:0).** Prerequisite: E E 3303 and PHYS 2301, Phase III standing in electrical or computer engineering. For majors only or departmental consent. Vector analysis. Partial differential equations. General treatment of static, electric, and magnetic fields from the vector viewpoint.
- 3342. Electromagnetic Theory II (3:3:0).** Prerequisite: E E 3341, Phase III standing in electrical engineering. For majors only or departmental consent. General solutions for Maxwell's equations. Traveling waves in scalar media. Boundary conditions and constraints imposed by bounding surfaces.
- 3353. Feedback Control Systems (3:3:0).** Prerequisite: E E 3312 and Phase III standing in electrical or computer engineering. For majors only or departmental consent. An introduction to the analysis and design of automatic control systems. Control system concepts. Controller design and digital control.
- 3360. Engineering Technical Communications (3:3:0).** Prerequisite: ENGL 1302, junior standing, and consent of instructor. For majors only or departmental consent. Written and oral communication techniques for professional engineers. Presentation of engineering projects, experimental data, and interpretation of results.
- 3362. Digital Design Using Microcontrollers (3:3:0).** Prerequisite: E E 2372. Advanced digital systems design. Assembly language programming, interfacing, and applications of microcontrollers.
- 4310. Introduction to VLSI Design (3:3:0).** For majors only or departmental consent. A basic introduction to large-scale integrated design of circuits and devices. Geometrical patterns of semiconductor devices on a chip, Mos circuits, masking and patterning, and automation tools.
- 4314. Solid State Devices (3:3:0).** Prerequisite: E E 3312 and 3341. For majors only or departmental consent. Principles and properties of semiconductor devices and optical devices. Thyristors and other switches. Integrated circuit devices. Device modeling.
- 4316. Power Electronics (3:3:0).** Prerequisite: E E 3353. For majors only or departmental consent. Switch mode power conversion, power supplies, inverters, motor drives, power semiconductor devices, and magnetics. System analysis, design, and modeling.
- 4321. Applications of Analog Integrated Circuits (3:3:0).** Prerequisite: E E 3312. For majors only or departmental consent. Principles involved in designing analog integrated circuits. Device physics, small signal, and large signal models. Biasing and basic circuit building blocks. Applications.
- 4323. Modern Communication Circuits (3:3:0).** Prerequisite: E E 3312, 3323. For majors only or departmental consent. Analysis and design techniques for modern communication circuits.
- 4324. Computer-Aided Circuit Analysis (3:3:0).** Prerequisite: E E 3353. For majors only or departmental consent. Development, implementation, and application of advanced circuit and system models for the design of integrated circuits. Designed to enhanced design skills through direct application of computer-aided analysis tools.
- 4325. Telecommunication Networks (3:3:0).** Prerequisite: E E 3323. For majors only or departmental consent. Networking and standards. Data and voice network architectures, cellular, satellite and telephone networks. Open network architecture, ISDN, transport and network layer protocols. Network modeling and optimization. Queuing theory.
- 4331. Special Problems in Electrical Engineering (3).** Prerequisite: Approval of department chairperson. For majors only or departmental consent. Individual studies in advanced engineering areas of special interest. May be repeated for credit.
- 4333. Project Laboratory IV (3:0:9).** Prerequisite: EE 3333 EE 3341 and phase III standing in electrical or computer engineering. For majors only or departmental consent. A laboratory course to accompany fourth-year basic courses in electrical or computer engineering.
- 4334. Project Laboratory V (3:0:9).** Prerequisite: E E 4333. For majors only or departmental consent. A laboratory course to accompany fourth-year courses in electrical or computer engineering.
- 4342. Microwave Solid-State Circuits (3:3:0).** Prerequisite: E E 3312 and 3342. For majors only or departmental consent. Study of microwave electronics and design at the device and solid-state circuit level. Circuit design issues such as transistor-based amplifier design, noise, broadband, and high-power considerations, and microwave oscillators. Device topics to be included are special diodes, avalanche devices, and other active devices.
- 4343. Introduction to Power Systems (3:3:0).** Prerequisite: E E 3341. For majors only or departmental consent. Electrical power transmission and distribution systems; power generation systems; system modeling, planning, management and protection.
- 4344. Antennas and Radiating Systems (3:3:0).** For majors only or departmental consent. Antenna fundamentals, calculations of impedance, reciprocity, uniformly spaced arrays, aperture radiation, Juygen's principle, Babinet's principle, parabolic and spherical reflectors, aperture synthesis, multipole radiation.
- 4345. Pulsed Power (3:3:0).** Prerequisite: E E 3342. For majors only or departmental consent. Fundamentals of pulsed power circuits, components, and systems. Pulse forming lines, energy storage, voltage multipliers, switching, materials, grounding and shielding, measurements, and applications.
- 4353. Gaseous Electronics (3:3:0).** Prerequisite: E E 3342. For majors only or departmental consent. Kinetic theory of gases, collisions, emission processes, self-sustained discharge, Paschen law, glow discharge, arc discharge, streamers, spark discharge, corona discharge, and gas lasers.
- 4360. Fiber Optic Systems (3:3:0).** Prerequisite: E E 3312 and 3323. For majors only or departmental consent. Optical fibers, couplers, sources, and detectors; applications to communications and sensing.
- 4361. Advanced Communication Systems (3:3:0).** Prerequisite: E E 3323. For majors only or departmental consent. Information transmission in electronic systems. Random variables and stochastic processes, noise in analog and digital modulation systems, optimal receivers.
- 4362. Modern Optics for Engineers (3:3:0).** Prerequisite: E E 3323, 3342. For majors only or departmental consent. Modern concepts in optics related to engineering applications. Geometrical, physical, and quantum optics; Fourier optics, holography, and image processing.
- 4364. Digital Signal Processing (3:3:0).** Prerequisite: E E 3323. For majors only or departmental consent. An introduction to digital signal processing. Sampling, z-transform, discrete and fast Fourier transforms, flowgraphs, design techniques for digital filters, effects of finite word length, and applications.
- 4367. Image Processing (3:3:0).** Prerequisite: E E 3323. For majors only or departmental consent. Imaging fundamentals. Linear operators in both spatial-frequency domains. Image enhancement and restoration techniques. Analysis and coding of images.
- 4368. Advanced Control Systems (3:3:0).** Prerequisite: E E 3353. For majors only or departmental consent. Analysis and design of advanced control systems including optimal, nonlinear, multiple-input multiple-output, digital, fuzzy logic, and neural network control.
- 4375. Microprocessor Architecture (3:3:0).** Prerequisite: EE 3362 and Phase III standing in electrical or computer engineering. For majors only or departmental consent. Processor structure and architecture, processors as building blocks, processor based digital systems, system design and evaluation.
- 4381. VLSI Processing (3:3:0).** Prerequisite: PHYS 2301 and MATH 3350. For majors only or departmental consent. Introduction to the physical principles, techniques, and technologies involved with the fabrication of very large scale integrated circuits (VLSI).
- 4382. Digital IC Analysis and Design (3:3:0).** Prerequisite: E E 3312, 3362. For majors only or departmental consent. Design of VLSI digital integrated circuits including basic device theory and processing technologies.
- 4385. Introduction to Microsystems I (3:3:0).** For majors only or departmental consent. Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces microsystem design, analysis, simulation, and manufacture through several case studies using representative devices.
- 4386. Introduction to Microsystems II (3:3:0).** Prerequisite: E E 4385. For majors only or departmental consent. Application of microfabrication to create microsensor systems. Integration of optics, optoelectronics, and microfluids. Includes other MEMS projects.

4391. **Electric Machines and Drives (3:3:0)**. Prerequisite: E E 3353. For majors only or departmental consent. Analysis and control of DC machines and induction machines. Space vector theory. Field oriented control. Modeling of machine and controller dynamics.

Graduate Courses

5120. **Electrical Engineering Graduate Seminar (1:1:0)**. Discussion will concern present research conducted in electrical engineering and other topics of interest to electrical engineers.
5301. **General Electrical Engineering (3:3:0)**. Prerequisite: Consent of instructor. Introduction and application of a wide range of electrical engineering topics; includes such subjects as circuit analysis, electronics, digital systems, communications, and related systems.
5310. **Introduction to VLSI Design (3:2:3)**. A basic introduction to very large-scale integrated (VLSI) design of circuits and devices. Geometrical patterns of semiconductor devices on a chip, MOS circuits, masking and patterning, and automation tools.
5312. **Low Power VLSI (3:3:0)**. Advanced and low power CMOS processes and devices, modeling and simulation, low power design, power management, and systems-on-a-chip integration issues.
5314. **Solid State Devices (3:2:3)**. Semiconductor materials and band theory of solids. Physics of semiconductor devices, charge transport, pn junctions, diodes, bipolar junction transistors, optoelectronic devices, and MOS devices.
5316. **Power Electronics (3:3:0)**. Switch mode power conversion, converters and inverters, power supplies and regulators, and power semiconductor circuits.
5321. **Design and Analysis of Analog Integrated Circuits (3:3:0)**. Principles involved in designing analog integrated circuits. Device physics, small signal, and large signal models. Biasing and basic circuit building blocks. Applications.
5323. **Modern Communication Circuits (3:3:0)**. Analysis and design techniques for modern communication circuits.
5324. **Computer-Aided Circuit Analysis (3:3:0)**. Development, implementation, and application of advanced circuit models for the design of integrated circuits. Designed to enhance design skills through direct application of computer-aided analysis tools.
5325. **Telecommunication Networks (3:3:0)**. Networking and standards. Data and voice network architectures, cellular, satellite and telephone networks. Open network architecture, ISDN, transport and network layer protocols. Network modeling and optimization. Queuing theory.
5328. **Statistical Theory of Communications (3:3:0)**. Probability review, functions of random variables, density and distribution functions, random processes, correlations, power spectral density, linear systems with random inputs, mean square estimation, matched filters.
5331. **Individual Studies in Engineering Applications (3:3:0)**. Prerequisite: Graduate standing in engineering. An individual study course involving a rigorous theoretical investigation of some aspect of an engineering problem of current interest. A formal report is required.
5332. **Topics in Electrical Engineering (3:3:0)**. The course will elaborate on a special topic of current interest in electrical engineering. May be repeated for credit.
5342. **Microwave Solid State Circuits (3:3:0)**. Study of microwave electronics and design at the device and solid-state circuit level. Circuit design issues such as transistor-based amplifier design, noise, broadband, and high power considerations, and microwave oscillators. Special diodes, avalanche devices, and other active devices.
5343. **Power Systems Engineering (3:3:0)**. Electrical power transmission and distribution systems; power generation systems; system modeling, planning, management and protection.
5344. **Antennas and Radiating Systems (3:3:0)**. Prerequisite: Consent of instructor. Antenna fundamentals, calculation of impedance, reciprocity, uniformly spaced arrays, aperture radiation, Huygen's principle, Babinet's principle, parabolic and spherical reflectors, aperture synthesis, multipole radiation.
5345. **Pulsed Power (3:3:0)**. Fundamentals of pulsed power circuits, components, and systems. Pulse forming lines, energy storage, voltage multipliers, switching, materials, grounding and shielding, measurements, and applications.
5353. **Gaseous Electronics (3:3:0)**. Kinetic theory of gases. Collisions. Emission processes. Self sustained discharge. Paschen law. Glow discharge. Arc discharge. Streamers. Spark discharge. Corona discharge. Gas lasers.
5360. **Fiber Optic Systems (3:3:0)**. Optical fibers, couplers, sources, and detectors; applications to communications and sensing. Integrated optics.
5361. **Advanced Communication Systems (3:3:0)**. Information transmission in electronic systems. Random variables and stochastic processes, noise in analog and digital modulation systems, and optimal receivers.
5362. **Modern Optics (3:3:0)**. Modern concepts in optics related to engineering applications. Geometrical, physical, and quantum optics; Fourier optics, holography, and image processing.
5363. **Linear System Analysis and Design (3:3:0)**. Basic properties of systems described by linear dynamical equations. Controllability, observability, stability, equivalence transformations.
5364. **Digital Signal Processing (3:3:0)**. An introduction to digital signal processing. Sampling, z-transform, discrete and fast Fourier transforms, flowgraphs, design techniques for digital filters, effects of finite word length and applications.
5365. **Parametric and Functional Device Testing (3:3:0)**. Fundamentals of semiconductor device chip and wafer testing. Parametric and functional tests, test philosophy, C programming for testing, and commercial wafer level testers.
5366. **Testing of Digital Systems (3:3:0)**. Prerequisite: Consent of instructor. High-level test synthesis, fault modeling and diagnosis, design for test, built-in self-test, test code generation, and applications.
5367. **Image Processing (3:3:0)**. Imaging fundamentals. Linear operators in spatial and spatial-frequency domains. Image enhancement and restoration techniques. Analysis and coding of images.
5368. **Advanced Control Systems (3:3:0)**. An introduction to advanced control systems. Optimal, adaptive, and robust control of linear and nonlinear systems. Fuzzy logic and neural network applications to control systems.
5371. **Engineering Analysis (3:3:0)**. Prerequisite: MATH 3350 or its equivalent. Application of mathematical methods and algorithms to engineering problems, stochastic linear system models, vector spaces and operators, orthogonality principle and its applications, adaptive filtering, matrix factorizational application of eigendecomposition methods.
5375. **Microprocessor Architecture (3:3:0)**. Processor structure and architecture, processors as building blocks, processor based digital systems, system design and evaluation.
5376. **System Modeling and Simulation (3:3:0)**. Mixed-signal system specification, behavioral modeling and analysis, functional modeling and analysis, mixed-signal system design, and evaluation.
5381. **Introduction to Semiconductor Processing (3:2:3)**. Introduction to the physical principles, techniques, and technologies involved with the fabrication of very large scale integrated circuits (VLSI).
5382. **Advanced Digital System Design (3:3:0)**. Advanced VLSI design. Computer arithmetic. High speed computation. Digital hardware design. CAD tools for VLSI design.
5385. **Introduction to Microsystems I (3:3:0)**. The basic Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces basic microsystem design, analysis, simulation, and manufacture through several case studies using representative devices.
5386. **Introduction to Microsystems II (3:3:0)**. Prerequisite: E E 5385. Application of microfabrication to create microsensor systems. Integration of optics, optoelectronics and microfluids. Includes other MEMS projects.
5391. **Electric Machines and Drives (3:3:0)**. Analysis and control of DC machines and induction machines. Space vector theory. Field oriented control. Modeling of machine and controller dynamics.
6000. **Master's Thesis (V1-6)**.
6351. **Physical Electronics (3:3:0)**. Prerequisite: E E 5352 or consent of instructor. Fundamentals of solid state physics relevant to device applications. Semiconductors, dielectrics, ferroelectricity, ferromagnetics, and superconductors. Laser devices, applications, and engineering of lasers.
6360. **Computer Vision and Image Reconstruction (3:3:0)**. Theories of image formation and reconstruction. Reconstruction problems in tomography, magnetic resonance imaging, synthetic aperture radar, and other modalities of imaging.
6363. **Adaptive Pattern Recognition (3:3:0)**. Prerequisite: E E 5328. Adaptive approaches to the design of discriminant

functions for pattern classification and recognition. Statistical, syntactic, neural networks and fuzzy-set based optimization constraints for discriminants.

6365. **Topics in Advanced Communications (3:3:0).** Applications of detection and estimation theory in the design of optimum communication systems.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**

Engineering Physics Program

Faculty

James M. Gregory, Coordinator; Charles W. Myles, Director; and Timothy Dallas, Director.

Horn Professors: Kristiansen and Menzel; **Professors:** Gangopadhyay, Gregory, Hatfield, Holtz, Lichti, Myles, and Trost; **Associate Professors:** Akchurin, Baker, Dunn, Gibson, Lamp, Simon, and Vann; **Assistant Professor:** Dallas and Thacker.

About the Program

The College of Engineering and the Department of Physics supervise the following degree program:

- Bachelor of Science in Engineering Physics

The program, which emphasizes flexibility and personalized advisement, is directed toward students who are seriously interested in the interplay between basic physics and work at the frontiers of engineering development. This program is ideal for students in the Honors College who have a love for physical science. Each degree program must include a distinct engineering specialty that provides a cohesive set of engineering courses leading through upper level engineering design. Students should review the mission statement and objectives for the department providing the engineering specialty.

Undergraduate Program

The engineering physics program is a cooperative effort of the College of Engineering and the Department of Physics in the College of Arts and Sciences. Graduates are prepared for advanced study in both engineering and physics.

Mission. The mission of the engineering physics program is to develop students into professionals with in-depth knowledge and skills in mathematics, science, and engineering to understand physical systems and to research, design, and solve problems in the context of societal and community needs.

Educational Goal and Objectives. Engineering physics is a unique program with three educational goals:

- Provide an in-depth knowledge of physical laws, principles, and material properties of physical systems to prepare graduates to work in either a research or industrial setting;
- Meet the educational objectives of the engineering program in which the option is selected; and
- Provide courses and experiences that develop students who have the professional skills to practice engineering.

The constituencies of the engineering physics program have established six specific educational objectives enabling graduates to:

- Identify and understand the fundamental physical principles underlying engineering devices and processes necessary to become successful engineers and lifelong learners;
- Evaluate engineering problems and solutions on the basis of fundamental scientific principles;
- Understand and know how to apply the basic physical limitations inherent in all real tools, instruments, and engineering processes;
- Apply a broad, generalist background of fundamental physics common to all engineering disciplines;
- Work in teams to research, design, and solve problems of a physical nature and to communicate effectively both internally and externally to the team; and
- Practice engineering with a commitment to professional, scientific, and ethical responsibility.

System Engineering (S E)

(To interpret course descriptions, see pg. 10.)

5301. **System Engineering Processes (3:3:0).** An introduction to the system engineering process and practice required in response to federal government procurements. The topics are applicable to the development and marketing of electro-mechanical products and associated supporting software.

In the first semester of their freshman year, students should consult the advisor in the particular engineering department in which they expect to specialize. No later than the first semester of the junior year, students must file a degree plan approved by the engineering advisor, the physics advisor, and the Dean of the College of Engineering. Students, in consultation with the physics advisor and the engineering advisor, select the courses to be used for the electives shown in the curriculum tables in this section. This allows considerable flexibility to accommodate the various programs available in the engineering departments.

A student majoring in Engineering Physics must complete all Phase I courses with a minimum grade of C as specified for all engineering majors. The student must then petition the program coordinator to enter Phase II. The criteria for the student to successfully complete Phase II are determined by the engineering department in which the student has chosen to specialize. The requirements are available from the departments. Successful completion of Phase II allows the student to petition for entrance to Phase III, once again subject to the stipulations of the specialty department.

Engineering Physics Curriculum Electrical Engineering Option

FIRST YEAR			
Fall		Spring	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1305, Eng. Phys. Anal. I	3	PHYS 2401, Prin. Phys. II	4
PHYS 1408, Prin. Phys. I	4	E E 2372, Mod. Dig. Sys. Des.	3
ENGL 1301, Ess. Coll. Rhetoric	3	E E 1304, Intro. Elec. Comp. Eng.	3
POLS 1301, Amer. Govt., Org.	3	ENGL 1302, Adv. Coll. Rhetoric	3
TOTAL	16	TOTAL	16
SECOND YEAR			
Fall		Spring	
MATH 2350, Calculus III	3	MATH 3350, Math. for Engrs. I	3
PHYS 2402, Prin. Phys. III	4	E E 2331, Proj. Lab. I	3
E E 3302, Fund. of Elec. Eng.	3	E E 3303, Linear Sys.	3
E E 3362, Eng. Appr. to Dig. Des.	3	Elective (Prob. & Stat.)	3
CHEM 1307, Prin. Chem. I	3	E E 3311, Electronics I	3
CHEM 1107, Prin. of Chem. I (Lab)	1	TOTAL	15
TOTAL	17		
THIRD YEAR			
Fall		Spring	
PHYS 3305, Elect & Mag.	3	PHYS 3204, Intermed. Lab.	2
E E 3312, Electronics II	3	PHYS 3306, Elec. and Magnet.	3
E E 3323, Prin. of Comm. Sys.	3	E E 3333, Proj. Lab. III	3
E E 3332, Proj. Lab. II	3	Elective (Vis. Perf. Arts)	3
Elective (Engineering)**	3	POLS 2302, Amer. Pub. Pol.*	3
PETR 3308, Engr. Comm.	3	Elective (History)	3
TOTAL	18	TOTAL	17
FOURTH YEAR			
Fall		Spring	
PHYS 4307, Intro. Quant. Mech.	3	PHYS 4304, Mechanics	3
E E 4333, Proj. Lab IV	3	PHYS 4302, Statist. Therm. Phys.	3
PHYS 4306, Senior Project	3	or PHYS 4309, Solid State Physics	3
Elective (Engineering)**	3	E E 4334, Proj. Lab. V	3
Elective (History)	3	Elective (Indiv. and Group Behav.)	3
TOTAL	15	Elective (Hum. and Fine Arts)	3
		TOTAL	15

* Any approved political science course may be substituted.

** Non-electrical engineering.

Engineering Physics Curriculum Civil Engineering Structures Option

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1305, Eng. Phys. Anal. I	3	PHYS 2401, Prin. Phys. II	4
PHYS 1408, Prin. Phys. I	4	CHEM 1307, Prin. of Chem. I	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1107, Prin. of Chem. I (Lab)	1
POLS 1301, Amer. Govt., Org.	3	ENGL 1302, Adv. Coll. Rhetoric	3
TOTAL	16	POLS 2302, Amer. Pub. Pol.	3
		TOTAL	17

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calculus III	3	MATH 3350, Math. Engrs. & Scient.	3
PHYS 2402, Prin. Phys. III	4	C E 3303, Mech. of Solids	3
CHEM 1308, Prin. of Chem. II	3	I E 3301, Engr. Eco. Anal.	3
CHEM 1108, Prin. of Chem. II (Lab)	1	M E 2322 or CH E 3321 Eng. Ther.	3
C E 2301, Statics	3	C E 2101, Const. Materials (Lab)	1
Elective (Vis. Perf. Arts)	3	Elective (History)	3
TOTAL	17	TOTAL	16

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 3305, Elect & Mag.	3	PHYS 3306, Elect. & Mag. II	3
C E 3305, Mech. of Fluids	3	C E 3341, Prin. of Struct. Des.	3
C E 3440, Structural Analysis	4	C E 3321, Intro. Geotech. Eng.	3
C E 3130, Civil Eng. Seminar	1	C E 4340, Structural Analysis II	3
C E 3103, Mech. of Solids (Lab)	1	PHYS 3204, Intermed. Lab.	2
PETR 3308, Eng. Comm.	3	C E 3121, Geotech. Eng. (Lab)	1
TOTAL	15	TOTAL	15

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 4307, Intro. Quant. Mech.	3	PHYS 4305, Mechanics	3
or PHYS 3301, Optics		PHYS 4302, Stat. & Them. Phys.	3
PHYS 4306, Senior Project	3	C E 4330, Des. Eng. Systems	3
C E 4343, Des. Concrete Struc.	3	Elective (Hum. and Fine Arts)	3
C E 4321, Geotech. Eng. Des.	3	Elective (History)	3
C E 4342, Des. of Steel Struc.	3	TOTAL	15
TOTAL	15		

Engineering Physics Curriculum Civil Engineering Environmental Option

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1305, Eng. Phys. Anal. I or PHYS 1408, Prin. Phys. I	4	PHYS 2401, Prin. Phys. II	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1307, Prin. of Chem. I	3
POLS 1301, Amer. Govt., Org.	3	CHEM 1107, Prin. of Chem. I (Lab)	1
TOTAL	13	ENGL 1302, Adv. Coll. Rhetoric	3
		POLS 2302, Amer. Pub. Pol.	3
		TOTAL	17

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calculus III	3	MATH 3350, Math. Engrs. & Sci.	3
PHYS 2402, Prin. Phys. III	4	C E 3303, Mech. of Solids	3
CHEM 1308, Prin. of Chem. II	3	I E 3301, Engr. Eco. Anal.	3
CHEM 1108, Prin. of Chem. II (Lab)	1	M E 2322 or CH E 3321 Eng. Ther.	3
C E 2301, Statics	3	Elective (History)	3
Elective (History)	3	TOTAL	15
TOTAL	17		

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 3305, Elect & Mag.	3	PHYS 3306, Elect. & Mag. II	3
C E 3305, Mech. of Fluids	3	PHYS 3204, Intermed. Lab	2
C E 3440, Structural Analysis	4	C E 3309, Environmental Eng.	3
PETR 3308, Eng. Comm.	3	C E 3321, Intro. Geotech. Eng.	3
TOTAL	13	C E 3121, Geotech. Eng. (Lab)	1
		C E 3171, Environmental Eng. (Lab)	1
		C E 3354, Engineering Hydrology	3
		C E 3105 Mech. Fluids (Lab)	1
		TOTAL	17

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 4307, Intro. Quant. Mech.	3	PHYS 4304 Mechanics	3
or PHYS 3301, Optics		PHYS 4302, Stat. & Them. Phys.	3
PHYS 4306, Senior Project	3	C E 4330, Des. Eng. Systems	3
C E 3372, Water Sys. Des.	3	Elective (Vis. Perf. Arts)	3
C E 4353, Des. Hydraulic Sys.	3	TOTAL	12
ENVE 4391 or 4399	3		
Elective (Hum. and Fine Arts)	3		
TOTAL	18		

Engineering Physics Curriculum Chemical Engineering Option

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1408, Prin. Phys. I	4	PHYS 1305, Eng. Phys. Anal. I or	3
CHEM 1307, Prin. of Chem. I	3	CH E 1305, Eng. Anal.	3
CHEM 1107, Prin. of Chem. I (Lab)	1	PHYS 2401, Prin. Phys. II	4
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1308, Prin. of Chem. II	3
POLS 1301, Amer. Govt., Org.	3	CHEM 1108, Prin. of Chem. II (Lab)	1
TOTAL	17	ENGL 1302, Adv. Coll. Rhetoric	3
		TOTAL	17

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calculus III	3	MATH 3350, Math. Engrs. & Sci.	3
PHYS 2402, Prin. Phys. III	4	PHYS 3204, Intermed. Lab.	2
CH E 2410, Intro. Chem. Proc.	4	CH E 2306, Expos. Tech. Info.	3
CHEM 3305, Organic Chem I	3	CH E 2421, Chem. Eng. Thermo. I	4
POLS 2302, Amer. Pub. Pol.	3	CHEM 3105, Organic Chem I (Lab)	1
TOTAL	17	Elective (History)	3
		TOTAL	16

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 3305, Elect. & Mag.	3	PHYS 3306, Elect. & Mag. II	3
CH E 3315, Fluid Mechanics	3	PHYS 4302, Stat. & Them. Phys.	3
CH E 3322, Che. Engr. Thermo II	3	CH E 3232, Transport Lab	2
CH E 3326, Heat Transfer	3	CH E 3341 Mass-Trans. Operations	3
Elective (History)	3	CH E 3353, Process Control	3
TOTAL	15	Elective (Visual/Perf. Arts)	3
		TOTAL	17

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 4306, Senior Project	3	PHYS 4304, Mechanics	3
PHYS 4307, Intro. Quant. Mech. or		CH E 3330, Materials	3
PHYS 3301, Optics	3	CH E 4554, Chem. Eng. Plant Des.	5
CH E 4232, Unit Oper. Lab. I	2	Chemical Engineering Elective	3
CH E 4323, Chem. Reaction Eng.	3	Elective (Ind. and Group Behav.)	3
I E 3301 Eng. Econ. Anal.	3	TOTAL	17
Elective (Humanities/Multicultural)	3		
TOTAL	17		

Engineering Physics Curriculum Industrial Engineering Option

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1305, Eng. Phys. Anal. I	3	PHYS 2401, Prin. Phys. II	4
PHYS 1408, Prin. Phys. I	4	CHEM 1307, Prin. of Chem. I	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1107, Prin. of Chem. I (Lab)	1
POLS 1301, Amer. Govt., Org.	3	I E 2351, Prin. of Ind. Auto	3
TOTAL	16	E GR 1306, Engr. Graphics	3
		TOTAL	17

SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calculus III	3	PHYS 3204, Intermed. Lab.	2
PHYS 2402, Prin. Phys. III	4	MATH 3350, Math. Engrs. & Sci.	3
CHEM 1308, Prin. of Chem. II	3	I E 2301, Engr. Des. Prod.	3
CHEM 1108, Prin. of Chem. II (Lab)	1	I E 3301, Engr. Eco. Anal.	3
C E 2301, Statics	3	M E 3321 or CH E 3321 Thermo.	3
ENGL 1302, Adv. Coll. Rhetoric	3	POLS 2302, Amer. Pub. Pol.	3
TOTAL	17	TOTAL	17

THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 3305, Elec. & Mag.	3	PHYS 3306, Elect. & Mag. II	3
I E 3351, Manuf. Engr.	3	I E 3311, Op. Research I	3
I E 3341, Engr. Stat.	3	I E 3371, Production Contr.	3
I E 3361, Work Anal. & Des.	3	I E 3372, Mat. Syst. Contr.	3
Elective (History)	3	COMS 3308, Bus. and Prof. Comm.	3
TOTAL	15	Elective (History)	3
		TOTAL	18

FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 4307, Intro. Quan. Mech.	3	PHYS 4305, Mechanics	3
or PHYS 3301, Optics		PHYS 4302, Stat. & Them. Phys.	3
PHYS 4306, Senior Project	3	I E 4333, Senior Des. Project	3
I E 4311, Oper. Res. II	3	I E 4362, Industrial Ergonomics	3
I E 4361, Engr. Des. for People	3	Elective (Hum. and Fine Arts)	3
Elective (Hum. and Fine Arts)	3	TOTAL	15
TOTAL	15		

Engineering Physics Curriculum Mechanical Engineering Option

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
PHYS 1305, Eng. Phys. Anal. I	3	PHYS 2401, Prin. Phys. II	4
PHYS 1408, Prin. Phys. I	4	CHEM 1307, Prin. of Chem. I	3
ENGL 1301, Ess. Coll. Rhetoric	3	CHEM 1107, Prin. of Chem. I (Lab)	1
POLS 1301, Amer. Govt., Org.	3	ENGL 1302, Adv. College Rhet.	3
TOTAL	16	E GR 1306, Engr. Graphics	3
		TOTAL	17
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calculus III	3	PHYS 3204, Intermed. Lab.	2
PHYS 2402, Prin. Phys. III	4	MATH 3350, Math. Engrs. & Scient.	3
CHEM 1308, Prin. of Chem. II	3	M E 2322, Engr. Thermo. I	3
CHEM 1108, Prin. of Chem. II (Lab)	1	or CH E 3321, Engr. Thermo.	
M E 2315, Comp. Aided Anal.	3	I E 3301, Engr. Eco. Anal.	3
Elective (History)	3	M E 2364, Mechanics I	3
TOTAL	17	TOTAL	14
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 3305, Elec. & Mag.	3	PHYS 3306, Elect. & Mag. II	3
M E 3364, Intro. to Mech. Des.	3	M E 3371, Heat Transfer	3
M E 3164, Eng. Mech. II Lab.	1	M E 3311, Materials Science	3
M E 3370, Fluid Mechanics	3	M E 3322, Engr. Thermo. II	3
E E 3302, Fund. of Elec. Engr.	3	COMS 3358, Bus. and Prof. Comm.	3
POLS 2302, Amer. Pub. Pol.	3	M E 3465, Intro. to Design	4
TOTAL	16	TOTAL	19
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
PHYS 4307, Intro. Quan. Mech. or PHYS 3301, Optics	3	PHYS 4304, Mechanics	3
PHYS 4306, Senior Project	3	PHYS 4302, Stat. & Them. Phys.	3
M E 4370, Design I	3	M E 4371, Design II	3
M E 3433, Systems & Vibrations	4	Elective (History)	3
E E Elective (2372, 3303, or 3311)	3	Elective (Vis. & Perf. Arts)	3
Elective (Hum. and Fine Arts)	3	TOTAL	15
Multicultural Elective	3		
TOTAL	22		



Department of Engineering Technology

Faculty

Larry B. Masten, Chairperson

Professor: Masten and Pigott; *Associate Professors:* Alayyan, Burkett, Ernst, Green, and Reynolds; *Assistant Professors:* Akram, Darwish, and Liang; *Lecturers:* Hubbard, Potter, and Reeder.

About the Program

This department supervises the following degree program:

- Bachelor of Science in Engineering Technology

Students may select course work in one of three areas of specialization—construction, electrical-electronics, or mechanical engineering technology. All three options are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology. This department also supervises engineering technology options in the Master of Engineering degree program.

Undergraduate Program

The engineering technologist generally works in the applied part of the engineering spectrum and is playing an increasingly important role in our technological society. Rather than preparing students to go into research, the engineering technology program prepares students for those engineering activities that emphasize applying engineering knowledge to solving practical industrial problems. The activities of the engineering technologist usually include product development, construction supervision, technical sales, component design, field service engineering, work force coordination, and supervision.

The curriculum in engineering technology consists of a basic core of about 60 semester hours of specified courses. These courses in basic science, humanities, social studies, mathematics, and applied science give a foundation in technology and general education. The remaining 68-69 hours of required course work vary with the student's choice of an engineering technology area and

electives. The program specializations allow in-depth training in the student's chosen field.

The construction specialization stresses basic structural design and construction operations to prepare students to enter various phases of the construction industry. Course work includes basic structural design and analysis, contracts and specifications, construction management, safety and health, surveying, cost estimating, scheduling, and transportation.

The curriculum in electrical-electronics engineering technology is designed to bring the student to a high level of understanding of the body of engineering and scientific knowledge within the broad scope of electrical engineering, but with emphasis upon the application of this knowledge to current industrial practices. The program prepares students to work in all phases of development, design, production, and maintenance in the field of communication, automatic controls, digital systems, computers, instrumentation, and others.

Mechanical engineering technology is concerned with energy, mechanical devices, and manufacturing. The curriculum gives a good base for further learning, via industrial experience, in all of these areas. The curriculum emphasizes environmental control (heating, ventilating, cooling, and humidity control), steam-powered electric generating plants, and mechanical design. Both environmental control and steam power plants offer relatively stable employment, and many engineering technology graduates have obtained jobs in these areas. In the area of mechanical devices, courses in strength of materials, kinematics, dynamics, and design are offered. These courses equip the student to create a mechanical device that will perform the desired function and then design the parts of the mechanical device with sufficient strength to perform that function, including balancing the mechanical device to provide smooth operation. To provide an understanding of manufacturing and of the current industrial practices, the curriculum includes instruction in various types of machine tools and manufacturing processes as well as an introduction to numerical control.

Students are required to plan their program in consultation with faculty advisors. Emphasis on communication skills requires the inclusion of engineering communications (PETR 3308).

Engineering technology students may pursue a minor in virtually any field of study at Texas Tech. The minor must consist of a minimum of 18 hours, with at least 6 of those hours being junior or senior level courses.

A minor in engineering technology is available by completing 18 hours of selected engineering technology courses. The appropriate engineering technology advisor should be consulted for a list of approved courses.

To obtain a degree in engineering technology, transfer students must complete at least 30 credit hours of engineering technology courses in their discipline.

All students must have a personal computer and should check with the department to obtain recommended specifications.

Once a student has elected to take the State Board FE Exam, that student is then obligated to pass the exam in order to graduate.

If a student obtains a grade of D or less in a given course twice, or drops a given course twice, or obtains a D or less once and withdraws once, then the student will be required, with the help of the department secretary, to set up a meeting with the student's advisor, the course instructor, and the department chairperson prior to registration for the next semester or summer session. The meeting will focus on how the student can be helped to succeed and the following actions will be considered:

- The student will be counseled on how to improve performance.
- The student will be required to take courses that he may have already passed or received transfer credit for in order to correct a deficiency that is identified as hindering the student's progress.
- The student will be required to take a time management course at the PASS center.
- The student will be required to take XL 0201 (Strategies for Learning).

Students failing to set up the meeting will have a transcript and registration hold entered on their record. If a student obtains a grade of D or less in a given course, drops a given course, or some combination of these three times, then the student may be required to transfer to the Bachelor of Arts in Engineering program.

The department's mission to provide educational opportunities to a greater cross-section of the state's population includes the following objectives:

- To provide high-quality engineering technology programs with appeal to a broad range of students including traditional students, under-represented populations, and the by-passed learner. (The by-passed learner is one who has two or more of the following characteristics: Was not a great success in high school, was not planning to attend post-secondary education after high school, has been away from school for some time, or is a first-generation collegian. Very often these students have the ability and desire to do very well in Engineering Technology. The foundational curriculum at the beginning of

the programs, the supportive faculty, and the instructional environment make the engineering technology programs more attractive to the by-passed learner than traditional engineering programs.)

- To provide programs that reflect the needs of industry worldwide.
- To provide the support necessary for students to develop their intellectual capacities, technical competencies, and social responsibilities.
- To have faculty who perform independent applied research and/or consulting that will add depth, quality, and practical experience to the department.
- To continuously improve the programs in order to correlate with the type and rate of change in the global marketplace.

Internship. The Department of Engineering Technology believes that its students benefit greatly from participation in an internship program. One of the major benefits is improved full-time employment opportunities after graduation. Accordingly, all engineering technology students are required to complete

at least the equivalent of three months of full-time work of an appropriate nature in order to graduate. However, part-time work of an appropriate nature conducted during the regular semester also will be considered. Students must enroll in GTEC 4300 while pursuing the internship.

Credit by Exam. In addition to standard transfer credits, the department will permit students to receive credit for some courses in the curriculum if they can demonstrate proficiency in that area by examination. It is the responsibility of the students to petition the department chair for such examination(s) well before they would enroll in the course(s).

The examination for credit for E GR 1306 and 1307, Engineering Graphics, is held only in the fall the first Friday after classes begin. Students must register for the exam in 224 Mechanical Engineering Building, by 5 p.m. the first Wednesday after classes begin for the fall term. Students should have a background in beginning drawing and descriptive geometry.

Engineering Technology Curriculum Construction Specialization

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1350, Analytical Geometry	3	MATH 1351, Calculus I	3
CHEM 1305, Chem. and Society**	3	PHYS 1403, Gen. Phys. I	4
CHEM 1105, Gen. Chem. I (Lab.)**	1	POLS 1301, American Gov't. Org.	3
CTEC 1312, Const. Methods	3	GTEC 1211, Computer Prog.	2
E GR 1307, Engineering Graphics	3	TOTAL	15
TOTAL	16		
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 1352, Calculus II	3	GTEC 3311, Strength of Materials	3
HIST 2300, Hist. of U.S. to 1877	3	GTEC 3412, Fluid Mechanics	4
PHYS 1404, General Physics II	4	GTEC 1312, AC/DC Technology	3
GTEC 2311, Statics	3	ECO 2305, Prin. of Economics**	3
CTEC 2301, Surveying & Surveys	3	POLS 2302, Amer. Public Pol.	3
TOTAL	16	TOTAL	16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MATH 3322, Math for En. Tech.	3	MATH 2300, Statistical Methods	3
PETR 3308, Engineering Comm.	3	HIST 2301, Hist. of U.S. since 1877	3
CTEC 3311, Struct. Analysis	3	CTEC 3302, Transportation Tech.	3
CTEC 3313, Found. & Earthwork	3	CTEC 3103, Materials Msmt. Lab.	1
CTEC 3104, Soil Properties Lab.	1	GTEC 2351, Thermodynamics	3
CTEC 4342, Cost Estimating	3	CTEC 4341, Const. Management	3
TOTAL	16	TOTAL	16
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
CTEC 4312, Steel Structures	3	GTEC 4322, Cost & Prof. Anal.	3
CTEC 4313, Masonry Struc.	3	CTEC 4311, Concrete Structures	3
CTEC 4270 Capstone Design	2	CTEC 4321, Contracts & Specs.	3
CTEC 4331, Special Topics Const.	3	CTEC 4343, Constr. Safety Health	3
Vis. Perf. Arts Elective*	3	Humanities Elective*	3
GTEC 4121, Technology Seminar	1	TOTAL	15
TOTAL	15		

Minimum number of hours required for graduation—128 including internship.

* One of these courses must also meet the multicultural requirement.

** Suitable substitutions can be made with approval of option coordinator.

Electrical–Electronics Specialization**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1350, Analytical Geometry	3	MATH 1351, Calculus I	3
CHEM 1305, Chem. and Society	3	PHYS 1404, Prin. Physics II	4
CHEM 1105, Gen. Chem. I (Lab.)	1	GTEC 1312, AC/DC Technology	3
PHYS 1403, Prin. Physics I	4	E GR 1307, Graphics ACAD	3
POLS 1301, Amer. Govt., Org.	3	GTEC 1211, Technology I	2
TOTAL	17	TOTAL	18

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 1352, Calculus II	3	EET 2312, Optoelec. Devices	3
HIST 2300, Hist. U.S. to 1877	3	EET 2112, Optoelectronics Lab.	1
EET 2301, Linear Elec.	3	GTEC 1351, Thermodynamics	3
EET 2111, Linear Elec. Lab.	1	POLS 2302, American Public Pol.	3
EET 2314, Digital Techn. I	3	HIST 2301, Hist. of U.S. Since 1877	3
EET 2114, Digital Technology I Lab.	1	C S 1303, Prog. Lang. in C/C++	3
GTEC 2311, Statics	3	TOTAL	16
TOTAL	17		

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 3322, Math. for En. Tech.	3	EET 3312, Digital Communications	3
EET 3311, Telecomm. Tech.	3	EET 3112, Digital Comm. Lab.	1
EET 3111, Telecomm. Tech. Lab.	1	EET 3314, Digital Technology II	3
EET 3316, Power Distribution	3	EET 3114, Digital Tech. II Lab	1
EET 3116, Power Distribution Lab.	1	EET 3324, Linear Des. Appls.	3
EET 3321, Prog. Logic Controller	3	EET 3124, Linear Des. Lab	1
EET 3321, Prog. Logic Cont. Lab.	1	PETR 3308, Bus. & Prof. Comm.	3
TOTAL	15	TOTAL	15

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
EET 4317, Adv. Micro-Electronics	3	EET 4353, Control Systems	3
EET 4331, System Des. Lab. I	3	EET 4370, Capstone Design	3
GTEC 4121, Technology Seminar	1	EET 4352, Digital Signal Process	3
Humanities Elective*	3	GTEC 4231, Intro. to Project Mgt.	2
Ind. Group Behavior Elective*	3	Vis. Perf. Arts Elective*	3
TOTAL	13	TOTAL	14

Minimum number or hours required for graduation—128 including internship.
*One of these courses must also meet the multicultural requirement.

Mechanical Specialization**FIRST YEAR**

<i>Fall</i>		<i>Spring</i>	
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MATH 1321, Trigonometry	3	MATH 2322, Anal. Geo. & Calc I	3
CHEM 1305, Chem. and Society	3	PHYS 1403, Gen. Phys. I	4
CHEM 1105, Gen. Chem. I (Lab.)	1	POLS 1301, Amer. Govt., Org.	3
E GR 1306, Engineering Graphics	3	GTEC 1211, Computer Prog.	2
MTEC 1312, Mech. Technology	3	TOTAL	15
TOTAL	16		

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 2323, Calculus II	3	GTEC 3311, Strength of Materials	3
PHYS 1404, Gen. Phys. II	4	MTEC 3370, Intro. Proj. Mgt.	3
GTEC 1312, AC/DC Technology	3	GTEC 2351, Thermodynamics	3
POLS 2302, Amer. Public Policy	3	Humanities Elective	3
GTEC 2311, Statics	3	PETR 3308, Engineering Comm.	3
TOTAL	16	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MTEC 3441, Mat. for Mech. Tech.	4	GTEC 3412, Fluid Mech. & Lab.	4
GTEC 2151, Intro. to Thermo. Lab	1	MTEC 3412, Vap. & Gas Cycl., Lab.	4
HIST 2300, Hist. of U.S. to 1877	3	MTEC 4353, Mech. Design	3
MATH 3322, Math. for En. Tech.	3	HIST 2301, Hist. of U.S. Since 1877	3
MTEC 4351, Mechanisms	3	MTEC 3206, Adv Graphic Des Meth	2
GTEC 4231, Project Mgt.	2	TOTAL	16
TOTAL	16		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
MTEC 4311, AC Design I	3	MTEC 4352, Dynamics	3
MTEC 4321, Mech. Tech. Lab.	3	GTEC 4322, Cost and Prof. Anal.	3
MTEC 4170, Capstone Design I	1	MTEC 4270, Capstone Design II	2
MTEC Elective	3	Elective	3
Visual & Performing Arts Elective	3	MTEC Elective	3
GTEC 4121, Technology Seminar	1	TOTAL	14
Individual or Group Behavior	3		
TOTAL	17		

Minimum number of hours required for graduation—128 including internship.

Construction Engineering Technology (CTEC)

(To interpret course descriptions, see pg. 10.)

- 1312. Construction Methods (3:2:3).** Introduction to the construction environment and construction methods, materials, processes, working drawings, and specifications. Field trips to local construction sites and laboratory construction projects are required.
- 2301. Surveying and Surveys (3:2:3) [ENGR 1307, 1407].** Prerequisite: MATH 1321 or equivalent. Care and use of modern surveying equipment; differential leveling, area calculations; horizontal and vertical curves; effects of observation errors.
- 3103. Materials Measurements Laboratory (1:0:3).** Prerequisite: GTEC 3311. The study and testing of construction materials; including nondestructive methods.
- 3104. Soil Properties Laboratory (1:0:3).** Prerequisite: GTEC 3311. The study and testing of the engineering properties of soils, including field-testing simulations.
- 3302. Transportation Technology (3:3:0).** Prerequisite: CTEC 2301 and GTEC 3412. Design of components of the transportation system needed for modern society with practical examples.
- 3311. Structural Analysis (3:3:0).** Prerequisite: GTEC 3311. Analysis of determinate and indeterminate structural systems.
- 3313. Foundations and Earthwork (3:3:0).** Prerequisite: GTEC 3311. Soil properties, elements of soil mechanics, and the design of foundations for structures.
- 4270. Capstone Design Course (2:1:3).** Prerequisite: CTEC 4341 and 4342. Design and development of construction projects. Projects vary from semester to semester. However, the ASC-Region V Competition is one of the projects. Generally will include cost estimate, scheduling, design, final report and presentation, and working in teams.
- 4311. Reinforced Concrete Structures(3:3:0).** Prerequisite: CTEC 3311. Common practices of design and construction of reinforced concrete structures (ACI-318). Includes wood form work design.
- 4312. Steel Structures (3:3:0).** Prerequisite: CTEC 3311. Common practices of design and construction of steel structures (AISC-ASD).
- 4313. Masonry Structures (3:3:0).** Prerequisite: GTEC 3311. A study of material properties and common practices of design and construction of masonry structures.
- 4321. Construction Contracts and Specifications (3:3:0).** Prerequisite: Junior or senior CTEC standing or approval of option coordinator. Principles and analysis of construction contracts and project specifications. Other aspects of construction management such as contract laws, negotiations, and professional ethics will be examined.
- 4341. Construction Management (3:2:2).** Prerequisite: Junior or senior CTEC standing or consent of option coordinator. Modern methods for managing construction projects, including critical path scheduling, resource allocation, and funds flow. Practical applications are made through simulated projects.
- 4342. Cost Estimating (3:2:2).** Prerequisite: Junior or senior CTEC standing or consent of option coordinator. Analysis of construction working drawings and specifications to quantify material, labor, overhead, and equipment requirements relative to project bid preparation. Computer software programs are utilized to develop construction bids for simulated projects and case studies are used to develop both technical and professional ethics.
- 4343. Construction: Safety and Health (3:3:0).** Prerequisite: Senior CTEC standing or consent of instructor. Management of safety and health in the construction environment. Examines basic elements of a safety and health program for the construction general contractor, including regulator agencies.

Engineering Graphics (E GR)

- 1306. Engineering Graphics: Software A (3:2:4) [ENGR 1305].** For students majoring in mechanical and industrial engineering and mechanical engineering technology. This course provides a background in orthographic projection, selected topics of descriptive geometry, engineering drawing techniques, and computer-aided design software.
- 1307. Engineering Graphics: Software B (3:2:4).** For students majoring in civil engineering, electrical/electronics, and construction engineering technology. This course provides a background in orthographic projection, selected topics of descriptive geometry, engineering drawing techniques, and computer-aided design and drafting software.

Electrical-Electronics Engineering Technology (EET)

- 2111. Linear Electronics Lab (1:0:3).** Corequisite: EET 2311 concurrent enrollment. Designed to supplement the lecture course with laboratory experimental techniques.
- 2112. Optoelectronics Lab (1:0:3).** Corequisite: EET 2312 concurrent enrollment. A laboratory course to introduce students to experimental techniques and to complement the lecture material in EET 2312.
- 2114. Digital Technology I Lab (1:0:3).** Corequisite: EET 2314 concurrent enrollment. Designed to supplement the lecture material of EET 2314 with laboratory experiments.
- 2311. Linear Electronics (3:3:0).** Prerequisite: PHYS 1403; corequisite: GTEC 1312. Fundamentals of electronic circuit theory and characteristics of active devices networks.
- 2312. Optoelectronic Devices (3:3:0).** Prerequisite: EET 2311, 2111; corequisite: PHYS 1404. A study of optoelectronic devices, fiber optics, and basic communication systems.
- 2314. Digital Technology I (3:3:0).** Corequisite: GTEC 1312, EET 2311, 2111. Fundamentals of Boolean theorems, logic circuits, and applications.
- 3111. Telecommunications Lab (1:0:3).** Corequisite: EET 3311 concurrent enrollment. Implementation of the theorem and applications of EET 3311 in the laboratory.
- 3112. Digital Communications Lab (1:0:3).** Corequisite: EET 3312 concurrent enrollment. Designed to introduce students to experimental techniques and to complement the lecture course EET 3312.
- 3114. Digital Technology II Lab (1:0:3).** Corequisite: EET 3314 concurrent enrollment. Laboratory experiments to complement the lecture material of EET 3314.
- 3116. Power Transmission Lab (1:0:3).** Corequisite: EET 3316. Designed to introduce students to experimental techniques in areas of using dc and ac motors and 3-phase systems.
- 3121. Program Logic Controller Lab (1:0:3).** Corequisite: EET 3321 concurrent enrollment. Laboratory experiments include EEPROM's, GAL's, and PAL's IC's.
- 3124. Linear Design Lab (1:0:3).** Corequisite: EET 3324 concurrent enrollment. Laboratory experiments include design and applications to complement the lecture material in EET 3324.
- 3311. Telecommunications Technology (3:3:0).** Prerequisite: EET 2112, 2312, MATH 1351; Corequisite: MATH 1352. A study of voice and data communications with fiber optic applications.
- 3312. Digital Communications (3:3:0).** Prerequisite: EET 3111, 3311; corequisite: EET 3114, 3314. A study of modulate and demodulate digital signals and digital satellite systems.
- 3314. Digital Technology II (3:3:0).** Prerequisite: EET 2114, 2314. A study of advanced MSI and LSI digital IC's with emphasis on applications.
- 3316. Power Transmission and Distribution (3:3:0).** Prerequisite: EET 2311, 2111, and GTEC 1312. Emphasis on the principles of power transmission and the electrical motors in steady-state system applications.
- 3321. Programmable Logic Controller (3:3:0).** Prerequisite: EET 3114, 3314; corequisite: MATH 1352 or 2323. A comprehensive study of relay logic, ladder logic, and programming controllers.
- 3324. Linear Design and Applications (3:3:0).** Prerequisite: EET 3121, 3321. An advanced study of operational amplifiers, phase locked loops, and RLC oscillators.
- 4317. Advanced Micro-Electronic Technology (3:3:0).** Prerequisite: EET 3324 and 3124. The study of microprocessor circuits and their incorporation into functional systems.
- 4331. System Design Laboratory I (3:0:9).** Corequisite: EET 4317 and GTEC 4121. A laboratory course to accompany first-semester senior courses in electrical-electronics engineering technology.
- 4352. Digital Signal Processing (3:3:0).** Prerequisite: MATH 3350 or 3322, EET 3312, 3112, 3314, and 3114. An introduction to digital transmission systems, binary line codes, and optical fiber systems.
- 4353. Control Systems (3:3:0).** Prerequisite: EET 3324, 4317, MATH 3322. An introduction to automatic control systems and the electro-mechanical components used in control systems.
- 4370. Capstone Design Course (3:1:6).** Prerequisite: EET 4331. Corequisite: MATH 3322 or 3350 and EET 4353. Design and analysis of electrical-electronics engineering projects. Projects vary. Participation in a suitable competition can satisfy this course requirement. Generally will include presentation of proposal, scheduling, design, final report, presentation, and teamwork.

General Engineering Technology (GTEC)

- 1211. Computer Programming (2:1:2).** Theory and practice in logical solutions of numerical problems. Introduction to computer languages. Computer programming using an appropriate level language.
- 1312. Alternating and Direct Current Technology (3:2:3).** Prerequisite: MATH 1321; corequisite: PHYS 1404 and GTEC 1211. Principles of electrical and magnetic circuits and their application in the operation of electrical power equipment.
- 2151. Introduction to Thermodynamics Lab (1:0:3).** Prerequisite: PHYS 1403; corequisite: MATH 1352 or 2323 and GTEC 2351. Provide a laboratory experience to compliment the lecture course GTEC 2351.
- 2311. Applied Mechanics-Statics (3:3:0).** Prerequisite: PHYS 1403; corequisite: MATH 1352 or 2323. Equilibrium of particles and rigid bodies. Analysis of trusses, frames, machines, and beams. Friction, centroids, moments of inertia.
- 2351. Introduction to Thermodynamics (3:3:0).** Prerequisite: PHYS 1403, and GTEC 1211; corequisite: MATH 1352 or 2323. A study of the fundamental laws of thermodynamics and their application to analysis of gas, steam, and refrigeration cycles.
- 3311. Applied Mechanics II-Strength of Material (3:3:0).** Prerequisite: GTEC 2311.

Mechanical Engineering Technology (MTEC)

- 1312. Mechanical Engineering (3:2:3).** Introduction to manufacturing processes and plant operations; plant visits and field trips; familiarization with equipment and instruments; metal fabrication, machine tools, weld, heat treating, and associated safety practices.
- 3206. Advanced Graphical Design Methods in Engineering (2:1:2).** Prerequisite: GTEC 3311, E GR 1306. Advanced graphical design methods to include 3-D assembly drawings and finite element analysis using appropriate software.
- 3342. Process Automation (3:2:3).** Prerequisite: MTEC 1312 and junior standing. Selected topics in automated manufacturing systems including: numerical controlled machinery, programmed controllers, robotics, inspection, and material handling devices.
- 3370. Introduction to Quality Control (3:3:0).** Prerequisite: Consent of instructor. Introduction to quality control and includes an introduction to statistical process control and ISO standards.
- 3412. Analysis of Vapor and Gas Cycles with Laboratory (4:3:3).** Prerequisite: GTEC 2351. Evaluation of power and refrigeration cycles. Laboratory study of the component equipment of refrigeration and power cycles.

3441. **Materials Technology (4:3:3)**. Prerequisite: Junior or senior standing. Introduction to the fundamental nature of the structure and properties of engineering materials, their mechanical properties, and behavior based upon their composition.
4311. **Air Conditioning System Design I (3:3:0)**. Prerequisite: GTEC 2351. The design and arrangement of air conditioning systems. Calculation of heating and cooling loads, piping design, and duct design. Psychrometric system analysis.
4312. **Applied Energy Conversion (3:3:0)**. Prerequisite: MTEC 3412. Overview of modern power plants and the thermodynamics of steam power stations. Analysis and design of turbines. Introduction to alternative energy conservation. F, even years.
4313. **Air Conditioning System Design II (3:3:0)**. Prerequisite: MTEC 4311. Continuation of MTEC 4311 with energy use estimations, energy conservation, automatic controls, selection of fans and pumps, and a design project. S, odd years.
4321. **Mechanical Technology Laboratory (3:0:6)**. Senior projects laboratory. Testing and analysis of components of heat power, refrigeration, and mechanical systems.
4332. **Specialized Topics in Mechanical Technology (3)**. Prerequisite: Senior standing and consent of instructor. In-depth study of specialized topics of particular interest to the mechanical technologist. May be repeated for credit.
4351. **Mechanisms of Machinery (3:3:0)**. Prerequisite: MATH 1351 or 2322. Kinematic analysis and synthesis of cams, gears, and linkages. Applications to machine elements and assemblies.
4352. **Dynamics of Machinery (3:3:0)**. Prerequisite: GTEC 2311, MTEC 4351. Study of dynamic forces generated in machinery. Balancing of rotating machines. Analysis of gyroscopes and vibration of mechanical systems.
4353. **Mechanical Design (3:3:0)**. Prerequisite: GTEC 3311, MTEC 3441, MTEC 4351. Analysis of stresses and deformations in machine elements. Analysis of strength of machine elements including theories of failure. Design of mechanical elements such as shafts, screws, columns, springs, journal bearings, roller and ball bearings, spur gears, and flexible mechanical elements.
4170. **Capstone Design Course I (1:1:0)**. The design and analysis of mechanical engineering projects. Topics included will be the design process, design for manufacturability, concept evaluation, codes and standards, reliability, tolerances, quality, scheduling, and working in teams. Projects will be chosen and worked upon in preparation for MTEC 4270.
4270. **Capstone Design Course II (2:0:6)**. Prerequisite: MTEC 4170. A continuation of MTEC 4170 with emphasis on the application of the material previously learned to complete respective design projects. Projects will vary from semester to semester.

Department of Industrial Engineering

Faculty

Milton Louis Smith, Chairperson

Professors: Ramsey, J. Smith, M. Smith, and Zhang; *Associate Professors:* Beruvides, Hsiang, Kobza, Liman, Montes, and Woldstad; *Assistant Professors:* Collins and Rivero.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Industrial Engineering
- Master of Science in Industrial Engineering
- Master of Science in Systems and Engineering Management
- Master of Science in Manufacturing Systems and Engineering
- Doctor of Philosophy in Industrial Engineering

Undergraduate Program

The mission of the department is to provide the highest quality of industrial engineering education by stimulating discovery, integration, application, and communication of knowledge. 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 objectives of the industrial engineering program are as follows: To graduate well-rounded industrial engineers who are prepared for employment and for entry into a graduate program; to graduate industrial engineers who have a strong sense of professionalism, with respect for fellow workers and their profession; and to provide graduates with a set of skills that will allow them to grow professionally and provide service and leadership in their careers.

The curriculum provides students with an opportunity to apply their engineering, mathematical, and science knowledge to design systems (production or processes) and solve engineering problems. Students learn to function on teams, communicate effectively, design and conduct experiments, and utilize current engineering tools. Students gain an understanding of their professional and ethical responsibilities as they examine contemporary issues and the impact of engineering solutions in the global workplace. Perhaps most importantly, students learn to learn so that they can continue to update their industrial engineering skills throughout their careers.

The curriculum is continually evaluated by faculty, students, alumni, and industry to provide a contemporary industrial engineering program that meets the needs of our customers. A variety of assessment tools are utilized in the evaluation process. Program changes are implemented on an ongoing basis.

Students entering the industrial engineering program are assigned a faculty advisor and are responsible for arranging a course of study with the advisor's counsel and approval. Programs leading to joint B.S.-M.S. degrees requiring 150 credit hours are available. Students interested in these programs should inform their academic advisor during the first semester of the junior year. Both thesis and nonthesis M.S. degree programs are included with the nonthesis M.S. requiring 6 additional credit hours.

Industrial Engineering Curriculum. The curriculum is designed to provide a comprehensive education in industrial engineering and to balance the breadth and depth of instruction to develop effective engineers. The minimum hours required for graduation is 128. The courses are offered so that progress through the program is efficient and flexible to individual students' needs. A faculty advisor assists each student with his or her individual program on a semester by semester basis.

Graduate Program

The Master of Science in Industrial Engineering (MSIE), Master of Science in Systems and Engineering Management (MSSEM), Master of Science in Manufacturing Systems and Engineering (MSMSE), and the Doctor of Philosophy programs prepare competent industrial engineers 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 program consists of two options: (1) a 30-hour thesis option, including 6 credit hours of thesis research, and (2) a 36-hour nonthesis option. The course selection may include a minor in an area outside industrial engineering.

Master's and Ph.D. programs will incorporate courses taken in each of the three specialty areas below.

1. Ergonomics and Human Factors Engineering

– occupational biomechanics, work physiology, industrial ergonomics, environmental hygiene, cognitive engineering, human performance, human computer interaction, and occupational safety.

2. Manufacturing and Quality Assurance

– manufacturing engineering and design, computer integrated manufacturing/CAD/CAM, process analysis and economics, automated manufacturing and process planning, programmable control systems, reliability and maintainability, on-line and off-line quality assurance, and total quality assurance.

3. Operations Research and Engineering Management

– simulation modeling, scheduling and sequencing, just-in-time production systems, inventory and production control, linear and nonlinear programming, network analysis, artificial intelligence and expert systems, and productivity management.

The Master of Science in Systems and Engineering Management (MSSEM) program is offered both on campus and by distance education and is designed to prepare its graduates for positions in technical management. Both the MS in Systems and Engineering Management and the MS in Manufacturing Systems and Engineering degree programs are offered at the TTU Amarillo site; these degree programs are supported by Texas Tech University faculty at Amarillo and Lubbock. Details regarding admission and degree requirements are available from the department.

Industrial Engineering Curriculum

		FIRST YEAR	
	Fall		Spring
I E 1305, Engr. Anal.	3	I E 1101, Intro. to I E	1
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
CHEM 1307, Prin. of Chem. I	3	E GR 1306, Engr. Graphics	3
CHEM 1107, Prin. Chem. I (Lab.)	1	CHEM 1308, Prin. of Chem II	3
Social Science—Humanities*	3	CHEM 1108, Prin. of Chem II Lab.	1
TOTAL	16	Social Science-Humanities*	3
		TOTAL	17
		SECOND YEAR	
	Fall		Spring
I E 2301, Engr. Design Prod.	3	I E 3301, Engr. Eco.	3
MATH 2350, Calculus III	3	M E 3311, Materials	3
PHYS 1408, Prin. of Phys. I	4	MATH 3350, Higher Math Engr. I	3
C E 2301, Statics	3	I E 2331, Pro. Comm. for Engr.	3
Social Science Elective*	3	PHYS 2401, Prin. of Phys. II	4
TOTAL	16	TOTAL	16
		THIRD YEAR	
	Fall		Spring
I E 3351, Manuf. Engr.	3	I E 3311, Operations Research I	3
I E 3341, Engr. Stat.	3	I E 3343, Q. C. & Engr. Stat.	3
I E 3361, Work Anal. & Des.	3	I E 3371, Production Contr.	3
M E 2322, Engr. Thermo. I	3	I E 3372, Mgt. Syst. Contr.	3
Soc. Sci.—Humanities*	3	E E 3302, Elec. Sys. Analy.	3
TOTAL	15	Soc. Sci.—Humanities*	3
		TOTAL	18
		FOURTH YEAR	
	Fall		Spring
I E 4311, Operations Res. II	3	I E 4333, Senior Design Proj.	3
I E 4361, Engr. Des. for People	3	I E Electives†	6
I E Elective†	3	C E 3302, Dynamics,	3
I E 4351, Facilities Planning	3	or C E 3303, or M E 3331	
Engineering Elective+	3	Soc. Sci.—Humanities*	3
TOTAL	15	TOTAL	15

Minimum hours required for graduation—128.

* Choose from Core Curriculum requirements.

† I E electives from the following courses: I E 2351, 4320, 4331, 4352, 4362, 4363.

††Any course approved for the Core Curriculum requirement for oral communications is acceptable.

+ Engineering elective from the following courses: C E 3302, 3303, 3305, E E 3388, M E 3331, 3370.

Industrial Engineering (I E)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1101. Introduction to Industrial Engineering (1:1:0).** The profession of industrial engineering, history of production systems, the profession and its relation to resources utilization and control.
- 1305. Engineering Analysis (3:3:0).** Use of microcomputers in engineering analysis and design. Structured programming languages.
- 2301. Engineering Design in Production Operations (3:3:0).** Prerequisite: IE 1305 and EGR 1306. The engineering design process applied to development management objectives, resource planning, product design, production operations, and engineering design team operations.
- 2331. Professional Communication for Engineers (3:3:0).** Prerequisite: ENGL 1302. Rhetorical theory and conventions applied to communication strategies for engineering practice in the global workplace, addressing collaboration, ethical situations, community service, and electronic communication.
- 2351. Principles of Industrial Automation (3:2:3).** Prerequisite: IE 1305. Principles of design of industrial automation and real-time systems using structured languages. Hardware and software interfacing.
- 3301. Engineering Economic Analysis (3:3:0).** Prerequisite: MATH 1352 or equivalent. Evaluation of engineering proposals using time value of money. Selections between alternatives, break even and minimum cost studies, depreciation, taxes, replacement studies, life cycle costing, and inflation.
- 3311. Operations Research I (3:3:0).** Corequisite: MATH 2350. Introduction to operations research, linear programming, dynamic programming, integer programming, traveling salesman problem, transportation, and assignment problems.
- 3341. Engineering Statistics (3:3:0).** Corequisite: MATH 2350. Descriptive statistics, probability theory, discrete and continuous distributions, point and interval estimates, sampling distributions, one- and two-parameter hypothesis testing, simple linear regression, and linear correlation.
- 3343. Quality Assurance and Engineering Statistics (3:3:0).** Prerequisite: IE 3341. Quality assurance systems, quality control and statistical quality control (including control charting, acceptance sampling, quality costs, and loss functions), multiple linear regression, goodness of fit testing, and introduction to experimental design.

3351. **Manufacturing Engineering I (3:2:3)**. Prerequisite: ME 3311, PHYS 1105, or consent of instructor. Properties of materials as related to manufacturing. Processing methods for metals, plastics, ceramics, semiconductors, and composites. Process selection, planning, and economics.
3361. **Work Analysis and Design (3:2:3)**. Corequisite: IE 3341. Principles and techniques of work measurement, methods engineering, workplace design, work sampling, and predetermined time systems. Basic ergonomic principles applied to workplace design and physiological work measurement.
3371. **Production Control (3:3:0)**. Prerequisite: IE 3341. Production control systems, production planning, forecasting, scheduling, materials and inventory control systems and models, learning curves, critical path methods of PERT and CPM.
3372. **Management Systems Control (3:3:0)**. Prerequisite: Junior standing. Cost control techniques for management, methods of financial statement analysis, capital and expense budgets, cost ratios, cost behavior, pricing methods, and overhead allocation methods.
4311. **Operations Research II (3:3:0)**. Prerequisite: IE 3311 or equivalent and a working knowledge of microcomputer operation. Fundamentals of Monte Carlo methods. Systematic development, programming, and analysis of computer simulation models using a high-level simulation language such as GPSS, SLAM II, or SIMAN.
4320. **Fundamentals of Systems (3:3:0)**. Basic foundations and applications of general systems theory applied to engineering and organizational enterprises addressing systems efficiency, effectiveness, productivity, economics, innovation, quality, and QWL.
4331. **Individual Studies in Industrial Engineering (3)**. Prerequisite: Advanced standing and departmental approval. May be repeated.
4333. **Senior Design Project (3:3:0)**. Prerequisite: Industrial engineering senior. Individual industrial engineering design project. Applications of systems thinking, oral and written communications, professionalism, and ethics.
4351. **Facilities Planning and Design (3:3:0)**. Prerequisite: IE 3311, 3361, 3371. Modern plant layout and materials handling practices, stressing the importance of interrelationships with management planning, product and process engineering, methods engineering, and production control.
4352. **Manufacturing Engineering II (3:3:0)**. Prerequisite: IE 3351 or consent of instructor. Introduction to computer-aided manufacturing. Computer-aided process planning; control and monitoring of processes. Numerical control and industrial robots.
4361. **Engineering Design for People (3:2:3)**. Design of systems for human use, including human sensory and information processing abilities, human-machine system design processes and principles, and reduction of human error in systems design.
4362. **Industrial Ergonomics (3:2:3)**. Prerequisite: IE 3361. Advanced ergonomics principles. Emphasis on physiological, biomechanical, and psychological assessment of work. Establishing human capabilities and limitations.
4363. **Work and Product Safety Engineering (3:3:0)**. Prerequisite: Junior or senior standing. Principles of design for work and product safety, accident theory, loss prevention, accident cost analysis, standards and regulations, system safety, hazards recognition, evaluation and control, product safety, and liability.
5306. **Safety Engineering (3:3:0)**. Prerequisite: Consent of instructor. Loss prevention principles, practice, and regulations; accident factors, models, costs, and analysis; systems safety; product safety; safety and health related workplace hazards.
5307. **Loss Assessment and Control (3:3:0)**. Prerequisite: IE 4363 or IE 5306 or consent of instructor. Advanced topics in worker safety and health; hazard recognition and analysis; system safety techniques and applications; loss assessment and control.
5309. **Human Factors in Engineering and Design (3:3:0)**. Introduction to human factors issues in the design of human-machine systems. Design of workstations, controls, and displays, human-computer interfaces, and the environment in industrial systems.
5311. **Principles of Optimization (3:3:0)**. Prerequisite: Consent of instructor. Linear optimization models: theory and application. Includes simplex, revised simplex, dual, and primal-dual algorithms, sensitivity and parametric analysis, duality theory, decomposition, linear complementarity problem, assignment and transportation problems, and Karmarkar's algorithm.
5312. **Queueing Theory (3:3:0)**. Prerequisite: Consent of instructor. Modeling and analysis of simple and complex service systems. Includes single and multiple server Markov queues, queues with general arrival processes and service times, bulk and batch queues, priority queues, and queueing networks.
5314. **Multistage Decision Processes (3:3:0)**. Prerequisite: IE 3311 or 5311 or consent of instructor. Discrete dynamic programming: Knapsack problem, path problems, equipment replacement, capacity expansion, inventory, partitioning problems, sequencing problems; introduction to continuous dynamic programming; Markov decision processes.
5316. **Simulation Models for Operations Analysis (3:3:0)**. Prerequisite: Any scientific programming language. Application of simulation techniques to analysis of large scale operations. Production-distribution models; model construction; validation of simulation models; limitations of simulation techniques; programming with simulation languages.
5317. **Statistical Analysis for Digital Simulation (3:3:0)**. Prerequisite: IE 5366 or 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 (3:3:0)**. Development of models for linear, integer, and nonlinear programming; problem formulation, solution, and analysis. Monte Carlo models; sampling methods; and accuracy. Software for current spreadsheet packages.
5319. **Risk Modeling and Assessment (3:3:0)**. Risk analysis methods: risk management and control; failure consequences; engineering economic evaluations using risk; data collection and preparation for risk analysis; and software for risk analysis.
5320. **Systems Theory (3:3:0)**. Examines theoretical foundations of general systems theory applied to engineering and organizational enterprises addressing issues of systems efficiency, effectiveness, productivity, economics, innovation, quality, and QWL.
5321. **Decision Theory (3:3:0)**. Prerequisite: Consent of instructor. Philosophy, theory, and practice of management; decision theory and social responsibility.
5322. **Industrial Cost Analysis (3:3:0)**. Cost analysis and/or control of industrial enterprises. Economic budgeting, planning, decision making, and financial analysis for engineering and engineering management.
5323. **The Engineering Management Environment (3:3:0)**. Management of research and development; the legal, financial, and professional interrelationships of engineers and their environment in relation to the modern production organization.
5324. **Advanced Economics of Systems (3:3:0)**. Prerequisite: IE 3301, equivalent, or consent of instructor. Design analysis and sensitivity of complex economic systems with evaluation of economic system performance measures and modeling.
5325. **Productivity and Performance Improvement in Organizations (3:3:0)**. Productivity and performance improvement (including efficiency, effectiveness, quality, QWL, innovation, profitability, and budgetability) theories, techniques, analysis, and applications for industrial systems.
5327. **Inventory Systems (3:3:0)**. Prerequisite: IE 3341 or consent of instructor. Deterministic and stochastic systems with static and dynamic models; just-in-time systems. Forecasting techniques, MRP, and case studies in inventory systems management.

Graduate Courses

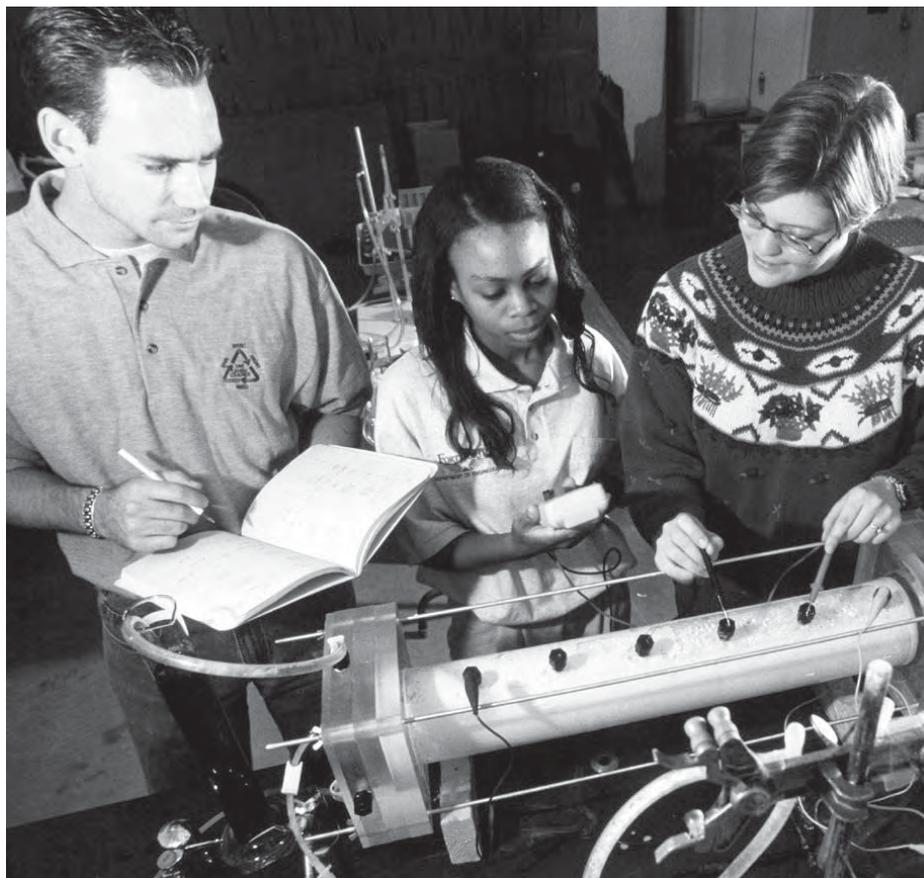
5301. **Ergonomics and Design (3:2:3)**. Prerequisite: Consent of instructor. Functional anatomy and physiology of the musculoskeletal system and their applications in work design. Introduction to work physiology, kinesiology, and anthropometry and their applications.
5302. **Environmental Ergonomics (3:2:3)**. Prerequisite: Consent of instructor. Evaluation, measurement, and control of the physical environment. Environments considered include: heat, cold, noise, vibration, light, radiation, and air contaminants.
5303. **Work Physiology (3:2:3)**. Prerequisite: Consent of instructor. Study of cardiovascular, pulmonary, and muscular responses to work, including energy costs of work endurance, fatigue, physical work capacity, and physiological modeling.
5304. **Occupational Biomechanics (3:2:3)**. Prerequisite: Consent of instructor. Historical development and theoretical fundamentals of body mechanics. The body link system and kinematic and kinetic aspects of body movement. Applications to work systems.
5305. **Cognitive Engineering (3:3:0)**. Prerequisite: Consent of instructor. Implications of human perceptual, cognitive, and psychomotor capabilities for the design of systems for effective human use and control.

5328. **Activity Scheduling (3:3:0)**. Prerequisite: IE 3371 or consent of instructor. Deterministic sequencing of single machine, parallel machines, flow shops, and job shops. Theory of complexity. Optimization and heuristic algorithms for combinatorial sequence generation.
5329. **Project Management (3:3:0)**. Technical, organizational, and personnel project management examination including planning, estimating, budgeting, scheduling, resources management, control. Risk analysis and management using software for project performance evaluation.
5331. **Theoretical Studies in Advanced Industrial Engineering Topics (3)**. Prerequisite: Consent of instructor and departmental approval. Individual theoretical study of advanced topic selected on the basis of departmental recommendation. May be repeated.
5332. **Experimental Investigation in Advanced Industrial Engineering Topics (3)**. Prerequisite: Consent of instructor and departmental approval. Individual experimental study of an advanced topic selected on the basis of departmental recommendation. May be repeated.
5340. **Robust Design and Optimization for Systems (3:3:0)**. Prerequisite: Consent of instructor. Experimental, analytical, and optimization approaches for the design and operation of integrated systems emphasizing quality and resource allocation concepts, strategies, and tools.
5342. **Design of Experiments (3:3:0)**. Prerequisite: IE 3341 or 5381 or equivalent. Single factor, factorial, blocked, split plot designs. Means comparisons, contrasts, estimates of variation. Confounding and fractional factorials.
5344. **Statistical Data Analysis (3:3:0)**. Prerequisite: IE 3341 or 5381 or equivalent. Exploratory data analysis, graphical displays and analysis. Linear and nonlinear regression, response surfaces. Selected mainframe and microcomputer packages.
5345. **Reliability Theory (3:3:0)**. Prerequisite: IE 3341 or 5381 or equivalent. System level reliability, redundancy, maintainability, and availability analysis and modeling. Life testing, acceleration, parametric, and nonparametric models.
5346. **Total Quality Systems (3:3:0)**. Prerequisite: Consent of instructor. Total quality philosophy, customer definition and demands, quality strategies, planning and integration, benchmarking, team structures and interaction, supplier qualification, and quality audits.
5351. **Advanced Manufacturing Processes (3:3:0)**. Prerequisite: Consent of instructor. Advanced topics in manufacturing materials and processes, including metallurgical considerations, nonmetallic materials, deformation processes, metal removal theory, and process economics.
5352. **Advanced Manufacturing Engineering (3:3:0)**. Prerequisite: Consent of instructor. Advanced topics in manufacturing engineering, including manufacturing systems, production integration, cellular manufacturing, group technology, intelligent manufacturing, concurrent engineering, and life-cycle product design engineering.
5354. **Computer Control in Manufacturing (3:3:0)**. Prerequisite: Consent of instructor. Theory and application of computer control of machines and processes used in manufacturing systems. Relevant issues on the analysis, design, and implementation of computer controlled systems.
5355. **Computer-Aided Manufacturing (3:3:0)**. Prerequisite: Consent of instructor. Computer usage in manufacturing systems, CAD/CAM, numerical control, CNC, DNC, computer-aided process planning, manufacturing engineering database systems, industrial robot applications, flexible manufacturing systems, and integration of CAD and CAM.
6000. **Master's Thesis (V1-6)**.
6323. **Systems Management Global Environment (3:3:0)**. Prerequisite: Admission to the doctoral program. This course explores the critical quantitative as well as qualitative issues shaping the practice and research of systems-technical management.
6329. **Systems Management Seminar (3:3:0)**. Prerequisite: Admission to the doctoral program. Doctoral research seminar exploring the latest trends in systems engineering and technical management research.
6331. **Advanced Industrial Engineering Topics (3)**. Prerequisite: Doctoral degree status and departmental approval. Advanced theoretical and/or empirical studies in industrial engineering, ergonomics-human factors, quality or manufacturing engineering, or OR-engineering systems management.
6399. **Research Methods in Science and Technology (3:3:0)**. Prerequisite: Doctoral degree status and design of experiments or equivalent. Examines the research process and differing methodological approaches to research in laboratory, industrial, field work, and case study settings.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Manufacturing Systems and Engineering (MSE)

(To interpret course descriptions, see pg. 10.)

5101. **Graduate Seminar of Advanced Manufacturing Systems and Engineering (1:1:0)**. Prerequisite: Advancement to enrollment status of the M.S. in Manufacturing Systems and Engineering program. Discussion of advanced manufacturing systems and engineering.
5333. **Manufacturing Systems and Engineering Internship (3)**. Prerequisite: Consent of instructor and program advisor. Internship carried out under the supervision of the program graduate advisor, the student's major advisor, and/or project manager of the internship provided by industrial companies. The internship must take place at the approved major industrial companies within the state of Texas with careful planning in advance.
6000. **Master's Thesis (V1-6)**. Prerequisite: Advancement to candidacy status. Thesis research carried out under the supervision of the student's major advisor.



Department of Mechanical Engineering

Faculty

Thomas D. Burton, Chairperson

Professors: Anderson, Burton, Chyu, Eibeck, Ertas, Hashemi, Levitas, Maxwell, and Parameswaran; **Associate Professors:** Barhorst, Berg, Dunn, Ekwaro-Osire, James, Oler, and Rasty; **Assistant Professors:** Han, Idesman, Ma, and Pantoya.

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

Undergraduate Program

The mission of the department is to offer students nationally recognized educational opportunities grounded in the fundamentals of mechanical engineering and involving state-of-the-art technology. The educational objectives of the mechanical engineering program are as stated below:

Fundamentals. To provide students with technical competence in science, mathematics, and mechanical engineering science in order to develop a foundation for effective practice and as a basis for future learning of technical material.

Application. To provide students with the skills needed to apply the fundamentals to the design, analysis, experimentation, and simulation of mechanical engineering components and systems, including the ability to communicate their work effectively.

Nontechnical. To provide students with the background and outlook needed to function in interdisciplinary teams in the global environment of the future; to account for societal, economic, and environmental factors; and to be guided by principles of ethics and professionalism.

Mechanical engineering is the broadest of the engineering disciplines with a curriculum providing a strong foundation in mathematics and the physical sciences of chemistry and physics followed by an in-depth education in five of the principal engineering sciences—thermal science, fluids engineering, mechanics and materials, dynamics and controls, and mechanical design. The program in mechanical engineering provides students the ability to apply their engineering, mathematics, and science knowledge to design mechanical systems and to solve engineering problems. Students learn to design and conduct experiments, to communicate effectively, to function in teams, and to utilize modern engineering tools. Students gain an understanding of their professional and ethical responsibilities as engineers.

Perhaps most important, students are prepared for the lifelong learning necessary to function effectively as the practice of engineering evolves.

Graduates with a degree in mechanical engineering will find employment opportunities covering a wide spectrum, including the aerospace, automotive, petroleum production and refining industries, petrochemicals, electrical power, electronics, semiconductors and computers, manufacturing, and production, as well as research positions in industry and government laboratories. Problem-solving techniques learned in the mechanical engineering curriculum are also applied to continued educational pursuits or graduate study in engineering, as well as in areas such as law, medicine, business administration, and other professions.

The department requires students to have computational devices for use in the classroom and at home. Each student is required to have a scientific calculator for use in the classroom. Students are also expected to have a personal computer for use at home. At a minimum, this computer should support high-level programming languages such as C and application packages such as word processing, spreadsheets, and mathematical analysis software.

150-Hour Combined Bachelor's–Master's Degree Program. The department has re-

cently implemented a combined B.S.–M.S. program that will allow qualified students to obtain a Master of Science in Mechanical Engineering (M.S.M.E.) degree through an additional 12-15 months of study beyond the bachelor's degree. Students enrolled in the program will follow the standard undergraduate mechanical engineering curriculum for course work through the first seven semesters shown in the mechanical engineering curriculum below. In the final undergraduate semester, two graduate courses will be substituted for the mechanical engineering and design electives, which will be waived. At this time the student receives the B.S.M.E. degree. The two graduate courses taken in the final undergraduate semester are applied to the student's master's program. In addition, during the final undergraduate semester, the student will be expected to contact faculty in the department in order to identify possible research areas for the master's thesis. The completion of the M.S.M.E. program would then typically require an additional 12-15 months of study. Applications for admission to this program may be obtained prior to completion of the junior year. Further information on this combined program is available from the department.

Undergraduate Enrollment Policy. Because of significant undergraduate enrollment pressure, the department has instituted an

Mechanical Engineering Curriculum

		FIRST YEAR	
		Fall	Spring
MATH 1351, Calculus I	3	MATH 1352, Calculus II	3
CHEM 1307, Prin. of Chem. I	3	PHYS 1408, Prin. of Phys. I	4
CHEM 1107, Prin. Chem. I (Lab.)	1	ENGL 1302, Adv. Coll. Rhetoric	3
ENGL 1301, Ess. Coll. Rhetoric	3	E GR 1306, Engr. Graphics	3
M E 1315, Intro to Mech. Eng.	3	Elective (History)*	3
HIST 2300, Hist. of U.S. to 1877	3	TOTAL	16
TOTAL	16		
		SECOND YEAR	
		Fall	Spring
MATH 2350, Calculus III	3	MATH 3350, Higher Math. Engr. I	3
PHYS 2401, Prin. of Phys. II	4	M E 2322, Eng. Thermo. I	3
E E 3302, Fund. of E E	3	M E 2364, Eng. Mechanics I	3
M E 2315, Comp. Aided Anal.	3	*Elective (Political Science)	3
POLS 1301, Amer. Govt., Org.	3	*Elective (Oral Communication)	3
TOTAL	16	TOTAL	15
		THIRD YEAR	
		Fall	Spring
M E 3464, Engr. Mechanics II	4	M E 3322, Engr. Thermo. II	3
M E 3164, Engr. Mech. II Lab.	1	M E 3328, Materials & Mech. Lab.	3
M E 3311, Materials Science	3	M E 3433, Systems & Vibrations	4
M E 3331, Dynamics	3	M E 3365, Intro. to Design	3
M E 3370, Fluid Mechanics	3	M E 3165, Intro. to Design (Lab.)	1
I E 3301, Engr. Econ. Anal.	3	M E 3371, Heat Transfer	3
TOTAL	17	TOTAL	17
		FOURTH YEAR	
		Fall	Spring
M E 4334, Cont. Dynamic Sys.	3	M E 4371, Engr. Design II	3
M E 4351, Thermal-Fluid Sys. Lab.	3	Elective (Mech. Engr. Design)**	3
M E 4370, Engr. Design I	3	Elective (Math or Science)**	3
MATH 3342, Math. Stat. Engr. Sci.	3	Elective (Mech. Engr.)**	3
M E 4120, Senior Seminar	1	Elective (Visual or Performing Arts)*	3
Elective (Humanities)*	3	TOTAL	15
Elective (Multicultural)†	3		
TOTAL	19		

Minimum hours required for graduation—128.

* Choose from Core Curriculum requirements.

** Select from departmentally approved list.

† Requirement can be met in combination with either humanities or visual and performing arts courses.

enrollment limitation policy. Entering students who major in mechanical engineering will be evaluated after the completion of seven courses: ME 1315, ME 2315, EGR 1306, MATH 1351, 1352, CHEM 1307, and PHYS 1408. As part of the dynamic enrollment plan and to continue as an ME major, the student must achieve a 2.5 cumulative GPA in the seven listed courses, as well as a 2.5 cumulative GPA for all course work completed at Texas Tech [Note: "Cumulative" GPA is the non-adjusted, non-grade replacement GPA]. Transfer students (from another institution or another department within Texas Tech) must complete one 12-hour semester at Texas Tech with a cumulative GPA of 2.5 or better to be permitted to continue in the ME major. Students who do not meet the stated requirements will be dropped from the ME program and will not be permitted to register for any ME courses appearing in the university catalog in the "Second Year, Spring" semester or beyond (exception: students may register for ME courses, such as ME 2322, that may be required in another major). Exceptions to this policy may be considered on a case by case basis, but such exceptions will be rare.

Co-Op Program. Mechanical engineering students are encouraged to consider the College of Engineering Co-op program. This normally involves three work assignments in industry for a cumulative duration of one year. These work assignments are normally completed prior to the start of the senior year. Co-op students gain valuable real-world engineering experience that enhances the academic experience on campus and provides excellent preparation for a career in industry.

General Academic Requirements. Students are expected to follow the curriculum presented in the table below. Students whose high school courses do not include chemistry, physics, mathematics through analytical geometry, and at least two credits of a foreign language will be required to take additional course work during an adjusted first year of study. All students must earn a grade of C or better in all courses. The department rigorously enforces prerequisite requirements for all courses.

Graduate Program

Students seeking master's or doctor's degrees should consult the graduate advisor for the department about their plans of study before enrolling for any courses. The student may wish to emphasize course work and research activities in any one of the following areas: thermal sciences, fluid mechanics, dynamics and controls, design, solid mechanics and materials, or multidisciplinary studies.

Before being recommended for admission to a master's degree program with a major in this department, the student may be requested to take a preliminary examination to determine proficiency in background for graduate work or may be required to take (without graduate credit) such undergraduate leveling courses as may be designated by the department.

Three general plans of study are available for the Master of Science degree: (1) the thesis option consisting of 30 hours (six hours of thesis credit and 24 hours of graduate course work); (2) the nonthesis report option consisting of 36 hours (33 hours of graduate course work and three hours of credit for the master's report); and (3) the nonthesis course work only option (36 hours of graduate course work). The decision on which plan to follow is made jointly by the student and the advisor. Each option has a set of required core courses and a set of elective courses that are selected in consultation with the student's advisor. Each of the three options requires a final comprehensive evaluation during the semester of intended graduation. Departmental guidelines for course work, advisory committees, and the final evaluation can be obtained from the department's graduate advisor.

The department has no specific foreign language requirement. Research tools are included as an integral part of the degree program in the leveling, minor, or major courses of each student. All courses are determined by the student's advisory committee.

Additional information may be obtained from the department.

Mechanical Engineering (M E)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1315. Introduction to Mechanical Engineering (3:3:0).** Corequisite: MATH 1351. Introduction to the mechanical engineering discipline including familiarization with the thermal and mechanical sciences, engineering problem solving, discussion of professionalism and ethics, and experiences in team design projects.
- 2315. Computer-Aided Analysis (3:3:0).** Prerequisite: ME 1315, MATH 1352, and PHYS 1408. Introduces numerical methods used in solution of typical engineering problems. Includes design activity.
- 2322. Engineering Thermodynamics I (3:3:0).** Prerequisite: MATH 2350 and PHYS 1408. Properties of pure substances, ideal gas behavior, first and second law analysis, and applications to energy conversion and power cycles.
- 2364. Engineering Mechanics I (3:3:0).** Prerequisite: MATH 1352 and PHYS 1408. Corequisite: M E 2315. Statics of particles and rigid bodies; equilibrium, friction centroids and virtual work.
- 3164. Engineering Mechanics II Laboratory (1:0:3).** Corequisite: M E 3464 and E GR 1306. Introduces the use of finite elements software to perform load and stress analysis on mechanical components.
- 3165. Introduction to Design Lab (1:0:3).** Prerequisite: M E 3464, 3164; corequisite: M E 3365. Computer-based design and analysis exercises in mechanical engineering.
- 3311. Materials Science (3:3:0).** Prerequisite: CHEM 1307. Corequisite: MATH 2350. Fundamental thermodynamic and chemical nature of the structure and properties of materials.
- 3322. Engineering Thermodynamics II (3:3:0).** Prerequisite: ME 2322. Principles of thermodynamics for general systems, cycle analysis, availability and irreversibility, thermodynamics of state, thermodynamics of nonreacting and reacting mixtures. Includes design activity.
- 3328. Materials and Mechanics Laboratory (3:2:3).** Prerequisite: ME 2364 and 3311. Evaluating and reporting the characteristics of materials and mechanical systems.
- 3331. Dynamics (3:3:0).** Prerequisite: MATH 2350 and ME 2364. Kinematics and kinetics of particles and rigid bodies. [ENGR 2302]
- 3464. Engineering Mechanics II (4:4:0).** Prerequisite: M E 2364; corequisite: ME 3164. Analysis of structures to determine stresses, strains, and deformations using classical and finite element methods.
- 3365. Introduction to Design (3:3:0).** Prerequisite: M E 3464 and 3164; corequisite: ME 3165. Analysis, design, and evaluation of mechanical elements.
- 3370. Fluid Mechanics (3:3:0).** Prerequisite: ME 2322 and 2364. Basic principles of fluid statics, fluid dynamics, ideal and viscous flows, and turbo-machinery. Includes design activity.
- 3371. Heat Transfer (3:3:0).** Prerequisite: ME 3370. Introduction to heat transfer by the mechanisms of conduction, convection, and radiation. Includes design activity.
- 3433. Systems and Vibrations (4:3:3).** Prerequisite: MATH 3350 and ME 3331. Modeling and analysis of dynamic systems, equilibrium, stability and linear systems theory, introduction to mechanical vibrations. Companion laboratory.
- 4000. Special Topics in Mechanical Engineering (V1-6).** Prerequisite: Departmental approval. Individual studies of special topics in mechanical engineering. May be repeated for credit.
- 4120. Senior Seminar (1:1:0).** Prerequisite: Senior standing. Discussion of issues associated with ethics, professionalism, and starting a career in mechanical engineering.
- 4130. Graduate Preparation Seminar (1:1:0).** Limited to undergraduate students in 150-hour program; topics to prepare students for graduate study and research.
- 4330. Advanced Topics in Mechanical Engineering (3:3:0).** Prerequisite: Departmental approval. Advanced topics in mechanical engineering. May be repeated for credit.
- 4331. Individual Study in Mechanical Engineering (3).** Prerequisite: ME 3464 and departmental approval. Individual study in advanced mechanical engineering areas. Approved M E or design elective.
- 4334. Control of Dynamic Systems (3:3:0).** Prerequisite: ME 4333. Introduction to analysis and design of control systems, including applications to electromechanical systems.
- 4342. Design Through Failure Analysis (3:3:0).** Prerequisite: ME 3311. Case studies presenting "forensic engineering" techniques necessary for the determination of failure mechanisms, design integrity, materials selection, legal problems, and product liability. Approved M E or design elective.

- 4345. Probabilistic Mechanical Design (3:3:0).** Prerequisite: M E 3365. Application of probabilistic approaches in mechanical design. Techniques for the quantification of uncertainty and risk inherent in mechanical systems. Mechanical reliability methods. Approved M E or design elective.
- 4351. Thermal-Fluid Systems Laboratory (3:2:3).** Prerequisite: ME 3322; corequisite: ME 3371. Measurements, testing, performance evaluation, and documentation of thermal-fluid systems.
- 4354. Automotive Systems (3:3:0).** Prerequisite: ME 3371. Modeling and analysis of typical automobile and truck powertrains, suspension, and performance. Theory and practice are discussed with emphasis on practical applications. Approved M E elective.
- 4356. Aerodynamics (3:3:0).** Corequisite: ME 3370. An introduction to aerodynamics, including wing and airfoil theory, aircraft performance, and aircraft stability and control. Approved M E or design elective.
- 4358. Combustion (3:3:0).** Prerequisite: M E 3322 and 3371. Introduction to combustion kinetics; the theory of premixed flames and diffusion flames; turbulent combustion; dynamics of detonations and deflagrations. Approved M E or design elective.
- 4370. Engineering Design I (3:2:3).** Prerequisite: ME 3311, 3331, 3365, 3165, corequisite: ME 3371. Design problems characteristic of mechanical engineering, including consideration of cost, design optimization, codes and standards, and ethics.
- 4371. Engineering Design II (3:0:9).** Prerequisite: ME 4370. Design projects in mechanical engineering, including consideration of cost, design optimization, codes and standards, and ethics.
- 4373. Thermal-Fluid Systems (3:3:0).** Prerequisite: ME 3371. Corequisite: M E 3322. Design and analysis of thermal-fluid systems. Approved M E or design elective.
- 4375. HVAC System Design (3:3:0).** Prerequisite: ME 3322 and 3371. The determination of loads and the design of heating, ventilating, and air conditioning systems. Approved ME or design elective.
- 5312. Control Theory I (3:3:0).** Prerequisite: MATH 2360, 3354, 4351, or consent of instructor. Linear dynamical systems, stability, frequency response and Laplace transform, feedback, state space description, and geometric theory of linear systems. (MATH 5312)
- 5313. Control Theory II (3:3:0).** Prerequisite: MATH 5312, 5316, 5318, or consent of instructor. Quadratic regulator for linear systems, Kalman filtering, nonlinear systems, stability, local controllability, and geometric theory of nonlinear systems. (MATH 5313)
- 5314. Nonlinear Dynamics (3:3:0).** Prerequisite: M E 5311, or 5316. Nonlinear oscillations and perturbation methods for periodic response; bifurcations and chaotic dynamics in engineering and other systems.
- 5316. Advanced Vibrations (3:3:0).** Prerequisite: ME 3331, 3433, or consent of instructor. Vibration of single and multiple-degree of freedom systems, continuous systems, FE formulation, computer sided modal analysis, and random vibrations.
- 5321. Thermodynamics (3:3:0).** Prerequisite: ME 3322 or consent of instructor. Classical macroscopic theory with an emphasis on availability concepts in nonreacting, reacting, single phase, and multicomponent systems.
- 5322. Conduction Heat Transfer (3:3:0).** Prerequisite: ME 3371 or consent of instructor. Fundamental principles of heat transmission by conduction. Multidimensional steady and transient analysis using various analytical and computational methods.
- 5323. Two-Phase Flow and Heat Transfer (3:3:0).** Prerequisite: ME 3371. Liquid-vapor two-phase flow hydrodynamics, boiling and condensation heat transfer, mechanisms and prediction methods.
- 5324. Radiation Heat Transfer (3:3:0).** Prerequisite: ME 3371. Fundamental principles of heat transmission by thermal radiation; radiant properties, radiation exchange, participating media, and combined modes.
- 5325. Convection Heat Transfer (3:3:0).** Prerequisite: ME 3371 or consent of instructor. Fundamental principles of heat transmission by convection; theoretical, numerical, and empirical methods of analysis for internal and external flows.
- 5326. Combustion (3:3:0).** Prerequisite: M E 3322 and 3371. Introduction to combustion kinetics; the theory of premixed flames; turbulent combustion; formation of air pollutants in combustion systems; examples of combustion devices which include internal combustion engines, gas turbines, furnaces and waste incinerators; alternative fuel sources.
- 5330. Boundary Layer Theory (3:3:0).** Prerequisite: M E 3370 or consent of instructor. Laws of motion for Newtonian viscous fluids in steady laminar and turbulent boundary layers. Utilization of analytical and approximate methods to obtain solutions for viscous flows.
- 5332. Potential Flow (3:3:0).** Prerequisite: M E 3370. The study of inviscid incompressible flows. Topics include stream functions and velocity potential, vorticity dynamics, and applications to aerodynamics.
- 5334. Gas Dynamics (3:3:0).** Prerequisite: M E 3370 or consent of instructor. Development of basic equations for compressible flow, normal and oblique shocks, flow-through nozzles and ducts, external flows.
- 5335. Mathematical Models of Turbulence (3:3:0).** Prerequisite: M E 5330. Nature of turbulence, the Reynold's equations, and the transport equations for Reynold's stresses. Different kinds of closure models and their application to boundary layer flows.
- 5336. Computational Fluid Dynamics (3:3:0).** Prerequisite: M E 5301 or equivalent. Simultaneous solution of momentum, heat, and mass transfer problems by applying various computational techniques.
- 5340. Elasticity (3:3:0).** Prerequisite: Consent of instructor. Stress, deformation, and strain; basic equations; analytical solution; energy principles and principles of virtual displacements; finite element method; and solutions of problems with elements of design.
- 5341. Plasticity (3:3:0).** Prerequisite: ME 5340. Stress-strain relations for plasticity and viscoplasticity, variational principles, finite element method, radial return algorithm, elements of limit analysis, and solutions of problems with elements of design.
- 5342. Fracture and Failure Analysis (3:3:0).** Prerequisite: M E 5340. Engineering aspects of failure. Failure mechanisms and related environmental factors. Principles of fracture mechanics and fractography. Techniques for failure analysis and prevention.
- 5344. Introduction to High Pressure Science and Technology (3:3:0).** Prerequisite: M E 3311. Behavior of materials under high pressure: Material synthesis, equation of state, phase diagram, and phase transformations. Design and application of high pressure apparatus.
- 5345. Computational Mechanics I (3:3:0).** Prerequisite: M E 5311 or 5340. Finite element method for elastic problems, Galerkin weighted residual and variational approaches to numerical solutions of mechanical problems, error estimates and adaptive FE refinement, iterative algorithms for nonlinear problems, static elastoplastic and elastoviscoplastic problems, general purpose finite element codes.
- 5346. Computational Mechanics II (3:3:0).** Prerequisite: M E 5311 or 5340. Finite element method for dynamic elastic problems, time integration schemes for dynamic problems, iterative algorithms for nonlinear dynamic problems, heat transfer analysis, coupled thermo-mechanical problems, accuracy analysis, general purpose finite element codes.
- 5347. Phase Transformation I (3:3:0).** Prerequisite: M E 3311 and 5340. Shape memory effect, psuedoelasticity, psuedoplasticity. Crystallography, continuum thermodynamics, and kinetics of phase transformations. Constitutive equations for phase transformations in elastic materials.
- 5348. Phase Transformation II (3:3:0).** Prerequisite: M E 5341 and 5347. Strain-induced phase transformations, transformation-induced plasticity. Continuum

Graduate Courses

- 5301. Analysis of Engineering Systems (3:3:0).** Prerequisite: MATH 3350 or consent of instructor. Analytical techniques for solving ordinary and partial differential equations frequently occurring in advanced mechanical engineering.
- 5302. Numerical Analysis of Engineering Systems (3:3:0).** Prerequisite: ME 2315, MATH 3350, or consent of instructor. Numerical analysis of ordinary and partial differential equations and other advanced topics as applied to mechanical engineering problems.
- 5311. Advanced Dynamics (3:3:0).** Prerequisite: ME 3331, 3433, or consent of instructor. Newtonian dynamics of particles and rigid bodies, rotating coordinate systems, coordinate and inertia property transformations, Lagrangian and Hamiltonian mechanics, Gibbs-Appell equations, and gyroscopic mechanics.

thermodynamics and kinetics of interaction between phase transformation and plasticity.

- 5349. **Nonlinear Mechanics of Materials (3:3:0).** Prerequisite: M E 5341, 5347, and/or consent of instructor. Large strains and rotations, stress and strain measures, large strain elasticity, plasticity, twinning, crystallography, and phase transformations. Nonlinear continuum thermodynamics, constitutive equations. Experimental regularities.
- 5351. **Advanced Engineering Design (3:2:3).** Prerequisite: Consent of instructor. Design analysis and synthesis of multicomponent systems. Application of fatigue, fracture mechanics, random vibration, acoustic and anisotropic materials to component design.
- 5352. **Probabilistic Design (3:3:0).** Application of probabilistic approaches in engineering design. Techniques for the quantification of uncertainty and risk inherent in mechanical systems.
- 5353. **Fundamental of Transdisciplinary Design and Process (3:3:0).** The fundamental aspects of design and process which cut across the boundaries of all disciplines and provide a means for solving complex problems.
- 5354. **Systems Engineering Principles (3:3:0).** An overview of the systems engineering design process focusing on defining both the business and the technical needs and required functionality early in the development cycle, documenting requirements with design synthesis and system validation is presented.
- 5385. **Introduction to Microsystems (MEMS) I (3:3:0).** Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces basic microsystem design, analysis, simulation, and manufacture through several case studies using representative devices.
- 5386. **Introduction to Microsystems (MEMS) II (3:3:0).** Prerequisite: M E 5385. Application of microfabrication to create microsensor systems. Integration of optics, optoelectronics and microfluids. Includes other MEMS projects.
- 6000. **Master's Thesis (V1-6).**
- 6301. **Master's Report (3).**
- 6331. **Theoretical Studies (3:3:0).** Prerequisite: Consent of instructor. Theoretical study of advanced topics selected on the basis of the departmental advisor's recommendation. May be repeated for credit in different areas.
- 7000. **Research (V1-12).**
- 8000. **Doctor's Dissertation (V1-12).**



Col. Rick Husband, commander of the Columbia space shuttle, graduated from Texas Tech in 1980 with a degree in mechanical engineering.

Department of Petroleum Engineering

Faculty

James F. Lea, Chairperson

Butler Professor: Lea; *Sun Associate Professor:* Lawal; *Watford Associate Professor:* Heinze; *Associate Professors:* House and Oetama; *Assistant Professors:* Adisoemarta and Cox.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Petroleum Engineering
- Master of Science in Petroleum Engineering
- Doctor of Philosophy in Petroleum Engineering

Undergraduate Program

Success in engineering courses is highly dependent on knowledge and skills in mathematics. It is strongly recommended that students have a minimum mathematics SAT score of 500, a minimum score of 23 on the mathematics ACT, or take mathematics courses at a junior or community college to be ready to take calculus classes at Texas Tech.

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.

Petroleum engineering applies the curriculum management of the College of Engineering. Phase I includes the first three semesters, Phase II the fourth semester, and Phase III the final two years of study. Progress from one phase to the next requires a satisfactory GPA, designated course completion, and departmental consent. To graduate, the student must complete the specified minimum number of hours in each phase of the curriculum, have a minimum overall GPA of 2.0, and earn a grade of C or better in all courses.

Students applying for transfer into this program from another institution or from another department at Texas Tech must have a minimum 2.0 cumulative GPA. Transfer applicants must also have earned a grade of C or better in all courses related to the degree.

The department recommends that students consider acquiring a personal computer to facilitate course work.

The Petroleum Engineering curriculum is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Program Educational Objectives. The department supports the mission of the university through its undergraduate program by providing students with an appropriate curriculum and educational experience. The course selection and content remain current through continuous assessment by employers, alumni, faculty, and students. Students obtain a broad education that enables them to understand the impact of petroleum engineering solutions in a global, social, and environmental context. To accomplish the mission, the petroleum engineering faculty, with advice from students, alumni, petroleum industry advisory board (PIAB) members, and industry employers, endorse the following program educational objectives:

- A. To provide its students with the best possible education in order to lead useful and productive lives;
- B. To educate its students to be practical, employable, and qualified petroleum engineers and to provide them with a foundation for continuing education;
- C. To support the petroleum industry with well-educated and highly skilled petroleum engineers;
- D. To serve society by encouraging the ideals of ethical behavior, professionalism, conservation of resources, and environmental responsibility;
- E. To offer useful technology to the people of the State of Texas, the nation and international communities through research and publications; and
- F. To continue the development of the undergraduate and graduate programs by recruiting highly motivated students as well as faculty who are dedicated to teaching, research, and service.

The department, by fulfilling these objectives, will remain faithful to the mission of the College of Engineering and Texas Tech University, and in so doing, will satisfy the needs of the people of the State of Texas.

Program Outcomes. Graduates of the B.S.P.E. program (and the M.S.P.E. and Ph.D. programs) at Texas Tech University are educated to:

- A. Apply knowledge of mathematics, geology, physics, chemistry as well as other engineering sciences.
- B. Conduct experiments safely and accurately and be able to correctly analyze the results.
- C. Design a process or system.
- D. Work in a team environment.
- E. Understand professional and ethical conduct and act accordingly.
- F. Recognize, express, and resolve engineering problems.
- G. Communicate successfully.
- H. Develop knowledge of present-day issues.
- I. Develop a special multidisciplinary knowledge of geology and engineering.
- J. Use modern engineering tools to apply engineering practice.

- K. Develop an appreciation of the need to continue to learn.
- L. Evaluate a project not only from a technical standpoint, but also from the principles of economics, risk, and uncertainty.

Planning and Assessment. The department strongly encourages students to experience at least one summer internship for professional growth. Intern students will be assessed externally. The department has conferred over 1,700 B.S. degrees since the program's inception in 1948. A high-priority goal is to produce quality B.S. graduates measured by:

- A. One hundred percent placement of graduates each year,
- B. Student average starting salaries near the top of the national average in accredited U.S. petroleum engineering departments,
- C. Provide summer intern opportunities and experiences within the industry for 100 percent of students desiring positions,
- D. Ninety percent Fundamentals of Engineering Examination pass rate of graduating seniors,
- E. Recruiting quality undergraduates,
- F. ABET accreditation,
- G. Petroleum Industry Advisory Board recommendations on curriculum and graduates, and
- H. An independent assessment of capstone senior course.

The department is heavily involved in assisting our students to find employment—both summer internships and full-time positions—upon graduation. Approximately 50 companies have recruited our students and nearly 100 percent of them have been placed upon graduation for the previous 12 years. Approximately 60 percent of our undergraduate body is on scholarship. An interview and resume workshop for the fall and spring semesters is conducted to assist students with interviewing and resume writing skills as an additional effort to maintain our outstanding placement rate. The curriculum is under continuous review, and revisions are made as needed to maintain accreditation and ensure employability of students. Faculty participation with ABET and the SPE Education and Accreditation Committee ensure the department is current on engineering education. In addition, faculty have attended and been principal planners in all five 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.

Petroleum Engineering Curriculum

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 1351, Calculus I	3	MATH 1352, Calc. II	3
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
CHEM 1307, Prin. Chem. I	3	PHYS 1408, Prin. Phys. I	4
CHEM 1107, Prin. Chem. I (Lab.)	1	PETR 1305, Engr. Anal.	3
GEOL 1303, Phys. Geology	3	POLS 1301, Amer. Govt., Org.	3
GEOL 1101, Phys. Geology Lab.	1	TOTAL	16
PETR 1101, Intro. Petroleum Engr.	1		
TOTAL	15		

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 2350, Calc. III	3	C E 3303, Mech. of Solids	3
PHYS 2401, Prin. of Phys. II	4	MATH 3350, Math. Engrs. I	3
PETR 2301, Petr. Develop.	3	PETR 2302, Res. Fluid Prop.	3
C E 2301, Statics	3	C E 3305, Mech. of Fluids	3
GEOL 3302, Structural Geology	3	M E 2322, Engr. Thermo.	3
TOTAL	16	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MATH 3342, Statistics for Engineers	3	I E 3301, Engr. Eco. Anal.	3
PETR 3303, Petr. Prod. Meth.	3	PETR 3304, Formation Eval.	3
PETR 3302, Res. Rock Prop.	3	PETR 3306, Reservoir Engr.	3
PETR 3113, Core Anal. Lab.	1	GEOL 4324, Geol. of Petroleum	3
C E 3302, Dynamics	3	PETR 3407, Drilling Engr.	4
PETR 3308, Engr. Comm.	3	TOTAL	16
TOTAL	16		

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
PETR 4306, Adv. Res. Engr.	3	PETR 4309, Adv. Prod. Engr.	3
PETR 4305, Nat. Gas. Engr.	3	PETR 4308, Well Test. Anal.	3
PETR 4121, Petro. Eng. Sem.	1	PETR 4300, Petr. Prop. Eval.	3
HIST 2300, Hist. U.S. to 1877	3	PETR Elective*	3
POLS 2302, American Pub. Pol.	3	Humanities Elective†	3
PETR 4105, Gas & Prod. Lab.	1	HIST 2301, Hist. U.S. Since 1877	3
Humanities Elective†	3	TOTAL	18
TOTAL	17		

Minimum hours required for graduation—129.
 One year (two semesters) of a single foreign language must be taken at the college level unless the second year of credit in a single foreign language has been received before entrance into the university.

* Select from PETR 4000 or 4331.
 † Choose from Core Curriculum requirements.

Petroleum Engineering (PETR)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1101. **Introduction to Petroleum Engineering (1:1:0).** Introduction to the petroleum engineering profession. Group discussions and selected readings on requirements, responsibilities, ethics, opportunities, and history of petroleum engineering.
- 1305. **Engineering Analysis I (3:3:0).** Corequisite: MATH 1351. Introduction to engineering fundamentals, dimensions, units, and conversions. Synthesis and analysis of typical engineering problems. Introduction to the use of computers, computing, and structured programming.
- 2301. **Petroleum Development Methods (3:3:0).** Prerequisite: MATH 1351, PHYS 1408, and PETR 1305. Introduction to petroleum engineering, rotary drilling, and well completion practices, including casing, cementing, perforating, and workovers. Discussion of equipment design and use.
- 2302. **Reservoir Fluid Properties (3:3:0).** Prerequisite: MATH 1351, PHYS 1408, and CHEM 1307. Study of reservoir fluid properties including PVT behavior of hydrocarbon systems. Investigation of the nature, methods of estimation, and use of reservoir fluid properties. Laboratory PVT demonstrations.
- 3113. **Core Analysis Laboratory (1:0:3).** Corequisite: PETR 3302. Laboratory determination of reservoir rock properties to include porosity, permeability, saturations, compressibility, and resistivity with weekly formal lab reports submitted.
- 3302. **Reservoir Rock Properties (3:3:0).** Prerequisite: PETR 2302, MATH 1352, and CE 3305. A study of the physical properties of petroleum reservoir rocks as they relate to the production of oil

- 3303. **Petroleum Production Methods (3:3:0).** Prerequisite: PETR 2301, PHYS 2401, MATH 2350, and CE 3305. Artificial lift practices including design of sucker rod pumping systems and gas lift installations. Well stimulation practices including acidizing and hydraulic fracturing. Application of inflow performance relationships.
- 3304. **Formation Evaluation (3:3:0).** Prerequisite: PHYS 2401, MATH 2350, PETR 3302. Use of open-hole well logs including logging suites for the electric survey to the induction and laterlog suites to determine volume and relative producibility of hydrocarbon reserves. Analysis and design techniques of actual well logging packages are emphasized.
- 3306. **Reservoir Engineering (3:3:0).** Prerequisite: PETR 2302 and 3302, PHYS 2401, MATH 3350. Production performance predictions and estimation of hydrocarbons in place for gas, condensate, and oil reservoirs. Applications of material balance calculations for various reservoir types and applications of fluid flow in porous media.
- 3308. **Engineering Communications (3:3:0).** Prerequisite: ENGL 1301,1302, junior standing, or consent of instructor. Written and oral communication techniques for professional engineers, including writing matrix, fog index, computer analysis, and visual aid production, proposal writing, and other tools. (Writing Intensive)
- 3407. **Drilling Engineering (4:3:1).** Prerequisite: PETR 2301, 3303, GEOL 3302, CE 3305, PHYS 2401, and MATH 3342, 3350; corequisite: I E 3301. Rotary drilling systems, drilling fluids and rheology, drilling mechanism, well planning, blowout and well control, hole deviation, and directional drilling. (Writing Intensive and Design Course)
- 4000. **Special Studies in Petroleum Engineering (V1-6).** Prerequisite: Departmental and instructor approval. Individual studies in petroleum engineering areas of special interest. May be repeated for credit.
- 4105. **Natural Gas and Production Laboratory (1:0:3).** Corequisite: PETR 4305. Experiments in production practices, including gas and liquid measurement, fluid property determination, flow metering devices, pumping well characteristics, and lease operations.
- 4121. **Petroleum Engineering Seminar (1).** Prerequisite: CE 3302, 3303, 3305, PHYS 2401, MATH 3342, 3350, ME 2322, CHEM 1107, I E 3301. Study of engineering problems of special interest and value to the student. Review for Fundamentals Examination.
- 4300. **Petroleum Property Evaluation and Management (3:2:3).** Prerequisite: PETR 3304, 3306, 3308, I E 3301, GEOL, 4324 structural geology elective, and statistics elective; corequisite: PETR 4308. Senior capstone course with economic, analytical, and statistical evaluation of hydrocarbon-producing properties, emphasizing relative worth of investments based on engineering judgment, business strategy, and risk analysis utilizing actual oil properties in team projects. Students will apply their knowledge of general petroleum engineering, drilling and completion, production and artificial lift, reservoir, and formation evaluation. (Writing Intensive and Design Course)
- 4305. **Natural Gas Engineering (3:3:0).** Prerequisite: PETR 3303, 3306, ME 2322, PHYS 2401, MATH 3342, 3350; corequisite: PETR 4105. The production of natural gas and condensate reservoirs; processing, transportation, distribution, and measurement of natural gas and its derivatives.
- 4306. **Advanced Reservoir Engineering (3:3:0).** Prerequisite: PETR 3306, MATH 3342, 3350. Frontal-advance theory and application, mechanisms of waterflooding processes, and application to reservoir performance prediction.
- 4308. **Well Testing and Analysis (3:3:0).** Prerequisite: PETR 3306, MATH 3342, 3350. Basic theory of transient flow in porous media and its application to the design and analysis of actual well tests using pressure-time relationships with emphasis on the pressure derivative. Buildup, drawdown, falloff, injectivity, pulse, interference, and drill stem tests are included for single or multiphase wells.
- 4309. **Advanced Production Engineering (3:3:0).** Prerequisite: PETR 3303, 3306, M E 2322, I E 3301, MATH 3342, 3350, and advanced standing. Problem course in analysis, design, and application of production and processing equipment, separator problems, emulsions, treating, and transmission systems. (Design Course)
- 4331. **Special Problems in Petroleum Engineering (3).** Prerequisite: Advanced standing. Individual studies in advanced engineering areas of special interests. May be repeated for credit.

Graduate Courses

- 5000. **Studies in Advanced Petroleum Engineering Topics (V1-6).** An individual study course. Nature of course depends on student's interests and needs. May be repeated for credit on different topics.

Graduate Program / Petroleum Engineering

The department is staffed with industry-experienced faculty who has an average of more than 15 years of experience per faculty member. This experience is combined with sound engineering and scientific principles in the classroom and made an integral part of the candidate's educational challenge. Also, the department is located in a geographical area that produces 20 percent of the nation's petroleum resources and 68 percent of Texas' petroleum resources lie within a 175-mile radius. This proximity provides the student with unique opportunities for directly interfacing with industry while still a student as well as first hand observations of oil field operations. The department has been consistently ranked in the top ten petroleum engineering departments for both the graduate and undergraduate program.

Graduate studies in petroleum engineering prepare the engineer to assume responsibility in technical and managerial areas within the oil and gas industry. Historically, the graduate can expect to be challenged quickly and in areas of strong potential for personal and professional growth. Candidates with superior skills and the desire to progress within the industry can expect to be successful. The Petroleum Engineering Department at Texas Tech prepares the advanced student with the technical skills required to meet those challenges.

The master's program requires 33 graduate credit hours above the baccalaureate degree, including 6 credit hours allowed for the thesis and at least 18 credit hours of graduate petroleum engineering courses (excluding seminar). Additional graduate credit hours of other engineering, mathematics, or science will be allowed when approved by the candidate's advisory committee and graduate advisor. A written thesis is required for the master's degree. In addition, the candidate's thesis committee will administer a final oral exam in defense of the completed thesis. The department also offers a nonthesis master's program that requires 36 graduate credit hours approved by the graduate advisor. The graduate program for nonthesis master's candidate is specifically

tailored for that candidate's educational background, industry experience, and individual interest. For both the thesis and the nonthesis programs, a final comprehensive examination is required. The policy governing the comprehensive examination is available with the departmental graduate advisor. Comprehensive examinations are given only after the Graduate Dean has admitted the students to candidacy.

Joint B.S.—M.S. Degrees. Student entering the petroleum engineering program are assigned a faculty advisor and are responsible for arranging a course of study with the advisor's counsel and approval. Programs leading to a joint B.S.-M.S. degree are available. Students interested in these programs should inform their academic advisor during the first semester of the junior year.

The objectives of the Ph.D. program are to provide students opportunities to reach a critical understanding of the basic scientific and engineering principles underlying their fields of interest and to cultivate their ability to apply these principles creatively through advanced methods of analysis, research, and synthesis. The Ph.D. degree is awarded primarily on the basis of research. Applicants for the doctoral degree must have a degree in engineering disciplines and must meet the approval of the department's graduate committee. Students majoring in this department for doctoral degree must take diagnostic examinations (or preliminary examination) by the end of their second long semester. These examinations are based on the undergraduate curriculum. Each student is required to take the diagnostic examinations in their area of specialization and any three-core areas.

In addition to regulations established by the Graduate School, applicants for candidacy for the doctor's degree are required to demonstrate high proficiency in a single research area. The course work for each student must meet the approval of the student's doctoral advisory committee. The department has no specific foreign language requirement (but a foreign language for the Ph.D. degree can be specified at the discretion of the

student's dissertation advisor). Research tools are included as an integral part of the degree program in the leveling, minor, or major courses of each student. Additional information may be obtained from the departmental program advisor.

All petroleum-engineering courses can be taken for credit. No more than six hours of PETR 5000 can appear in a master degree plan without approval from the Graduate Dean. The curriculum is organized into four core areas that denote the teaching and research concentration of the faculty. However, the degree plan of a petroleum engineering student should include at least one course from each of the four core areas: Drilling Engineering—PETR 5000, 5302, 5303, 5315, 5317.

Production Engineering—PETR 5000, 5306, 5314, 5316, 5318, 5319.

Reservoir Engineering—PETR 5000, 5307, 5309, 5310, 5311, 5312, 5313, 5320, 5321, 5322, 5323, 5325, 5326, 5327.

Formation Evaluation—PETR 5000, 5304, 5305, 5308, 5324, 5328, 5329.

Qualified students with a BS or BA degree in any field may enter the MS program in petroleum engineering by completing (without graduate credit) leveling work as needed in physics, chemistry, mathematics, geology, basic engineering courses and undergraduate petroleum engineering courses. The details of the leveling program will be worked out on an individual basis by the graduate advisor, and the length of the program will depend on the student's background. The leveling program courses (PETR 5380, 5381, 5382, 5383, and 5384) must be completed with a minimum grade of B. All graduate students are required to register for PETR 5121 or 7121 each long semester unless exempted by the chairperson. The graduate seminar course does not count toward fulfilling degree requirements for the master's or doctor's program.

5121. **Graduate Seminar (1:1:0).** Discussions of petroleum engineering research and special industry problems. Required each semester for all graduate students. May be repeated for credit.
5301. **Teaching Experience in Petroleum Engineering (3:3:0).** Prerequisite: Admission to doctoral program. On-the-job training in teaching petroleum topics. Students prepare and present lectures, grade problem sets, and prepare laboratory experiments. Students and instructor evaluate performance.
5302. **Petroleum Environmental Engineering (3:3:0).** Prerequisite: Consent of instructor. A unified treatment of all aspects of petroleum environmental well planning processes, pollution prevention and safety, management practices and self-assessment process, environmental oil and gas law.
5303. **Advanced Drilling Techniques (3:3:0).** Prerequisite: PETR 3307 or consent of instructor. A unified treatment of all aspects of well planning and the optimization of oil and gas drilling processes.
5304. **Advanced Well Log Analysis (3:3:0).** Prerequisite: PETR 3304 or consent of instructor. Methods of analyzing various types of well logs to obtain quantitative hydrocarbon reservoir parameters.
5305. **Advanced Formation Evaluation (3:3:0).** Prerequisite: Must have graduate standing in petroleum engineering. Application of petrophysical core analysis to formation evaluation. Integration of special core analysis with well logs.
5306. **Advanced Artificial Lift Methods (3:3:0).** Prerequisite: Consent of instructor. Study of the design and analysis of current mechanisms for lifting oil from the reservoir to surface facilities including optimization theory.
5307. **Enhanced Oil Recovery (3:3:0).** Prerequisite: Consent of instructor. Fundamental relations governing the displacement of oil in petroleum reservoirs and methods for predicting oil recovery by miscible and immiscible displacement.
5308. **Pressure Transient Analysis (3:3:0).** Prerequisite: MATH 3350, PETR 4308, or consent of instructor. Theory of transient fluid flow in petroleum reservoirs and applications of methods to interpret transient pressure behavior.
5309. **Hydrocarbon Reservoir Simulation (3:3:0).** Prerequisite: MATH 3350 or consent of instructor. The development of unsteady state fluid flow equations for hydrocarbon reservoirs and the applica-

- tion of finite difference methods to obtain solutions to the equations.
5310. **Advanced Simulation Techniques (3:3:0)**. Prerequisite: PETR 5309. Treatment of advanced concepts of reservoir simulation for multidimensional, multiphase flow in hydrocarbon reservoirs.
5311. **Thermal Oil Recovery (3:3:0)**. Prerequisite: Consent of instructor. Study of the recovery of oil by thermal methods, including steam injection and in situ combustion.
5312. **Simulation of Enhanced Oil Recovery Applications (3:3:0)**. Prerequisite: Consent of instructor. Study of 1D, 2D, 3D, one-, two-, and three-phase simulation modeling of carbon dioxide and thermal recovery applications.
5313. **Numerical Applications in Petroleum Engineering (3:3:0)**. Prerequisite: Consent of instructor. Least squares, solving first and second order partial differential equations; backward, central, forward difference solutions, matrix, Gaussian, Adams, Rung-Kutta solutions.
5314. **Nodal Analysis and Well optimization (3:3:0)**. Prerequisite: Consent of instructor. Inflow performance relationships, well design, theory of the reservoir flow, flow restrictions, completion effects, multiphase phase flow, and use of computer programs for complex solutions.
5315. **Horizontal Well Technology (3:3:0)**. Prerequisite: PETR 3307, 3407, or consent of instructor. Topics include why horizontal, incremental cost, historical prospective, drilling change, completion modification, production difference, reservoir aspects, pressure transient, and analysis adjustment.
5316. **Advanced Production Engineering (3:3:0)**. Prerequisite: PETR 3303, 4309, or consent of instructor. Advanced study of production operations, well deliverability, inflow performance, gas lift design, production system analysis and optimization, downhole equipment and surface facilities design.
5317. **Well Completion and Stimulation (3:3:0)**. Prerequisite: Consent of instructor. Completion parameters, well design, fatigue failure, mechanical properties, hydraulic, acid, sandstone fracturing, well bore stability, proppants placement, skin damage, gravel packing, and workovers.
5318. **Gas Production Engineering (3:3:0)**. Prerequisite: Consent of instructor. Design of processing, transportation, distribution, and flow measurement systems; gas storage reservoirs, flow in porous media, tubing, and pipelines; phase behavior of gas condensates; and coal bed methane.
5319. **Multiphase Fluid Flow in Pipes (3:3:0)**. Prerequisite: Consent of instructor. Horizontal, vertical, and inclined flow in pipes and annuli; numerical methods correlations usage and development; empirical correlations correct usage and extrapolations potential; future of multiphase flow.
5320. **Advanced Reservoir Engineering (3:3:0)**. Prerequisite: Consent of instructor. Recovery prediction, tensor permeabilities, multiphase flow, drainage equations, flow potential, streamline-streamtube methods, injectivity, displacements in layered reservoirs, and line source solutions.
5321. **Fluid Flow in Porous Media (3:3:0)**. Prerequisite: Consent of instructor. Physics of petroleum reservoirs, unified mathematics approach to porous media, conservation equations, multiphase flow, transient analysis, wettability, capillary, imbibitions, and saturation paths.
5322. **Computational Phase Behavior (3:3:0)**. Prerequisite: Consent of instructor. Advanced PVT and EOS characterization, tuning EOS by regression, gas condensate reservoirs, use of laboratory experiments and correlation to obtain PVT data, psuedoization and use of PVT programs.
5323. **Advanced Phase Behavior (3:3:0)**. Prerequisite: Consent of instructor. Thermodynamics of equilibria, volumetric phase behavior, Gibbs and Helmholtz energy, chemical potential, phase diagram, modeling paraffins, asphaltenes, hydrates and mineral deposition, use of PVT software.
5324. **Geostatistics for Reservoir Engineers (3:3:0)**. Prerequisite: Consent of instructor. Flow in porous media, reservoir characterization, geostatistics, estimation, simulation, case studies, quantifying uncertainties, geological simulation, data integration, grid block properties, and geostatistics software.
5325. **Water Flooding Techniques (3:3:0)**. Prerequisite: Consent of instructor. Frontal advanced theory for multiphase flow, immiscible flow, capillary cross flow, psuedofunctions, streamlines, measures of heterogeneity, field case studies, pattern flooding, and use of black oil reservoir simulators.
5326. **Miscible Flooding Techniques (3:3:0)**. Prerequisite: Consent of instructor. Physics theories and methods for miscible projects, screening methods, gas injection processes, convection-dispersion equations, fingering and channeling, phase behavior and heterogeneity, characteristic methods.
5327. **Streamline Simulation (3:3:0)**. Prerequisite: Consent of instructor. Multiphase flow equations, displacements in layered reservoirs, streamline models, frontal advanced equation with gravity effects, volumetric linear scaling, streamlines with compositional effects.
5328. **Advanced Property Evaluation (3:3:0)**. Prerequisite: Consent of instructor. Statistical evaluation of hydrocarbon producing properties, risk analysis, economic analysis of production forecasts and reserve estimation, and cash flow analysis.
5329. **Advanced Core Analysis (3:3:0)**. Prerequisite: Consent of instructor. Rock properties relating to production of oil and gas, multiphase fluid flow, micro- and macro-interaction of fluids and reservoir rocks, Archie parameters and well logs, modeling saturations with permeability.
5380. **Drilling Engineering Methods (3:3:0)**. Prerequisite: Consent of instructor. Drilling equipment, components, description, operation; drilling fluids; hydraulic calculations; casing design; hole problem; cost control, penetration rate, well planning; pressure control; directional drilling; bit; cement.
5381. **Production Engineering Methods (3:3:0)**. Prerequisite: Consent of instructor. Artificial lift, inflow performance relationships, well design and application of stimulation practices, processing equipment, separator problems, emulsions, treating, and transmission systems.
5382. **Well Logging Fundamentals (3:3:0)**. Prerequisite: Consent of instructor. Use of open-hole logs, survey of induction and lateralog suites to determine reserves.
5383. **Reservoir Engineering Fundamentals (3:3:0)**. Prerequisite: Consent of instructor. Reservoir performance predictions, computation of in place gas, condensate and oil reservoirs, applications of ME for reservoir mechanisms, decline curves, EOR methods, fluid flow in porous media.
5384. **Basic Fluids and Rock Properties (3:3:0)**. Prerequisite: Consent of instructor. Reservoir fluids and rock properties, fluid sampling, phase behavior, reservoir drives mechanisms, concepts of porosity, permeability, saturations, capillary pressure and compressibility for gas-oil production.
6000. **Master's Thesis (V1-12)**.
6001. **Master's Report (V1-6)**.
6331. **Proposal/Project Communication (3:3:0)**. Prerequisite: Admission to doctoral program. Guide to research, technical report, project planning, problem definition, grant proposals, thinking, talking, and writing in research, writing technical journal, review articles, and technical presentations.
7000. **Research (V1-12)**.
7121. **Doctoral Seminar (1)**. Open discussion of recent advanced findings in any field of endeavor with special attention to their relationship to the philosophy of petroleum engineering. May be repeated for credit.
8000. **Doctor's Dissertation (V1-12)**.

College of Human Sciences

"Improving and enhancing the human condition"



Linda C. Hoover, PhD
Dean

142 Human Sciences
Box 41162
Lubbock, TX, 79409-1162
(806) 742-3031
www.hs.ttu.edu

About the College

Texas Tech human sciences programs at the baccalaureate, master's, and doctoral levels are innovative in focus, relevant to the needs of a rapidly changing society, and designed to prepare professionals – both men and women – for employment in broad career options.

The College of Human Sciences is a professional college, requiring the highest expectations for its graduates. College programs are accredited by the American Association of Family and Consumer Sciences and seven other national accrediting agencies. Additionally, the college offers courses of significance to the general and professional education of students majoring in other colleges and provides continuing education for professionals in fields related to human sciences.

Most undergraduate degree programs lead to the Bachelor of Science degree. Majors offered for all programs within the College of Human Sciences include the following:

- Apparel Design and Manufacturing
- Early Childhood
- Family and Consumer Sciences
- Food and Nutrition
- Human Development and Family Studies
- Interior Design
- Personal Financial Planning
- Restaurant, Hotel, and Institutional Management
- Retailing

For additional information about undergraduate degree programs in the various departments, see the following pages and/or contact the office of Academic Advising Services (HS 159).

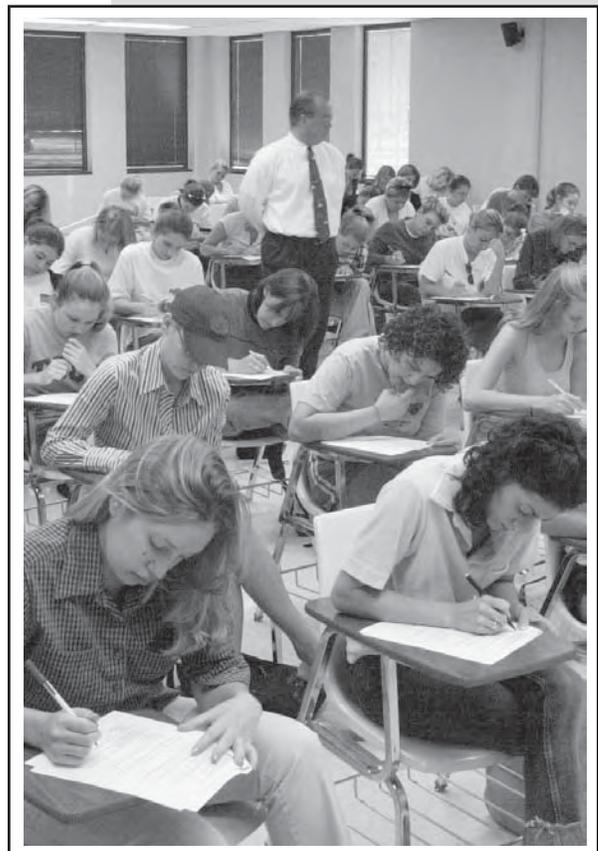
The College of Human Sciences at Texas Tech offers a dynamic curriculum, a well-qualified faculty, outstanding facilities, and a commitment to excellence. In addition to undergraduate majors, the college offers the Master of Science and Doctor of Philosophy degrees with majors in all departments. Specific information regarding graduate degrees may be found in the Graduate Program section.

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.

Undergraduate Program

General Standards and Requirements

Students are expected to assume responsibility for knowing the rules, regulations, and policies of the university; to learn the requirements pertaining to their degree program; and to consult the catalog, registration guidelines, and degree plans for their major.



Financial Aid to Students. Numerous scholarships and assistantships are available to provide financial assistance and valuable experience to capable students. Write to the Dean of the College of Human Sciences, Box 41162, Texas Tech University, Lubbock, Texas 79409-1162. The scholarship application deadline is February 1. Emphasis will be on leadership, service, high school and transfer grade point averages, test scores, and need. To receive full-time financial aid, students must be enrolled for a minimum of 12 hours. Some programs allow enrollment in less than full-time hours, but students must check with the Financial Aid Office concerning eligibility for these programs.

Catalog Selection. Students must use the catalog issued for the year in which they were first officially admitted to the College of Human Sciences or a more recent catalog if approved. However, if they are not enrolled at Texas Tech for one academic year or have transferred to another college at Texas Tech or another institution, they must be readmitted to the College of Human Sciences and use the catalog in effect at the time of readmission. For graduation purposes, a catalog expires after seven years.

Academic Advising Services. The purpose of Academic Advising Services is to provide quality service to the faculty and students in the college. The advising staff is responsible for assisting students from orientation to graduation. Students should visit online at www.hs.ttu.edu/AAS to obtain information and updates prior to advance registration periods. Schedule of classes, registration, adding and dropping classes, payment of fees, and individual degree plans (click on degree audit under student services) are available through the TechSIS Web for students at www.techsis.admin.ttu.edu/student. Students needing additional assistance may visit with an advisor on a first-come, first-served basis by going to the office of Academic Advising Services in Human Sciences 159 or call 742-1180. Office hours are from 8 to noon and 1 to 4 p.m. Monday through Thursday (subject to change).

Graduation. Graduation is attained by fulfilling the requirements for a bachelor's degree using an acceptable catalog edition. The student is responsible for fulfilling all catalog requirements. At least one year prior to the graduation semester, students should file a Statement of Intention to Graduate form with Academic Advising Services. After submission of the form, the Coordinator of Undergraduate Programs will complete a degree audit and mail a Progress Report for Graduating Seniors (list of courses lacking towards degree completion) to the student. Thereafter, students will follow the audited list of remaining courses. Substitutions and minor forms must be filed prior to or at the same time as the Statement of Intention to Graduate. The Progress Report for Graduating Seniors will be reviewed prior to the last semester and students will be notified of any discrepancies that may prevent graduation. The last 30 hours are to be taken from Texas Tech unless permission has been granted by the dean. This includes correspondence and off-campus courses. Any change in graduation date must be

communicated to the office of Academic Advising Services.

Correspondence Courses. All correspondence courses must be approved in writing by the coordinator of undergraduate programs.

Credit by Examination. A matriculated student may attempt credit by examination (described elsewhere in this catalog) by obtaining written approval from the coordinator of undergraduate programs.

Course Load. The normal course load for a semester is 15 hours or above. The maximum load for a semester is 19 hours (7 hours for a summer term).

Course Prerequisites. Prerequisites are governed by the catalog in effect when the course is taken.

Ineligible Registration. The College of Human Sciences reserves the right to drop any ineligibly registered student from a course for reasons such as lower division-upper division rule infractions, lack of prerequisites, GPA requirements, and failure to attend the first week of class in HDFS 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.

Pass-Fail. A maximum of 13 hours may be taken pass-fail. The pass-fail option may be used for free elective courses. If an ineligible course is taken pass-fail, it must be replaced by the next higher course. Pass-fail hours are excluded in determining eligibility for the Dean's Honor or President's List. No student on probation is allowed the pass-fail option.

Selection of a Major. Freshman level human sciences courses will be helpful in clarifying career goals. See an academic advisor for additional information.

Substance Abuse Studies

The College of Human Sciences and the College of Arts and Sciences jointly offer an interdisciplinary minor in substance abuse studies (SAS). 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 course work be taken in this order:

1. Take this class first: HDFS 3325, Family Dynamics of Addiction.
2. Take this class last: HDFS 4325, Treatment of Addictive Disorders.
3. Take at least two of these classes in any order: HDFS 2327, Substance Abuse Prevention; HLTH 3325, Health and Chemical Dependency; SOC 3383, Alcohol, Drugs,

and Society; and PSY 4325, Drugs, Alcohol, and Behavior.

4. Take remaining classes in any order: FCSE 3325, Educational Programming: Addiction Issues; HDFS 3329, Addictive Relationships; and PFP 2325, Family Financial Counseling.
5. One of these classes may be substituted for Group IV: HDFS 3321, Human Sexuality; HDFS 3326, Families in Crisis; HDFS 3317, Problems of Adolescence; SOC 4327, Juvenile Delinquency; and SOC 4325, Criminology.

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 all required academic hours of training for licensure and certification.

Additional information may be obtained from Dr. Kitty S. Harris, Program Director, Center for the Study of Addiction, 172 Human Sciences Building.

Human Sciences (HUSC)

(To interpret course descriptions, see pg. 10)

Undergraduate Courses

1100. **Introduction to Human Sciences (1:1:0).** Overview of the college and instruction on how to study within the college to help prepare students for academic and personal success. Topics include personal and family relationships, personal finance, nutrition, academic advising, etc. Required first semester.
2000. **Special Studies (VI-6).** A course for lower-level human sciences majors for individual study or special problems.
3214. **Human Sciences Seminar (2:2:0).** For junior or senior human sciences majors only. Recommended to be taken one year prior to anticipated graduation. Integrative approach and professional orientation to societal issues, including public policy, ethics, cultural diversity, and global interdependence.
4300. **Coaching Leaders (3:3:0).** Prerequisite: 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.

Graduate Courses

5311. **Problems in Human Sciences (3:3:0).** May be repeated for credit.
6000. **Master's Thesis (V1-12).**

Graduate Program / Human Sciences

The College of Human Sciences offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees.

The Master of Science degree has majors in Environmental Design; Food and Nutrition; Family and Consumer Sciences Education; Human Development and Family Studies; Marriage and Family Therapy; Personal Financial Planning; and Restaurant, Hotel, and Institutional Management.

The Doctor of Philosophy degree has majors in Environmental Design and Consumer Economics, Food and Nutrition, Family and Consumer Sciences Education, Hospitality Administration, Human Development

and Family Studies, and Marriage and Family Therapy.

The graduate programs in the college are designed to educate scholars and leaders in all areas that affect human development; nutrition; family studies; environmental design; restaurant, hotel, and institutional management; personal financial planning; family and consumer sciences education; and consumer behavior.

Persons successfully completing graduate work in the college have traditionally been prepared to serve as leaders in the business world, private sector organizations, and academic institutions. Anyone interested in graduate programs should consult the Graduate School section of this catalog for information concerning university requirements for master's and

doctoral degrees. Information about the graduate minor in risk-taking behavior is also provided in the Graduate School section under the heading "Opportunities for Interdisciplinary Study."

Admission to master's degree programs requires the recommendation of the department and approval of the graduate dean. Admission to the doctoral program requires the recommendation of the department as well as approval of the graduate dean.

Applicants should contact the program director or the chairperson of the department offering the specialization for college and departmental guidelines.

Department of Education, Nutrition, and Restaurant-Hotel Management

Faculty

Lynn Huffman, Chairperson

Professors: Brittin, Couch, Felstehausen, Hoover, Huffman, and Spallholtz; *Associate Professors:* Boyce, Boylan, Dodd, Roman-Shriver, and Stout; *Assistant Professors:* Adams, Blum, Fagan, Goh, Kim, Shriver, and Wu; *Instructor:* Ward.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Family and Consumer Sciences
- Bachelor of Science in Food and Nutrition
- Bachelor of Science in Restaurant, Hotel, and Institutional Management
- Master of Science in Family and Consumer Sciences Education
- Master of Science in Food and Nutrition
- Master of Science in Restaurant, Hotel, and Institutional Management
- Doctor of Philosophy in Family and Consumer Sciences Education
- Doctor of Philosophy in Food and Nutrition
- Doctor of Philosophy in Hospitality Administration

In addition to the regular degree programs, this department provides a 9-month post-baccalaureate dietetic internship that is accredited by the American Dietetic Association (ADA) and meets the ADA eligibility requirements for dietetic registration.

Mission

The mission of the department is to provide quality education, research, and service focused on the knowledge and skills intrinsic in the disciplines of family and consumer sciences education, food and nutrition, and hospitality management. To accomplish this mission, the department offers the following program areas:

- Family and Consumer Sciences
- Food and Nutrition
- Restaurant, Hotel, and Institutional Management.

Undergraduate Program

Family and Consumer Sciences Program

The mission of the family and consumer sciences education program is to prepare individuals for professional positions in secondary schools, colleges and universities, extension education, and related areas through quality education, research, and service. The family and consumer sciences program offers specialization in both family and consumer sciences teacher certification and family and consumer sciences. Each specialization provides a broad background in all family and consumer sciences subject areas and prepares students for a wide variety of career opportunities. Students take courses in human development and family studies, personal financial planning, food and nutrition, housing and interior design, clothing construction, textiles, restaurant, hotel, and institutional management. The certification course work meets Texas requirements for teacher certification in family and consumer sciences.

Family and Consumer Sciences Teacher Certification. The family and consumer sciences teacher certification program is designed for students planning teaching careers

in junior high and high school family and consumer sciences; extension; adult and community-based education; educational support services such as curriculum development and media; business; government; human services; and other fields. The program includes course work in all family and consumer sciences content areas and the professional education courses required for teacher certification. See an academic advisor for current information.

Students seeking teacher certification must meet all requirements outlined in the College of Education section of this catalog. Admission requirements include completion of approximately 60 semester hours with an overall 2.5 GPA or better and a satisfactory level of performance on the TASP test or equivalent. Other requirements include a 2.5 GPA or better in professional education courses and the teaching field and a grade of C or better in all required specialization 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.

It is possible to become qualified to teach in a second teaching field by taking additional courses. Students also may earn a teaching certificate in family and consumer sciences as a part of a major in human development and family studies. See the Human Development and Family Studies section. Family and consumer sciences certification students can take courses online through the Texas FCS Distance Education Alliance or the FCS Program Consortium. More information on these options can be found at www.fcsalliance.org or www.gpidea.org or by contacting an FCS advisor.

Family and Consumer Sciences. The family and consumer sciences specialization prepares students for careers in human services, extension, business, government, communications, and other fields that require a broad background in family and consumer sciences. The program includes course work in all family

and consumer sciences content areas. Students may expand career opportunities by selecting electives in areas such as mass communications, business, or computer science. A minor requires 18 semester hours in approved courses. Qualified students must complete an internship (2.5 GPA required) during the junior or senior year. A grade of C or better is required for all courses in the specialization.

Pre-Teaching Family and Consumer Sciences Minor. The pre-teaching minor is designed for students in any major in the college who plan to seek a family and consumer sciences teaching certificate after completing a bachelor's degree. The minor allows undergraduate students to take 22 hours of the course work required for teacher certification, reducing the time needed to complete certification requirements after graduation. To be admitted to a teacher certification program, students must meet all requirements outlined in the College of Education section of this catalog. Students who meet the requirements for admission to a graduate program may combine teacher certification requirements with work toward a master's degree. Courses: FCSE 2102, 3301, ADM 1303, F&N 2310, and 12 hours of guided human sciences electives.

Family and Consumer Sciences Minor. The family and consumer sciences minor is available to students in any major who desire a broad background in family and consumer sciences. The minor includes 18 semester hours in course work representing the various family and consumer sciences content areas. Courses: FCSE 3301 or 3303 and 15 hours of guided human sciences electives.

Extension Family and Consumer Sciences Minor. The minor in extension family and consumer sciences is designed for students in any major in the college who wish to prepare for employment in extension family and consumer sciences positions. The 25 hours of course work include courses from various family and consumer sciences content areas as well as courses that focus on educational methods in Extension. Courses: HDFS 3320, F&N 1410, PFP 3301, HDFS 2303, FCSE 3301 or 3303, 4307, and 6 hours of guided human sciences electives.

Food and Nutrition Program

The mission of the food and nutrition program is to prepare individuals who will make a contribution to professions related to food and nutrition and to society as a whole through quality education, research, and service. This program emphasizes the role of food and nutrition in the health and well-being of people. The specialization prepares competent professionals for nutrition and dietetic careers in hospitals, schools, colleges, food service, business, and government agencies. Courses also contribute to the liberal education of all students who enroll in food and nutrition classes.

Food and Nutrition Minor. A student may minor in food and nutrition by completing 18-19 hours of selected course work. Specific courses for the food and nutrition minor are finalized and approved by the student in conjunction with the major and minor advisors. Courses: F&N 1301, 2420, 2310, choose 3 from the following: F&N 3320, 3340, 4330, 4350, 4360, or 4380.

Specializations. A degree in food and nutrition offers the following specializations:

- **Preprofessional Health Careers** — This option offers a career path for individuals interested in medicine, optometry, pharmacy, physical therapy, and other allied health options.
- **General Dietetics** — The Didactic Program in Dietetics (DPD) at Texas Tech is approved by The American Dietetic Association (ADA) and designed to provide the student with an academic program that "provides for the achievement of knowledge and skills requirements for entry-level dietitians" as outlined by ADA. A verification statement signed by the program director is given to students who successfully complete all DPD requirements. A grade of C or better is required for all F&N, support, and HUSC core courses. ADA accredited graduates from the DPD are eligible to apply for an internship (such as the post-baccalaureate internship offered at Texas Tech). After successful completion of both an undergraduate and a supervised practice program, the student is eligible to take the national examination given by the Commission of Dietetic Registration (CDR) and become a Registered Dietitian (R.D.) after passing the exam. General Dietetics emphasizes the nutritional care and education of people and prepares the

student to qualify for an internship; graduate school; or a position in a hospital, community agency, or a food service system or business with the prime responsibility of improving and maintaining the nutritional status of people.

Restaurant, Hotel, and Institutional Management Program (RHIM)

The mission of the restaurant, hotel, and institutional management 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 career opportunities in the hospitality industry and includes courses in food and nutrition, arts and sciences, and core courses in RHIM. The curriculum keeps pace with changes in the hospitality field by providing classroom and laboratory experiences.

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.

Restaurant, Hotel, and Institutional Management Minor. A student may minor in restaurant, hotel, and institutional management by completing 19 hours of selected course work. Specific courses for the RHIM minor are finalized and approved by the student in conjunction with the major and minor advisors. Courses: RHIM 2308, 3341, 3350, 3460, and 6 hours of RHIM electives.

Restaurant, Hotel, and Institutional Management Curriculum

FIRST YEAR			
	Fall		Spring
HUSC 1100 or I S 1100	1	ENGL 1302	3
ENGL 1301	3	MATH Elective*	3
MATH Elective*	3	POLS 2302	3
POLS 1301	3	F&N 1410	4
RHIM 2210	2	RHIM 2308	3
RHIM 2312 of Elective	3	TOTAL	16
TOTAL	15		
SECOND YEAR			
	Fall		Spring
HIST 2300	3	HIST 2301	3
ECO 2305	3	HDFS 3320	3
SPCS 1300	3	Elective	3
RHIM 3460	4	RHIM 3350	3
Elective	3	RHIM 3470	4
TOTAL	16	TOTAL	16
THIRD YEAR			
	Fall		Spring
RHIM 3320	3	ANSC 3404	4
COMS 3358	3	RHIM 3390	3
RHIM 3341	3	RHIM 3358	3
RHIM 3321	3	RHIM 3322	3
FD T 3303	3	RHIM 4312	3
RHIM 3100	1	TOTAL	16
TOTAL	16		
FOURTH YEAR			
	Fall		Spring
RHIM 4322	3	RHIM 4300	3
RHIM 4415	4	RHIM 3000	2
Visual & Performing Arts*	3	RHIM 4316	3
HUSC 3214	2	RHIM 4313	3
RHIM elective**	3	RHIM elective**	3
TOTAL	15	TOTAL	14

TOTAL—124 hours

NOTE: Students are expected to have competency in computer usage.

NOTE: RHIM 3000 is required prior to graduation and should be taken before last semester.

* Choose from Core Curriculum requirements.

** Choose from RHIM 3308, 3330, 3355, 4320, 4330.

**Family and Consumer Sciences
Teacher Certification Curriculum**

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or I S 1100	1	ENGL 1302	3
ENGL 1301	3	Math. or Logical Reasoning*	3
Mathematics*	3	Oral Communication	3
FCSE 2102	1	POLS 2302	3
POLS 1301	3	EDIT 2318	3
Visual & Performing Arts*	3	TOTAL	15
I D 1380	3		
TOTAL	17		
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
HIST 2300	3	HIST 2301	3
English Literature	3	ENGL 2311	3
Natural Lab. Science*	4	HDFS 3301	4
EDSE 2300	3	PFP 2325 or FCSE 3301	3
ADM 2311	3	F&N 1410	3
ADM 1303	3	TOTAL	16
TOTAL	19		
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
FCSE 3301	3	HDFS 3313 or 3311	3
HDFS 3320	3	FCSE 3350	3
HDFS 3331	3	FCSE 3103, 4302	4
F&N 2310	3	EDSE 4310**	3
HDFS 3312	3	EDSE 4322**	3
HDFS 3310	3	EDLL 4380**	3
TOTAL	18	TOTAL	19
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
FCSE 4308	3	FCSE 4601**	6
FCSE 4306, 4103	4	FCSE 4601**	6
RHIM 3460	4	FCSE 4304**	3
FCSE 4000	3	TOTAL	15
HUSC 3214	2		
TOTAL	16		

TOTAL—135 hours

*Choose from Core Curriculum requirements.

**Admission to Teacher Education and a minimum 2.5 GPA required (apply prior semester).

Graduate Program

The department supervises degree programs leading to Master of Science and Doctor of Philosophy degrees. The Master of Science degree requires a minimum of 30 semester hours including a thesis or 36 hours for a nonthesis plan. Courses must be chosen in consultation with the major professor. Students without appropriate background in the chosen specialization will be required to take undergraduate leveling courses designated by the department. The Doctor of Philosophy degree requires a minimum of 60 hours beyond the master's degree, including at least 18 hours in the specialization area.

The department also offers a nine-month dietetic internship program. Selected credits earned during the program may apply to an optional master's or doctoral degree. Twelve hours of graduate credit are required in supervised experience in health and food service facilities. Upon completing the internship, the student is eligible to take the written examination to become a registered dietitian.

Graduate students may obtain a secondary-level family and consumer sciences teaching certificate by completing course work prescribed in the Texas Standards for Teacher Certification. Selected credits earned for certification may apply toward a graduate degree in family and consumer sciences education.

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.

Family and Consumer Sciences Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or I S 1100	1	ENGL 1302	3
ENGL 1301	3	Math. or Logical Reasoning*	3
Mathematics*	3	ANTH 1301 or EDSE 2300	3
FCSE 2102	1	POLS 2302	3
POLS 1301	3	EDIT 2318	3
Visual & Performing Arts*	3	TOTAL	15
I D 1380	3		
TOTAL	17		
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
HIST 2300	3	HIST 2301	3
Humanities*	3	ENGL 2311	3
Natural Lab. Science*	4	SOC 1301 or 1320	3
ADM 2311	3	HDFS Elective	3
Minor or Elective	3	F&N 2310	3
ADM 1303	3	TOTAL	15
TOTAL	19		
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
HDFS 3320	3	FCSE 3303	3
HDFS 3301	3	HDFS 3331	3
PFP 3301 or FCSE 3350	3	HDFS 3310 or 3312	3
F&N 1410	4	F&N or RHIM Elective	3
Minor or Elec.	3	Minor or Elec.	3
TOTAL	16	TOTAL	15
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
HUSC 3214	2	Minor or Elec.	3
Oral Communication*	3	Minor or Elec.	3
RHIM Elective	3	FCSE 4307	3
Minor or Elec.	3	FCSE 4307	3
HDFS 3311 or 3313	3	PFP or I D Elective or FCSE 3350	3
TOTAL	14	TOTAL	15

TOTAL—126 hours

* Choose from Core Curriculum requirements.

Food and Nutrition—General Dietetics Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or I S 1100	1	ENGL 1302	3
ENGL 1301	3	PSY 1300	3
Mathematics*	3	CHEM 1308, 1108	4
CHEM 1307, 1107	4	POLS 2302	3
POLS 1301	3	F&N 1301	3
F&N 1201	2	TOTAL	16
TOTAL	16		
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
HIST 2300	3	HIST 2301	3
ZOOL 2403	4	F&N 3340	3
F&N 2420	4	RHIM 3322	3
CHEM 2303, 2103	4	F&N 2310	3
TOTAL	15	AAEC 3401 or MATH 2300	3-4
		TOTAL	15-16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
RHIM 3460	4	RHIM 3470	4
F&N 3402	4	FD T 3301 or 3303	3
RHIM 3341	3	F&N 3411, 4120	5
HUSC 3214	2	RHIM 3390	3
F&N 3310	3	F&N 4320	3
TOTAL	16	TOTAL	18
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
F&N 4340	3	F&N 4350	3
F&N 4330, 4130	4	F&N 4341	3
F&N 4380	3	COMS 2300 or 3358	3
HDFS 3320	3	F&N 4360	3
Humanities Elective*	3	Visual & Performing Arts*	3
TOTAL	16	TOTAL	15

TOTAL—127 hours

NOTE: Students are expected to have competency in computer usage.

* Choose from Core Curriculum requirements.

Food and Nutrition—Preprofessional Health Careers Curriculum

FIRST YEAR			
Fall		Spring	
HUSC 1100 or I S 1100	1	BIOL 1403	4
ENGL 1301	3	ENGL 1302	3
MATH 1351	3	CHEM 1308, 1108	4
CHEM 1307, 1107	4	POLS 2302	3
POLS 1301	3	F&N 1301	3
PSY 1300 or SOC 1301	2	TOTAL	17
TOTAL	17		
SECOND YEAR			
Fall		Spring	
HIST 2300	3	HIST 2301	3
ZOOL 2403	4	F&N 3340	3
F&N 2310	3	BIOL 1404	4
PHYS 1403	4	PHYS 1404	4
F&N 2420	4	MATH 2300	3
TOTAL	18	TOTAL	17
THIRD YEAR			
Fall		Spring	
CHEM 3305, 3105	4	CHEM 3306, 3106	4
F&N 3310	3	F&N 3411	4
F&N 3402	4	F&N 4320	3
COMS 2300 or 3358	3	F&N 4102	1
HUSC 3214	2	MBIO 3401	4
TOTAL	16	TOTAL	16
FOURTH YEAR			
Fall		Spring	
F&N 4340	3	F&N 4350	3
F&N 4330, 4130	4	F&N 4341	3
F&N 4380	3	F&N 4360	3
HDFS 3320	3	Visual & Performing Arts*	3
Humanities Elective*	3	TOTAL	12
TOTAL	16		

TOTAL—129 hours

NOTE: Students are expected to have competency in computer usage.

* Choose from Core Curriculum requirements.

Family and Consumer Sciences Education (FCSE)

(To interpret course descriptions, see pg. 10)

Undergraduate Courses

- 2102. Introduction to Family and Consumer Sciences (1:1:0).** For human sciences students only. Exploration of family and consumer sciences programs in traditional and nontraditional settings, including family and consumer sciences extension, adult education, business and community agencies, and public schools. Includes field experience.
- 3103. Field Experience in Family and Consumer Sciences I (1:1:0).** Supervised observation and teaching in family and consumer sciences. (Concurrently with FCSE 4302).
- 3301. Foundations of Family and Consumer Sciences Education (3:3:0).** Prerequisite: FCSE 2102, 2.5 GPA, and application and/or admission to the Teacher Education Program. Introduction to programs in secondary schools and other settings. Program development and teaching methods.
- 3303. Educational Processes in Family and Consumer Sciences Professions (3:3:0).** Designed for nonmajors. Focus on the teaching-learning process in professional settings outside the traditional classroom.
- 3325. Educational Programming: Addiction Issues (3:3:0).** Prerequisite: HDFS 3325. Addiction issues affecting individuals and families in business, community, and school settings. Emphasis on program development, implementation, and evaluation.
- 3350. Special Topics in Family and Consumer Sciences (3:3:0).** Semester long study of a specific topic pertinent to the family and consumer sciences profession. May be repeated (different topics) for a maximum of 12 credit hours.
- 4000. Individual Study (V1-6).** Prerequisite: Written consent of supervising faculty member. May be repeated for credit for up to 6 hours.
- 4103. Field Experiences in Family and Consumer Sciences II (1:1:0).** Corequisite: FCSE 4306. Supervised observation and teaching in occupational family and consumer sciences.

- 4301. Student Teaching in Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 3301 and admission to student teaching. Supervised teaching in an approved secondary family and consumer sciences program. (Concurrently with FCSE 3103).
- 4302. Professional Applications in Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 3301. Application of family and consumer sciences knowledge and skills in child development, clothing and textiles, family studies, food and nutrition, housing and interiors, and management and consumer economics. (Concurrently with FCSE 3103).
- 4304. Instructional Management in Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 4306, 4308; corequisite: FCSE 4601. Principles and procedures for managing the family and consumer sciences classroom. Designed to support the student teaching experience.
- 4306. Occupational Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 4302; corequisite FCSE 4103. Application of family and consumer sciences knowledge and skills in food service, home furnishings, clothing, child development, services for the elderly, and institutional and hospitality management.
- 4307. Internship in Family and Consumer Sciences (3:3:0).** Prerequisite: Junior standing, FCSE 3301 or 3303, 2.5 GPA. Supervised experiences in family and consumer sciences positions in extension, business, or related areas. May be repeated once for credit.
- 4308. Research and Evaluation in Family and Consumer Sciences (3:3:0).** Prerequisite: FCSE 4302. Introduction to methods of research and evaluation in family and consumer sciences. Includes practical applications.
- 4601. Student Teaching in Family and Consumer Sciences (6:6:0).** Prerequisite: FCSE 4306, 4308, corequisite: FCSE 4304 Supervised teaching in an approved secondary family and consumer sciences program. (Writing Intensive)

Graduate Courses

- 5118. Seminar (1:1:0).** May be repeated for credit.
- 5301. Administration in Family and Consumer Sciences Education Professions (3:3:0).** Administration of family and consumer sciences programs with emphasis on leadership development in a variety of settings.
- 5302. Curriculum Development in Family and Consumer Sciences Education (3:3:0).** Philosophy and development of family and consumer sciences programs for secondary schools, junior and senior colleges, and extension programs; survey of legislation, recent curriculum developments, and trends affecting family and consumer sciences programs.
- 5303. Evaluation in Family and Consumer Sciences Education (3:3:0).** Procedures for appraisal of individual growth and achievement in all subject areas in family and consumer sciences. Development of evaluative instruments for cognitive, affective, and psychomotor learning and interpretation of data in the evaluation of various types of family and consumer sciences programs.
- 5304. Techniques of Research in Family and Consumer Sciences Education (3:3:0).** Methods and techniques of research in family and consumer sciences, interpretation of findings and application to selected situations and problems.
- 5307. Techniques of Supervision in Family and Consumer Sciences Education (3:3:0).** Philosophy, responsibilities, and techniques of supervision in family and consumer sciences and other learning environments.
- 5308. Communication Processes in Family and Consumer Sciences Education (3:3:0).** Techniques of interaction and interpersonal relations in family and consumer sciences education programs. A comprehensive exploration of current communicative processes emphasizing interpersonal relationships with special audiences, i.e., handicapped, disadvantaged, and multicultural.
- 5309. Occupational Family and Consumer Sciences Education I (3:3:0).** Designed for vocational family and consumer sciences teachers seeking occupational certification. Emphasis on teaching methods in occupational family and consumer sciences, including cooperative and laboratory programs.
- 5311. Problems in Family and Consumer Sciences Education (3:3:0).** May be repeated for credit.

5312. **Occupational Family and Consumer Sciences Education II (3:3:0).** Focus on tasks, skills, and equipment for teaching in family and consumer sciences occupational programs.
5341. **History and Philosophy of Family and Consumer Sciences Education (3:3:0).** Historical, philosophical, and legislative bases of family and consumer sciences education. Consideration of current and future roles of family and consumer sciences education in secondary, post-secondary, higher education, extension education, and other areas.
5342. **Contemporary Adult and Continuing Education in Family and Consumer Sciences Education (3:3:0).** A systemic approach to development and administration of adult and continuing education programs in family and consumer sciences. Emphasis on professional development, career redirection, and life-long learning.
5343. **University Teaching in Family and Consumer Sciences Education (3:3:0).** Synthesis and analysis of innovative educational strategies, humanistic evaluation, and faculty role in program governance.
5344. **Internship in Family and Consumer Sciences Education (3:3:0).** Prerequisite: 6 hours in family and consumer sciences education and approval of instructor. Supervised experiences in family and consumer sciences positions in extension, business, secondary schools, or related areas. May be repeated for credit.
5350. **Special Topics in Family and Consumer Sciences Education (3:3:0).** Semester-long study of a specific topic pertinent to the family and consumer sciences education profession. May be repeated (different topics) for a maximum of 12 hours credit.
6000. **Master's Thesis (V1-6).**
6307. **Professional Issues in Family and Consumer Sciences Education (3:3:0).** Social, economic, and environmental changes impacting society and the response of family and consumer sciences professionals through education, research, and outreach programs in higher education. Focus on administrative leadership skills needed by leaders in the profession.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**
- in food, energy utilization, and the role of diet in health and disease.
1410. **Science of Nutrition (4:3:2).** Study of the nutrients found in foods and utilization of those nutrients by the body. Designed to convey the basic principles of nutritional science.
2310. **Principles of Food Preparation (3:2:2) [HECO 1315].** Application of scientific principles to food preparation.
2325. **Sports Nutrition (3:3:0).** Nutrition concepts and applied nutritional practices for the competitive and amateur athlete and physically active individual.
2420. **Nutrition (4:3:2).** Prerequisite: F&N 1301. Sources and roles of nutrients and their importance to human health. For nutrition majors and minors only.
3310. **Essentials of Dietetic Practice (3:2:2).** Prerequisite: F&N 2420. Role of dietitian in modern health care systems. Techniques of assessment, nutrition care planning, and documentation. Legal aspects of dietetic practice. (Writing Intensive)
3320. **Nutrition and Diet Therapy for Allied Health Professionals (3:3:0).** Prerequisite: ZOO 2403. Principles of nutrition and diet therapy as applied to frequently encountered health problems. For nursing, pre-med, and other allied health students.
3340. **Nutrition in the Life Cycle (3:3:0).** Prerequisite: F&N 2420 and ZOO 2403. Factors that affect diet and nutrition throughout the life cycle.
3350. **Child Nutrition (3:3:0).** Nutritional needs of young children in relation to mental and physical development; cultural, social, and psychological aspects of food and dietary patterns.
3402. **Survey of Biochemistry (4:4:0).** Prerequisite: CHEM 2103, 2303 or 3105 and 3305. Survey of general biochemistry.
3411. **Dietetic Counseling Strategies (4:3:1).** Prerequisite: F&N 3310. Application of interviewing, counseling, and educational techniques in dietetics, including individual and group methods.
4000. **Individual Study (V1-6).** Prerequisite: Written consent of supervising faculty member. May be repeated for up to 6 hours credit.
4120. **Medical Terminology (1:1:0).** Terminology in describing normal anatomical, physiological, and psychological conditions and those related to disease and its treatment. For students entering dietetic and allied health professions.
4130. **Field Work in Food and Nutrition (1:0:3).** Corequisite: F&N 4330. Preplanned experiences with evaluation of student performance in hospitals, community health centers, clinics, and volume feeding establishments. May be repeated once for credit.
4320. **Nutritional Biochemistry (3:3:0).** Prerequisite: F&N 2420 and 3402. Concepts of normal nutrition in relation to the chemistry and physiology of the human body.
4330. **Community Nutrition (3:3:0).** Prerequisite: F&N 2420; corequisite: F&N 4130. Study of nutrition-related problems in the community and the various resources, activities, agencies, and programs involved in health promotion and disease prevention.
4340. **Medical Nutritional Therapy I (3:3:0).** Prerequisite: F&N 3310, 3340, 3402, and ZOO 2403. 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.
4341. **Medical Nutritional Therapy II (3:3:0).** Prerequisite: F&N 4340. Pathophysiology, medical management, nutritional assessment, and nutritional therapy as they relate to disorders of the hepatic, gastrointestinal, cardiovascular, hematopoietic, immune, renal, and pulmonary systems; cancer; diseases of childhood; and pregnancy.
4350. **Emerging Issues in Food Science and Nutrition (3:3:0).** Prerequisite: F&N 2420 and senior standing. Readings, discussion, and analysis of trends and developments in food science and nutrition.
4360. **Experimental Methods with Food (3:1:6).** Prerequisite: F&N 2310 and general chemistry. Investigation of the chemical and physical factors influencing quality in food; consideration of proportions, manipulations of ingredients, and additives in preparation.
4380. **Cultural Aspects of Food (3:3:0).** Prerequisite: Junior standing or consent of instructor. A study of the historical, social, psychological, economic, religious, and aesthetic significance of food customs in various cultures. (Writing Intensive)

Graduate Courses

Food and Nutrition (F&N)

(To interpret course descriptions, see pg. 10)

Undergraduate Courses

1201. **Introduction to Dietetics (2:2:0).** Introduction to the field of dietetics including registration, ethical, legal, and professional issues.
1301. **Introduction to Nutrition (3:3:0).** An introduction to nutrition and its role in human health. For nutrition majors and minors only.
1325. **Nutrition, Foods, and Healthy Living (3:3:0) [BIOL 1322, HECO 1322].** An introduction to the nutrients, their content
5000. **Independent Study in Food and Nutrition (V 1-6).** Independent study in food and nutrition. May be repeated for credit.
5118. **Seminar (1:1:0).** May be repeated for credit.
5300. **Perspectives in Food and Nutrition (3:3:0).** Foundations of food and nutrition concepts. Does not apply to food and nutrition degree plan. May be repeated for credit.
5301. **Sensory Evaluation of Food (3:2:3).** Study of the physical and chemical properties of foods and their interrelations to sensory evaluation of foods.
5302. **Human Metabolism in Nutrition (3:3:0).** Concepts of normal nutrition in relation to the chemistry and physiology of the human body. May not be counted toward a food and nutrition degree.
5303. **Community Nutrition (3:3:0).** Study of nutrition related problems in the community and various resources, activities, agencies, and programs involved in health promotion and disease prevention. May not be counted toward F&N degree.

5304. **Medical Nutrition Therapy I (3:3:0).** Nutritional assessment and oral, enteral, and parenteral nutrition support. Pathophysiology medical management, nutritional assessment, and nutritional therapy as they relate to protein energy malnutrition, trauma, obesity, diabetes, and endocrine disorders. May not be counted toward F&N degree.
5305. **Medical Nutrition Therapy II (3:3:0).** Pathophysiology, medical management, nutritional assessment, and nutritional therapy as they relate to disorders of the hepatic, gastrointestinal, cardiovascular, hematologic, immune, renal, and pulmonary systems, cancer, diseases of childhood, and pregnancy. May not be counted toward F&N degree.
5306. **Experimental Methods With Foods (3:2:3).** Investigation of the physical and chemical factors influencing quality in food. May not be counted toward F&N degree.
5308. **Cultural Aspects of Food (3:3:0).** A study of the interaction of food and culture in various societies. May not be counted toward F&N degree.
5310. **Nutrition of the Aged (3:3:0).** Nutrition needs and factors affecting nutrition of the aged.
5311. **Problems in Food and Nutrition (3:3:0).** May be repeated for credit.
5320. **Resource Management in Dietetics (3:3:0).** Prerequisite: Consent of instructor. Materials and human resources management in administration and clinical aspects of dietetics.
5321. **Dietetic Counseling Strategies (3:3:0).** Application of interviewing, counseling, and educational techniques in dietetics including individual and group methods. May not be counted toward F&N degree.
5327. **Carbohydrates and Lipids in Nutrition (3:3:0).** Nutritional roles and metabolism of lipids and carbohydrates and metabolic responses to various dietary practices and diseases.
5329. **Minerals in Nutrition (3:3:0).** Prerequisite: F&N 4320 or consent of instructor. Study of minerals and their interrelationships in nutrition.
5330. **Introduction to Food and Nutrition Research (3:3:0).** Introduction to and critical review of current research designs and methodology in survey and controlled experiments; proposal writing, reporting, and interpretation of data.
5331. **Issues in Nutrition (3:3:0).** Prerequisite: F&N 4320. Current issues in human nutrition with emphasis on interrelationships of nutrients in metabolism and their impacts on health.
5332. **Issues in Food Science (3:3:0).** Current issues in food science with emphasis on the relationship of food science to human nutrition.
5333. **Vitamins in Nutrition (3:3:0).** Prerequisite: F&N 4320 or consent of instructor. Study of essential vitamins and factors affecting vitamin utilization.
5334. **Advanced Medical Nutrition Therapy (3:3:0).** Prerequisite: F&N 3340 or 4320 or consent of instructor. Physiological and metabolic bases for dietary modification in disease including assessment of biochemical and anthropometric indicators.
5336. **Nutritional Assessment and Data Interpretation (3:3:0).** Methods, techniques, and data interpretation for assessing nutritional status of individuals and groups.
5350. **Nutritional Pathophysiology (3:3:0).** Prerequisite: One semester of college biology or consent of instructor. An introduction to human pathophysiology with emphasis on the impact of nutritional influences.
5360. **Advanced Community Nutrition (3:3:0).** Prerequisite: Consent of instructor. Study of community nutrition needs, resources, policies, programs, and applications of skills in health promotion.
5380. **Proteins and Amino Acids in Nutrition (3:3:0).** Prerequisite: F&N 4320 or consent of instructor. Nutritional roles, interrelationships, measurement of nutritional value, requirements, and metabolic processes of proteins in health and disease.
5601. **Internship in Dietetics (6:0:24).** Prerequisite: Admission to the dietetic internship program. Internship experience in the practice of dietetics in clinical health care, food systems management, and community nutrition settings.
6000. **Master's Thesis (V1-6).**
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**
- Restaurant, Hotel, and Institutional Management (RHIM)**
(To interpret course descriptions, see pg. 10)
- Undergraduate Courses**
2210. **Introduction to Hospitality Management (2:2:0).** Analyzes the nature of work, people, and the interrelationships within the hospitality industry. Explores various career options.
2308. **Hotel Operations (3:2:3).** Principles and practices of managerial functions relating to the operation of hotel and motel facilities.
2312. **Introduction to Beverage Management (3:3:0).** Principles and practices regarding the production, selection, storage, and serving of beverages. Emphasis on responsible beverage use in business and social settings.
2350. **Culture of Travel and Tourism (3:3:0).** Study of the cultural and social benefits and outcomes of travel and tourism. For non-RHIM majors and not open to RHIM majors for credit.
3000. **Internship in Hospitality (V1-6).** Prerequisite: Sophomore standing and 2.5 GPA. Experiences in hospitality settings. May be repeated for a maximum of six hours credit.
3100. **Introduction to Internship in Hospitality (1:1:0).** Introduction to concepts and expectations of the internship experience.
3303. **Computers in the Hospitality Industry (3:2:3).** Prerequisite: Demonstrated computer competency. Examination and application of software and systems specific to the hospitality industry.
3308. **Hotel Group Sales and Services (3:3:0).** Emphasis on the function of convention and meeting sales and service departments related to lodging and tourism operations. Explores factors involved in the management of large group sales.
3320. **Facilities Management (3:3:0).** Management principles and practices relative to the internal maintenance of public dining and lodging facilities. Systematic control of hospitality spaces to safeguard health and to use available aesthetic values.
3321. **Hospitality Control I (3:3:0).** Introduction to hospitality control devices needed to measure fiscal success.
3322. **Hospitality Control II (3:3:0).** Prerequisite: RHIM 3321. Application of fiscal control devices in the hospitality industry. Includes computer applications in industry situations.
3330. **Special Topics in Hospitality (3:3:0).** Semester long study of a specific topic pertinent to the hospitality industry.
3341. **Hospitality Management (3:3:0).** Prerequisite: ENGL 1302. Factors involved in establishing hospitality operations, organization, administrative development, allocation of labor, and control. Examines hospitality organizations with emphasis on planning and problem analysis. (Writing Intensive)
3350. **Travel and Tourism (3:3:0).** An analysis of the economic and cultural impact of the international travel and tourism industry, including destination development, cultural integration, and demand for travel services.
3355. **Club and Resort Management (3:2:3).** Principles and practices of the general managerial procedures utilized in private clubs and resorts.
3358. **Human Resources in the Service Industry (3:3:0).** Explore human relations theories as they pertain to managing in the hospitality industry.
3390. **Purchasing in the Hospitality Industry (3:3:0).** Prerequisite: RHIM 3460. Current ethical, economic, legislative, and industrial developments related to purchasing food products and durable goods.
3460. **Food Systems Management I (4:3:3).** Sophomore standing. Application of scientific food preparation and management principles to quantity food production. Includes laboratory experience in quantity food facility.
3470. **Food Systems Management II (4:3:3).** Prerequisite: RHIM 3460 and 3 hrs. of mathematics courses. Optimum use of human, financial, and material resources by managers. Laboratory experiences include commercial food preparation and service.

4000. **Individual Study (VI-6)**. Prerequisite: Written consent of supervising faculty member. May be repeated for up to 6 hours credit.
4300. **Practicum (3:3:0)**. Prerequisite: Graduating senior's final semester and 800 hours of work-experience training completed. Beginning a career through the development of job search strategies, interviewing skills, and resume writing. Students can interview with a large variety of companies for entry-level management positions.
4312. **Beverage Control Management (3:3:0)**. Prerequisite: RHIM 3460. Selection, storage, and service of beverages with emphasis on inventory control, sales promotion, and profits.
4313. **Legal Aspects of Hospitality Industry (3:3:0)**. A study of the laws applicable to restaurants, hotels, and associated businesses. Includes duties, rights, and liabilities of institutions and guests.
4316. **Hospitality Management Marketing (3:3:0)**. Prerequisite: Senior standing. Application of marketing concepts, methods, and techniques used in the hospitality industry. Analysis of principles of consumer behavior, market research, promotion, and marketing strategy.
4320. **Hospitality Entrepreneurship (3:3:0)**. Prerequisite: Upper-division RHIM majors and minors. Aspects of opening and operating a small hospitality business.
4322. **Hospitality Cost Control III (3:3:0)**. Prerequisite: RHIM 3322. Utilization of fiscal control devices in the hospitality industry to develop financial assets and manage their application.
4330. **Contemporary Problems in the Hospitality Industry (3:3:0)**. Prerequisite: Senior RHIM majors. In-depth examination of selected problems in the hospitality industry.
4415. **Advanced Food Production Management (4:2:6)**. Prerequisite: RHIM 3322, 3390, 3470, 4312, FDT 3303. Assumption of maximum responsibility of management of actual food service operation based on sound managerial principles and successful food production and service techniques. Register through departmental office. (Writing Intensive)
5311. **Problems in Restaurant, Hotel, and Institutional Management (3:3:0)**. May be repeated for credit.
5316. **Hospitality and Service Marketing (3:3:0)**. Prerequisite: RHIM 4316 or consent of instructor. Examination of marketing theories and specific applications to the hospitality and service industry. Concentrates on differences of marketing concepts in service vs. products market.
5322. **Financial Analysis in the Hospitality Industry (3:3:0)**. Prerequisite: RHIM 4322 or consent of instructor. A systems approach to the financial decision making process in the hospitality industry.
5332. **Hospitality Control (3:3:0)**. Managerial concepts that apply to the hospitality industry using the uniform system of accounts for lodging, restaurant, and club industries.
5333. **Hospitality Management Research and Application (3:3:0)**. Examination of hospitality management and research concepts and their application in hospitality management settings.
5340. **Hospitality Consumer Behavior (3:3:0)**. Analysis of hospitality customers with emphasis on application of theoretical based research.
5341. **Strategic Management in the Hospitality Industry (3:3:0)**. Prerequisite: Completion of RHIM core. Examination of strategy formulation, content development, implementation, and evaluation at the unit and multi-unit level.
5350. **Travel and Tourism (3:3:0)**. A study of principles and concepts of travel and tourism behavior. Emphasis on tourism theories, history, planning, development, and research techniques.
5353. **Introduction to Restaurant, Hotel, and Institutional Management Issues and Research (3:3:0)**. Analysis of issues and methods of research related to the study of food, equipment, design, consumer acceptance, concept development, cost analysis, and operational efficiency.
5355. **Human Resources in the Hospitality Industry (3:3:0)**. In-depth study of human resources management in the service industry. Emphasis on employment issues, labor relations, and government regulations.
5370. **Food Systems Management (3:3:0)**. Examination of current trends in food service operations and technology. Emphasis on the functional subsystems of procurement, production, service and delivery, and sanitation and maintenance.
5375. **Operations Management for Service Industries (3:3:0)**. Prerequisite: ISQS 5346 or consent of instructor. Integration of quantitative production, operations methods, and traditional qualitative management in both the unit and multi-unit service operations.
5385. **Focus Group Research Methods (3:3:0)**. Exploration of focus group methodology to develop problem-solving and decision-making skills.
6000. **Master's Thesis (VI-6)**.
6001. **Internship in Hospitality Administration (VI-6)**. Prerequisite: Admission to doctoral program and consent of instructor. Internship experience in career-related position in the hospitality industry.
6100. **Seminar (1:1:0)**. Prerequisite: RHIM 5100.
6300. **Perspectives in Hospitality Administration (3:3:0)**. Foundation concepts in hospitality management. May be repeated for credit. Does not apply toward graduate credit.
6308. **Advanced Lodging and Leisure (3:3:0)**. Examines the lodging industry from a strategic management standpoint. Discussions and research will focus on industry interrelationships with economic, social, political, and financial entities.
6316. **Advanced Hospitality Marketing (3:3:0)**. An advanced investigation into the theories, strategies, and marketing policies influencing the corporate level decision making process and how they apply to the day to day operations of hospitality companies.
6320. **Franchising and Entrepreneurship in the Hospitality Industry (3:3:0)**. Examines managerial strategies and processes in starting, growing, and revitalizing hospitality businesses.
6322. **Financial Management in Hospitality Administration (3:3:0)**. Investigation of theories, strategies, and financial policies influencing corporate decisions in operations of domestic and international hospitality.
6330. **Theoretical Developments in Hospitality (3:3:0)**. Review and analysis of the history of the theoretical developments in the hospitality industry including a comparison with other disciplines.
6332. **Advanced Hospitality Control (3:3:0)**. Investigation of strategic cost management that includes financial and managerial accounting concepts relevant to the hospitality industry.
6340. **Organizational Management in Hospitality Administration (3:3:0)**. The study and practice of the latest concepts related to leadership and supervision in hospitality management.
6345. **Hospitality Business Ethics (3:3:0)**. Develop the cognitive skills and integrative abilities necessary to recognize moral distinctions which occur in the daily operations of businesses in the light of personal values and professional codes of ethics.
6350. **Advanced Travel and Tourism (3:3:0)**. An in-depth study of tourism supply, demand, policy, planning, development and marketing at the local, regional, state, national and international levels. Economic, social, political, and environmental considerations of tourism management and development will be a focus. Tourism-related research and experience to develop problem-solving and decision-making skills.

Graduate Courses

5001. **Internship in the Hospitality Industry (VI-6)**. Prerequisite: Consent of instructor. Experience in career-related positions in the hospitality industry.
5100. **Seminar (1:1:0)**.
5300. **Perspective in Restaurant Hotel and Institution (3:3:0)**. Foundation concepts in hospitality management. May be repeated for credit. Does not apply to a graduate degree.
5301. **Colloquium in Hospitality Management (3:3:0)**. Introduction to philosophies and processes involved in graduate study in the hospitality sector.
5308. **Hotel Management (3:3:0)**. An assessment of organizational and operational issues relating to the lodging industry.

periences with tourism organizations and agencies are components of the course.

6370. Advanced Food Systems Management (3:3:0). An examination of current technologies and processes in food industry related operations with emphasis on the subsystems of concept, and product development, production, and marketing.

6380. Grants and Project Funding (3:3:0). Examination and application of the processes related to grants and sponsored projects, including identification of sources of funding, proposal development, and grant administration.

6381. Community Action, Involvement, and Leadership (3:3:0). Analyze and assess

opportunities for community involvement. Students gain insight into the interconnectedness of individuals, businesses, and the larger community through problem-based learning.

7000. Research (V1-12).

8000. Doctor's Dissertation (V1-12).

Department of Human Development and Family Studies

Faculty

Dean M. Busby, Chairperson

Professors: Bell, Busby, Fischer, Haley, Harwood, Powell, Scott, and K.Wampler; **Associate Professors:** Caldera, Crawford, Feng, Fitzpatrick, Harrington, K. Harris, S. Harris, Hart, Ivey, Reifman, Sorrell, and R. Wampler; **Assistant Professors:** Bean, Bermúdez, Colwell, Lindsey, McCarty, Mulrow, Sharp, and Stelle; **Instructors:** Johnson and Nathan; **Adjunct Faculty:** Reid.

About the Program

This department supervises the following degree programs:

- Bachelor of Science in Human Development and Family Studies
- Master of Science in Human Development and Family Studies
- Doctor of Philosophy in Human Development and Family Studies
- Master of Science in Marriage and Family Therapy
- Doctor of Philosophy in Marriage and Family Therapy

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, family studies, substance abuse studies, and family therapy. 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, in substance abuse studies, or they may choose electives while pursuing another major course of study. A student may minor in HDFS by completing 18 hours of selected course work. The specific courses for the HDFS minor are approved by Academic Advising Services in the College of Human Sciences.

Bachelor of Science in Human Development and Family Studies

From a foundation of research and theory, this degree focuses on development across the life span (prenatal to late adulthood) in the context of couple, marriage, family, and peer relationships. This program focuses on intrapersonal (e.g., personality, cognition), interpersonal (e.g., relationship conflict, self-disclosure), and

societal (e.g., race-ethnicity, class) forces as they affect personal and family well-being.

Many courses offer perspectives on interpersonal and family behavior through development of the infant, child, adolescent, young adult (courtship, early marriage), middle-aged adult (divorce-remarriage, parenthood), and the older adult (widowhood, grandparenthood). Some courses also focus on important social issues that affect individual and family functioning (e.g., substance abuse, violence). Courses at the upper-division level provide professional training for the person wishing to seek employment in such diverse occupations as becoming a family life educator, Extension Service specialist, probation officer, child development specialist, or child care administrator.

Service-research skills are also enhanced by opportunities to observe and interact with infants, toddlers, and young children in the Child Development Research Center. The center is accredited by the National Association for the Education of Young Children. Supervised experiences with community groups provide opportunities for interaction with older children, adolescents, couples, families, and the elderly. These experiences assist students in understanding developmental stages of human behavior and interpersonal relations as they occur in family or group care settings.

Undergraduate students may want to specialize in one or more of the areas in which courses are offered in the department. These

Bachelor of Science: Human Development and Family Studies

This plan assumes that the student is exempt from any additional foreign language requirement. If a student must take two semesters of a single foreign language, the hours may count towards the 21 hours of electives.

		FIRST YEAR	
	Fall		Spring
HUSC 1100 or I S 1100	1	ENGL 1302 ^A	3
ENGL 1301	3	Natural Lab Science*	4
MATH Elective*	3	SOC 1301 or 1320	3
PSY 1300	3	POLS 2302 ^A	3
POLS 1301	3	Math. or Logical Reasoning*	3
Humanities*	3	TOTAL	16
TOTAL	16		
		SECOND YEAR	
	Fall		Spring
Natural Lab Science*	4	Statistics (choose 1)	3
English 2311	3	(MATH 2300, SOC 3391, PSY 3400)	
HDFS 2303	3	Technology and Applied Science*	3
HIST 2300	3	Visual and Performing Arts*	3
Oral Communication*	3	HDFS 2300	3
TOTAL	16	HIST 2301	3
		TOTAL	15
		THIRD YEAR	
	Fall		Spring
HDFS 3301	3	HUSC 3214 ^A	2
HDFS 3320	3	HDFS 3390 ^A	3
HDFS 3350	3	HDFS 3324	3
HDFS Elective	3	HDFS Elective	3
Minor/Collateral	3	Minor/Collateral	3
TOTAL	15	TOTAL	14
		FOURTH YEAR	
	Fall		Spring
HDFS Elective	3	HDFS Application/Research	3
HDFS Elective	3	HDFS Elective	3
Minor/Collateral	3	HDFS Elective	3
Minor/Collateral	3	Minor/Collateral	3
Minor/Collateral	3	Minor/Collateral	3
TOTAL	15	TOTAL	15

TOTAL—122 hours

* Choose from Core Curriculum requirements

areas include childhood, adolescence-adult development, addictions, family relationships, or application-research. Students may specialize in one or more of these areas by taking departmental elective courses from the desired areas.

Enrollment in the department is limited and based on an adjusted cumulative 2.5 GPA. To continue enrolling in human development and family studies courses, students must maintain a GPA that meets or exceeds this standard. In addition, transfer students must have an adjusted cumulative 2.5 GPA. Students with a lower GPA may be provisionally admitted or continue to enroll in courses if a petition is submitted to the department and approved by the admissions committee.

Child-Care Director Specialization. Students wishing to meet the state requirement of 6 hours of administration to become child-care directors should take HDFS 4330 and HDFS 4314 practicum in the Child Development Research Center office.

Core Curriculum. All students in the department must complete the university's Core Curriculum requirements. In addition, students in the department must complete the following courses to fulfill the college's core requirements: HUSC 1100, Introduction to Human Sciences; HUSC 3214, Human Sciences Seminar; and HDFS 3320, The Contemporary Family, which may also count toward the required hours in the major.

Students majoring in human development and family studies must take the following core courses for a total of 18 credit hours: HDFS 2300, Gender Roles: Lifespan Developmental Perspective; HDFS 2303, Lifespan Human Development; HDFS 3301, Theories of Human Development and the Family; HDFS 3324, Dynamics of Family Interaction; HDFS 3350, Development in a Cross-Cultural Perspective; and HDFS 3390, Research Methods.

Support Course Requirements. Students are required to take the following support courses for the major in human development and family studies: PSY 1300, General Psychology; SOC 1301 or 1320, Introduction to Sociology or Current Social Problems (also may be taken to fulfill the individual and group behavior requirement in the university Core Curriculum); ENGL 2311, Introduction to Technical Writing; and one of the following courses: MATH 2300, Statistical Methods, PSY 3400, Statistical Methods, or SOC 3391, Introduction to Social Research I.

Specialization Areas. Students must select a total of 21 hours from A, B, and C in the following list:

A. Human Development and Family Studies Area – Choose 6 hrs.

HDFS 3306 Child and Adolescent Guidance
 HDFS 3310 Prenatal and Infant Development
 HDFS 3311 Laboratory Experiences With Infants and Toddlers
 HDFS 3312 Development During Childhood
 HDFS 3313 Laboratory Experiences With Young Children
 HDFS 4306 Preparing Environments for Children
 W S 2300 Introduction to Women's Studies
 HDFS 3316 Development in Adolescence
 HDFS 3317 Problems of Adolescence
 HDFS 3318 Development in Young Adulthood
 HDFS 3319 Development in Middle Adulthood
 HDFS 3332 Aging in the Family
 HDFS 2125 Seminar in Addiction
 HDFS 2327 Substance Abuse Prevention
 HDFS 3325 Family Dynamics of Addiction
 HDFS 3329 Addiction and Relationships
 HDFS 4325 Treatment of Addictive Disorders
 HDFS 2322 Courtship and Marriage
 HDFS 3331 Parenting
 HDFS 3321 Human Sexuality Through Family Life Cycle
 HDFS 3322 Family in the Community
 HDFS 3326 Families in Crisis

B. Application/Research Area – Choose one course for 3 hrs.

HDFS 2320 Basic Interpersonal Skills
 HDFS 4000 Individual Study
 HDFS 4314 Practicum in Human Development and Family Studies
 HDFS 4320 Research in Human Development and Family Studies
 HDFS 4330 Administration in Human Development and Family Studies
 HDFS 4331 Introduction to Marriage and Family Therapy
 HDFS 4390 Program Development and Evaluation
 HDFS 4343 Advanced Topics in Human Development and Family Studies

C. Department Electives – Choose 12 credit hours of electives from A and B. Some students may want to concentrate their electives in one or two areas to demonstrate a specialization.

Bachelor of Science: Human Development and Family Studies — 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 I S 1100	1	ENGL 1302 [^]	3
ENGL 1301	3	EDIT 2318	3
MATH Elective*	3	I D 1380	3
FCSE 2102	1	POLS 2302	3
POLS 1301	3	Math. or Logical Reasoning*	3
Oral Communication*	3	TOTAL	15
Visual and Performing Arts*	3		
TOTAL	17		

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
Natural Lab Science*	4	HDFS Elective	3
English Literature (Choose any) [^]	3	HDFS 3310 [^]	3
HDFS 3301	3	PFP 2325 (s) or 3301	3
HIST 2300	3	ENGL 2311 [^]	3
ADM 1303	3	F&N 1410	4
EDSE 2300 or HDFS 3350	3	HIST 2301	3
TOTAL	19	TOTAL	19

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
FCSE 3301 (f)	3	FCSE 3350 or PFP 2325	3
HDFS 3312 [^]	3	HDFS 3313 [^] or 3311 [^]	3
HDFS 3320	3	EDSE 4310 ^{**} #	3
HDFS 3390 [^]	3	EDLL 4382 ^{**} #	3
HDFS Elective	3	EDSE 4322 ^{**} #	3
HDFS Elective	3	FCSE 3103#	1
TOTAL	18	FCSE 4302 (s) ^{**} #	4
		TOTAL	19

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
FCSE 4308 (f)#	3	FCSE 4601 (s)#	6
FCSE 4306 (f)#	3	FCSE 4601 (s)#	6
FCSE 4103 (f)#	1	FCSE 4304 (s)#	3
HDFS Elective	3	TOTAL	15
RHIM 3460	4		
HUSC 3214	2		
TOTAL	16		

TOTAL—138 hours

* Choose from Core Curriculum requirements

** Admission into the Teacher Education Program is required to enroll, 2.5 GPA minimum.

(f) Offered fall semester only

(s) Offered spring semester only

[^] Prerequisites apply

Must take concurrently

Bachelor of Science: Early Childhood Teacher Certification in Early Childhood to 4th Grade

The early childhood specialization prepares professionals to work with children from infancy through fourth grade. A strong emphasis in child development provides the foundation for understanding the child as an individual within the context of the family, the peer group, and school settings. The program meets current Texas requirements for teacher certification and is accredited by the State Board for Educator Certification and the National Council for Accreditation for Teacher Education. State teacher certification is granted from early childhood through the fourth elementary grade. See an academic advisor for updated certification requirements that may occur from recent legislative mandates. Admission to teacher certification is competitive and is based on an overall GPA of not less than 2.7 and satisfactory completion of all three portions of the TASP test. Students seeking teacher certification must meet all requirements outlined in the College of Education section of this catalog. To be recommended for certification, graduates must achieve satisfactory performance on the TExES, an examination prescribed by the State Board of Education.

FIRST YEAR			
Fall		Spring	
HUSC 1100 or I S 1100	1	ENGL 1302	3
ENGL 1301	3	HDFS 2305	3
MATH 1320	3	POLS 2302	3
POLS 1301	3	Nat. Lab Science (Earth/Space Sci)*	4
GEOG 130 or 2351	3	Oral Communication*	3
HDFS 2311	3	MUSI 2301 or 3336	3
TOTAL	16	TOTAL	19

SECOND YEAR			
Fall		Spring	
HIST 2300	3	HIST 2301	3
English Elective	3	Natural Lab Science (Life Science)*	4
MATH 2370	3	HDFS 3312	3
HDFS 3320	3	HDFS 3310	3
HDFS 3301	3	HDFS 3350 or	3
ART 3372	3	EDEL 2300	3
TOTAL	18	TOTAL	16

THIRD YEAR			
Fall		Spring	
EDSP 3300#	3	EDLL 3351#	3
EDLL 3350#	3	EDLL 3352#	3
EDIT 3318#	3	Natural Lab (Physical Science)	4
HDFS 3313 or 3311	3	HIST 3310	3
HDFS 3306	3	MATH 3370	3
HUSC 2000	1	TOTAL	16
TOTAL	16		

FOURTH YEAR			
Fall		Spring	
EDEL 4360, 4370#	6	EDEL 4330#	3
EDEL 4375, EDLL 4380#	6	EDEC 4000#	9
HLTH 3313 or ESS 3335	3	TOTAL	12
TOTAL	15		

TOTAL—128 hours

* Choose from Core Curriculum requirements.

Concurrent enrollment and acceptance into Teacher Education Program; 2.7 GPA minimum.

Graduate Program

These programs have prepared students for careers as university faculty, full-time researchers, medical school faculty, human service providers, and marriage and family therapists.

The M.S. and Ph.D. programs in human development and family studies focus on families and individuals within families as they develop across the life span. Both degree programs offer flexibility in study that encourages students to pursue research in early childhood, adolescent development, adult development, and gerontology as well as in related substantive issues including risk-taking behaviors, dating relationships, gender issues, program planning and evaluation, addictions, marriage, parenting, family violence, divorce, and blended families.

Graduate minors are also available in women's studies and adolescent and young adult risk-taking, which are interdisciplinary programs coordinated by graduate faculty within the department.

The M.S. degree requires a minimum of 30 hours of graduate course work and 6 hours of thesis research. The Ph.D. degree requires a minimum of 70 hours of graduate course work—12 hours of which are leveling requirements—plus at least 12 hours of dissertation research. Up to 30 transfer hours may be applied toward doctoral program requirements upon the approval of the student's committee and the Graduate School.

The M.S. and Ph.D. degree programs in marriage and family therapy provide clinical and academic training to students who will function as marriage and family therapists at the highest level of clinical competence, and who will make unique contributions to the field of marriage and family therapy through research, teaching, clinical practice, and other professional activities.

The M.S. degree is intended to provide the academic requirements leading to licensure as a Marriage and Family Therapist in the State of Texas. Actual licensure requires additional post-master's degree clinical experience. The Ph.D. degree requires a minimum of 42 hours beyond the master's degree plus a clinical internship and at least 12 hours of dissertation research. The Ph.D. program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education of the American Association for Marriage and Family Therapy.

Applicants should contact the department concerning admission requirements, programs of study, and financial assistance. Admission to a graduate degree program requires the recommendation of the department and the Graduate School.

Human Development and Family Studies (HDFS)

(To interpret course descriptions, see pg. 10)

Undergraduate Courses

2125. **Seminar in Addiction Recovery (1:1:3)**. Prerequisite: Consent of instructor. Philosophy and process of recovery from addiction. Intensive seminar and laboratory experience. May be repeated for credit.
2300. **Gender Roles: Life Span Developmental Perspectives (3:3:0)**. Introduction to gender role concepts and to the impact of gender and gender role systems on individual and family developmental processes.
2303. **Life Span Human Development (3:3:0) [PSYC 2311, 2314]**. Introduction to the theories, processes, and enhancement of development for infants, young children, adolescents, and adults.
2305. **Strategies of Studying Human Development (3:3:0) [PSYC 2312, TECA 1354]**. Observing, recording behavior, and reviewing techniques used in the study of human development throughout the life span.
2311. **Introduction to Early Childhood (3:3:0)**. 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.
2320. **Basic Interpersonal Skills (3:3:0)**. The study and application of interpersonal skills as they relate to various age levels and social contexts.
2322. **Courtship and Marriage (3:3:0) [SOC 2301]**. Considers the role of interpersonal relationships of dating, courtship, and marriage.
2327. **Substance Abuse Prevention (3:3:0)**. Introduction to different perspectives on current research and methodologies in the field of substance abuse.
3301. **Theories of Human Development and the Family (3:3:0)**. Survey of theories of human development with emphasis upon their implications for parenting, program development, and services. (Writing Intensive)
3306. **Child and Adolescent Guidance (3:3:0)**. Prerequisite: HDFS 3301. Development of strategies for promoting self-discipline, creative capacities, and positive relationships with children and adolescents.
3310. **Prenatal and Infant Development (3:3:0)**. Prerequisite: HDFS 3301. Study of how to promote the psychomotor, social-emotional, and cognitive-language development of infants from the prenatal period through the first two years in their interactions with caregivers, peers, and the environment.
3311. **Laboratory Experiences With Infants and Toddlers (3:1:4)**. Prerequisite or concurrent: HDFS 3310. Supervised experiences with infants and toddlers.
3312. **Development During Childhood (3:3:0)**. Prerequisite: HDFS 3301. Examination of psychomotor, social-emotional, and cognitive-language development during childhood.
3313. **Laboratory Experiences With Young Children (3:1:4)**. Prerequisite or concurrent: HDFS 3312. Supervised experiences with young children.
3316. **Development in Adolescence (3:3:0)**. Prerequisite: HDFS 3301. Enhancing the psychosocial, social-emotional, and cognitive-language development of adolescents within their interactions with peers, adults, and the culture.
3317. **Problems of Adolescence (3:3:0)**. Overview of problems associated with the adolescent years and training in use of helping skills appropriate for adolescent populations.
3318. **Development in Young Adulthood (3:3:0)**. Examination of individual developmental processes during the transition to adulthood and the first two decades of adult life.
3319. **Development in Middle Adulthood (3:3:0)**. Examination of individual developmental processes from the midlife transition through the middle years of adult life.
3320. **The Contemporary Family (3:3:0)**. Analysis of family interaction patterns with an introduction to family research. A study of family heritage, development, and networks emphasizing the successful family and sociocultural variations of family forms. (Writing Intensive)
3321. **Human Sexuality Through Family Life Cycle (3:3:0)**. Human sexuality from a life cycle perspective, with an emphasis on developmental, familial, and societal factors that influence individual sexuality.
3322. **The Family in the Community (3:3:0)**. Study of community resources as they relate to welfare of children and families.
3324. **Dynamics of Family Interaction (3:3:0)**. 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).
3325. **Family Dynamics of Addiction (3:3:0)**. An examination of the family system with specific reference to the causes and effects of chemical abuse and addiction.
3326. **Families in Crisis (3:3:0)**. Prerequisite: Sophomore standing. Examination of theories and strategies for helping families deal productively with crises. Consideration of child exceptionality, child abuse, unemployment, divorce, rape, alcoholism, death, and other crisis events.
3329. **Addiction and Relationships (3:3:0)**. Addicted persons may have difficulties with intimate relationships. Relationships can also be a specific addiction. This course examines addiction, relationships, and addictive relationships.
3331. **Parenting (3:3:0)**. Basic principles and skills for parent effectiveness. Includes strategies for inclusion of parents in the developmental-educational processes of the child.
3332. **Aging in the Family (3:3:0)**. Needs that arise from changes in family relationships, living arrangements, income, and employment.
3350. **Development in Cross-Cultural Perspective (3:3:0)**. Critical examination of developmental and family theory research across a diverse range of cultures.
3390. **Research Methods in Human Development and Family Studies (3:3:0)**. Prerequisite: HDFS 3320. Introduction to methods of research in human development and family studies. (Writing Intensive)
4000. **Individual Study (V1-6)**. Prerequisite: Written consent of supervising faculty member. Teaching assistantships, independent course work, or student-initiated research experience. May be repeated once for credit.
4306. **Preparing Environments for Children (3:3:0)**. Prerequisite: 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.
4314. **Practicum in Human Development and Family Studies (3)**. Prerequisite: Senior standing. Supervised experiences in established career-related positions; focus selected on basis of professional interest. May be repeated once for credit.
4320. **Research in Human Development and Family Studies (3:3:0)**. Prerequisite: HDFS 3390 or consent of instructor. Supervised faculty-initiated research experience in selected areas. May be repeated twice for credit.
4325. **Treatment of Addictive Disorders (3:3:0)**. Prerequisite: HDFS 3325. Survey of the current treatment philosophies and programs designed to assist individuals and families affected by addictive disorders.
4330. **Administration in Human Development and Family Studies (3:3:0)**. Prerequisite: 12 hours in department. This course includes application of administrative models, leadership attributes, research findings, and assessments of skills of human service settings.
4331. **Introduction to Marriage and Family Therapy (3:3:0)**. An experiential course with emphasis on developing skills that apply to interview situations. A problem-centered approach to family needs.
4343. **Advanced Topics in Human Development and Family Studies (3:3:0)**. This course focuses on recent developments in theory, philosophy, research, and/or applied approaches to human development and family studies.
4390. **Program Development and Evaluation (3:3:0)**. Knowledge and experience in the practice of program development and evaluation. Class evaluates an ongoing program.

Graduate Courses

5101. **Teaching College Human Development and Family Studies (1:0:1).** Strategies and direction in teaching college-level human development and family studies courses including supervision, advice and assistance, and review of teaching materials. May be repeated one time for credit. Pass-fail grading.
5110. **Colloquium in Human Development and Family Studies (1:1:0).** Prerequisite: Consent of instructor. Presentations of current research and discussions of the profession by department and visiting faculty. May be repeated for credit.
5302. **Introduction to Gerontology (3:3:0).** A multidisciplinary introduction to aging and gerontological issues.
5310. **Theories of Human Development (3:3:0).** Introduction to the application of concepts and theories in human development.
5311. **Problems in Human Development and Family Studies (3:3:0).** May be repeated for credit.
5313. **Psychosocial Development (3:3:0).** In-depth study of social, emotional, and psychological growth with emphasis on the development of personal and interpersonal competency.
5314. **Infant Development (3:3:0).** Analysis of empirical research regarding development processes during the first two years of life.
5317. **Adolescent Development (3:3:0).** Multidisciplinary survey of adolescent development including theories, research, and enhancement strategies.
5319. **Development in Adulthood (3:3:0).** Survey of theory and research concerning psychosocial development during adulthood and review of strategies for research with adult populations.
5320. **Interpersonal and Family Dynamics (3:3:0).** Group processes; factors influencing personal and family adjustment.
5321. **Family Theory (3:3:0).** A comprehensive exploration of theory in family studies. The role of theory in empirical investigation; conceptual frameworks; strategies of theory building; examination of systems theory and a spectrum of other models useful in the interdisciplinary study of individual, couple, and family behavior.
5341. **Socialization Processes and Addiction (3:3:0).** Multidisciplinary survey of socialization processes throughout the life span with implications for understanding addictions.
5344. **Aging and the Family (3:3:0).** Detailed examination of the family relationships of adults in late life. Emphasis on intergenerational issues and the enhancement of development and family life in later years.
5349. **Quantitative Methods I in Human Development and Family Studies (3:3:0).** An introduction to the quantitative methods and statistics necessary to conduct research with children and families through a developmental perspective.
5351. **Research Methods in Individual and Family Studies (3:3:0).** Study of research strategies and techniques relevant to human development, family studies, and marriage and family therapy including experience in conducting research investigations.
5352. **Sex-Gender Roles (3:3:0).** Survey of contemporary theory and research on sex-gender systems and roles and the impact of sex and gender on psychosocial development and relationship processes.
5353. **Issues and Research in Human Development and Family Studies (3:3:0).** History, philosophy, and current issues relevant to the areas of family studies and human development. May be repeated for credit under various topics.
5361. **Parent-Child and Peer Relationships (3:3:0).** Review of current research in parenting and peer relationships and implications for program development.
5380. **Relationship Development (3:3:0).** Theory and research related to the formation of initial impressions of others and the development of interpersonal relationships.
5381. **Individual and Family Measurement (3:3:0).** Detailed examination of measurement methods appropriate for individual and family research, consideration of strengths and weaknesses of each, and experience in development and application of measures.
6000. **Master's Thesis (V1-6).**
6320. **Seminar in Risk Taking (3:3:0).** Survey of theory and research in adolescent and adult risk-taking behaviors. Introductory course for graduate minor in risk taking.
6330. **Family Problems (3:3:0).** An introduction to theory, research, application, and current issues regarding adolescent and young adult risk behaviors. Emphasis is on a developmental/contextual perspective. Introductory course for graduate minor in risk taking.
6362. **Quantitative Methods II in Human Development and Family Studies (3:3:0).** Prerequisite: HDFS 5349. The second course in a four-course sequence focusing on methods for conducting relationship research through a developmental perspective. Family data and the General Linear Model will be explored.
6363. **Advanced Topics in Human Development (3:3:0).** Prerequisite: Consent of instructor. Current topics in human development across the life course. May be repeated for credit as topic varies.
6364. **Quantitative Methods III in Human Development and Family Studies (3:3:0).** Prerequisite: HDFS 5349, 5351, 6352. The third course in the quantitative methods sequence focusing on multivariate techniques involving multiple dependent variables in human development and family studies.
6365. **Quantitative Methods IV in Human Development and Family Studies (3:3:0).** Prerequisite: HDFS 5349, 5351, 6352, 6364. The final course in a four-course sequence on methods for conducting relationship research through a developmental perspective. A focus on Factor Analysis, Structural Equation Modeling, HLM, etc.
6366. **Qualitative Methods in Human Development and Family Studies (3:3:0).** Prerequisite: HDFS 5349, 5351. Provides students with an overview of qualitative research methods in HDFS and includes exposure to qualitative data collection and analyses of data from multiple family members.
6370. **Analyzing Developmental Data (3:3:0).** Prerequisite: Research methods, introductory statistics, or consent of instructor. Statistical methods for analyzing individual and family change over time and time ordered processes of interactional data.
6371. **Practicum in Human Development and Family Studies (3:3:0).** Supervised experiences in professional positions. May be repeated for credit up to 9 hours.
6373. **Advanced Topics in Family Studies (3:3:0).** Prerequisite: Consent of instructor. Current topics in family studies. May be repeated for credit as topics vary.
6390. **Program Development and Evaluation (3:3:0).** Reviews evaluation issues, critiques evaluation research, and undertakes planning and evaluation of original programs.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**
- Marriage and Family Therapy (MFT) (To interpret course descriptions, see pg. 10)**

Graduate Courses

5300. **Introduction to Marriage and Family Therapy Practice (3:0:3).** Prerequisite: Consent of instructor. Analyses of and solutions for common problems in marriage and family therapy practice.
5301. **Family Therapy I (3:3:0).** Prerequisite: Consent of instructor. Examination of structural, strategic, and systemic approaches to family therapy including the work of Minuchin, Haley, Mental Research Institute, and Milan Associates.
5302. **Family Therapy II (3:3:0).** Prerequisite: Consent of instructor. Examination of transgenerational and object relations approaches to family therapy including the work of Bowen, Boszormenyi-Nagy, Whitaker, and Satir.
5304. **Systemic Evaluation in Couple and Family Therapy (3:3:0).** Prerequisite: Consent of instructor. This course provides an in-depth examination of a systemic approach to clinical evaluations. Students receive training in administration and application of systemic assessment methods.
5322. **Family Systems (3:3:0).** Application of general systems theory and cybernetics to family systems. Exploration of interactional patterns, information processing, family structure, family belief systems, and family life cycle transitions with an emphasis on change processes.
5370. **Issues in Professional Development (3:3:0).** An examination of the major issues for professionals in marriage and family therapy. Emphasis on ethical standards, professional identity, and private practice issues.
6000. **Master's Thesis (V1-6).**
6303. **Family Therapy III (3:3:0).** Prerequisite: Consent of instructor. An examination of family influences on human sexual functioning,

basic interactional assessment, and interventions for common sexual dysfunctions. Intervening in incestuous families and the role of addiction in sexual behavior.

6305. **Developmental Issues in Therapy (3:3:0)**. Prerequisite: Consent of instructor. An examination and integration of human development topics within a systems framework.
6311. **Contemporary Directions in Marriage and Family Therapy (3:3:0)**. Prerequisite: Consent of instructor. An examination of postmodern thought on marriage and family therapy with emphasis on the collaborative and narrative approaches.
6322. **Family Systems II (3:3:0)**. Prerequisite: Consent of instructor. Advanced topics and issues in systems theory. Special focus on marriage and family therapy research.
6323. **Qualitative Research Methods in Marriage and Family Therapy (3:3:0)**. Prerequisite: Consent of instructor. Focuses on qualitative research methodologies specifically related to marriage and family therapy research. Students will gain practical experience applying qualitative methods to their research with clinical populations and family therapy topics.
6342. **Advanced Family Therapy Topics (3:3:0)**. Prerequisite: Consent of instructor. Advanced topics in the field of family therapy that may include family therapy with special populations and recent developments in family therapy theory and application. May be repeated for credit.
6370. **Diversity in Marriage and Family Therapy (3:3:0)**. Prerequisite: Consent of instructor. An examination of issues of race, ethnicity, and culture as they relate to family therapy. The course is designed to raise awareness and to train multiculturally competent therapists.
6395. **Practicum in Marriage and Family Therapy (3)**. Prerequisite: Consent of instructor. Supervised experiences designed to prepare the student for involvement in marriage and family therapy and family life education. May be repeated for credit up to 48 hours.
6396. **Supervision of Marriage and Family Therapy (3:3:0)**. Prerequisite: Two years of marriage and family therapy practicum and consent of instructor. Theory, research, and supervised practicum in supervision of family therapy.
6397. **Supervision Practicum in Marriage and Family Therapy (3:3:0)**. Prerequisite: Completion of MFT 6396 or equivalent and consent of instructor. Course provides structured experience in supervision of marriage and family therapy students.
7000. **Research (V1-12)**.
7395. **Internship in Marriage and Family Therapy (3)**. Prerequisite: Permission of Director of Marriage and Family Therapy Program. Full-time supervised internship in an appropriate setting. May be repeated for up to 12 hours credit.
8000. **Doctor's Dissertation (V1-12)**.

Department of Merchandising, Environmental Design, and Consumer Economics

Faculty

Joann Shroyer, Chairperson

Professor: Harp, Shroyer; *Associate Professors:* Cordell, Curry, Gustafson, V. Hampton, Khan, Russ, and Wilson; *Assistant Professors:* Adams, Amor, Bagwell, Collier, Joo, Tombs, and Yoo; *Instructors:* Alexander, Barnhill, G. Hampton, Hess, Kirkman, Payne, and Pegram.

About the Program

The department supervises the following degree programs:

- Bachelor of Interior Design
- Bachelor of Science in Apparel Design and Manufacturing
- Bachelor of Science in Personal Financial Planning
- Bachelor of Science in Retailing
- Master of Science in Environmental Design
- Master of Science in Personal Financial Planning
- Doctor of Philosophy in Environmental Design and Consumer Economics

A student may minor in one of these programs by completing a minimum of 18 hours selected in conference with the program director/coordinator.

Undergraduate Program

General Requirements

The Bachelor of Science and Bachelor of Interior Design degree programs are separated into lower division (first and second years) and upper division (third and fourth years). Students remain in the lower division until they have completed courses designated as first and second year requirements; earned at least 64 hours; have at least a 2.0 cumulative GPA in apparel design and manufacturing or interior design; and have at least a 2.8 GPA in personal financial planning or retailing for all work at Texas Tech. The grade of C

Apparel Design and Manufacturing Curriculum

		FIRST YEAR			
		Fall		Spring	
	HUSC 1100 or IS 1100		1	ENGL 1302	3
	ENGL 1301		3	Mathematics*	3
	ART 1302		3	ART 2304	3
	ART 1303		3	ADM 2308	3
	ADM 1301		3	ADM 1304	3
	ADM 1303		3	TOTAL	15
	TOTAL		16		
		SECOND YEAR			
		Fall		Spring	
	Natural Science Lab.*		4	Natural Science Lab.*	4
	HIST 2300		3	HIST 2301	3
	ART 3323		3	ADM 2302	3
	ADM 2311		3	Mathematics*	3
	ADM 2310		3	TOTAL	13
	TOTAL		16		
		THIRD YEAR			
		Fall		Spring	
	POLS 1301		3	POLS 2302	3
	ADM 3312		3	HUSC 3214	2
	ADM 3310 or 4309		3	ART 1310 or 2311	3
	Minor or Elective		3	ADM 3303	3
	TOTAL		12	ADM 4307	3
				TOTAL	14
		FOURTH YEAR			
		Fall		Spring	
	Individual or Group Behavior*		3	HDFS 3320	3
	COMS 3358		3	Minor or Guided Elective	6
	ADM 3305		3	ADM 4310	3
	Minor or Guided Elective		6	ADM 4389	3
	TOTAL		15	TOTAL	15
		SUMMER			
		First Term		Second Term	
	ADM 4390		3	ADM 4391	3
	TOTAL—122				

* Choose from Core Curriculum requirements.

is a minimum requirement in all departmental and support courses for all majors in the department. Prerequisites for departmental courses are governed by the catalog in effect when the course is taken.

An internship is required of each student specializing in apparel design and manufacturing, personal financial planning, interior design, and retailing. The internship experience is jointly planned by the faculty and the student. Application should be made through the program coordinator one year prior to the semester in which the internship is planned. A laboratory fee is required.

For the internship in apparel design and manufacturing, a grade of C or higher must be earned in ADM 3303, 3305, 3310, 4389, 4307, 4309, and 4310. ADM 4389 is required the spring semester prior to enrollment in ADM 4390, 4391.

For the internship in personal financial planning, a grade of C or higher must be earned in PFP 2310, 3374, 3375, 3378, 3198, PFP 3376 or FIN 4324, and ACCT 3307. PFP 4399 may be taken for up to 6 hours.

For the internship in interior design, a grade of C or higher must be earned in I D 3190, 3385, and 3386. I D 3190 is required the spring semester prior to enrollment in I D 4307.

For the internship in retailing, a grade of C or higher must be earned in RTL 3340, 3360, 3370, 4330, 4360, 4370, 4389; MGT 3370; MKT 3350, 3352 or 3353, 4351, 4359, or 4360; and ACCT 2301 or MGT 3376. RTL 4389 is required the spring semester prior to enrollment in RTL 4390, 4391.

Bachelor of Science in Apparel Design and Manufacturing

Apparel Design and Manufacturing Core. All students majoring in apparel design and manufacturing are required to take the apparel design and manufacturing core courses that are prerequisite to the advanced courses. The apparel design and manufacturing core consists of the following courses: ADM 1301, 1303, 1304, 2302, 2308, 2310, and 2311.

This program offers a comprehensive curriculum that prepares students for entry-level positions in the apparel industry or for continued study in graduate school. The curriculum emphasizes creativity, technical skills, knowledge of textiles, apparel product management, custom design for individual consumers, and design for mass production.

Students participate in extracurricular activities that provide additional learning opportunities, including the Hi-Tech Fashion Organization, Fashion Tours of New York or Los Angeles, two yearly design competitions, and a Senior Fashion Exhibit.

Sophomore Portfolio Review. In the fall semester of the sophomore year, students submit a portfolio with representative work from specific art and apparel design and manufacturing courses. In the event a "conditional" evaluation is received by a student, the student must resubmit the portfolio within one semester following portfolio review. At this time, the student must have met the recommended conditions stated by the reviewers to progress to the next level of course work.

Senior Portfolio Review. During the spring semester of the senior year, students are required to present a portfolio to be reviewed by a jury of apparel design professionals. If a "conditional evaluation" is received, the recommendations of the jury must be met prior to graduation.

Program Policies. A minimum grade of C is required in all art and apparel design and manufacturing courses. In addition, students must be registered in ADM 4310 to enter design competitions in the spring semesters of the junior and senior years. One design competition must be entered during the senior year to meet program requirements.

Bachelor of Science in Retailing

Retailing offers an innovative and challenging undergraduate program through a multidisciplinary curriculum that combines a creative approach to problem solving with an understanding of business principles. Retailing courses emphasize integration of team building, leadership, career planning strategy, and industry application. Course work outside the major includes study in technology, marketing, management, accounting, and economics. 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. A Students In Free Enterprise (SIFE) team, internship program, retail lecture series, and a strong alumni base afford students the opportunity to interface with a dynamic combination of retail executives and organizations throughout their academic study.

Retailing Curriculum

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or I S 1100	1	ENGL 1302	3
ENGL 1301	3	MATH 1331	3
MATH 1330	3	POLS 2302	3
POLS 1301	3	Natural Lab. Science*	4
RTL 1340	3	Guided Elective	3
TOTAL	13	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
HIST 2300	3	HIST 2301	3
Natural Lab Science	4	ACCT 2300	3
ISQS 2340	3	ECO 2305	3
ENGL 2311	3	RTL 2370	3
RTL 2340	3	RTL 4370	3
TOTAL	16	TOTAL	15

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MKT 3350	3	ACCT 2301 or MGT 3376	3
MGT 3370	3	MKT 3352 or 3353	3
Guided Elective	3	COMS 3358	3
RTL 3340	3	HUSC 3214	2
RTL 3370	3	RTL 3360	3
TOTAL	15	TOTAL	14

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
MKT 4351	3	MKT 4359 or 4360	3
HDFS 3320	3	Humanities*	3
Visual & Performing Arts*	3	RTL 4330	3
RTL 4360	3	RTL 4389	3
Guided Elective	3	TOTAL	12
TOTAL	15		

SUMMER

<i>First Term</i>		<i>Second Term</i>	
RTL 4390	3	RTL 4391	3

TOTAL—122 hours

* Choose from Core Curriculum requirements.

Bachelor of Science in Personal Financial Planning

Students are prepared for careers in financial planning and counseling in private practice, financial institutions, and governmental and social agencies. The multi-disciplinary program includes courses in business, accounting, economics, family studies, and communications. Students will develop a background for graduate study in personal financial planning and for certification programs as financial planners and financial counselors.

The program is registered by Certified Financial Planner Board of Standards, Inc. (CFP Board). The marks CFP® and Certified Financial Planner™ represent the most respected professional certification in the financial services industry. The mark CFP® identifies a certificant who has met educational standards, passed the CFP Board Certification Examination, satisfied a work experience requirement, and agreed to the CFP Board's Code of Ethics and Professional Responsibility.

Personal Financial Planning Curriculum

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or I S 1100	1	ENGL 1302	3
ENGL 1301	3	MATH 1331	3
MATH 1330	3	ACT 2300	3
*Humanities	3	ECO 2301	3
POLS 1301	3	PFP 2330	3
PFP 1370	3	TOTAL	15
TOTAL	16		

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
POLS 2302	3	HIST 2301	3
ENGL 2311	3	ACCT 3307	3
HIST 2300	3	ECO 2302	3
MATH 2345	3	Natural Lab. Science*	4
PFP 2310	3	PFP 3375	3
TOTAL	15	TOTAL	16

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
HDFS 3320	3	Natural Lab. Science*	4
BLAW 3391	3	HUSC 3214	2
PFP 3330	3	PFP 3378	3
PFP 3374	3	PFP 3198, 3350	4
PFP 3376	3	PFP 4376	3
TOTAL	15	TOTAL	16

SUMMER

PFP 4399 (Summer only)	3
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FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
COMS 3358	3	Visual & Performing Arts*	3
HDFS Elective	3	Elective	3
PFP 3397	3	PFP 4375	3
PFP 4377	3	PFP 4380	3
PFP 4370	3	PFP Elective	3
TOTAL	15	TOTAL	15

TOTAL—126 hours

* Choose from Core Curriculum requirements.

Bachelor of Interior Design

Accredited by the Foundation for Interior Design Education Research, 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. In the fall and spring semesters, sophomores submit a portfolio with representative work from specific studio courses (ARCH 1441, 1442, I D 1382, 2380, 2383). In the event a "conditional" evaluation is received by a student, the portfolio is reviewed a second time by the interior design faculty. A consensus of opinion by the faculty is required for determining recommendations for the student. Prior to being admitted to I D 3385, students who received "conditional" evaluations must have met the recommended conditions identified by the reviewers.

Senior Portfolio Review. During the senior year and while enrolled in I D 4104, students are required to present a portfolio to be reviewed by a jury of design professionals. This experience provides the student practice in critically evaluating, organizing, and presenting work. Students receiving "conditional" evaluations must meet the recommended conditions stated by the reviewers.

Student Projects Policy. The Department of Merchandising, Environmental Design, and Consumer Economics 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.

Interior Design Curriculum

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 1100 or I S 1100	1	ENGL 1302	3
ENGL 1301	3	Math. or Logical Reasoning*	3
MATH*	3	ARCH 1442	4
ARCH 1441	4	POLS 1301	3
I D 1380, 1382	6	I D 2380	3
TOTAL	17	TOTAL	16

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
ART 1310 or 1311	3	Natural Lab. Science*	4
HIST 2300	3	HIST 2301	3
Natural Lab. Science*	4	ENGL 2311	3
I D 2383	3	I D 3387	3
I D 3381	3	TOTAL	13
TOTAL	16		

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
ECO 2305	3	POLS 2302	3
ARCH 2351	3	ARCH 3350	3
I D 3311, 3382, 4383	9	I D 3190, 3383, 3385, 3386	10
TOTAL	15	TOTAL	16

SUMMER

I D 4307	3
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FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
HUSC 3214	2	COMS 3358	3
MKT 3350	3	PHOT 2310	3
HDFS 3320	3	I D 4104, 4385	4
I D 4606	6	Humanities*	3
TOTAL	14	Guided Elective	3
		TOTAL	16

TOTAL—126 hours

* Choose from Core Curriculum requirements.

Graduate Program

Admission into the master's and the doctoral programs requires submission of GRE scores and/or GMAT scores. Admission of international students requires submission of TOEFL scores.

The department offers an optional 6-hour credit internship for students who have not previously had experience in personal financial planning, environmental design, or consumer economics. To obtain departmental procedures and guidelines, students should contact the associate chairperson for graduate programs.

Master's Programs

The master's degree in environmental design requires a minimum of 45 semester hours including thesis. The master's degree in personal financial planning requires a minimum of 42 hours, including thesis. Students are required to defend the thesis based on original research and to take a final oral examination. Appropriate leveling course work may be required. A nonthesis option is available in personal financial planning. This option requires a minimum of 38 hours of course work. The program is registered by the Certified Financial Planner Board of Standards, INC. The marks CFP[®] and Certified Financial Planner[™] are the most respected professional designations in the financial services industry. The mark CFP[®] identifies a person who has met the educational standards, passed the CFP Board of Standards Certification Examination, satisfied a work experience requirement, and agreed to the CFP Board of Standards Code of Ethics.

Doctoral Program

The doctor's degree requires a minimum of 75 semester hours of graduate work beyond the bachelor's degree, exclusive of credit for the dissertation. Students develop their courses of study in consultation with a graduate advisory committee. Leveling course work may be required. A preliminary examination is required of all students before the end of the second semester of work toward the Ph.D. degree. The student's progress will be evaluated and recommendations will be made concerning continuation of graduate studies and leveling course work necessary to remove any deficiencies revealed by the examination. Following the completion of all course work, a qualifying examination for admission to candidacy for the Ph.D. degree will be conducted in accordance with the requirements of the Graduate School.

Joint Programs

Joint degrees offered by this department at the master's level include the following:

- Law/Personal Financial Planning, J.D.-M.S.
- Business Administration/Personal Financial Planning, M.B.A.-M.S.
- Business Administration/Personal Financial Planning, M.S.B.A.-M.S.

Apparel Design and Manufacturing (ADM)

(To interpret course descriptions, see pg. 10)

Undergraduate

1301. **Introduction to Apparel Design (3:3:0)**. Overview of apparel design room practices. Emphasis on the business, art, and craft of apparel design.
1303. **Clothing Construction (3:1:4) [HECO 1328]**. Application of basic apparel assembly methods, including the fundamentals of fit and use of home sewing machines and sergers.
1304. **Intermediate Clothing Construction (3:1:4) [HECO 1329]**. Prerequisite: ADM 1303. Intermediate apparel assembly, alteration of commercial patterns, use of industrial sewing machines, and selection of appropriate fabrics.
2302. **Fashion Illustration (3:1:4)**. Prerequisite: ART 1302, 1303. Illustration techniques for the fashion figure and rendering of garment details using various media, including color theory applied to fashion drawing and portfolio development.

2308. **Flat Pattern Design (3:1:4)**. Prerequisite: ADM 1301, 1303. Application of basic flat pattern techniques to bodices, skirts, sleeves, neckline, and bodice-sleeve combinations.
2310. **Design Through Draping (3:1:4)**. Prerequisite: ADM 2308. Application of design principles interpreted through draping techniques. Development of original designs for missy, plus sizes, menswear, and childrenswear.
2311. **Textiles (3:3:0) [HECO 1320]**. Selection, use, and care of textiles in relation to fiber characteristics, yarn, and fabric structure.
3303. **Tailoring (3:1:4)**. Prerequisite: Apparel design and manufacturing core. Advanced patternmaking, fit, construction, assembly, and finishing techniques for lined, tailored apparel. Emphasizes jackets and coats.
3305. **Computer Applications in Apparel Design (3:1:4)**. Prerequisite: Apparel design and manufacturing core. Computer-aided design methods for product development, including design, illustration, specification, costing, patternmaking, and plotting. Use of CAD in portfolio development.
3310. **Knitted Textile and Apparel Design (3:1:4)**. Prerequisite: Apparel design and manufacturing core. Design and production of textiles on knitting machines. Emphasis on knit structures and methods for cut and sew apparel.
3312. **History and Philosophy of Dress (3:3:0)**. Prerequisite: Junior standing. Apparel throughout the ages as reflected in cultures of the past and as an influence on contemporary design. (Writing Intensive)
4000. **Individual Study (V1-6)**. Prerequisite: Written consent of supervising faculty member prior to registration. Individual study or research under the guidance of a fashion design faculty member to enhance the degree program. May be repeated for up to 6 hours credit.
4307. **Apparel Manufacturing (3:1:4)**. Prerequisite: Apparel design and manufacturing core. Mass production strategies, including product development, sizing, grading, marking, costing, and manufacturing. Implementation of strategies for developing individual apparel collections.
4309. **Surface Design (3:1:4)**. Prerequisite: Apparel design and manufacturing and art core. Exploration of textile dyeing, printing, and painting with emphasis on composition using varied media and materials.
4310. **Apparel Product Development (3:1:4)**. Prerequisite: Apparel design and manufacturing core and junior standing. Research, planning, and development of an apparel collection for a target market, meeting relative workmanship, cost, and quality standards.
4389. **Professional Practices for Apparel Design and Manufacturing (3:1:2)**. Prerequisite: A grade of C or higher in all apparel design and manufacturing courses and senior standing. Planning and implementing strategies necessary for securing career positions in fashion design.
- 4390, 4391. **Internship in Apparel Design and Manufacturing (3:1:6 each)**. Prerequisite: A 2.0 cumulative GPA and a grade of C or higher in ADM 3303, 3305, 4389, 4307, 4309 or 3310, and 4310. Applied problems in apparel design emphasizing student participation in business and industry.

Consumer Economics and Environmental Design (CEED)

Graduate

5198. **Advanced Professional Practices in Personal Financial Planning (1:1:0)**. Prerequisite: Completion or concurrent enrollment in CEED 5371 (enrollment precedes CEED 5307). Emphasis on the principles of professional practice focusing on ethics, effective managerial strategies, and the student's transition to the professional workplace.
5301. **Graduate Research Seminar (3:3:0)**. Introduction to philosophies, technologies, and processes involved in research and graduate study related to the student's major area of specialization.
5307. **Internship (3:1:6)**. Supervised internship experiences in established career-related positions in the student's major area of specialization. May be repeated for credit up to 6 hours.
5310. **Readings (3:3:0)**. A comprehensive and critical review of literature and research data related to current issues in the student's major area of specialization.

5311. **Individual Study in Environmental Design and Consumer Economics (3:3:0)**. May be repeated for credit.
5362. **Asset Management I (3:3:0)**. Prerequisite: CEED major, joint degree student, or consent of instructor. This course focuses on the theory and practice of family asset allocation planning with special emphasis on the basic tools, techniques, and methodologies employed by finance planners.
5371. **Advanced Personal Financial Planning (3:3:0)**. The study and use of methods to assist families of different socioeconomic groups in family financial planning decisions.
5372. **Asset Management II (3:3:0)**. Prerequisite: CEED 5362 or FIN 5325. Applications of family financial planning models to decision making and asset resource allocation.
5373. **Professional Practice in Personal Financial Planning (3:3:0)**. Prerequisite: CEED 5371, 5377 or equivalent, CEED 5394, 5395, 5398, and ACCT 5311. Techniques and methods for practice development and operation in family financial planning.
5374. **Family Economics (3:3:0)**. Economic status of families at all income levels; factors influencing their standard of living; interrelationships with the economy.
5375. **Current Consumer Issues (3:3:0)**. Analysis of current consumer problems and decision-making responsibilities. Policies and programs for consumer protection and education. May be repeated for credit.
5376. **Family and Personal Consumption Behavior (3:3:0)**. Emphasis on factors involved in individual and family consumption. Concepts related to levels and standards of living and quality of life will be examined.
5377. **Advanced Financial Counseling (3:3:0)**. The study and use of methods to assist families of different socio-economic groups in correcting family financial dysfunction.
5378. **Research Methods I (3:3:0)**. Positivist, interpretive, and critical modes of research inquiry in the student's major area of specialization.
5379. **International Issues for Families and Households (3:3:0)**. Analysis of relevant social, economic, and political developments pertinent to individuals and family welfare approached from a global perspective.
5380. **Contemporary Issues in Personal Financial Planning (3:3:0)**. Prerequisite: CEED 5371 or consent of instructor. The study of contemporary issues in the financial planning profession and the financial services industry.
5381. **Environmental Design Analysis (3:3:0)**. Implications from the social sciences as applied to analyzing causes and arriving at possible solutions to problems related to housing and interiors in contemporary society.
5382. **Interior Design Systems (3:3:0)**. Study of systems used in the design and re-
- search of residential and nonresidential interiors.
5384. **Advanced Lighting Systems (3:3:0)**. Prerequisite: I D 3381 or equivalent. Advanced study and application of lighting systems.
5388. **Design of Interior Environments for Physically and Mentally Challenged Populations (3:3:0)**. Adaptation and evaluation of proximate environments to meet the needs of the physically and mentally challenged.
5394. **Retirement Planning and Employee Benefits (3:3:0)**. Prerequisite: CEED 5371. Application of retirement planning models and programs to personal and financial aspects of retirement.
5395. **Advanced Risk Management (3:3:0)**. Application of risk management theory to family risk analysis and financial loss prevention throughout the family life cycle.
5396. **Asset Management III (3:3:0)**. Prerequisite: CEED 5372 and consent of instructor. Students will work with the issues regarding the blending of client risk tolerance, investment objectives, and desired holding period into a successfully conceived investment plan.
5397. **Life Insurance Planning (3:3:0)**. This course explores the use of life insurance and annuities in financial planning. A heavy emphasis will be placed upon advanced planning techniques.
5398. **Advanced Estate Planning (3:3:0)**. Application of estate planning methodologies and policies to personal and family financial planning.
6330. **Research Fund Development (3:3:0)**. Exploration of processes for preparing research ideas for presentation to individuals, groups, and/or organizations. Study of research proposal characteristics, how proposals are reviewed, strategies for success, and public versus private funding sources.
6370. **Environmental Design Technology and Development (3:3:0)**. Examination of environmental design processes and related technologies. Analysis and synthesis of human factors, interior components, information systems, and the environment.
6378. **Research Methods II (3:3:0)**. Prerequisite: CEED 5378 or equivalent and 3 credit hours of statistics. Application of statistical packages to analyze data and interpret results. Includes mainframe and micro applications.
6383. **Regulatory Policy (3:3:0)**. A survey of regulatory policies focusing on current issues, alternatives, and dilemmas concerning consumers.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.
- Interior Design (I D)**
- Undergraduate**
1380. **Introduction to Interior Design (3:3:0)** [HECO 1325, 1326]. Survey of principles and concepts including aesthetics and
- processes relevant to planning residential and nonresidential environments.
1382. **Interiors I (3:1:4)**. Prerequisite or Corequisite: I D 1380. Introduces principles and concepts relevant to planning residential environments.
2380. **Interiors II (3:1:4)**. Prerequisite: A grade of C or higher in ID 1380, 1382, and ARCH 1441 (or concurrent enrollment). Introduces skills necessary to design, analyze, and present concept, preliminary, working, and presentation drawings.
2383. **Interiors III (3:1:4)**. Prerequisite: A grade of C or higher in I D 2380 and ARCH 1442 (or concurrent enrollment). Graphic media application in rendering and presentation methods. Perceptual development in volumetric organization relative to 2 and 3 dimensional design.
3190. **Preinternship Seminar (1:1:0)**. Prerequisite: Junior standing, ID 3385 and 3386 or concurrent enrollment, and a 2.0 cumulative GPA; enrollment required in spring immediately preceding I D 4307. Emphasis on preparation for interior design internship, career opportunities, job search, and interview strategies.
3311. **Interior Materials (3:2:2)**. Prerequisite: I D 2383. Successful completion of sophomore portfolio review. Selection of materials used in residential and nonresidential environments based on characteristics, composition, installation methods, and maintenance requirements. (Writing Intensive)
3381. **Lighting Systems (3:2:2)**. Prerequisite: A grade of C or higher in I D 2380 or equivalent. Survey of the human factors relating to the luminous environment that support health, safety, comfort, human performance, and aesthetics.
3382. **Period Furnishings I (3:3:0)**. Prerequisite: A grade of C or higher in I D 2383 or consent of instructor. Introduction to furniture and interior elements through the 17th century. Emphasis on the evolution of forms, relationships to previous periods, and implications for current design applications.
3383. **Period Furnishings II (3:3:0)**. Prerequisite: A grade of C or higher in ID 3382. Introduction to furniture and interior elements from 18th, 19th, and 20th centuries. The evaluation of forms, relationships to previous periods, and implications for current and future designs are emphasized.
3385. **Advanced Design Processes (3:1:4)**. Prerequisite: A C or higher in ID 3381 and 3387 and successful completion of sophomore portfolio review. Emphasis on problem formulation, programming, design conceptualization, design development, working drawings, specifications, schedules, furniture selection, layout and design presentation, universal design, life safety, and building codes. (Writing Intensive)
3386. **Studio Procedures and Professional Practices for Interior Designers (3:3:0)**. Prerequisite: Junior standing, interior

- design. Professional opportunities as they relate to individual competencies. Preparation of business documents. Study of the ethics, business, and legal aspects of studio procedures.
3387. **Computer Aided Drafting for Interior Designers I (3:1:4)**. Prerequisite: A grade of C or higher in I D 2380 or equivalent. Introduction to computer-aided design and two-dimensional drafting for the interior designer and other uses of computers in the practice of interior design.
4000. **Individual Study (V1-6)**. Prerequisite: Written consent of supervising faculty member. May be repeated for up to 6 hours credit.
4104. **Senior Portfolio Seminar (1:1:0)**. Prerequisite: 2.0 GPA and spring enrollment immediately preceding May, August, or December graduation. Analysis of professional issues with emphasis on portfolio development and review.
4307. **Internship in Interior Design (3:1:6)**. Prerequisite: Departmental approval and a grade of C or higher in ID 3190, 3385, and 3386. Supervised intern experiences in established career-related positions. May be repeated as I D 4000 Individual Study.
4383. **Computer-Aided Drafting for Interior Designers II (3:1:4)**. Prerequisite: A grade of C or higher in I D 3387 or consent of instructor. Advanced three-dimensional computer-aided design and two-dimensional drafting for the interior designer and other uses of computers in the practice of interior design.
4385. **Advanced Interiors (3:1:4)**. Prerequisite: A grade of C or higher in ID 3385 and spring enrollment immediately preceding May, August, or December graduation. Advanced experiences in residential and nonresidential design that integrate problem solving skills, building systems, techniques of graphic expression, materials and specifications, and aesthetic sensibility.
4606. **Collaboration Studio (6:1:8)**. Prerequisite: A grade of C or higher in I D 3385. An interdisciplinary studio for the design profession that addresses the process and skills necessary for collaboration.
- Personal Financial Planning (PFP)**
- Undergraduate**
1370. **Introduction to Personal Financial Planning (3:3:0)**. For PFP majors only. Introduction to personal financial planning, including goal setting, cash management, insurance, taxes, investment alternatives, housing and retirement plans.
2310. **Technological Applications in Personal Financial Planning (3:1:3)**. Prerequisite: MATH 1330 and successful completion or concurrent enrollment in PFP 1370. Introduction to computer software programs used in family financial planning, including spreadsheets, word processing, data base management, and presentations.
2325. **Family Financial Counseling (3:3:0)**. For nonmajors only. Methods and procedures to assist individuals and families of different socio-economic environments to resolve dysfunctional financial behaviors including skills essential in counseling clients.
2330. **Personal Financial Counseling I (3:3:0)**. Prerequisite: PFP major. Methods and procedures to assist individuals and families of different socioeconomic environments to resolve dysfunctional financial behaviors including skills essential in counseling clients.
3198. **Professional Practices in Personal Financial Planning (1:1:0)**. Prerequisite: GPA of 2.8 and all PFP 3000 level courses completed or concurrent enrollment. Principles of professional practices focusing on ethics, effective managerial strategies, and the student's transition to the professional workplace.
3301. **Financial Planning for Young Adults (3:3:0)**. Prerequisite: Upper-division standing. For nonmajors only. Introduction to personal financial planning, including goal setting, cash management, credit, insurance, taxes, housing, investment alternatives, and retirement plans.
3330. **Personal Financial Counseling II (3:3:0)**. Prerequisite: 2.8 GPA and completion of PFP 2310, 2330, and ENGL 2311. Counseling techniques and interviewing strategies for use in financial counseling and planning settings. Emphasis on the importance of communication processes in helping individuals and families.
3350. **Regulatory Influences on Personal Financial Planning (3:3:0)**. Prerequisite: GPA of 2.8, ACCT 3307, PFP 1370, and 2310. Study of the impact of federal and state regulations on family financial planning decisions.
3374. **Retirement Planning (3:3:0)**. Prerequisite: GPA of 2.8 and successful completion of PFP 1370, 2310, ENGL 2311, and completion or concurrent enrollment in ACCT 3307. A foundation course in family retirement planning. (Writing Intensive)
3375. **Risk Management (3:3:0)**. Prerequisite: GPA of 2.8 and successful completion of PFP 1370. A foundation in family risk management.
3376. **Asset Management I (3:3:0)**. Prerequisite: 2.8 GPA and completion of PFP 1370, 2310, and MATH 2345. This course focuses on the theory and practice of personal asset allocation planning with a special emphasis on the basic tools, techniques, and methodologies employed by financial planners. Topics covered include : basic security valuation and analysis, capital markets, investment alternatives, fundamentals of portfolio design, money management process, client goals and expectations, regulation of financial advisors, and financial planning issues in asset management.
3378. **Estate Planning (3:3:0)**. Prerequisite: GPA of 2.8 and successful completion of PFP 1370, 2310, and completion or concurrent enrollment in ACCT 3307. A foundation course in family estate planning.
3397. **Life Insurance Planning (3:3:0)**. Prerequisite: 2.8 GPA and completion of PFP 1370 and 2310. This course explores the use of life insurance and annuities in financial planning. Topics include: forecasting needs, liquidity analysis, selecting an insurer, product features, life company operations, regulation of insurers and agents, packaging cases for underwriting, legal rights, taxation issues, reinsurance and impaired life underwriting. A heavy emphasis will be placed upon advanced planning techniques such as life insurance trusts, buy sell agreements, charitable gift annuities, split dollar life, key employee coverage, funding nonqualified deferred compensation DBO plans.
4000. **Individual Study (V1-6)**. Prerequisite: Written consent of supervising faculty member prior to registration. 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.
4370. **Personal Financial Planning Capstone (3:1:3)**. Prerequisite: GPA of 2.8 and successful completion of PFP 3374, 3375, 3376, 3378, and ACCT 3307. Integrates the financial planning content areas into the development of comprehensive financial plans. Course work includes case studies and work with clients.
4375. **Financial Planning in Institutional Setting (3:3:0)**. Prerequisite: GPA of 2.8 and successful completion of PFP 3374 and 3375. Focuses on delivering financial planning and counseling services through public and private employer-based systems.
4376. **Asset Management II (3:1:3)**. Prerequisite: GPA of 2.8 and completion of PFP 3376 and ACCT 3307 with grades of C or higher. The evaluation of client risk tolerance, analysis of asset manager's historic performance, and the creation of portfolios using mutual funds and variable annuities.
4377. **Personal Financial Planning and Counseling Seminar (3:3:0)**. Prerequisite: GPA of 2.8 and successful completion of all 3000 level PFP courses. Analysis of ethical issues involving financial planners and counselors. Examines impact of public policy and demographic trends.
4380. **Advanced Technological Applications in Personal Financial Planning (3:1:3)**. Prerequisite: GPA of 2.8 and completion or concurrent enrollment in PFP 4370. Advance course work in professional software packages for financial planning and investment portfolio applications.
4396. **Asset Management III (3:3:0)**. Prerequisite: 2.8 GPA, completion of PFP 4376, and consent of instructor. Students will

work with issues regarding the blending of client risk tolerance investment objectives and holding periods into a successfully conceived investment plan.

- 4399. Internship in Personal Financial Planning (3:1:6).** Prerequisite: GPA of 2.8, all PFP 3000 level courses, and ACT 3307 completed with a grade of C or higher. Supervised intern experiences in established career-related positions. May be repeated for credit.

Retailing (RTL)

Undergraduate

- 1340. Introduction to Retailing (3:3:0).** Basic principles, concepts, and practices in the operation of retail organizations.
- 2340. Contemporary Issues in Retailing (3:3:0).** Prerequisite: A grade of C or higher in RTL 1340. Fundamental principles and current issues that affect retailing; emphasis on related influences from government, economics, technology, and society.
- 2370. Retail Planning and Control I (3:3:0).** Prerequisite: A grade of C or higher in RTL 1340, MATH 1330, 1331; corequisite: ISQS 2340. Introduction to numerical terminology, concepts, and related calculations involved in solving retail management problems and managing fiscal outcomes.
- 3340. International Retailing (3:3:0).** Prerequisite: A grade of C or higher in RTL 2340, ENGL 2311, ECO 2305. Cultural differences, world markets, and political constraints encountered in international retailing strategy. (Writing Intensive)
- 3360. Diversity Concepts and Skills (3:3:0).** Prerequisite: A grade of C or higher in RTL 2340, 2370. Basic diversity issues and concepts, emphasis on application to the retailing function.
- 3370. Retail Planning and Control II (3:3:0).** Prerequisite: A grade of C or higher in RTL 2340, 2370, ISQS 2340, ACCT 2300. Advanced numerical terminology, concepts, related calculations, and computer applications involved in analyzing fiscal outcomes.
- 4000. Individual Study (VI-6).** Prerequisite: Written consent of supervising faculty member prior to registration. Individual study or research under the guidance of a retailing faculty member to enhance the degree program. May be repeated for up to 6 hours credit.
- 4330. Retailing Research (3:3:0).** Prerequisite: A grade of C or higher in RTL 3340, 3370, MKT 3350. Research in the retailing process; emphasis on application-oriented techniques and processes for implementation.
- 4360. Retail Management (3:3:0).** Prerequisite: A grade of C or higher in RTL 3370, MGT 3370, COMS 3358 or MGT 3373. Interrelated functions in retail management examined through case study. (Writing Intensive)
- 4370. Merchandise Promotion (3:3:0).** Prerequisite: A grade of C or higher in RTL 2340, 3360, MKT 3350. Merchandise communication through the interaction and coordination of sales promotion, personal selling, visual merchandising, advertising, special events, and public relations.
- 4389. Professional Practices in Retailing (3:3:0).** Prerequisite: Senior standing, departmental approval, and a 2.0 cumulative GPA; enrollment precedes RTL 4390, 4391. Focuses on ethics and effective managerial strategies; emphasizes the relationship of total curriculum to the profession.
- 4390, 4391. Internship in Retailing (3:1:6 each).** Prerequisite: Departmental approval, a 2.0 cumulative GPA, and a grade of C or higher in RTL 3340, 3360, 3370, 4330, 4360, 4370, 4389; MGT 3370; MKT 3350, 3352 or 3353, 4351, 4359 or 4360; ACCT 2301 or MGT 3376. Supervised applications of concepts, principles, and techniques learned in the classroom; emphasis on student participation in business or industry.



College of Mass Communications

About the College

The College of Mass Communications is one of the largest undergraduate programs in the United States and is one of 107 programs in the nation that is accredited by the Accrediting Council on Education in Journalism and Mass Communications. The college is recognized as a leader among the nation's elite mass communications programs with a curriculum that emphasizes a broad-based communications education for undergraduate majors who must adapt to rapid changes in information/communications industries. The college emphasizes its internship opportunities and job placement services through its Career Center.

The college seeks to prepare students to become leaders in their respective professions. Our courses provide students with the opportunity to think critically and to communicate effectively.

The college supervises the following degree programs:

- Bachelor of Arts in Advertising
- Bachelor of Arts in Electronic Media and Communications
- Bachelor of Arts in Journalism
- Bachelor of Arts in Photocommunications
- Bachelor of Arts in Public Relations
- Master of Arts in Mass Communications

The undergraduate and graduate programs prepare students for careers in professional areas of mass communications and/or to pursue additional graduate degrees.

Faculty

Professors: Harp, Hudson, and Reddick; *Associate Professors:* Dean, Oskam, Parkinson, Reeves, Saathoff, Thornhill, and Watts; *Assistant Professors:* Bichard, Callison, Chambers, Miller, Moretti, Ortiz, Patwardhan, and Youngblood; *Instructors:* Brewton, Douglass, Galvez, M. Wernsman, R. Wernsman, and West; *Lecturer:* Price.

Undergraduate Program

The College of Mass Communications is accredited by the Accrediting Council on Education in Journalism and Mass Communications (ACEJMC). The college operates under the general policy of the ACEJMC, which requires students to take a minimum of 80 semester hours in courses outside the major area of journalism and mass communications, with no fewer than 65 semester hours in the basic liberal arts and sciences.

To keep the curriculum abreast of trends and changes in mass communications and to broaden the education of majors by requiring core subjects such as introduction to mass communications, mass media theories and society, mass communications law, and news writing, the minimum number of semester hours required by the college for the Bachelor of Arts degree has been set at 122 hours. The minimum number of hours that can be taken within the college is 39.



Jerry C. Hudson, PhD
Founding Dean

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First-semester freshmen enrolling in the college must meet the university-wide admission requirements and present ACT or SAT scores when entering the college. Students enrolling in the college for the first time will be designated as general mass communications students. Students enrolled in other colleges at Texas Tech may transfer into the college after completing at least 15 semester hours excluding CLEP courses and have a minimum adjusted GPA of 2.75.

The change from the general mass communications status, which is not a major, to a specific major will be accomplished after the following requirements have been met:

1. Completed the ACT or SAT examination with scores submitted to the college.
2. Made at least a C in ENGL 0301 (if required), 1301, and 1302.
3. Completed the college's economics requirement with a grade or grades of C or better.
4. Completed the college's mathematics requirement with a grade or grades of C or better.
5. Completed the entry-level course in the major sequence with a grade of C or better. (The entry-level course in journalism is JOUR 2310; for advertising, ADV 2310; for public relations, P R 2310; for electronic media and communications, EM&C 3300; for photocommunications, PHOT 3310.)
6. Passed the college's grammar, spelling, and punctuation exam.

Core Curriculum Requirements. The Core Curriculum requirements ensure breadth in each academic program. These requirements have been incorporated into the college's undergraduate degree programs. Students have no need to refer to the Core Curriculum requirements unless so directed by their degree program.

Course Load. A normal full-time course load is 15-19 hours per semester. In calculating the course load, the associate dean of student services will consider all active correspondence courses as a part of the course load. Course loads in excess of 19 semester hours require approval by the associate dean of the college. The maximum course load for a student on probation is 16 hours.

The normal course load for a single summer term is 6-8 hours. To meet graduation requirements, a graduating senior may petition to take 9 hours one term or a total of 15 hours in both terms.

Correspondence Courses. Approval for courses to be taken by correspondence must be obtained in the Student Services Division (106 Mass Communications). All course prerequisites must be met to be granted enrollment. In all programs no more than 6 credit hours may be completed during the final 30 credit hours. Junior status is required to enroll in upper division courses. Major and minor mass communications courses are excluded.

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. Students who do not enroll for one calendar year will be placed into the current catalog upon readmission to the university. For graduation purposes, a catalog expires after seven years at which time the current catalog becomes the catalog in effect.

Credit by Examination. A matriculated student may attempt credit by examination (described elsewhere in this catalog). Approval from the associate dean of student services is required to take an examination a second time before six months have elapsed or if more advanced material in the same subject has already been completed.

Grades of D. Credits for a course in which a grade of D is earned may not be applied toward fulfillment of the major, adjunct, minor, or teaching field requirements for any degree program.

Grading Practices. The college conforms to university grading practices as set forth in the Undergraduate Academics section of this catalog. In addition, the following regulations apply within the college.

Except for those courses designated "may be repeated for credit" in this catalog, no course may be used more than once on a degree plan unless it has been approved by the associate dean of student services.

Second Bachelor's Degree. Permission to enroll in courses to pursue a second bachelor's degree must be obtained at the Student Services Division office (106 Mass Communications). No second bachelor's degree is conferred until the candidate has completed at least 30 semester hours in the major in residence, in addition to the courses counted toward the first bachelor's degree. Credit by examination courses will not satisfy the 30-hour residence requirement.

Freshman Year. Entering freshmen develop their programs in conference with an academic advisor. The students report to their advisors for such individual conferences or group meetings as are needed for the purpose of orienting themselves to academic regulations and procedures, curricula, and degree requirements in their various areas of interest.

Students are urged to take required freshman courses during the freshman year. During the sophomore year the student should complete the second year of English and all other freshman requirements. Normally, Core Curriculum requirements should be completed by the end of the sophomore year. Freshmen should not enroll in junior-senior level courses.

Admission of Transfer Students. Students requesting permission to transfer from another academic institution must meet the university-wide admission requirements. Transfer students must present ACT or SAT scores when entering the college. No more than 12 hours of journalism or mass communications courses will be accepted in transfer. Students requesting permission to transfer from another college at Texas Tech must have

a minimum adjusted GPA of 2.75. In addition, they must provide the Student Services Division (106 Mass Communications) with a transcript of all academic work. Approval will be granted at the Student Services Division. The college 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.

Final 30 Credit Hours. The final 30 credit hours of a degree program must be completed with Texas Tech enrollments. A maximum of 6 of these credit hours may be taken by Texas Tech correspondence. Credit for courses taken without prior approval from the associate dean of student services may not be applied to degree program requirements.

Degree Plan and Intention to Graduate. Students are encouraged to file degree plans with the Student Services Division as soon as their academic goals are clearly defined. Students must file degree plans upon completing 60 hours of course work. In addition, the Intention to Graduate form must be submitted upon completion of 80 hours of course work. Students who have completed 80 or more hours will have a hold placed on their records until they file the Intention to Graduate form.

Other general rules for all students, regardless of major, enrolling in mass communications courses are as follows:

1. The student must have passed the prerequisite course with a grade of C or better when enrolling in an upper level course (3000 or above).
2. All adjunct courses required for any major-minor sequence must be passed with a grade of C or better and may not be taken pass-fail.
3. Students who make less than a C in a core course or a course required in a mass communications major-minor sequence must repeat and pass the course with a grade of C or better prior to graduation or prior to taking any course for which this course is a prerequisite.
4. All students must have an adjusted 2.75 GPA, including repeated courses, at the end of the semester before entering the second required course in the major-minor sequence.
5. The second required course in the major-minor sequence is JOUR 3312 for news-editorial journalism, EM&C 3335 for broadcast journalism, ADV 3312 for advertising, EM&C 3380 for electronic media and communications, P R 3312 for public relations, and PHOT 3316 for photocommunications.
6. Students must pass the college's grammar, spelling, and punctuation exam prior to enrolling in the first writing course (JOUR 2310).
7. No course may be repeated for credit unless so designated.
8. No course required by the college may be taken pass-fail unless required by a mass communications major-minor sequence.
9. Prerequisites are governed by the catalog in effect at the time the course is taken.
10. Students in majors and sequences in the college must take the following core courses: MCOM 1300, 3300, 3320, and JOUR 2310.
11. Sophomore standing (at least 30 hours) is required for entry into 3000-level courses in the college if prerequisites are not stated.
12. Junior standing (at least 60 hours) is required for all 4000-level courses in the college if prerequisites are not stated.
13. All students in majors and sequences are required to select a minor outside the college and

complete a minimum of 18 semester hours, at least 6 of which must be on the junior-senior (3000-4000) level.

14. Students in any major or sequence in the college must pass 12 hours of English courses without substitution for the final 3 hours.
15. Major or minor mass communications courses may not be taken by correspondence.
16. Students who register for a course for which they have not passed the prerequisite course with a grade of C or better will be dropped from the course.
17. Courses used for majors in the college may not be counted toward fulfilling the college's general degree requirements.

Teacher Education. Students who want to teach journalism in secondary schools must complete a degree in journalism and take the necessary courses in the College of Education to be certified. 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, 3312, 3350, 3380, 4370, 3390; PHOT 2310; MCOM 3300, 3320. Passing the grammar, spelling, and punctuation exam prior to enrolling in JOUR 2310 is required

Minors. Minor students are required to pass the college's grammar, spelling, and punctuation exam prior to enrolling in the first writing course in the college (JOUR 2310). A minor consisting of a minimum of 21 semester hours, which must include 6 hours of junior and senior level courses, is available in journalism, advertising, telecommunications, photo-communications, public relations, and mass communications. At least 12 of the 21 hours must be taken in residence. Specific requirements include the following:

Mass Communications: MCOM 1300, 3300, 3320, and 12 hours from ADV 2310, EM&C 3300, 3310, JOUR 2300, 2310, MCOM 2300, PHOT 2310, P R 2310.

Journalism: JOUR 2300, 2310, 3310, 3312, 3380, 4370, and 3 hours of electives from journalism courses.

Advertising: ADV 2310, 3312, 3351, 3361, 4312, JOUR 2310, MCOM 3380.

Telecommunications: EM&C 3300, 3380, 4320; MCOM 2300, JOUR 2310; one course from EM&C 3360, 3370, 4370, 4375; and 3 hours of electives from EM&C courses.

Photocommunications: PHOT 3310, 3316, 3335, 4300 or 4303; and 6 hours of electives from JOUR 2300, P R 2310, EM&C 3300, 3310, ADV 2310, MCOM 3300.

Public Relations: JOUR 2310, P R 2310, 3312, 4312, MCOM 3380, ADV 2310, ADPR 3341

General Degree Requirements

Requirements for the degree of Bachelor of Arts apply to all baccalaureate degrees offered through the college unless specifically shown to the contrary.

Bachelor of Arts. The curriculum established for this degree is designed to provide the foundation of a liberal education through a well-rounded study of the humanities; arts; mathematics; and social, behavioral, and natural sciences. It also provides the factual basis and the insights requisite for specialized study and professional work in these fields.

General Requirements. See Undergraduate Credit by Examination in the Admissions

section of this catalog for information on credit provided by test scores to meet these requirements. Students must take the specified number of hours in the areas listed below. With a few exceptions courses from the minor may be used to satisfy these requirements. Except for the multicultural requirement, a course may not be counted in two different areas of the general requirements nor may a course be counted in requirements for both the major and minor.

Semester Hours

English 12

The 12 hours of English must consist of ENGL 1301 and 1302 and two literature courses (which excludes ENGL 2311, 2371, 3365, 3366, 3367, 3368, 3371, 3372, 3373, 4300, 4360, 4365, 4366, 4367, 4373, and 4378 as they are not literature courses). However, ENGL 2311 may be used as equivalent to fulfill 3 hours of this requirement.

Oral Communication 3

COMS 1300, 2300 or 3358, CH E 2306, MGT 3373 (MGT 3373 may not be taken by correspondence), PETR 3308.

Foreign Language 11-16

A student must complete 6 hours at the sophomore level or above in a single language. If 4 or more semesters of high school foreign language are accepted for admission, the student should consult the information preceding the course listing for the foreign language department. A student enrolling in the first-year sequence will have a requirement of 11-16 hours. A student who enrolls in the second-year sequence will have a 6-hour requirement. International students whose native language is not English and who graduated from a secondary school in their native country may satisfy this requirement by bringing their certificate of graduation to the Student Services Division of the college. Credit by examination through the language laboratory is available for the following languages: French, German, Latin, and Spanish. Students who petition to complete the foreign language requirement via study abroad through a non-Texas Tech affiliated program will agree to have foreign language credit applied to their degrees based on scores on a language placement test administered by the language laboratory upon their return from the study abroad. Approval to do this must be granted in advance by the associate dean of student services. For more information, consult the Department of Classical and Modern Languages and Literatures.

Mathematics and Logical Reasoning 6

All mathematics courses 1320 and above (except 3430) may be used. Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply. PHIL 2310 or 4310 may be used to satisfy 3 hours of this requirement. The following courses from the Core Curriculum may not be used: AAEC 3401, I E 3341, MUTH 3303, PSY 3400, and SOC 3391. MATH 2300 is required as an adjunct course requirement for all mass communications majors.

Natural Science 8-11

If 4 or more high school semesters of natural laboratory science (not including general, physical, or applied science) are accepted for admission, the requirement is 8 hours; if not, the requirement is 11 hours. The first 8 hours of a student's requirement must come from the natural science laboratory courses listed in the Core Curriculum. Additional required credit hours may come from those courses or from ANTH 3310, 3311, 4341, or HONS 3302.

Technology and Applied Science 3

Courses must be selected from the list of Core Curriculum options. Mass Communications majors may not use EM&C 3300 or 3310 to satisfy this requirement.

Individual or Group Behavior 6

Three hours must come from courses in individual or group behavior approved for Core Curriculum requirements. The other 3 hours may come from the same list or from anthropology, economics, geography, political science, psychology, sociology, and social work but excluding courses cited as options for any other requirement. Mass Communications majors may not use ADV 4313, JOUR 4330, or MCOM 1300 to satisfy any part of this requirement. Courses used in a health major or minor may not be used to satisfy this requirement.

American History 6

Students will normally enroll in HIST 2300 and 2301 although any American history courses will satisfy this requirement.

Political Science 6

Students will enroll in POLS 1301 and normally in 2302. For more information, see the Department of Political Science section of this catalog. One course must be taken from a Texas college or university.

Humanities 6

Classical and modern languages, English (except ENGL 2311, 3365, 3366, 3367, 3368, 4365, 4366, and 4367), history, philosophy (except PHIL 1310, 2310, 3321, 3330, 3331, 4310), ANTH 3323, 3325, 3346, 3351, ARCH 2311, 2312, 3311, CLAS 3302, 3303, 3320, 3330, 3350, C LT 2301, 3302, 3334, 4305, COMS 3311, 3318, 3319, FADS 3312 HONS 3301, HUM 2301, 2302, JOUR 3350, LAIS 2300, 4300, LARC 3302, POLS 3330, 3331, 3332, 3333, 3334, TH A 2310. Mass Communications majors may not use JOUR 3350 to satisfy any part of this requirement.

Visual and Performing Arts 6

Art (except ART 3311, 3362, 4315), ARCH 1412, 1441, 1442, DAN 3313, HONS 3304, LARC 1401, MUAP 1001, 1002, 1123, 1124, 2001, 2002, 2123, 2124, 2133, 2134, 3001, 3002, 3205, 4001, 4002, MUCP 1201, 1202, any MUEN course except 1103, MUHL 1301, 1302, 1308, 2301, 2302, 2308, 2309, 3304, 3308, MUSI 2301, MUTH 1300, 1301 and 1101,1303 and 1103, 1304 and 1104, TH A 2301, 2303, 2304, 2305, 3308, 3309, 3310, 4303, SPAN 4392.

Multicultural Requirement 3

3 hours of course work chosen from the Core Curriculum requirements approved list. This course may also be used to satisfy another general degree requirement listed above.

Personal Fitness and Wellness 2

To satisfy the College of Arts and Sciences requirement of 2 hours of personal fitness and wellness, students are to complete successfully any two PF&W courses. For a specific physical activity, the completion of the course sequence is allowed if the sequence is taken in the appropriate order (i.e., beginning then advanced). Only exercise and sport science majors may satisfy this requirement with ESS activities courses. Also accepted for fulfilling the requirement are AERS 1105, 1106, DAN 1107, 1304, 2100, 2102 (all with permission of instructor), MILS 1101, 1102, MUEN 1103. Students over age 25 are exempt. Any student who has served honorably in the U.S. Armed Forces for a minimum of 90 days may receive credit for 2 semester hours in personal fitness and wellness. Application for this credit must be made in the first semester of attendance at the university. Students participating in varsity athletics may enroll in the PF&W course that corresponds to their varsity sport. A maximum of one credit hour per academic year per sport may be earned in this manner.

Major, Minor, and Electives

In addition to the above requirements, the student must take major, minor, and elective courses sufficient to total 122 semester 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 Services Division of the college).

Many departments and programs have residency requirements for minors. See departmental or program listings for specific information. Courses used to fulfill the writing intensive requirement are to be taken in residence.

Students should have selected their major and minor fields by the time they reach their junior year. For the major subject they will be required to complete a minimum of 39 semester hours, including 6 hours of intensive writing courses. At least 18 hours of the major subject must be in courses at the junior-senior level. For the minor, a minimum of 18 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 the Student Services Division.

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.



Graduate Program / Mass Communications

The master's program is designed to prepare students to enter the communications industry or to continue studies toward the Ph.D. degree in advanced communications theory, issues, and research. Depending upon courses selected, students are prepared for careers in media (journalism, publishing, and electronic communications), advertising, public relations, human-resource development, and related fields. Careers in the communications industry include professional opportunities in marketing, sales, technological product development, research and analysis, strategic planning, or other positions with broad spheres of national and international influence.

The student is offered two curriculum options: A 31-hour program of work culminating in the traditional research-based master's thesis or a 37-hour program requiring completion of either comprehensive written exams or a written report based upon a master's-level professional project. Students choosing the option of compre-

hensive written exams must complete 37 hours of course work. Students choosing the master's-level professional project must complete 31 hours of course work plus 6 hours of MCOM 6050. The thesis, comprehensive exams, and master's level professional project are all executed under faculty-committee direction. Up to 6 hours may be taken in cognate areas.

Students seeking the master's degree should consult the director of the college or the college's graduate coordinator before enrolling in any courses.

Upon entering the college's program, graduate majors may be required to take up to 9 hours of 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 graduate coordinator regarding these requirements.

Journalism Curriculum

News-Editorial Specialization

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	JOUR 2310, 3310	JOUR 3312	JOUR 3390
JOUR 2300	MCOM 3300	JOUR 3380	JOUR 4350
ECO 2305 or 2301 and 2302	MCOM 3320	PHOT 2310	JOUR 4370
MATH 2300 or 2345			JOUR elect.

Broadcast Specialization

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	JOUR 2310, 3310	JOUR 3314	JOUR 4350
JOUR 2300	JOUR 3312	EM&C 3335	JOUR 4370
MATH 2300 or 2345	MCOM 3300	JOUR/EM&C elect.	EM&C 4390
ECO 2305 or 2301 and 2302	MCOM 3320		

Online Specialization

First Year	Second Year	Third Year	Fourth Year
MCOM 1300	JOUR 2310, 3310	JOUR 3312	JOUR 3390
JOUR 2300	MCOM 3300	EM&C 4315	JOUR 4350
ECO 2305 or 2301 and 2302	MCOM 3320	PHOT 2310	JOUR 4370
MATH 2300 or 2345			JOUR/EM&C elect.

Journalism Major. Students majoring in news-editorial (journalism) are required to complete 39 semester hours within the college, including the following courses: JOUR 2300, 2310, 3310, 3312, 3380, 3390, 4350, 4370, MCOM 1300, 3300, 3320, and PHOT 2310. Also required are ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Broadcast Journalism Specialization. Students in this sequence are enrolled as journalism majors and are required to complete 39 semester hours within the college, including the following courses: JOUR 2300, 2310, 3310, 3312, 3314, 4350, 4370, EM&C 3335, 4390, MCOM 1300, 3300, and 3320. Also required are ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Online Journalism Specialization. Students in this sequence are enrolled as journalism majors and are required to complete 39 semester hours within the college, including the following courses: JOUR 2300, 2310, 3310, 3312, 3390, 4350, 4370, EM&C 4315; MCOM 1300, 3300, 3320. Also required are ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Advertising Curriculum

First Year
MCOM 1300
ECO 2305 or
2301 and 2302
MATH 2300, or
1330 and 1331,
or 2345

Second Year
JOUR 2310
ADV 2310
MCOM 3300
ADV 3312
MCOM 3320

Third Year
ADV 3351, 3361
MCOM 3380
MKT 3350
Mass Comm. elect.

Fourth Year
ADV 4312
Mass Comm. elect.
Mass Comm. elect.
MKT 3352

Students majoring in advertising are required to complete 39 semester hours within the college, including the following courses: ADV 2310, 3312 3351, 3361, 4312, JOUR 2310, MCOM 1300, 3300, 3320, and 3380. Also required are ECO 2305 or 2301 and 2302, MATH 2300 or 1330 and 1331 or 2345, MKT 3350, 3352.

Electronic Media and Communications Curriculum

First Year
MCOM 1300
MATH 2300
or 2345
ECO 2305 or
2301 and 2302

Second Year
EM&C 3300
MCOM 3300
MCOM 3320
JOUR 2310
MCOM 2300

Third Year
EM&C 3380
EM&C writing course
EM&C elective
Mass Comm. elect.

Fourth Year
EM&C 4320
EM&C elective
EM&C elective

Students majoring in electronic media and communications are required to complete 39 semester hours within the college, including the following courses: MCOM 1300, 2300, 3300, 3320; JOUR 2310; EM&C 3300, 3380, 4320; one course from EM&C 3360, 3370, 4370 or 4375; and at least 9 hours from EM&C courses. Also required are ECO 2305 or 2301 and 2302; and MATH 2300 or 2345.

Photocommunications Curriculum

First Year
ECO 2305
or 2301 &
2302
MCOM 1300
MATH 2300 or 2345

Second Year
PHOT 3310, 3316
MCOM 3300, 3320
JOUR 2310
Mass Comm. elect.

Third Year
PHOT 3330, 3335
JOUR 3312 or 3316
PHOT 4303 or 4300

Fourth Year
PHOT 4300
PHOT 4312

Students majoring in photocommunications are required to complete 39 semester hours within the college, including the following courses: PHOT 3310, 3316, 3330, 3335, 4300, 4303 or 4300 (different area of study), and 4312; JOUR 2310; MCOM 1300, 3300, and 3320; and one course from JOUR 3312 and 3316. Also required are ART 1302 or 1303, ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Public Relations Curriculum

First Year
ECO 2305 or
2301 & 2302
MATH 2300, or
1330 and 1331,
or 2345
MCOM 1300

Second Year
ADV 2310
P R 2310
JOUR 2310
MCOM 3300, 3320
MCOM 3380

Third Year
ADPR 3341
P R 3312
MKT 3350
COMS 3358
Mass Comm. elect.

Fourth Year
MKT 3352
MGT 3370
P R 4312
Mass Comm. elect.
Mass Comm. elect.

Students majoring in public relations are required to complete 39 semester hours within the college, including the following courses: P R 2310, 3312, 4312; ADPR 3341; MCOM 1300, 3300, 3320, 3380; ADV 2310; and JOUR 2310. Also required are ECO 2305 or 2301 and 2302; MATH 2300 or 1330 and 1331 or 2345; MKT 3350, 3352; MGT 3370; and COMS 3358.

Advertising (ADV)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 2310. Principles of Advertising (3:3:0) [COMM 2327].** Prerequisite: sophomore standing. An overview of the broad field of advertising. Acquaints students with the role of advertising in the American economy and social system and the procedures involved in planning advertising campaigns.
- 3312. Advertising Writing (3:2:3).** Prerequisite: ADV 2310, JOUR 2310, and a 2.75 adjusted GPA. Principles and practice of writing for advertising. Includes writing for internal audiences as well as for various media to meet advertising goals to persuade and inform mass audiences. (Writing Intensive)
- 3351. Advertising Media Planning (3:3:0).** Prerequisite: ADV 2310 and MATH 2300 or 1330 and 1331 or 2345 and a 2.75 adjusted GPA. Must be taken after or concurrent with JOUR 2310 or ADV 3312. A study of the various advertising media to provide students with a knowledge of the use of advertising media, methods of selection, and the skills and background required for media buying.
- 3361. Advertising Creative Strategy (3:2:3).** Prerequisite: ADV 2310, 3312. Must be taken after or concurrently with ADV 3351. Analysis of the creative aspects of advertising; strategy, copy, layout, typography, and production. Provides practical application of how to plan and execute effective print and broadcast messages.
- 3390. Internship in Advertising (3).** Prerequisite: Junior or senior standing; ADV 3351 or 3361, plus 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 (VI-3).** Prerequisite: Consent of instructor. A hands-on experience in developing and presenting an integrated communications campaign for a business problem or opportunity. Repeatable once for credit.
- 4300. Individual Study in Advertising (3).** Prerequisite: Senior standing, 9 hours of advertising courses, and consent of instructor prior to registration. May be repeated for credit.
- 4304. Advanced Creative Strategy (3:3:0).** Prerequisite: ADV 3361 and consent of instructor. Advanced formulation and techniques of creative strategy with emphasis on copywriting. Includes participation in local, state, regional, and/or national advertising competitions.
- 4312. Advertising Campaigns (3:2:3).** Prerequisite: All required mass communications courses taken in final long semester. Introduction to advertising research; methods of message and media research techniques with special application to campaign planning. Basic principles and applications of advertising campaign planning, preparation, and presentation taught in a problem-solving mode. (Writing Intensive)



4313. **International Advertising (3:3:0).** A study of the practices and procedures of advertising on the international market.

Graduate Courses

5326. **Advertising and the Consumer (3:3:0).** Survey and analysis of current behavioral science findings related to advertising.
6315. **Special Topics in Advertising (3:3:0).** A rotating topics course examining theory, research, economics, ethics, performance and practice of advertising. May be repeated twice when topics vary.
7000. **Research (V1-12).**

Advertising-Public Relations (ADPR)

3341. **Mass Communications Graphics and Production (3:2:3).** Prerequisite: ADV 2310 and 3312, or P R 2310 and 3312. Design, composition, layout, typography and production applied to advertising and public relations; use of computer as a layout and design tool for visual communications.
4310. **Advertising-Public Relations Administration (3:2:3).** Prerequisite: MCOM 3380 and ADPR 3341 or ADV 3361. Case analysis research literature, presentations, special reports, examination of contemporary issues, functions, management, organizational issues, integrated communications problems. (Writing Intensive)

Electronic Media and Communications (EM&C)

Undergraduate Courses

3100. **Electronic Media Activities (1:0:3).** Prerequisite: Sophomore standing and consent of instructor. Laboratory in broadcast and multimedia activities; limited to 3 hours for majors and minors, 1 hour for others. Must be taken pass-fail.
3300. **Electronic Media and Society (3:3:0).** Prerequisite: Sophomore standing. Current and emerging telecommunications technologies, their integration into modern society and impact on information transfer.
3310. **Introduction to Electronic Media and Communications (3:3:0).** Prerequisite: Sophomore standing. Basic instruction in the origin, history, development, regulation, and social responsibilities of broadcasting and cable communications. Examines new technology and telecommunications systems.
3315. **Principles of Digital Media Production (3:2:3).** Provides students with the working knowledge required for basic production of digital graphics, video, and audio.
3320. **Audio Production for Electronic Media (3:2:3).** Prerequisite: EM&C 3300 or consent of instructor. Study of technology and theory of audio media. Opportunity to acquire experience planning and producing broadcast and nonbroadcast audio material.
3330. **Studio Production for Electronic Media (3:2:3).** Prerequisite: EM&C 3300 or consent of instructor. A concentrated course in the theory and application of principles, procedures, and techniques of multi-media studio production.

3333. **Multimedia Development (3:2:3).** Prerequisite: EM&C 3315 or consent of instructor; for mass communications majors only. Provides students with the working knowledge required for multimedia production, including exposure to current software, design theory, and CD-ROM production.
3335. **Digital Imaging and Editing (3:2:3).** Prerequisite: EM&C 3315 or JOUR 2310 for broadcast majors. Introduction to the single video camera production process and audio, lighting, electronic graphics, and postproduction applications for creating and manipulating moving images for digital distribution.
3340. **Programming and Promotion for Electronic Media (3:3:0).** Prerequisite: EM&C 3300 and MATH 2300 or 2345. A comprehensive study of programming and promotion in the electronic media covering audience analysis, plus historical development and current programming practices and promotions.
3345. **Analyzing Television (3:3:0).** An introduction to scholarly media analysis that examines the economic, technological, cultural, and creative dimensions of American television.
3350. **News Presentation for Electronic Media (3:2:3).** Prerequisite: EM&C 3335 and JOUR 3350. The theory and practice of news presentation and the responsibilities and opportunities of the news anchor and news reporter.
3360. **Writing for Corporate Media (3:2:4).** Prerequisite: EM&C 3300, JOUR 2310. Development of principles and practice in writing for corporate media. Emphasis on video program research, proposals, budgets, treatments, and script writing. (Writing Intensive)
3370. **Writing for Electronic Media (3:2:3).** Prerequisite: EM&C 3300, JOUR 2310. A comprehensive study of the principles, procedures, design, and skill processes in writing informative, persuasive, and news and public affairs copy for electronic media programming. (Writing Intensive)
3380. **Advertising for Electronic Media (3:2:3).** Prerequisite: ADV 3351 for advertising major; EM&C 3300, JOURN 2310, and MATH 2300 for EM&C majors. Study of the electronic media for persuasive promotion of ideas, goods, and services. Emphasis on principles employed in broadcast advertising budgets, sales promotions, and campaigns.
3390. **Internship in Electronic Media and Communications (3).** Prerequisite: Junior or senior standing; EM&C 3340 or 3380; completion of required internship specialization cases; and recommendation of faculty member and internship coordinator. Minimum of 160 hours supervised employment in media or communications organization. Weekly reports, interviews, and term paper.
4300. **Senior Projects in Electronic Media and Communications (3).** Prerequisite: Senior standing, 9 hours of EM&C courses, and consent of instructor prior to registration. May be repeated once for credit with different emphasis.
4315. **Online Media Production (3:2:3).** Prerequisite: JOUR 2310 and either EM&C 3315 or JOUR 3310 and 3312. Preparation and dissemination of media content

to mass and niche audiences in online environments.

4320. **Electronic Media Operations (3:3:0).** Prerequisite: EM&C 3380 and senior standing. An analytical study of the legal, economic, operational, sales, and policy factors of station organization and administration. Case studies and individual projects.
4325. **Media Economics (3:3:0).** An analytical study of media economics ranging from the local market to the global marketplace, emphasizing case analyses of both traditional and emerging media industries.
4370. **Writing for Series Television (3:3:0).** Prerequisite: EM&C 3300 and JOUR 2310 or consent of instructor. A long-form intensive writing course. Provides an introduction to the basic skills, professional standards, and creative challenges of scriptwriting for series television. (Writing Intensive)
4375. **Writing for Feature Films (3:3:0).** Prerequisite: EM&C 3300 and JOUR 2310 or consent of instructor. Provides an introduction to the basic skills, professional standards, and creative challenges of scriptwriting for feature films. (Writing Intensive)
4380. **Features and Documentaries for Electronic Media (3:2:3).** Prerequisite: EM&C 3300 or 3335 or consent of instructor. Broadcast journalism techniques in writing and producing television features, documentaries, and related programming. Emphasis on pre- and post-production activities from research to final video editing. (Writing Intensive)
4390. **Electronic Media and Communications Practicum (3).** Prerequisite: EM&C 3300, required practicum specialization courses, senior standing in mass communications areas only, and consent of instructor prior to registration. A nonpaid supervised study opportunity is provided for the student to observe and analyze the methods, techniques, and creative processes of the media professional. Must be taken pass-fail.

Graduate Courses

6315. **Special Topics in Electronic Media (3:3:0).** A rotating topics course examining socio-political 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

2300. **Principles of Journalism (3:3:0).** An overview of the broad field of journalism for journalism and nonjournalism majors. Extensive use of current literature as springboards for discussion of trends, movements, and principles of journalism.
2310. **News Writing (3:2:3) [COMM 2311].** Prerequisite: Students must have a 2.75 GPA, C or better in ENGL 0301 (if required), 1301, and 1302, sophomore standing, and pass the grammar, spelling, and punctuation exam. The evalu-

- ation of news; news gathering methods and writing. Required lab.
3310. **News Presentation I (3:2:3)**. Prerequisite: JOUR 2300 and 2310. Contemporary design and production of news package delivery, including newspaper, magazine, video and web formats.
3312. **Reporting (3:2:3)**. Prerequisite: JOUR 2310, and a 2.75 cumulative GPA. Discussion and practice in interviewing; reporting; and writing various types of stories, including meetings, conventions, accidents, and other general news stories. (Writing Intensive)
3314. **Broadcast Journalism (3:2:3)**. Prerequisite: JOUR 2310 and a 2.75 cumulative GPA. The study and practice of writing and editing news for radio and television. Emphasis on the principles, techniques, and forms of broadcast communication. (Writing Intensive)
3316. **Magazine Writing (3:3:0)**. A study of the scope, influence, and responsibilities of the magazine as a cultural and social force. Survey of editorial problems; intensive writing practice and emphasis on marketing magazine articles. (Writing Intensive)
3317. **Publication Design and Graphics (3:2:3)**. Prerequisite: ADV 3312 or JOUR 2310. Covers the contemporary design and production of mass media publications, including newsletters, annual reports, pamphlets, newspapers and magazines. Secondary emphasis on desktop publishing technologies. (Writing Intensive)
3350. **History of American Journalism (3:3:0)**. Study of the development of journalism in America from its European roots to the present and its interrelation with society.
3380. **Editing (3:2:3)**. Prerequisite: JOUR 2310, 3312. Advanced study of purposes and methods of preparing copy for media presentation, including headline writing and editing. Study and practice in print and online publishing.
3390. **Internship in Journalism (3)**. Prerequisite: Junior or senior standing; JOUR 2310, 3312, plus recommendation of faculty member and internship coordinator. Minimum of 160 hours supervised employment in media or communications organization. Weekly reports, interviews, and term paper required. Must be taken pass-fail.
4300. **Individual Study in Journalism (3)**. Prerequisite: Senior standing, 9 hours of journalism courses, and consent of instructor prior to registration.
4330. **Public Opinion and Propaganda (3:3:0)**. The nature of public opinion and propaganda; the role of the press in its formation and how the press is influenced by public opinion.
4350. **Multiplatform News Delivery (3:2:3)**. Prerequisite: JOUR 4370 and either JOUR 3314 or 3380 or EM&C 4315. Capstone course on production of news in print, online, and broadcast environments.
4370. **Advanced Reporting (3:2:3)**. Prerequisite: JOUR 2310, 3312. A course in the interrelation and writing of news on social, political, and economic topics. Emphasis on precision journalism and the use of online computer technologies to acquire and disseminate information,

implementation through lab assignments.

4390. **Journalism Practicum (3)**. Prerequisite: JOUR 2310, 3312, senior standing in mass communications areas, consent of instructor. A nonpaid supervised opportunity for the student to observe and analyze the methods, techniques, and creative processes of the media professional. Pass-fail.

Graduate Courses

5315. **Special Topics in Journalism (3:3:0)**. Prerequisite: JOUR 3312 or consent of instructor. A course in the reporting of selected topics. Topics will rotate. Lecture and discussion implemented through off-campus reporting assignments. May be repeated once when topic varies.
6315. **Special Topics in Journalism (3:3:0)**. A rotating topics course examining theory and research into ethical, political and organizational issues affecting news gathering, reporting and journalistic performance. May be repeated twice when topics vary.
7000. **Research (VI-12)**.

Mass Communications (MCOM)

Undergraduate Courses

1300. **Introduction to Mass Communications (3:3:0) [COMM 1307]**. A broad survey of communications in modern life with particular emphasis on print media, broadcasting, advertising, and public relations.
2300. **Visual Communications (3:3:0)**. An introduction to photographic techniques and visual design, including message interpretation, evaluation, recent trends, theories of visual perception, and use of images in media.
3300. **Mass Media Theories and Society (3:3:0)**. Prerequisite: Sophomore standing. Theory-based exploration of the relationship between the mass media and society, such as aggression and television violence.
3320. **Mass Communications Law (3:3:0)**. Prerequisite: Sophomore standing. A study of the legal problems facing journalists, broadcasters, and advertisers, including libel, privacy, regulation of radio-TV, ethics, and commercial speech.
3380. **Mass Communications Research Methods (3:3:0)**. Prerequisite: Sophomore standing and MATH 1330 and 1331, or 2300, or 2345. Comprehensive overview of mass communications research focusing on planning, designing, conducting, analyzing, interpreting, and applying research to address communication issues and problems.
4000. **Special Problems in Mass Communications (VI-3)**. Prerequisite: Consent of instructor. Individual research on approved problems or projects in mass communications areas. May be repeated for 3 hours credit.

Graduate Courses

5160. **Proseminar in Mass Communications (1:1:0)**. Designed to bring together students and faculty for professional and academic interchange with emphasis on

research interests of faculty and advanced graduate students. Pass-fail only.

5320. **Mass Communications Law (3:3:0)**. A study of the legal problems facing journalists, broadcasters, and advertisers including libel, privacy, and regulation of telecommunications media and commercial speech.

5330. **Critical Studies in Mass Communications (3:3:0)**. Surveys a wide range of interpretive methods, cultural theories, and critical issues. Includes units on advertising, journalism, entertainment television, and the music industry.
5344. **Seminar in Public Opinion and Propaganda (3:3:0)**. A study of propaganda theory and methods. Bases of public opinion. Opinion-making processes in governments, political parties, pressure groups.
5347. **Studies in International Communications (3:3:0)**. A critical examination of the structure, control, and performance of the media systems of nations and regions.
5349. **Administration of Communications Media (3:3:0)**. For mass communications majors only. Problems of executive planning and management of newspapers, magazines, and broadcast media.
5362. **Seminar in Mass Communications (3:3:0)**. A comprehensive exploration of theory and research into the social, psychological, and economic problems affecting modern mass communications.
5364. **Research Methods (3:3:0)**. Basic communications research designs: exploratory, survey, experimental, content, and secondary analysis. Measures of central tendency, contingency analysis, correlation analysis.
5366. **Seminar in Mass Communications Theory (3:3:0)**. In-depth study of the theory and epistemology of mass communications. Integration, comparison, and extension of theories with respect to a specific problem area including practice in development of research hypotheses.
5370. **Internship in Mass Communications Administration (3)**. Prerequisite: MCOM 5349 and approval of instructor. Supervised experience in an established career-related area of mass communications administration. May not be substituted for MCOM 6050.
5374. **Data Analysis (3:3:0)**. Prerequisite: MCOM 5364. The use and interpretation of statistics for data analysis. Covers the selection of statistical techniques, the use of statistics packages, and the interpretation of results.
6000. **Master's Thesis (VI-6)**.
6050. **Master's Report (VI-6)**.
6330. **Seminar in Media and Sport (3:3:0)**. This course examines the interaction of mass media and sport, including the related history; media economics; and the use of media by athletes, teams, and organizations.
6364. **Selected Research Methods (3:3:0)**. Prerequisite: Introductory statistics or permission. Rotating research methods course focusing on experimental, survey, content analysis or others. May be repeated twice when topics vary.
7000. **Research (VI-12)**.

Photocommunications (PHOT)**Undergraduate Courses**

2310. **Principles of Photography (3:3:0)** [COMM 1318]. Prerequisite: Sophomore standing and at least a 2.0 overall GPA. This course will cover the fundamentals of photography and photo appreciation. Students will need a 35mm SLR camera with manual capabilities. Not for photo majors.
3310. **Photography I (3:3:2)**. Prerequisite: Photocommunications major, sophomore standing, and a 2.0 GPA. This class will cover the use of a 35mm SLR camera with manual capabilities.
3316. **Photography II (3:3:0)**. Prerequisite: PHOT 3310, JOUR 2310, and at least a 2.75 GPA. Students will learn the use of medium and large format cameras. Studio and location lighting skills will be covered for commercial photography situations.
3330. **Digital Photography I (3:3:0)**. Prerequisite: PHOT 3310 or instructor's consent. Students will learn to use image editing software specially tailored to the needs of photographers. Digital workflow will be discussed. This is a software class.
3335. **Digital Photography II (3:3:0)**. Prerequisite: PHOT 3330. Students will deal with the issues surrounding the production of accurate digital prints. Color management issues and calibration will be covered.
3390. **Internship in Photocommunications (3:3:0)**. Prerequisite: PHOT 3310 and 3316 plus recommendation of faculty member and internship coordinator. Professional work in mass media. Minimum of 160 hours of supervised employment in media or communications organization. Weekly reports, interviews, and term paper required. Must be taken pass-fail.
4300. **Special Problems in Photography (3)**. Prerequisite: PHOT 3316 or consent of instructor. This course is for individual or group study of areas of photography (i.e., documentary, advertising, history) or development of photography projects. May be repeated twice for credit when topics vary.
4303. **Color Photography (3:2:3)**. Prerequisite: PHOT 3316. Study of color negative film, transparencies, printing, filtration, and analysis. Laboratory work includes color printing, negative and transparency film processing.
4312. **Senior Portfolio (3:1:4)**. Prerequisite: Senior standing. Students will create a professional portfolio and promotional materials. The business and legal aspects of photography will be discussed.

Graduate Courses

6315. **Special Topics in Photographic Media (3:3:0)**. A rotating topics course examining the role and future of visual imagery and photography and their impact on society. May be repeated twice when topics vary.
7000. **Research (V1-12)**.

Public Relations (P R)**Undergraduate Courses**

2310. **Principles of Public Relations (3:3:0)**. Prerequisite: Sophomore standing. A study of the policies and procedures of creating and maintaining goodwill among organizations' various publics. Examines the many aspects of public relations as a staff and management function.
3312. **Public Relations Writing (3:2:3)**. Prerequisite: P R 2310, JOUR 2310, and a 2.75 cumulative GPA. An overview of the audience analysis, media analysis, and the logic and language skills needed to construct persuasive messages used in the public relations profession. (Writing Intensive)
3390. **Internship in Public Relations (3)**. Prerequisite: Junior or senior standing; JOUR 2310, PR 2310, 3312, plus recommendation of faculty member and internship coordinator. Minimum of 160 hours supervised employment in media or communications organization. Weekly reports, interviews, and term paper required. Must be taken pass-fail.
4000. **Special Public Relations Project in Integrated Communication (V1-3)**. Prerequisite: Consent of instructor. A hands-on experience in developing and presenting a PR campaign for a business problem or opportunity. May be repeated once for credit.

4300. **Individual Study in Public Relations (3)**. Prerequisite: Senior standing, 9 hours of public relations courses, and consent of instructor.
4312. **Public Relations Campaigns (3:2:3)**. Prerequisite: All required mass communication courses taken in the final long semester. Public relations campaign planning, preparation, and presentation in problem-solving mode. Setting objectives, executing research projects, preparation of public relations planning, messages, budgeting, creative media promotion evaluation.

Graduate Courses

5340. **Foundations of Public Relations (3:3:0)**. Public relations history, principles, theory, writing, and critiques of cases and campaigns.
5343. **Public Relations Problems and Cases (3:3:0)**. Use of contemporary public relations problems and cases to study planning, strategy, and tactics, including the organization, execution, and control of the PR function in organizations.
6315. **Special Topics in Public Relations (3:3:0)**. A rotating topics course examining theory, research, and application related to planning, implementation and evaluation in public relations. May be repeated twice when topics vary.
7000. **Research (V1-12)**.



College of Visual and Performing Arts

About the College

The College of Visual and Performing Arts offers a diverse array of programs and courses in art, music, theatre, and dance. The college seeks to prepare students who will be leaders in the profession by employing the highest standards in performance, teaching, research, and artistic and creative vision. The college provides students with opportunities to be innovative and confident, to think critically, and to be successful in their chosen field. Courses and degrees emphasize synthesis and connection via academic and creative programs, internships, and service learning. The college contributes cultural enrichment and an understanding of the arts locally, regionally, nationally, and internationally.

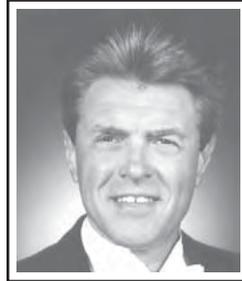
Undergraduate Program

Core Curriculum Requirements. The Core Curriculum requirements ensure breadth in each academic program. These requirements have been incorporated into the college's various degree programs. Students should consult the "Undergraduate Academics" section of this catalog for a listing of courses that satisfy the requirements in each category.

Major, Minor, and Electives. In addition to Core Curriculum requirements, students must take major, minor, and elective courses sufficient to total 120-138 semester hours. The minor (if applicable) may be any departmental minor from outside the major, an established interdisciplinary minor, or a student-initiated interdisciplinary minor (with approval of the appropriate associate dean of the college). Many departments and programs have residency requirements for the major and minor. See departmental or program listings for specific information.

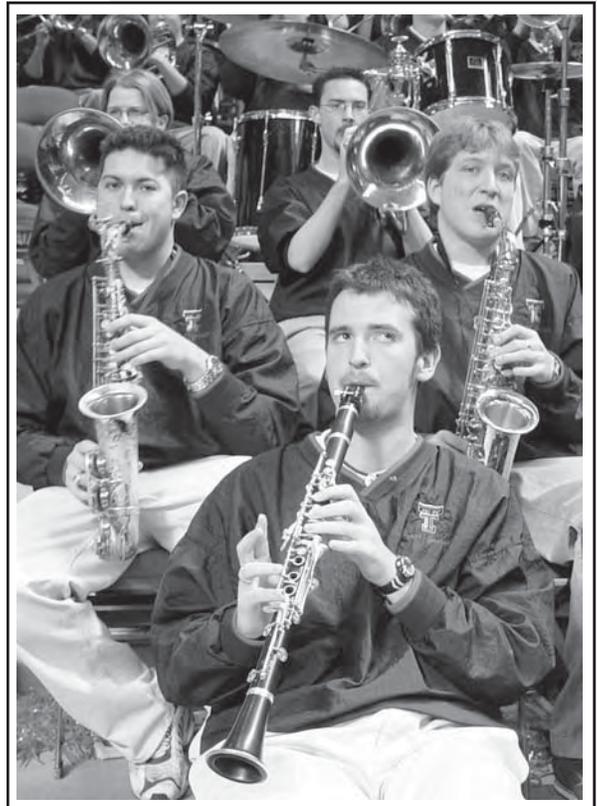
Students should have selected their major and minor (if applicable) fields by the time they reach their junior year. For the major subject they will be required to complete a minimum of 36 semester hours including 6 hours of intensive writing courses. As indicated in the degree programs on the following pages, some majors require more than the 36-hour minimum. At least 18-24 hours of the major subject must be in courses at the junior-senior level. For the minor, a minimum of 18 semester hours must be completed (except in foreign languages – explained under the department), at least 6 of which must be junior or senior level courses. All courses in the major and minor must be approved by the appropriate academic unit. A minimum of 40 semester hours of junior and senior work must be presented in the total degree. Information regarding graduate programs offered by the college is available within the individual departments. Students should consult an advisor for specific requirements of their degree programs.

Course Load. A normal full-time course load is 12-19 hours per long semester. In calculating the course load, the dean will consider all active correspondence courses as a part of the course load. Course loads in excess of 19 semester hours require approval by 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.



**Garry W. Owens, PhD
Dean**

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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.

Correspondence Courses. A Texas Tech resident student may apply course work completed at a distance through Extended Studies toward a bachelor’s degree with prior approval of the academic dean (218 Administration Building). A student who has failed a course taken in residence may take that course or a degree plan alternative through the Division of Outreach and Extended Studies with prior approval of the academic dean.

Catalog Selection. Students must use the catalog issued for the year in which they were first officially admitted to the college, or a more recent catalog if approved. However, if they are not enrolled at Texas Tech for one academic year or transfer to another institution or another college at Texas Tech, they must be readmitted to the College of Visual and Performing Arts and use the catalog in effect at the time of readmission. For graduation purposes, a catalog expires after seven years at which time the current catalog becomes the catalog in effect.

Credit by Examination. A matriculated student may attempt credit by examination (described in Admissions section of this catalog) by obtaining written approval from the dean’s office. Approval is required to take an examination a second time before six months have elapsed or if more advanced material in the same subject has already been completed.

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. Credit by examination and correspondence courses will not satisfy the 24-hour residence requirement.

Freshman Year. Entering freshmen develop their programs in conference with an academic advisor. The students report to their advisors for such individual conferences or group meetings as are needed for the purpose

of orienting themselves to academic regulations and procedures, curricula, and degree requirements in their various areas of interest.

Final 30 Credit Hours. The final 30 credit hours of a degree program must be completed with Texas Tech enrollments. A maximum of 6 of these credit hours may be taken by Texas Tech correspondence. Credit for courses taken without prior approval may not be applied to degree program requirements.

Degree Plan and Intention to Graduate. Students are encouraged to file degree plans with the dean as soon as their academic goals are clearly defined. Students must file degree plans after completing 60 to 70 hours of course work and no later than one year prior to the intended semester of graduation. The Intention to Graduate form must be submitted no later than one year before the proposed date of graduation.

Teacher Education. Prospective teachers should refer to the College of Education section of this catalog and the chair or undergraduate advisor of the school or department in which they wish to major within the College of Visual and Performing Arts.

Undergraduate Degrees

Bachelor of Arts

The curriculum established for this degree is designed to provide the foundation of a liberal education through a well-rounded study of the humanities; arts; mathematics; and social, behavioral, and natural sciences. It also provides the factual basis and the insights requisite for specialized study and professional work in these fields.

General Requirements. See “Undergraduate Credit by Examination” in the Admissions section of this catalog for information on credit provided by test scores to meet these requirements. Students must take the specified number of hours in the areas listed below. With a few exceptions, courses from the major and minor may be used to satisfy these requirements. Except for the multicultural requirement, a course may not be counted in two different areas of the general requirements nor may a course be counted in requirements for both the major and minor.

Semester Hours

- English** 6-12
At least 6 hours of English must consist of ENGL 1301 and 1302, literature courses (which excludes ENGL 2311, 23713365, 3366, 3367, 3368, 3371, 3372, 3373, 4300, 4360, 4365, 4366, 4367, 4373, and 4378 as they are not literature courses) are used to fulfill the additional 6 hours. However, ENGL 2311 or CLAS 1310 may be used as equivalents to fulfill 3 hours of this requirement.
- Oral Communication** 3
COMS 1300, 2300 or 3358, CH E 2306, MGT 3373 (MGT 3373 may not be taken by correspondence), PETR 3308.
- Foreign Language** 6-16
A student must complete 6 hours at the sophomore level or above in a single language. If 4 or more semesters of high school foreign language are accepted for admission, the student should

consult the information preceding the course listing for the foreign language department. A student enrolling in the first-year sequence will have a requirement of 11-16 hours. A student who enrolls in the second-year sequence will have a 6-hour requirement. International students whose native language is not English and who graduated from a secondary school in their native country may satisfy this requirement by bringing their certificate of graduation to the Student Division of the Visual and Performing Arts Dean’s Office. Credit by examination through the language laboratory is available for the following languages: French, German, Latin, and Spanish. Students who petition to complete the foreign language requirement via study abroad through a non-Texas Tech affiliated program will agree to have foreign language credit applied to their degrees based on scores on a language placement test administered by the language laboratory upon their return from the study abroad. Approval to do this must be granted in advance by the Associate Dean. For more information, consult the Department of Classical and Modern Languages and Literatures.

Mathematics and Logical Reasoning 6

Only one of MATH 1300, 1320, and 1420 may apply. Only one of MATH 1330 and 1430 may apply. All other mathematics courses 1320 and above (except 3430) may be used. PHIL 2310 or 4310 may be used to satisfy 3 hours of this requirement.

Natural Science 8-11

If 4 or more high school semesters of natural laboratory science (not including general, physical, or applied science) are accepted for admission, the requirement is 8 hours; if not, the requirement is 11 hours. The first 8 hours of a student’s requirement must come from the natural science laboratory courses listed in the Core Curriculum. Additional required credit hours may come from those courses or from ANTH 3310, 3311, 4341, or HONS 3302.

Technology and Applied Science 3

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

Individual or Group Behavior 3-6

Three hours must come from courses in individual or group behavior approved for Core Curriculum requirements. An additional 3 hours may come from the same list or from anthropology, economics, geography, political science, psychology, sociology, and social work but excluding courses cited as options for any other requirement.

American History 6

Students normally enroll in HIST 2300 and 2301, although any American history courses will satisfy the requirement.

Political Science 6

Students will enroll in POLS 1301 and normally in 2302. See the catalog section for the Department of Political Science within the College of Arts and Sciences. One course must be taken from a Texas college or university.

Humanities 3-6

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

Visual and Performing Arts 6

Satisfied in the majors

Multicultural Requirement 3

Three hours of course work chosen from the Core Curriculum requirements approved list. This course also may be used to satisfy another general degree requirement listed above.

Personal Fitness and Wellness 2

If elected, hours may come from any two PF&W courses. For a specific physical activity, the completion of the course sequence is allowed if the sequence is taken in the appropriate order (i.e., beginning then advanced).

Total for Degree 120-122

In addition to the above requirements, students must take major, minor, and elective courses sufficient to total 120-122 semester hours.

Major, Minor, and Electives. Students should have selected their major and minor fields by the time they reach their junior year. For the major subject they will be required to complete a minimum of 36 semester hours, including 6 hours of intensive writing courses. As indicated in the degree programs on the following pages, some majors require more than the 36-hour minimum. At least 18-24 hours of the major subject must be in courses at the junior-senior level. For the minor, a minimum of 18 semester hours must be completed (except in certain foreign languages as explained in the curriculum for languages), at least 6 of which must be of junior or senior level.

The minor may be any departmental minor, an established interdisciplinary minor, or a student-initiated interdisciplinary minor (with approval of the associate dean in the Student Division of the College of Visual and Performing Arts).

Many departments and programs have residency requirements for the major and minor. See departmental or program listings for specific information. Courses used to fulfill the writing intensive requirement are to be taken in residence.

All courses in the major and minor must be approved by the appropriate academic unit. Students are expected to develop a degree plan no later than the first semester of the junior year. Forms and information are available in department offices.

A minimum of 40 semester hours of junior and senior work must be presented.

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 Program Advisor and, as necessary, the departmental or program advisors overseeing the minor areas. At least two of the three concentration areas must reside in the College of Visual and Performing Arts. Each concentration area consists of a minimum of 18 hours in the chosen discipline, for a total of 54 hours minimum across the three areas. Through these self-selected concentration areas combined with forming an integrated specialization and receiving a liberal arts foundation, the B.G.S. degree can prepare a student to pursue an intellectual and/or artistic interest, a career goal, or further study at the graduate or professional level.

Declaration of Major. Students declare the General Studies major in the College of Visual and Performing Arts just as they do any major.

A visit with the Academic Program Advisor (806-742-0700) is the best place to start, followed by visits to program advisors representing the three intended concentration areas.

Graduation Requirements. Requirements for the B.G.S. degree in the College of Visual and Performing Arts are as follows:

- 120 credit hours minimum.
- Minimum total of 40 junior/senior hours.
- Three concentration areas to total at least 54 hours, each comprising an existing departmental or interdisciplinary minor of at least 18 hours each; minimum 6 jr./sr. hours in each concentration; 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 below.

	<i>Semester Hours</i>
English	6-12
Oral Communication	3
Political Science	6
American History	6
Mathematics and Logical Reasoning	6
Natural Laboratory Science	8-11
Technology and Applied Science	3
Individual/Group Behavior	3-6
Humanities	3-6
Visual/Performing Arts	satisfied
	<i>in concentrations</i>
Personal Fitness and Wellness	0-2
Foreign Language	6-16
Multicultural Studies	3



Bachelor of Fine Arts

The curriculum leading to the Bachelor of Fine Arts (B.F.A.) degree provides highly professional programs in theatre arts, visual studies, design communication, and studio art.

	<i>Semester Hours</i>
English	6
Required Political Science, History	12
Oral Communication	3
Mathematics and Logical Reasoning	6
Natural (Laboratory) Science	8
Technology*	3
Individual or Group Behavior**	3
Humanities	3
Foreign Language†	0-10
Multicultural Requirement*	3
Three hours of course work chosen from the Core Curriculum requirements approved list. This course may be used to satisfy another General Degree requirement. Consult the School of Art or the Department of Theatre and Dance.*	
Professional Program (Select One)	
• Theatre Arts	86-89
• Visual Studies	76
(leading toward teacher certification)	
• Design Communication	82
• Studio Art	82
Professional Education	21
(teacher certification only)	
Total for Degree	120-138

* No additional hours required if satisfied within the requirements for the art and theatre majors.

** No additional hours required if ART 3311 or 4315 is included in upper level art history requirements for art majors.

† Entering students are expected to have had four semesters of a single foreign language in high school. Students who do not meet this requirement will be required to complete two semesters of a single foreign language.

Bachelor of Music

Bachelor of Music degrees are offered with majors in performance (MUPF), music composition (MUCP), music theory (MUTH), and music (MUTC—leading to teacher certification).

	<i>Semester Hours</i>
English	6
Oral Communication	3
Mathematics and Logical Reasoning	6
Six hours math or 3 hours math plus PHIL 2310 or MUTH 3303	
Foreign Language	0-16
Entering students are expected to have had four semesters of a foreign language in high school. Students who do not meet this requirement will be required to complete two semesters of a single foreign language.	
Humanities	3
Natural (Laboratory) Science	8
Technology and Applied Science	3
Required Political Science & History	12
Individual or Group Behavior	3
Multicultural Requirement*	3
Three hours of course work chosen from the Core Curriculum requirements approved list. This course may be used to satisfy another General Degree requirement.*	
Music Courses for Major (Select One)	
MUPF	85-92
MUCP	96
MUTH	87
MUTC	75-76
Professional Education	21
(teacher certification only)	
Total for Degrees	
MUPF	126-137
MUCP	137
MUTH	134
MUTC	137-138

* No additional hours required if satisfied within the requirements for music majors.

Visual and Performing Arts (VPA)

(To interpret course descriptions, see pg. 10.)

Undergraduate Course

3301. **Critical Issues in Arts and Culture (3:3:0).** Analysis of music, visual arts, theatre and dance as fundamental to contemporary society and relationship of arts to broader social context.

Graduate Course

5300. **Topics in the Visual and Performing Arts (3:3:0).** Prerequisite: Consent of instructor. Focused study of topics relevant to the arts, including, but not limited to, history, theory, and current issues such as arts management, interdisciplinary investigation, or cultural/sociological constructs. May be repeated for credit with different topic.

Graduate Program / Fine Arts

Admission to graduate programs in the College of Visual and Performing Arts is a two-step process with requirements established by both the Graduate School and the school or department in which the student plans to study. The student should note carefully any particular requirements for admission established by the school or department in which he or she plans to major and contact the graduate advisor of the unit for more detailed information.

Ph.D. in Fine Arts

A multidisciplinary doctoral program leading to the Ph.D. degree in Fine Arts is offered by the faculties in the College of Visual and Performing Arts. The general aim of this program is to develop leadership in the fine arts. Accordingly, the curriculum involves a multidisciplinary approach to make candidates aware of the full scope and educational interrelatedness of the arts.

The program requires a minimum of 48 semester hours of graduate course work beyond the master's degree—30 in the major area and 18 in a multidisciplinary core of art, music, philosophy, and theatre arts. In addition, the program requires at least 12 hours enrollment in dissertation.

Work in the major area ordinarily involves a basic core along with an individualized curriculum that allows the candidate to pursue a professional goal relating to personal interests and competencies.

Each candidate will write a formal dissertation, ordinarily in the major area; however, students with appropriate backgrounds may be permitted to do interdisciplinary dissertations. The nature of the dissertation project may vary among three plans: traditional or interdisciplinary research, research devoted to solving a professional

problem, or research based on an internship experience. Regardless of the project chosen, however, the research will culminate in a formal document submitted to the dean of the Graduate School.

In addition to meeting the Graduate School's minimal requirements for admission, applicants must also be approved by their major departments and by the Visual and Performing Arts Graduate Committee. All applicants for the program must have completed a master's degree or its equivalent with emphasis in some area of the arts.

Core Courses

ART 5310.	Historical and Critical Perspectives in the Visual Arts (3:3:0).
ART 5314.	The Visual Arts in Contemporary Context (3:3:0).
MUSI 5310.	Historical and Critical Perspectives in Music (3:3:0).
MUSI 5314.	Music in Contemporary Context (3:3:0).
PHIL 5310.	History of Aesthetics (3:3:0).
PHIL 5314.	Contemporary Aesthetics (3:3:0).
TH A 5310.	Historical and Critical Perspectives in Theatre Arts (3:3:0).
TH A 5314.	Theatre Arts in Contemporary Context (3:3:0).

Fine Arts Management

The associate dean of the college counsels a focus in Fine Arts Management within the Master of Arts degree program in Interdisciplinary Studies. This flexible option allows students to develop management leadership for fine arts institutions and governmental agencies. Courses are available in business administration and public administration, as well as in the arts. For a description of this program, see Interdisciplinary Studies within the Graduate School section of this catalog or contact the associate dean of the College of Visual and Performing Arts.

School of Art

Faculty

Jon (Don) Wink, Director

Professors: Dingus, Fuentes, Kreneck, Morrow, Waters, and Wink; **Associate Professors:** Check, Fehr, Germany, Glover, Granados, Lloyd, Martin, Slagle, Steele, Tate, and Tedeschi; **Assistant Professors:** Bauer, W. Cannings, Collins, Cortez, Flueckiger, D. Fowler, Ricco, VenHuizen, and Wang; **Part-Time Instructors:** S. Cannings, C. Fowler, Hartsfield, Milosevich, and Rasberry.

About the Program

This school supervises the following degree programs:

- Bachelor of Fine Arts in Visual Studies (leading to teacher certification)
- Bachelor of Fine Arts in Design Communication
- Bachelor of Fine Arts in Studio Art
- Bachelor of Arts in Art History
- Master of Art Education in Art Education
- Master of Fine Art in Art
- Doctor of Philosophy in Fine Arts with a major in Art

The school's degree programs are accredited by the National Association of Schools of Art and Design.

Undergraduate Program

Mission Statement. The mission of the School of Art is to provide a stimulating and challenging environment in which students develop creative and scholarly potential, to support faculty members in the pursuit of excellence in teaching and research, to serve and lead public and professional constituencies, and to facilitate 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 experiences 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.

Advanced Placement. Entering art majors may be considered for advanced placement in the freshman core program through the Col-

lege Board Advanced Placement Program (AP), International Baccalaureate (IB), or the School of Art Portfolio Review. Art majors who score a 4 or 5 on the College Board Exams in drawing portfolio, two-dimensional design portfolio, or three-dimensional design portfolio will receive credit for drawing I, and/or design II, and/or design II (3-dimensional design) (ART 1302, 1303, 2303). Students may also be considered for advanced placement by presenting any of these portfolios of artwork to the School of Art Advanced Placement Review Committee where credit may be given in drawing I, design I, and/or design II. Students may also be considered for advanced placement by presenting a comprehensive portfolio of artwork to the School of Art Advanced Placement Review Committee. Advanced placement credit by portfolio examination is a service provided to students who declare a major in art. It is not intended for students minoring in art or seeking to fulfill a fine arts general education requirement. Students who are awarded advanced placement through the College Board Advanced Placement Program (AP) or School of Art examination may earn 6 hours of college credit. Entering art majors who receive a 4 or 5 on the College Board Advanced Placement Program in art history will be exempt from taking ART 1310 and 2311. Majors who receive AP art history credit must take three upper-level art history courses. The School of Art also provides students majoring in design communication the opportunity to receive placement credit for ART 1385 and 1386 through a performance test offered each semester. Further information may be obtained by writing or calling the school.

Individualized Programs. Through a unified foundations program, the School of Art prepares students to develop increasingly specialized and diverse courses of study. No grade below C is accepted for transfer credit in majors, minors, or specializations. Most upper level art courses are repeatable for credit and allow for individualized instruction.

Studio Art Centers International (SACI). Texas Tech University's association with SACI offers students the opportunity to study studio art, art history, and 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 Bachelor of Fine Arts degree in visual studies, design communication, 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 Bachelor of Arts degree in art history must complete at least 12 hours of upper division art history courses. At least 6 hours of upper division art courses must be taken in residence for all minors in this school.

Correspondence Courses. Major or minor courses may not be taken by correspondence.

Writing Intensive Requirement. Six hours of the major must be in writing intensive courses. Students may satisfy this requirement by completing art history courses numbered 3000 or above (except 3312) and designated studio and/or design courses.

Technology and Applied Science Requirement. Students pursuing the B.F.A. in studio may satisfy this requirement by completing four courses from the following list: ART 3300, 3301, 3308, 3325, 3326, 3328, 3329, 3330, 3331, 3333, 3334, 3336, 3337, 3338, 3339, 4326, 4328, 4329, 4330, 4334, and 4338. Students pursuing the B.F.A. in visual studies may satisfy this requirement by completing ART 3362. Students pursuing the B.F.A. in design communication may satisfy this requirement by completing four courses in the major with the exception of ART 3387, 4354, and 4355.

Art Minors. Students working toward any minor in art must complete a minimum of 18-21 semester hours, which must include 6 hours of junior and senior level courses. Hours applied to the minor area of study may not include courses used to fulfill requirements in the student's major. These courses, however, may make the student eligible, immediately, for upper division courses throughout the 18-21 hours of the art minor. The area of design communication does not offer a minor. Some specific tracks for a minor in art are as follows.

Art History Minor. Students working toward an art history minor must complete a minimum of 18 hours and include ART 1310, 2311, and 3312. The remaining 9 hours must be chosen from a menu of 11 different courses offered at the 3000 and 4000 level. These courses are: ART 3310, 3311, 3314, 3315, 3316, 3317, 3318, 3319, 4310, 4311, 4315. Students minoring in art history are required to take at least two upper level courses in art history in residence.

Studio Art Minor. Students working toward a minor in studio art must complete a minimum of 18 hours, beginning with ART 1320 and 1324. The remaining 12 hours are ART 1309 (ART 1310 or 1311 may substitute) and any 2000 or 3000 level studio course for which the student has the prerequisite or permission of the instructor. Six of the 18 hours of the studio minor must be taken at the junior and senior level in residence.

Fine Art Photography Minor. Students working toward a minor in photography must complete a minimum of 21 hours. The following courses are to be taken in sequence: ART 1302, 1303, 3325, 3329, 3319 (or ART 1309), 3326 (may be repeated). All advanced hours must be taken in residence.

Art Core. All students majoring in art are required to take 22 hours of core courses that consist of the following:

- ART 1100, Introduction to Art
- ART 1303, Drawing I: Introduction
- ART 2304, Drawing II: Introduction
- ART 1302, Design I: Introduction
- ART 2303, Design II: Introduction
- ART 1310, Art History Survey I
- ART 2311, Art History Survey II
- ART 3312, Art History Survey III

Undergraduate Degrees

Bachelor of Fine Arts

Visual Studies Major

The Bachelor of Fine Arts in Visual Studies (leading toward art teacher certification) prepares graduates for the realities facing teachers today. The program emphasizes contemporary theories and social issues in art and education, including race, class, and gender inequalities; intercultural concerns; community activism; critical awareness; anti-bias methods; and alternative resources. Grounded in social theories, the course work emphasizes visual cultures and contemporary art. Prior to student teaching, students participate in fielded practica in public schools and museums, as well as with alternative populations such as incarcerated youth, children and adults with differing abilities, and children from low socio-economic environs.

The B.F.A. degree with a visual studies major requires 73 semester hours of art and art history, 21-27 semester hours of professional education, and 46-62 semester hours of general requirements as stipulated by the College of Visual and Performing Arts. The minimum number of hours required for the visual studies major (leading to teacher certification) is a total of 132 credit hours. A minimum of 40 credit hours of junior and senior level courses are required for graduation.

Semester Hours

English	6
Oral Communication	3
COMS 2300, 3358 or HDFS 2320*	
Mathematics and Logical Reasoning:	6
CLEP allowed. Approved courses in logic may be substituted for the last 3 hours of this requirement. MATH 0301, 0302, 3430, PSY 3400, SOC 3391, and MUTH 3303 may not be used to fulfill any part of this requirement.	
Natural (Laboratory) Science*	8
Technology	3
ART 3362 satisfies this requirement.	
American History (HIST 2300 and 2301)	6
Students normally will enroll in HIST 2300 and 2301, although any American history course will satisfy this requirement. CLEP allowed.	
Political Science (POLS 1301 and 2302)	6
CLEP allowed.	
Humanities	3
Foreign Language	0-10
Entering students are expected to have two years of foreign language training. Students who do not meet this requirement will be required to take one year of a single foreign language. CLEP allowed.	
Multicultural Requirement	3
ART 1310, 2311, 3310, 3311, 3315, 3317, 3318, and 4315 satisfies this requirement.	
Individual and Group Behavior	3
ART 3311 or 4315 may be used to fulfill this requirement.	
Professional Education Requirement	
<i>All-Level Certification</i>	
EDSE 4310	3
EDSE 4322	3
EDLL 4382	3
ART 4362	3
ART 4365	3
ART 4001	3-6
ART 4000	3-6

Art Courses

Core Studio	13
ART 1100, 1302, 1303, 2303, 2304	
Art History Core	9
ART 1310, 2311, 3312	
Visual Studies Core	12
ART 3360, 3362, 3364, 3365	
2-Dimensional Studio Art	9
Choice of three ART 3323, life drawing; ART 3321, painting; ART 3308, printmaking; and ART 3325, photography	
3-Dimensional Studio Art	9
Choice of three ART 3300 or 3301, ceramics; ART 3333, metals, and ART 3336 or 3337, sculpture	
Art Electives*	6
6 semester credit hours of 2000 level or above	
Studio Area of Emphasis*	12
12 semester credit hours of 3000/4000 level courses	
Senior Seminar for Studio Art Majors	3
ART 4335	
Upper-Level Art History*	3
If either ART 3311 or 4315 is not included in upper level art history requirements, an additional 3 hours of Individual and Group Behavior must be included under Core Curriculum requirements.	

* Consult with undergraduate faculty advisor.

Bachelor of Fine Arts

Design Communication Major

The B.F.A. in design communication addresses the complexities and changing aspects of the profession. Problem-solving, conceptual development, and technological skills are essential components to the learning process. In addition to emphasizing integration of form and information for effective communication, this program also engages students in a critical understanding of the implications of their work by emphasizing social responsibility.

The design communication curriculum consists of 82 semester hours of art and art history courses and 41-60 semester hours of general requirements as stipulated by the College of Visual and Performing Arts. The minimum number of hours required for majors in design communication is 123 with a minimum of 40 upper level credit hours required for graduation.

Admission to Major. Admission to the design communication program is a two-step process: (1) apply to Texas Tech University and (2) apply to the design communication program. Design communication is a limited access program. Majors are selected each year in the spring semester by a selective portfolio review that leads to a series of carefully sequenced classes. Admission to the program is obtained through an application process. Admission to Texas Tech University does not ensure admission to the design communication program. See the web site (www.art.ttu.edu) for detailed information, application form, and deadlines.

Minimum Grade Requirement. After acceptance into the program, the student must meet and maintain a minimum grade of B in all design communication courses. If a B is not achieved, the course must be retaken. A course may be retaken once for grade replacement. If after retaking the course a grade of B has not been achieved, design communication status will be revoked.

Portfolio Review (ART 4382 Portfolio Development Prerequisite). Prior to enrolling in ART 4382 (Portfolio Development), the student is required to present a portfolio for review.

The student must successfully pass the review before entrance into the portfolio class is granted. If a student does not pass the review, prescription course(s) will be assigned before enrollment is granted.

Semester Hours

English	6
Mathematics and Logical Reasoning	6
CLEP allowed. Approved courses in logic may be substituted for the last 3 hours of this requirement. MATH 0301, 0302, 3430, PSY 3400, SOC 3391, and MUTH 3303 may not be used to fulfill any part of this requirement.	
Oral Communication	3
COMS 2300, 3358, or HDFS 2320	
American History (HIST 2300 and 2301)	6
Students normally will enroll in HIST 2300 and 2301, although any American history course will satisfy this requirement. CLEP allowed.	
Political Science (POLS 1301 and 2302)	6
CLEP allowed.	
Natural (Laboratory) Science	8
Technology	3
Humanities	3
Foreign Language	0-10
CLEP allowed. Entering students are expected to have 2 years of foreign language training. Students who do not meet this requirement will be required to take 1 year of a single foreign language.	
Multicultural Requirement	3
ART 1310, 2311, 3310, 3311, 3315, 3317, 3318, and 4315 may be used to fulfill this requirement.	
Individual and Group Behavior	3

Art Courses

Core Studio	13
ART 1100, 1302, 1303, 2303, 2304	
Art History Core	9
ART 1310, 2311, 3312	
Upper Level Art History	3
Design Comm. Emphasis & Electives	45
Studio Art Electives	12

Bachelor of Fine Arts

Studio Art Major

The Bachelor of Fine Arts in Studio Art offers depth in the studio areas and requires 82 hours of art and art history courses in addition to the 43-62 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 core must be outside the student's area of emphasis and must be chosen with advisor approval. The minimum number of hours required for majors in Studio Art is 125. A minimum of 40 credit hours of junior and senior level courses are required for graduation.

Upon completion of the studio and art history core courses, students select an area of emphasis from ceramics, jewelry and metals, painting, photography, printmaking, or sculpture, with the approval of faculty advisors. Within the studio art major and after approval of an advisor, a student may take a distribution of courses that combine digital media, photography, and printmaking. This combination of courses will enable students to experiment with various media and the technical aspects of digital imagery in creating fine art.

Semester Hours

English	6
Mathematics and Logical Reasoning	6
CLEP allowed. Approved courses in logic may be substituted for the last 3 hours of this requirement. MATH 0301, 0302, 3430, PSY 3400, SOC 3391, and MUTH 3303 may not be used to fulfill any part of this requirement.	
Oral Communication	3

COMS 2300, 3358, or HDFS 2320*

American History (HIST 2300 and 2301) 6
 Students normally will enroll in HIST 2300 and 2301, although any American history course will satisfy this requirement. Credit by examination for part of this requirement is available.

Political Science (POLS 1301 and 2302) 6
 Credit by examination for part of this requirement is available.

Natural (Laboratory) Science 8

Technology* 3

Humanities 3

Foreign Language 0-10
 Entering students are expected to have two years of foreign language training. Students who do not meet this requirement will be required to take one year of a single foreign language. CLEP allowed.

Multicultural Requirement 3
 ART 1310, 2311, 3310, 3311, 3315, 3317, 3318, and 4315 may be used to fulfill this requirement.

Individual and Group Behavior 3
 ART 3311 or 4315 may be used to fulfill this requirement.

Art Courses

Core Studio 13
 ART 1100, 1302, 1303, 2303, 2304

Art History Core 9
 ART 1310, 2311, 3312

Upper Level Art History 3
 If either ART 3311 or 4315 is not included in upper level art history requirements, an additional 3 hours of Individual and Group Behavior must be included under Core Curriculum requirements.

Life Drawing/Digital 6
 ART 3323 and 3324 or 3329

2-Dimensional Studio Art 6
 Choice of two: ART 3321, painting; ART 3308, printmaking; and ART 3325, photography

3-Dimensional Studio Art 9
 Choice of three: ART 3300 or 3301, ceramics; ART 3333, metals; and ART 3336 or 3337, sculpture

Studio Area of Emphasis* 21
 21 SCH of which 18 must be upper level

Studio Art Electives* 12
 Exclusive of area of emphasis. 12 SCH at the 3000 level or above; one course may be upper level art history

Senior Seminar 3
 ART 4335 Studio Art and Visual Studies Majors

* Consult with faculty advisor.

Bachelor of Arts

Art History Major

Students working toward the Bachelor of Arts degree with an art history major must complete the art core, 24 hours of upper level art history courses selected with the written consent of an advisor (at least 12 of which must be taken in residence and include 3 semester hours of senior thesis), and other requirements for the B.A. degree. An art history major is required to minor, subject to approval by the art history area advisor, in a field outside the school. The minimum number of hours required for majors in art history is 122.

Graduate Program / Art

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 including 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); and 6 semester hours of thesis, professional project, or studio problem leading to an art exhibition. The M.A.E. graduate coordinator will evaluate applicants who have met the minimum entrance requirements of the Graduate School. The applicant for the M.A.E. degree may be asked to submit a portfolio and/or slides of his or her art and, if possible, examples of student art to the preview committee during a personal interview. 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.

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 minor 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

The program leading to the Doctor of Philosophy degree in Fine Arts is detailed in the opening catalog section of the College of Visual and Performing Arts. The major in the School of Art (the art major) is designed to prepare broadly trained teachers in art education and/or art history-criticism. The art major includes preparation in the following: (1) focus in teaching survey art history and art appreciation and/or beginning and upper division art education classes at the university level, or (2) a combination of art education or art history-criticism with museum science. These combinations are best supported by available resources; however, in some instances an individualized plan of study can be arranged. All individualized plans must be clearly defined prior to entry.

For acceptance into the doctoral program, the applicant must have completed a master's degree, or its equivalent, with emphasis in some area of the visual arts. Every effort is made to select candidates who show strong scholarship and professional competence. Art doctoral faculty will evaluate each applicant's professional goals and any evidence of progress toward these goals. More specific qualifications will pertain to specific career directions. For further information, contact the Ph.D. graduate coordinator.

For admission into this program, the graduate art education and art history-criticism faculty review the applicant's dossier; a personal interview is recommended. Faculty submit recommendations to a three-member preview committee, who upon approval, recommend the applicant to the Graduate Committee of the college for acceptance into the program. Acceptance is also contingent upon satisfaction of all Graduate School requirements for admission. After admission, a specific degree plan is determined. In part, this process entails a formal evaluation that clarifies a student's goals and aims, and, if necessary, provides a basis for assigning leveling course work. Ordinarily, the formal evaluation scrutinizes materials presented with the application and is conducted at a meeting with the graduate faculty during a student's first semester.

Art (ART)*(To interpret course descriptions, see pg. 10.)***Undergraduate Courses**

1100. **Introduction to Art (1:1:0)**. Introduction to art as an academic pursuit with its diverse elements and opportunities, objectives, resources, careers, and achievements. Required of all art majors prior to admission to upper level courses. Offered fall semester only. Transfer credit acceptable. Pass-fail grading. For majors only.
1302. **Design Introduction (3:0:6) [ARTS 1311]**. 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. **Drawing Introduction (3:0:6) [ARTS 1316]**. Investigation of a variety of media, techniques, and subjects. Students develop perceptual, descriptive, and verbal skills with consideration of drawing as a conceptual process as well as an end in itself. Outside assignments. AP or portfolio waiver possible.
1309. **Art Appreciation (3:3:0) [ARTS 1301]**. Survey of the visual arts of western and nonwestern cultures with emphasis on understanding art through form, content, and cultural context. Nonmajors and art minors only.
1310. **Art History Survey I (3:3:0) [ARTS 1303]**. A survey of painting, sculpture, architecture, and the minor arts from prehistoric times to the 14th century. AP waiver possible.
2303. **Design II Introduction (3:0:6) [ARTS 1312]**. Prerequisite or corequisite: ART 1320. Emphasis on the three-dimensional concept of design. Students learn to apply verbal skills needed in advanced visual arts. Outside assignments.
2304. **Drawing II Introduction (3:0:6) [ARTS 1317]**. Prerequisite: ART 1324. Expansion of Drawing I stressing the expressive and conceptual aspects of drawing including developed descriptive imagery, use of color, abstraction, verbal skills, and the nude human figure as a subject. Outside assignments.
2311. **Art History Survey II (3:3:0) [ARTS 1304]**. A survey of painting, sculpture, architecture, and the minor arts from the 14th through 19th centuries. AP waiver possible.
3300. **Ceramics I Introduction to Wheel (3:0:6)**. Prerequisite: Studio core. Introduction to wheel throwing, glazing and firing. Outside assignments. TAS
3301. **Ceramics I Introduction to Handbuilding (3:0:6)**. Prerequisite: Studio core. Introduction to handbuilding techniques, glazing, and firing. Outside assignments. TAS
3308. **Printmaking I Introduction (3:0:6)**. Prerequisite: Studio core. Introduction to printmaking with sections designated for waterbase screenprinting, lithography, monoprints, woodcut, or etching. Outside assignments. Repeatable once for credit with different emphasis. TAS
3310. **Greek and Roman Art (3:3:0)**. Prerequisite: ART 1309, 1310, or consent of instructor. An examination of the principal contributions of the classical world in the areas of architecture, sculpture, and painting. Emphases: Greek and Roman. Repeatable for credit in different emphasis. (Writing Intensive)
3311. **Native American Arts (3:3:0)**. An examination of Native American cultures of the United States as revealed in ancient and contemporary architecture, arts, and crafts. Repeatable for credit in different emphasis. (Writing Intensive)
3312. **Art History Survey III (3:3:0)**. Prerequisite: ART 1309, 2311, or consent of instructor. An introduction to artistic movements, events, innovations, and debates of the 20th and 21st centuries, as examined in an international cultural frame. Repeatable for credit in different emphasis.
3313. **Latin American Art (3:3:0)**. Prerequisite: ART 2311 or 3312. May be repeated with change of emphasis.
3314. **Art of the United States (3:3:0)**. Prerequisite: ART 1309, 1311, or consent of instructor. A survey of American art and architecture and their European background from 1520-1893. Emphases: 1520-1859 and 1859-1893. Repeatable for credit in different emphasis. (Writing Intensive)
3315. **Ancient Near Eastern and Egyptian Art (3:3:0)**. Prerequisite: ART 1309, 1310, or consent of instructor. A discussion of Ancient Near Eastern art and architecture from Neolithic times down to 500 B.C. and the arrival of the Greeks in Persia; Ancient Egyptian art and architecture is covered from predynastic to the conquest of Egypt by Rome in 31 B.C. Repeatable for credit in different emphasis. (Writing Intensive)
3316. **19th Century Art (3:3:0)**. Prerequisite: ART 1309, 2311, or consent of instructor. Begins with the 18th century, then focuses on Impressionism, Post-Impressionism, Symbolism, and the French ambiance from which these movements emerged. (Writing Intensive)
3317. **Baroque Art (3:3:0)**. Prerequisite: ART 1309, 2311, or consent of instructor. A view of European art of the Counter Reformation and a consideration of the prevailing pressures that produced this art. Analyzes of the devices, effects, and dynamics of the age of change. Focuses on N. Baroque painting in Flanders and Holland. Repeatable for credit in different emphasis. (Writing Intensive)
3318. **The Art of the Renaissance (3:3:0)**. Prerequisite: ART 1309, 2311, or consent of the instructor. A study of aesthetic and intellectual directions in the Age of Humanism. Emphases: 15th century Florence, N. Italy, and Venice (1440-1560). Repeatable for credit in different emphasis. (Writing Intensive)
3319. **Photographic Arts of the 19th & 20th Centuries (3:3:0)**. Prerequisite: ART 2311 or consent of the instructor. An examination of the development of photography and its relation to the other visual arts. (Writing Intensive)
3321. **Painting I Introduction (3:0:6)**. Prerequisite: Studio core. Introduction to painting concepts and techniques with designated sections for watermedia or oil. Outside assignments. Repeatable once for credit in different emphasis.
3322. **Advanced Painting (3:0:6)**. Prerequisite: ART 3321 or consent of instructor. Emphasis on student's concepts and exploration of subject matter. Students select technical approach and media with instructor consent. Outside assignments. Repeatable for credit.
3323. **Drawing III Life Drawing (3:0:6)**. Prerequisite: Studio core. Application of developed representational skills to the study of human anatomical structure and drawing from life. Encouragement toward a more personal approach to descriptive drawing, using the figure as a uniquely meaningful subject. Outside assignments.
3324. **Advanced Life Drawing (3:0:6)**. Prerequisite: ART 2320. Development of individualized interpretation of the human figure using a variety of media and approaches with emphasis upon aesthetic and conceptual factors. Outside assignments. Repeatable for credit.
3325. **Photographic Arts I (3:0:6)**. Prerequisite: Studio core. Introduction to creative black and white photography. Covers camera operation, exposure adjustments, film development, printing, and presentation. Outside assignments. TAS
3326. **Advanced Photographic Arts (3:0:6)**. Prerequisite: ART 3325 or consent of instructor. Advanced fine art photography with topics that rotate each semester between color, studio still life, view camera, documentary, and book arts. Outside assignments. Repeatable for credit. TAS
3328. **Advanced Printmaking (3:0:6)**. Prerequisite: Studio core. Advanced printmaking with topics that rotate each semester between in-depth study of printmaking methods of screenprinting, lithography, intaglio, or relief printing. Outside assignments. Repeatable for credit. TAS
3329. **Introduction to Digital Imaging (3:0:6)**. Prerequisite: Basic Macintosh experience. 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. TAS
3330. **Advanced Ceramics: Wheel (3:0:6)**. Prerequisite: ART 2330. Emphasis on developing student's technical expertise, conceptual skills, and problem-solving ability. Content normally different each time offered. Outside assignments. Repeatable once for credit. TAS
3331. **Advanced Ceramics: Handbuilding (3:0:6)**. Prerequisite: ART 2331. Develops student's technical expertise, conceptual skills, and problem-solving ability. Content normally different each time offered. Outside assignments. Repeatable once for credit. TAS
3333. **Metal and Jewelry Design (3:0:6)**. Prerequisite: Freshman studio core or consent of instructor. Introduction to basic techniques used in metalsmithing and jewelry making. Emphasis on fabrication and design. Outside assignments. Repeatable once for credit. TAS
3334. **Advanced Metal and Jewelry Design (3:0:6)**. Prerequisite: Studio core. Further study of techniques used in metalsmithing and jewelry design. Development of individual direction and exploration of various media. Outside assignments. Repeatable for credit. TAS
3336. **Sculpture I Introduction to Metal Fabrication (3:0:6)**. Prerequisite: Freshman studio core. Introduction to sculpture through the study of metal fabrication,

- including a variety of welding and surface coloration techniques. Forge work and casting. Outside assignments. TAS
3337. **Sculpture II Introduction to Mixed Media (3:0:6)**. Prerequisite: Freshman studio core. Introduction to sculpture through the study of mixed media techniques and basic wood construction. Outside assignments. TAS
3338. **Advanced Sculpture: Issues in Metal Fabrication (3:0:6)**. Prerequisite: ART 2338. Emphasis on developing student's technical expertise, conceptual skills, and problem solving ability. Rotating topics include kinetics and the object. Outside assignments. Repeatable once for credit. TAS
3339. **Advanced Sculpture: Intermedia (3:0:6)**. Prerequisite: ART 2339. Emphasis on developing student's technical expertise, conceptual skills, and problem solving ability. Rotating topics include installation and video-performance. Outside assignments. Repeatable once for credit. TAS
3360. **Introduction to Theories and Practice in Art (3:2:4)**. Prerequisite: Freshman studio core. Overview of the role of the visual arts in personal, social, and institutional contexts. F
3362. **Technology in the Visual Arts (3:2:4)**. Prerequisite: Art core or consent of instructor. Instructional and studio emphases on technology in the visual arts. Outside assignments. F. TAS
3364. **Foundations Art in Social Instruction (3:2:4)**. Prerequisite: ART 3360. Examination of historical, political, and pedagogical issues and policies of the visual arts in institutional settings. S
3365. **Visual Culture (3:2:4)**. Examination of contemporary thought and practice in the visual arts. S
3372. **Rethinking Art Education (3:2:4)**. Contemporary content and teaching in the visual arts.
3381. **Typography (3:0:6)**. Prerequisite: ART 1381, 2381, and 2382. Theoretical and practical survey of visual typography. Typography fundamentals, historical contexts, visual organization, meaning, and expressive qualities of type as visual form and visible language.
3382. **Symbols (3:0:6)**. Prerequisite: ART 1382 and 3381. Exploration of symbols in design communication. Meaning, concept development, process, research, and problem solving are emphasized including appropriateness and responsibility to communicate effectively.
3383. **Type and Image (3:0:6)**. Prerequisite: ART 1382 and 3381. Study of the relationship between visual and verbal language. Exploration of the informative, expressive, and experimental potential to solve complex narratives. Form will be stressed.
3384. **Visual Systems (3:0:6)**. Prerequisite: ART 3382 and 3383. Development of integrated design systems and their systematic application of visual continuity. Emphasis on concept and the relationship between content and form.
3385. **Computer Design Methods I (3:0:6)**. Prerequisite: Program acceptance. Technical aspects of raster graphics. Stresses use of digital peripherals to capture and construct images, vector drawing, file integration, and digital production.
3386. **Computer Design Methods II (3:3:0)**. Prerequisite: Program acceptance. Technical aspects of page layout, file integration, and digital production will be introduced including digital peripherals as they relate to image capture.
3387. **Design Ideas (3:3:0)**. Prerequisite: Program acceptance. Introduction to interdisciplinary theories and methods as they relate to creative thinking. Explores social responsibility, ethics, and media literacy. Offered fall semester only. (Writing Intensive)
3388. **Design Process (3:0:6)**. Prerequisite: Program acceptance. Design process, systematic study of form, color symbology, production of meaning and its relationship to design communication. Emphasis is placed on professional standards and craftsmanship.
4000. **Student Teaching in Art Secondary (V3-12)**. Prerequisite: Admission to student teaching. Supervised teaching involving a period of responsibility for art instruction in an accredited secondary school.
4001. **Student Teaching in Art Elementary (V3-6)**. Prerequisite: Admission to student teaching. Supervised teaching involving a period of major responsibility for art instruction and learning in accredited elementary schools.
4104. **Advanced Problems (1)**. Prerequisite: Consent of instructor. Advanced problems in an area of production in which the student has achieved competence. Repeatable for credit.
4304. **Advanced Problems (3)**. Prerequisite: Consent of instructor. Advanced problems in an area of production in which the student has achieved competence. Repeatable for credit.
4310. **Seminar in Art History (3:3:0)**. Prerequisite: 6 hours of art history or consent of instructor. Extensive exploration of a particular period in art history. Repeatable for credit. (Writing Intensive)
4311. **Senior Thesis in Art History (3)**. Prerequisite: Consent of instructor. An individual course of intensive study requiring in-depth reading and substantial written projects. (Writing Intensive)
4312. **Topics in 20th and 21st Century Art (3:3:0)**. Prerequisite: ART 3312. Major movements in modernism and post-modernism, including aesthetic and critical theories and databases. May be repeated in different topics. (Writing Intensive)
4315. **The Arts of Pre-Columbian America (3:3:0)**. An examination of the ideologies and cultures of Meso, Central, and South America as expressed in their arts, cities, iconography, and writing. Critical evaluation of contemporary approaches to these topics. Emphases: Central Mexico and Maya. Repeatable for credit in different emphasis. (Writing Intensive)
4320. **Experimental Drawing (3:0:6)**. Prerequisite: ART 3320 and consent of instructor (must be drawing emphasis). Complete absorption with drawing as a total concept. Mature, individualistic development of a unique body of work utilizing a variety of media and surfaces. Outside assignments. Repeatable for credit.
4322. **Experimental Painting (3:0:6)**. Prerequisite: ART 3322 or consent of instructor. Individual exploration of subject matter and painting media directed toward the creation of a mature and consistent body of work. Outside assignments. Repeatable for credit.
4326. **Experimental Photographic Arts (3:0:6)**. Prerequisite: ART 3326 and consent of instructor. Exploration of advanced topics in photography directed toward the creation of a mature body of work. Outside assignments. Repeatable for credit. TAS
4328. **Experimental Printmaking (3:0:6)**. Prerequisite: Studio core. Problems in printmaking areas. Controlled projects and individual criticism. Outside assignments. Repeatable for credit. TAS
4329. **Advanced Digital Photo Imaging (3:0:6)**. Prerequisite: ART 3325 and 3329. Examination of advanced digital imaging with emphasis on photographic imagery. Students will explore digital art making and creative problem solving using both photographic and digital input and output. Outside assignments. Repeatable for credit. TAS
4330. **Senior Studio: Ceramics (3:0:6)**. Prerequisite: Six hours of 3000 level ceramics and consent of instructor. Mature, individualistic exploration directed toward developing a comprehensive, cohesive body of work for evaluation. Outside assignments. May be repeated for credit up to 12 hours. TAS
4334. **Senior Studio: Metal and Jewelry Design (3:0:6)**. Prerequisite: Six hours of 3000 level metal and jewelry design and consent of instructor. Mature, individualistic exploration directed toward developing a comprehensive, cohesive body of work for evaluation. Outside assignments. May be repeated for credit up to 12 hours. TAS
4335. **Senior Seminar for Studio Art Majors (3:3:0)**. Prerequisite: B.F.A. studio and visual studies majors with senior standing. A capstone course. Basic and necessary information that will enable the student to compete in the professional art world and acquaint the student with the requirements for graduate admission and application procedures. Offered fall semester only. (Writing Intensive)
4338. **Senior Studio: Sculpture (3:0:6)**. Prerequisite: Six hours of 3000 level sculpture and consent of instructor. Mature, individualistic exploration directed toward developing a comprehensive, cohesive body of work for evaluation. Outside assignments. May be repeated for credit up to 12 hours.
4354. **Illustration (3:0:6)**. Prerequisite: ART 3385, 3387, 3388, and 3323. Exploration of illustration through structured practical application. Image making, concept, style, appropriateness of imagery, and interpretation of narrative will be stressed. Repeatable once for credit.
4355. **Professional Internship (3)**. Prerequisite: Consent of instructor. Provides on-site internship experience. Placement is student initiated and faculty approved. Student's progress will be monitored. Repeatable once for credit.
4356. **Packaging (3:0:6)**. Prerequisite: ART 3381 and 3382. Study and design of three-dimensional form and surface. Stresses problem solving and innovative thinking as they relate to the environment and ecological concerns. Repeatable for credit.
4357. **Online Media (3:0:6)**. Prerequisite: ART 3383 and 3384. Introduction to key concepts and underlying processes used to

- create interactive experiences, including implications of new technology on social construction of meaning as it relates to the professional field of design. Repeatable once for credit.
4358. **Motion Graphics (3:0:6)**. Prerequisite: ART 3383 and 3384. Explores the interactive effects of time and motion, including visual rhythm, continuity, and relationship between form and content of visual communication. Repeatable once for credit.
4359. **Design History (3:3:0)**. Prerequisite: ART 3381 and 3382. Examination of the evolution of the graphic arts. Discusses design innovators as well as styles and movements. Emphasis on 20th century.
4361. **Contemporary Visual Studies (3:3:0)**. Modern and postmodern socio-economics, political and visual histories in art education.
4362. **Curriculum Theory and Instruction Methodology in Art (3:2:4)**. Prerequisite: ART 3364, 3365, or consent of instructor. Art teaching methodologies, including curriculum design, classroom organization and management, assessment strategies, and teaching effectiveness evaluation. S.
4365. **Visual Studies Seminar (3:2:4)**. Seminar focusing on teaching theories, curriculum development, communication strategies, real-life teaching scenarios, and student teaching preparation. F.
4380. **Publication Design (3:0:6)**. Prerequisite: ART 3383 and 3384. Sequential design and structural systems dealing with experimentation of type, image, pacing, and form. Emphasizes concept development, research, writing, and presentation skills. Outside assignments.
4381. **Public and Social Service Design (3:0:6)**. Prerequisite: ART 4380. Emphasis is placed on the role of the designer in the community, public awareness, and social responsibility. Stresses teamwork, communication, and interpersonal skills.
4382. **Portfolio Development (3:0:6)**. Prerequisite: Must pass portfolio review; prior to enrollment, minimum of 2-4 design communications electives and ART 4381. Emphasizes resume development, final portfolio preparation and refinement, business procedures, self-promotion, and interviewing skills.
5100. **Advanced Art Unit (1)**. Prerequisite: Instructor approval. Individual investigation in art. May be repeated for credit.
5101. **Art Seminar (1:1:0)**. Prerequisite: Instructor approval. Required of all graduate students admitted to the MFA program. Students must complete three seminars by graduation. Topics vary. Pass-fail grading.
5102. **Teaching Studio Art in Higher Education (1:1:0)**. Required seminar of all studio art teaching assistants. Provides methodology and practical teaching strategies unique to teaching studio art courses. Does not count toward minimum requirement for a graduate degree. Pass-fail grading.
5304. **Advanced Studio: Two-Dimensional (3)**. Prerequisite: Instructor approval. The development and execution of advanced two-dimensional studio problems. May be repeated for credit.
5305. **Advanced Studio: Three-Dimensional (3)**. Prerequisite: Instructor approval. The development and execution of advanced three-dimensional studio problems. May be repeated for credit.
5309. **Theories of Contemporary Art (3:3:0)**. Prerequisite: Instructor approval. Advanced survey of contemporary art theory and critical methods, with emphasis on the impact of the post-structuralist critique of representation.
5310. **Historical and Critical Perspectives in the Visual Arts (3:3:0)**. Historical and critical overview of the field including introduction to major theories and methodologies; study of particular artists, works, or movements that provide insight into specific creative techniques; basic media and techniques of the field; and interdisciplinary relationships with the other arts.
5311. **Art of Classical Antiquity (3:3:0)**. Prerequisite: Instructor approval. Examines architecture, painting, and sculpture of the Greek and Roman civilizations. Repeatable for credit.
5313. **18th and 19th Century Art (3:3:0)**. Prerequisite: Instructor approval. Principal developments in 18th and 19th century painting, sculpture, and architecture. Emphasis on Europe and the United States. Repeatable for credit.
5314. **The Visual Arts in Contemporary Context (3:3:0)**. Contemporary issues in the field: current artistic trends, theory and criticism, organization (e.g., funding, administration), and cultural policy (e.g., education, assessment, multi-cultural issues, censorship).
5315. **Arts of the Indian Americas (3:3:0)**. Prerequisite: Instructor approval. Examines art, culture, and architecture of North, Central, or South American Indians. Repeatable for credit.
5316. **Art Theory and Criticism (3:3:0)**. Prerequisite: Instructor approval. Examination of art works from antiquity to the early twentieth century using a variety of traditional and current artistic theories, critical models, and methodologies.
5317. **Renaissance and Baroque Art (3:3:0)**. Prerequisite: Instructor approval. Examination focusing upon major developments in Renaissance or Baroque painting, sculpture, architecture, and art criticism. Repeatable for credit.
5319. **20th-Century Visual Art (3:3:0)**. An examination of major developments in 20th-century painting, sculpture, graphic, and ceramic art. Repeated for credit with different emphasis.
5320. **Graduate Drawing (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in drawing. May be repeated for credit.
5322. **Graduate Painting (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in painting. May be repeated for credit.
5326. **Graduate Photography (3:0:6)**. Prerequisite: Instructor approval. Experimental investigation into varied aspects of photography as creative media. May be repeated for credit.
5328. **Graduate Printmaking (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in printmaking. May be repeated for credit.
5330. **Graduate Ceramics (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in ceramics. May be repeated for credit.
5331. **Ceramic Raw Materials (3:0:6)**. Prerequisite: Graduate standing and one graduate course in ceramics or consent of instructor. A specialized area of ceramics with emphasis on chemistry and formulation of clay bodies and glazes. Outside assignments and exams.
5334. **Graduate Metal and Jewelry Design (3:0:6)**. Prerequisite: Instructor approval. The exploration of personal direction and execution of advanced problems and techniques in metalsmithing and jewelry design. Emphasis will vary. May be repeated for credit.
5338. **Graduate Sculpture (3:0:6)**. Prerequisite: Instructor approval. The development and execution of advanced problems in sculpture. May be repeated for credit.
5360. **Seminar in Art Education (3:3:0)**. Topics vary per course from faculty research to publication processes, ecology, technology, interpretation, and issues of power, privilege, and ideology. May be repeated for credit.
5361. **Critical Pedagogy in the Visual Arts (3:3:3)**. Corequisite: ART 5101. Introduction to curriculum materials and technology to develop awareness of and practice in innovative procedures for teaching visual arts disciplines.
5362. **Historical Survey of the Teaching of Art (3:3:0)**. Survey of the historic growth of art education in Europe and America.
5363. **Research Methods in the Visual Arts (3:3:0)**. Prerequisite: Instructor approval. A survey of research methods applicable to the visual arts. May be repeated for credit. Offered online.
5364. **Feminist Research Methodologies in Visual Studies (3:3:0)**. Prerequisite: W S 5310, equivalent, or pass entrance essay exam. This interdisciplinary course focuses on the vision and methods that feminist scholars use to study feminist issues within and across a range of traditional disciplines. (W S 5320)
5366. **Instructional Technology in the Visual Arts (3:3:0)**. Research in critical theories and the cultural implications of visual arts instructional technology in schools, museums, and alternative sites.
6000. **Master's Thesis (V1-6)**.
6001. **Master's Thesis: Professional Project (V1-6)**. Prerequisite: ART 5363, 9 hours of degree program course work, and advisor approval. The professional project requires a written proposal, an oral defense of the proposal, a final written report, and an oral defense of the report. May be repeated 3 times for credit up to 6 hours.
6002. **Master's Thesis: Exhibition (V1-6)**. Prerequisite: ART 5363, 9 hours of degree program course work, 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)**.
7000. **Research (V1-12)**.
8000. **Doctor's Dissertation (V1-12)**.

Graduate Courses

School of Music

Faculty

William L. Ballenger, Director

Horn Professors: Van Appledorn and Westney; **Professors:** Ballenger, Barber, Bearden, Bogle, Cochran, Deahl, Dickson, Henry, Killian, Meek, Owens, Shinn, and Stoune; **Associate Professors:** A. Anderson, Arnold, Birdwell, Brumfield, Dent, Dolter, Fried, Gilbert, Hughes, Lewis, Lucas, McNeil, Rogers, L. Santa, Sharpe, Strieder, Wilson, and Wood; **Assistant Professors:** C. Anderson, Dees, Elrod, Ezerman, M. Santa, Shea, Sifford, C. J. Smith, C. M. Smith, Wass, and Yon; **Visiting Faculty:** Fielding, Fischer, Hollins, Jahnke, Losada, Pollard, and A. Smith.

About the Program

The school supervises the following degree programs:

- Bachelor of Music in Performance
- Bachelor of Music in Music Composition
- Bachelor of Music in Music Theory
- Bachelor of Music in Music (leading toward teacher certification)
- Bachelor of Arts in Music
- Master of Music in Composition
- Master of Music in Performance
- Master of Music in Music History and Literature
- Master of Music in Music Theory
- Master of Music Education in Fine Arts (with a major in Music)
- Master of Music in Pedagogy
- Doctor of Philosophy in Fine Arts with a major in Music
- Doctor of Musical Arts in Composition
- Doctor of Musical Arts in Conducting
- Doctor of Musical Arts in Performance
- Doctor of Musical Arts in Piano Pedagogy

The school also participates in the ethnic studies and humanities minor programs. The schools' degree programs are accredited by the National Association of Schools of Music.

Undergraduate Program

Courses for Nonmajors

Nonmusic majors may elect class or private instruction in voice or in any instrument subject to the availability of faculty. Students enrolled in applied music are carried at their maximum level of achievement, and the nonmusic major is not examined in competition with the music major. In addition to the above, courses designed to serve all students enrolled in the university include all major ensembles such as Marching Band (fall only—MUEN 1103, 3103, 3203); Symphonic, Concert, and University Bands (MUEN 3103, 3203); Orchestra (MUEN 3104, 3204); University Choir (MUEN 3101, 3201); University Singers, Women's Chorus and Men's Glee Club (MUEN 3101); Music Theatre (MUEN 3102, 3202); Jazz Ensembles and Combos (MUEN 3105); and Small-Medium Ensembles (MUEN 3106, 3110). Auditions are required for some of these ensembles; contact the ensembles office (742-2272) for information about auditions.

Nonmusic majors may also enroll in major courses in music, music composition, music literature, and music theory with consent of the instructor.

The following courses are designed specifically for nonmajors.

MUAP 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.

MUAP 2123, 2124. Group Keyboard Instruction III and IV. Consent of instructor required. Intermediate instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.

MUAP 2133, 2134. Class Guitar. Open to both majors and nonmajors. Beginning and intermediate instruction in guitar; basic left- and right-hand approaches of classical technique; basic chords and accompaniment styles.

MUCP 1201, 1202. Introduction to Contemporary Music. Open to both majors and nonmajors. 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.)

MUCP 3001. Projects in Electronic and Experimental Music. Open to both majors and nonmajors. Prerequisite: MUCP 1202, or the equivalent, and instructor approval. Independent study and creative projects utilizing the resources of the Experimental Music Studio. May be repeated for credit.

MUHL 1308. Music Appreciation. Beginning course for nonmajors. Appreciation of music is encouraged through consideration of a variety of musical styles.

MUHL 2308, 2309. Heritage of Music. Selected compositions will be studied through an interpretation of their historical, functional, and cultural significance.

MUHL 3304. History of Jazz. Historical and analytical survey of jazz from its beginning through "Rock"—its form, style, literature, and influence on 20th century music.

MUHL 3308. Masterpieces in Music. Representative musical works from the Baroque Period to the present are studied in relation to their historical and general cultural context.

MUHL 3310 History of Rock and Roll. This course focuses on hearing, understanding, and contextualizing Anglo-American rock and roll, a popular idiom rooted in the music of African Americans and rural whites.

MUTH 1300. Songwriting. A beginning course for nonmusic majors. A practical approach to music theory through songwriting. Includes aural training, notation, textual setting, melodic writing, and chord assignment.

Music Degree Programs

Performance degrees include majors in piano (pedagogy or accompanying specializations are also available), organ, voice, brass, wood-

wind, percussion, and stringed instruments. Majors are also offered in music composition and music theory. The Bachelor of Music (leading toward teacher certification) degree replaces the degree formerly known as the Bachelor of Music Education. A minimum of 12 hours in the Bachelor of Music (leading toward teacher certification) degree must be taken in residence at Texas Tech University. There is no minimum number of hours that must be taken in residence for all other degrees in music. Minors in music are available in a variety of programs ranging from 18 to 24 semester hours a minimum of which 6 hours must be taken in residence; information is available in the School of Music office.

A minimum of 42 hours of music courses, 18 hours of which must be junior or senior level, are required for the Bachelor of Arts degree with a music major, including MUSI 1200, MUHL 2301, 2302, 2303, MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, and 3303. Bachelor of Arts students also take a minor and complete the general degree requirements for the Bachelor of Arts degree.

Provisional acceptance into a major in music is based upon a combination of auditions, transcripts, entrance examinations, and/or interviews, depending upon the specific major. Admission to Texas Tech University does not guarantee admission to the School of Music as a music major. All entering students must audition in their declared principal applied area with the appropriate faculty. Final acceptance into any music program is based upon formal auditions in the appropriate applied and ensemble areas. Students wishing to change their majors to performance after having been accepted into another major in music must proceed through a formal acceptance process for performance in the appropriate applied and ensemble areas. Additional information about applied music is available from the School of Music. Graduation requirements in applied music vary according to the student's degree and major. All music students will have their work in their principal applied music studies periodically reviewed by the faculty.

Entering freshmen may receive credit for college-level work in music accomplished prior to entering the university. This may be done through advanced standing examinations administered by the faculty of the School of Music during the first semester of the freshman year after the student has obtained permission from the dean of the College of Visual and Performing Arts. Advanced standing examinations will be administered only in the fields of applied music and music theory. To receive credit by an advanced standing examination, the student must achieve a grade of not less than a B on such examination.

The student must earn a minimum grade of C during each semester of freshman and sophomore theory to qualify for advancement.

All students whose principal instrument is not keyboard must demonstrate keyboard proficiency as determined by the school.

All music majors, with the exception of those pursuing the Bachelor of Arts in Music, are required to enroll in an appropriate ensemble

continuously each semester of full-time enrollment status. Refer to the curriculum tables that follow and consult with an advisor for specific ensemble requirements pertaining to particular degree plans.

All music majors, with the exception of those pursuing the Bachelor of Arts in Music, will participate in an applied and academic assessment during the second semester of the sophomore year before being admitted officially to the upper division. See area chairs in the School of Music for specific details.

Recital Requirements. Performance majors are required to present a full-length senior recital. Piano performance majors with pedagogy emphasis are required to present a three-quarter length recital, and candidates for music with teacher certification or performance degrees must present a half-length recital. The recital program must be approved by the appropriate area faculty or applied faculty member and submitted to the Publicity Office at least two weeks prior to the recital for processing. Piano performance majors with chamber music and accompanying emphasis are required to present four recitals of standard accompaniment and chamber music repertoire. Permission to present each recital must be obtained from an examining jury at least two weeks prior to the recital.

Music composition majors are required to present a recital of their original compositions during the senior year. Permission to present the recital must be obtained from the composition faculty one semester prior to the recital.

Postponement or cancellation of a scheduled recital (without penalty) is allowed only with good reason such as illness or death in the family. Failure to pass a hearing or failure of preparation are not valid reasons. The appropriate applied faculty member must verify any reason for postponement or cancellation. If a recital is postponed for verified good reason, the student may reschedule in the same or subsequent semester. If a scheduled recital is postponed or canceled without verified good reason, the student may not reschedule during the same semester in which postponement or cancellation occurs.

All music majors must attend at least 12 weekly student recitals and at least 12 additional approved concerts or recitals per semester for six semesters.

Courses in Applied Music. Additional fees for applied music are shown in the Finances section of this catalog under Miscellaneous Special Fees. Applied music students are required to practice a minimum of three clock hours per week for each semester-hour credit.

Music Curriculum Leading Toward Teacher Certification

All tracks have the same Core Curriculum and Professional Education courses.

Core Curriculum

	<i>Semester Hours</i>
Basic Skills, ENGL 1301, 1302	6
Oral Communication	3
COMS 2300	
Mathematics	6
MATH 1320 and MUTH 3303 counted in music hours	
Science	8
Technology ,	3
MUSI 3341 satisfies this requirement	
American History, HIST 2300, 2301	6
Political Science, POLS 1301, 2302	6
Individual or Group Behavior	3
See an advisor	
Humanities	3
Total Hours	44

Professional Education

Students should contact the College of Education concerning professional education course requirements for all-level certification.

	<i>Semester Hours</i>
EDSE 4310	3
EDSE 4322	3
EDLL 4382	3
MUED 3311	3
MUED 3312	3
Student Teaching	6
Total Hours	21

All Level, Vocal Track

Principal Instrument: MUAP 1001, 1002, 2001, 2002, 3001, (2 credit hours each) 3002 (1), 3190
Secondary Instrument: MUAP 1103, 2103, 3103, 4103
Conducting: MUAP 3206, 3207
Piano: Must pass proficiency level equivalent to MUAP 2124 if not piano principal.
Music: MUSI 1101, 1200, 3202, 3237, 3238, 3216, 3217
Music History & Literature: MUHL 2301, 2302, 2303, 4300

Music Theory: MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, 3303, MUCP 4207

Major Ensemble: 7 semesters
Total Track Hours: 73
Total Program Hours: 138

All Level, Instrumental Track

Principal Instrument: MUAP 1001, 1002, 2001, 2002, 3001, (2 credit hours each) 3002 (1), 3190
Secondary Instrument: MUAP 1103, 1104, 2103, 2104, 3103, 3104, 4103, 4104 (select 6)
Conducting: MUAP 3206, 3208
Piano: Must pass proficiency level equivalent to MUAP 2124 if not piano principal.
Music: MUSI 1101, 1200, 3202, 3237, 3238, and 3218 & 3219 or 3225 & 3226
Music History & Literature: MUHL 2301, 2302, 2303, 4300
Music Theory: MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, 3303, MUCP 4207
Major Ensemble: 7 semesters
Vocal Ensemble: 1 hour
Total Track Hours: 73
Total Program Hours: 138

All Level, Keyboard Track

Principal Instrument: MUAP 1001 (1), 1105, 1002 (1), 1106, 2001 (2), 2002 (2), 3001 (2), 3002 (1), 3190
Secondary Instrument: MUAP 1103, 2103, 3103, 4103
Conducting: MUAP 3206, 3207 or 3208
Music: MUSI 1101, 1200, 3202, 3237, 3238, and 3216 & 3217, or 3218 & 3219, or 3225 & 3226, or 3221 & 3222
Music History & Literature: MUHL 2301, 2302, 2303, 4300
Music Theory: MUTH 1103 and 1303, 1104 and 1304, 2103 and 2303, 2104 and 2304, 3303, MUCP 4207
Major Ensemble: 7 semesters
Vocal Ensemble: 1
Total Track Hours: 72
Total Program Hours: 137



Bachelor of Music Curriculum

The curriculum tables that follow are provided as a convenience to students and advisors. All music majors must plan their individual courses of study in consultation with a faculty advisor.

Music Composition Curriculum

FIRST YEAR	
<i>Fall</i>	<i>Spring</i>
MUAP 1001, Prin. Instr. or Voice	MUAP 1002, Prin. Instr. or Voice
Applied Music, Sec. Instr.*	Applied Music, Sec. Instr.*
MUCP 1201, Intro. Contemp. Mus.	MUCP 1202, Intro. Contemp. Mus.
MUSI 1200, College Acad. Music	MUHL 2301, History of Music
MUTH 1303, Elem. Theory I	MUTH 1304, Elem. Theory II
MUTH 1103, Elem. Aural Skills I	MUTH 1104, Elem. Aural Skills II
ENGL 1301, Ess. Coll. Rhetoric	ENGL 1302, Adv. Coll. Rhetoric
Ensemble	Ensemble
Individual or Group Behavior	TOTAL
TOTAL	TOTAL

SECOND YEAR	
<i>Fall</i>	<i>Spring</i>
MUAP 2001, Prin. Instr. or Voice	MUAP 2002, Prin. Instr. or Voice
Applied Music, Sec. Instr.*	MUCP 2302, Mus. Composition
MUCP 2301, Mus. Composition	MUHL 2303, Hist. of Music
MUHL 2302, Hist. of Music	MUTH 2304, Intern. Theory II
MUTH 2303, Intern. Theory I	MUTH 2104, Intern. Aural Skills II
MUTH 2103, Intern. Aural Skills I	Ensemble
Mathematics	Humanities
Ensemble	TOTAL
TOTAL	TOTAL

THIRD YEAR**	
<i>Fall</i>	<i>Spring</i>
MUAP 3001, Prin. Instr. or Voice	MUAP 3002, Prin. Instr. or Voice
MUCP 3301, Mus. Composition	MUCP 3302, Mus. Composition
MUTH 2303, Form Ana. Synth.	MUTH 3308, 20th Cent. Tech.
MUCP 4207, Instrumentation	MUCP 4208, Orchestration
Tech. and App. Science†	Oral Communication
Natural Science	PHYS 1406, Sound & Music
Ensemble	Ensemble
TOTAL	TOTAL

FOURTH YEAR	
<i>Fall</i>	<i>Spring</i>
MUHL 4300, Special Topics	MUCP 4402, Mus. Composition
MUCP 4401, Mus. Composition††	MUAP 4190, Sr. Recital
MUTH 4305, Modal Counterpoint	MUTH 4307, Tonal Cpt. & Fugue
HIST 2300, American History	HIST 2301, American History
POLS 1301, Amer. Govt., Org.	MUAP 3206, Conducting
Ensemble	POLS 2302, Amer. Pub. Pol.
TOTAL	Ensemble
	TOTAL

Total program hours—137

* The secondary instrument consists of one semester of study on each of three different instruments, to be determined in consultation with the student's advisor. In general, each secondary instrument should be a member of a different instrumental family (string, woodwind, brass, percussion, voice), and these should be distinct from the primary instrument family, so that the student gains familiarity with the broadest variety of instruments.

** Continuance in the major of music composition requires a formal review and approval of all freshman and sophomore work. The principal criteria are completion of all academic requirements through the sophomore year and a grade average in music theory courses of no less than a B.

† Recommended course: MUCP 3001.

†† Candidates for the Bachelor of Music degree with a major in music composition are required to present a recital of their original compositions during the senior year. Permission to present the recital must be obtained from the composition faculty one semester prior to the recital.

Music Theory Curriculum

FIRST YEAR	
<i>Fall</i>	<i>Spring</i>
MUAP 1001, Prin. Instr. or Voice	MUAP 1002, Prin. Instr. or Voice
Applied Music, Sec. Instr.*	Applied Music, Sec. Instr.*
MUSI 1200, College Acad. Music	MUHL 2301, History of Music
MUTH 1303, Elem. Theory I	MUTH 1304, Elem. Theory II
MUTH 1103, Elem. Aural Skills I	MUTH 1104, Elem. Aural Skills II
ENGL 1301, Ess. Coll. Rhetoric	ENGL 1302, Adv. Coll. Rhet.
HIST 2300, American History	HIST 2301, American History
Ensemble	Ensemble
TOTAL	TOTAL

SECOND YEAR	
<i>Fall</i>	<i>Spring</i>
MUAP 2001, Prin. Instr. or Voice	MUAP 2002, Prin. Instr. or Voice
Applied Music, Sec. Instr.*	MUHL 2303, Hist. of Music
MUHL 2302, Hist. of Music	Foreign Language**
MUTH 2303, Interned. Theory I	MUTH 2304, Interned. Theory II
MUTH 2103, Interned. Aural Skills I	MUTH 2104, Interned. Aural Skills II
Foreign Language**	Ensemble
Mathematics	Technology & Applied Science
Ensemble	TOTAL
TOTAL	TOTAL

THIRD YEAR†	
<i>Fall</i>	<i>Spring</i>
MUAP 3001, Prin. Instr. or Voice	MUAP 3002, Prin. Instr. or Voice
MUTH 3303, Form Ana. Synt.	MUTH 3308, 20th Cent. Tech.
MUCP 4207, Instrumentation	MUCP 4208, Orchestration
Oral Communication	Individual or Group Behavior
Humanities	PHYS 1406, Sound & Music
Natural Science	MUAP 3206, Conducting
Ensemble	Ensemble
TOTAL	TOTAL

FOURTH YEAR	
<i>Fall</i>	<i>Spring</i>
MUAP 4001, Prin. Instr. or Voice	MUAP 4002, Prin. Instr. or Voice
MUHL elective	MUHL elective
MUTH 4305, Modal Counterpoint	MUTH 4307, Tonal Cpt. and Fugue
MUTH 4302, Fund. of Comp.	MUTH 4303, Fund. of Comp.
POLS 1301, Amer. Govt., Org.	POLS 2302, Amer. Pub. Pol.
Ensemble	Ensemble
MUHL 4300, Special Topics	TOTAL
TOTAL	TOTAL

Total program hours—134

* Choice of secondary instrument(s) depends on the student's primary instrument and shall be determined in consultation with the student's advisor.

** The student must complete six hours of a language approved by the division at the sophomore level.

† Continuance in the major of music theory requires a formal review and approval of all freshman and sophomore work. The principal criteria are completion of all academic requirements through the sophomore year and a grade average in music theory courses of no less than a B.

Performance—Voice Curriculum

FIRST YEAR	
<i>Fall</i>	<i>Spring</i>
MUAP 1001, Voice	MUAP 1002, Voice
MUSI 1200, College Acad. Music	MUHL 2301, History of Music
MUAP 1303, Sing. Diction I	MUSI 1304, Sing. Diction II
MUTH 1303, Elem. Theory I	MUTH 1304, Elem. Theory II
MUTH 1103, Elem. Aural Skills I	MUTH 1104, Elem. Aural Skills II
ENGL 1301, Ess. Coll. Rhet.	ENGL 1302, Adv. Coll. Rhet.
MUEN 3102, Music Theatre	Ensemble
Ensemble	TOTAL
TOTAL	TOTAL

SECOND YEAR	
<i>Fall</i>	<i>Spring</i>
MUAP 2001, Voice	MUAP 2002, Voice
MUHL 2302, Hist. of Music	MUHL 2303, Hist. of Music
MUTH 2303, Interned. Theory I	MUTH 2304, Interned. Theory II
MUTH 2103, Interned. Aural Skills I	MUTH 2104, Interned. Aural Skills II
For. Lang. (German, French, Italian) 5	For. Lang. (German, French, Italian) 5
Oral Communications	Humanities
Ensemble	Ensemble
TOTAL	TOTAL

THIRD YEAR	
<i>Fall</i>	<i>Spring</i>
MUAP 3001, Voice	MUAP 3002, Voice
MUAP 3303, Vocal Literature	MUAP 3190, Jr. Recital
MUTH 3303, Form Ana. Synth.	For. Lang. (2nd yr. Germ., Fren., Ital.) 3
Natural Science	Mathematics
For. Lang. (2nd yr.)	PHYS 1406, Physics Sound & Music
Ensemble	Ensemble
TOTAL	Technology & Applied Science
	TOTAL

FOURTH YEAR	
<i>Fall</i>	<i>Spring</i>
MUAP 4001, Voice	MUAP 4002, Voice
HIST 2300, American History	MUAP 4190, Sr. Recital
POLS 1301, Amer. Govt., Org.	MUAP 3206, Conducting
Ensemble	POLS 2302, Amer. Public Pol.
MUAP 4305, Vocal Ped.	Ensemble
MUHL 4300, Special Topics	Individual or Group Behavior
TOTAL	HIST 2301, American History
	TOTAL

Total program hours—135

Performance—Wind Instrument or Percussion Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 1001, Major Instr.	3	MUAP 1002, Major Instr.	3
Applied Music (piano)	1	Applied Music (piano)	1
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
Mathematics	3	ENGL 1301, Ess. Coll. Rhet.	3
Ensemble*	1-2	Ensemble*	1-2
TOTAL	14-15	TOTAL	15-16
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 2001, Major Instr.	3	MUAP 2002, Major Instr.	3
Applied Music (piano)	1	Applied Music (piano)	1
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
ENGL 1302, Adv. Coll. Rhet.	3	Oral Communications	3
Ensemble	1-2	Ensemble	1-2
TOTAL	15-16	TOTAL	15-16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 3001, Major Instr.	3	MUAP 3002, Major Instr.	3
MUTH 3303, Form Ana. Synth.	3	MUAP 3190, Jr. Recital	1
HIST 2300, American History	3	MUAP 3206, Conducting	2
Humanities	3	MUCP 4207, Instrumentation	2
Ensemble	1-2	HIST 2301, American History	3
Technology & Applied Science	3	PHYS 1406, Phys. Sound & Music	4
TOTAL	16-17	Ensemble	1-2
		TOTAL	16-17
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 4001, Major Instr.	3	MUAP 4002, Major Instr.	3
MUTH 4305 or 4307, Counterpoint	3	MUAP 4190, Sr. Recital	1
Individual or Group Behavior	3	MUHL or MUTH elective	3
POLS 1301, Amer. Govt., Org.	3	POLS 2302, Amer. Pub. Pol.	3
Ensemble	1-2	Ensemble	1-2
MUHL 4300, Special Topics	3	Natural Science	4
TOTAL	16-17	TOTAL	15-16

Total program hours—124
 * Twelve registrations in ensemble required.

Performance—Stringed Instrument Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 1001, Major Instr.	3	MUAP 1002, Major Instr.	3
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhet.	3
MUEN 3104, Orch.*	1	MUEN 3104, Orch.	1
TOTAL	13	TOTAL	14
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 2001, Major Instr.	3	MUAP 2002, Major Instr.	3
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
Oral Communication	3	Humanities	3
MUEN 3104, Orch.	1	MUEN 3104, Orch.	1
Technology & Applied Science	3	MUAP 3206, Conducting	2
TOTAL	17	TOTAL	16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 3001, Major Instr.	4	MUAP 3002, Major Instr.	4
MUTH 3303, Form Ana. Synth.	3	MUAP 3190, Jr. Recital	1
HIST 2300, American History	3	MUHL or MUTH elective	3
Natural Science	4	PHYS 1406, Sound & Music	4
MUEN 3104, Orch.	1	HIST 2301, American History	3
MUEN 3106, Chamber Music	1	MUEN 3104, Orch.	1
TOTAL	16	MUEN 3106, Chamber Music	1
		TOTAL	17
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 4001, Major Instr.	4	MUAP 4002, Major Instr.	4
MUTH 4305, Modal Counterpoint or MUTH 4307, Count. & Fugue	3	MUAP 4190, Sr. Recital	1
POLS 1301, Amer. Govt., Org.	3	MUCP 4207, Instrumentation	2
Mathematics	3	Individual or Group Behavior	3
MUEN 3104, Orch.	1	POLS 2302, Amer. Pub. Pol.	3
MUEN 3106, Chamber Music	1	MUEN 3104, Orch.	1
MUHL 4300, Special Topics	3	MUEN 3106, Chamber Music	1
TOTAL	18	TOTAL	15

Total program hours—126
 * Guitar students participate in ensemble and chamber music for six semesters each.

Performance—Piano Curriculum

FIRST YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 1105, Keyboard Skills	1	MUAP 1106, Keyboard Skills	1
MUAP 1001, Piano	3	MUAP 1002, Piano	3
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
TOTAL	14	MUHL Elective	3
		TOTAL	18
SECOND YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 2105, Keyboard Skills	1	MUAP 2106, Keyboard Skills	1
MUAP 2001, Piano	4	MUAP 2002, Piano	4
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Intermed. Aural Skills II	1
Oral Communications	3	Humanities	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
TOTAL	16	TOTAL	16
THIRD YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 3001, Piano	4	MUAP 3002, Piano	3
Tech. & Applied Science	3	MUAP 3190, Jr. Recital	1
MUTH 3303, Form Ana. Synth.	3	MUAP 3206, Conducting	2
MUAP 4301, Keyboard Lit.	3	MUAP 4302, Keyboard Lit.	3
HIST 2300, American History	3	HIST 2301, American History	3
MUEN 3106-301, Accompanying	1	PHYS 1406, Sound & Music	4
TOTAL	17	MUEN 3106-301, Accompanying	1
		TOTAL	17
FOURTH YEAR			
<i>Fall</i>		<i>Spring</i>	
MUAP 4001, Piano	4	MUAP 4002, Piano	3
MUAP 4303, Piano Pedagogy	3	MUAP 4190, Sr. Recital	1
MUHL 4300, Special Topics	3	MUTH 4307, Tonal Cpt. & Fugue	3
POLS 1301, Amer. Govt., Org.	3	Individual or Group Behavior	3
MUEN 3106-301, Accompanying	1	POLS 2302, Amer. Pub. Pol.	3
Mathematics	3	MUEN 3106-301, Accompanying	1
TOTAL	17	Natural Science	4
		TOTAL	18

Total program hours—133
 * Program shown is for performance majors. Pedagogy or collaborative piano specialization students should consult the chairperson of keyboard studies.



Performance–Organ Curriculum

FIRST YEAR

<i>Fall</i>		<i>Spring</i>	
MUAP 1001, Organ	3	MUAP 1002, Organ	3
MUAP 1001, Piano*	1	MUAP 1002, Piano*	1
MUSI 1200, College Acad. Music	2	MUHL 2301, History of Music	3
MUTH 1303, Elem. Theory I	3	MUTH 1304, Elem. Theory II	3
MUTH 1103, Elem. Aural Skills I	1	MUTH 1104, Elem. Aural Skills II	1
ENGL 1301, Ess. Coll. Rhetoric	3	ENGL 1302, Adv. Coll. Rhetoric	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
TOTAL	14	TOTAL	15

SECOND YEAR

<i>Fall</i>		<i>Spring</i>	
MUAP 2001, Organ	4	MUAP 2002, Organ	4
MUHL 2302, Hist. of Music	3	MUHL 2303, Hist. of Music	3
MUTH 2303, Intermed. Theory I	3	MUTH 2304, Intermed. Theory II	3
MUTH 2103, Intermed. Aural Skills I	1	MUTH 2104, Inter. Aural Skills II	1
Oral Communications	3	Humanities	3
MUEN 3106-301, Accompanying	1	MUEN 3106-301, Accompanying	1
Music Elective	3	TOTAL	15
TOTAL	18		

THIRD YEAR

<i>Fall</i>		<i>Spring</i>	
MUAP 3001, Organ	4	MUAP 3002, Organ	3
MUAP 3203, Church Serv. Playing	2	MUAP 3190, Jr. Recital	1
MUAP 3206, Conducting	2	MUAP 3207 or 3208, Chor. or Inst.	2
MUTH 3303, Form Ana. Synth.	3	HIST 2301, American History	3
HIST 2300, American History	3	Mathematics	3
MUEN 3106-301, Accompanying	1	PHYS 1406, Phys.Sound & Music	4
Technology & Applied Science	3	MUEN 3106-301, Accompanying	1
TOTAL	18	TOTAL	17

FOURTH YEAR

<i>Fall</i>		<i>Spring</i>	
MUAP 4001, Organ	4	MUAP 4002, Organ	3
MUTH 4305 or 4307, Counterpoint	3	MUAP 4190, Sr. Recital	1
POLS 1301, Amer. Govt., Org.	3	MUAP 4201, Organ Pedagogy	2
MUHL 4300, Special Topics	3	MUHL or MUTH elective	3
MUEN 3106-301, Accompanying	1	Individual or Group Behavior	3
Natural Science	4	POLS 2302, Amer. Pub. Pol.	3
TOTAL	18	MUEN 3106-301, Accompanying	1
		TOTAL	16

Total program hours—131

* Optional for students with extensive piano background.

Graduate Program / Music

The Master of Music degree consists of 30 hours of graduate work including recitals for the performance major or thesis for the music history and literature or music theory major. The Master of Music Education degree may be attained with a 30-hour program including a thesis or a 36-hour program without a thesis. For the performance or the accompanying-chamber music major, two public performances are required. Both performances must be judged satisfactory by the student's applied music faculty committee. The conducting student may present either two performances or one with a paper in support of the performance. A student whose recital is judged unsatisfactory will be permitted to present another recital program no earlier than four months from the date of the previous recital. The Master of Music degree in performance with a string pedagogy or a keyboard pedagogy specialization may be attained with a 36-hour program without thesis or recitals.

The music history specialization in the doctoral program requires one foreign language. Other specializations may or may not have this requirement, depending on the dissertation area. Except for the music history major (one foreign language), no foreign language requirement exists for the Master of Music degrees or for the Master of Music Education degree; however, vocal performance majors must demonstrate singing proficiency in French, German, and Italian.

Some applicants for admission to graduate programs in music are required to submit scores for the General Test of the Graduate Record Examination. Students applying for the Master of Music in performance or the Doctor of Musical Arts degree programs **do not** need to submit these scores. Students beginning a master's degree program take placement tests in music history and music theory, as well as in applied music if the major is performance or in music education if the major is music education. Texas Tech graduates with a bachelor's degree in music or music education are required to take the placement examinations. All students beginning doctoral study must complete preliminary examinations. All placement and preliminary examinations are administered by the School of Music during the registration period of each semester. Deficiencies, if any, may be removed by appropriate leveling work. The prospective graduate student should also consult the Graduate Studies section of this catalog for admissions requirements.

The Doctor of Musical Arts degree is a 45-hour program oriented toward professional practice in music emphasizing the creation or performance of musical works and the application and transmission of knowledge about musical works. Specializations are in performance, conducting, composition, and piano pedagogy. A nondissertation program, the degree culminates in four doctoral performance projects which are designed to suit the professional interests and aspirations of the student. Of singular importance is the inclusion of 9 credit hours of fine arts courses drawn from visual arts, theatre, and aesthetics. Additional information may be obtained from the School of Music.

The music major in the Ph.D. degree in Fine Arts consists of a minimum of 60 semester hours, which includes fine arts requirements and electives, an individualized music curriculum, and a dissertation. Specializations are in composition, music history, theory, conducting, music education, administration, performance, and pedagogy. This program is explained in the introductory catalog section to the College of Visual and Performing Arts.



(Music) Student Teaching All-Level (MUAL)*(To interpret course descriptions, see pg. 10.)*

4000. **Student Teaching in Music All-Level (V1-12).** Prerequisite: Attainment of admission standards for student teaching. Supervised teaching involving a period of major responsibility for instruction and learning in an accredited school.

Applied Music (MUAP)*(To interpret course descriptions, see pg. 10.)*

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

- 1103,1104. **Percussion (1:0:2 each)** [MUSI 1116, 1117, 1188, 2188]. Fundamentals of playing and teaching percussion instruments. Laboratory ensemble experience.
- 1105,1106,2105,2106. **Keyboard Skills (1:0:2 each).** Sight reading and ensemble skills. Required of all piano majors for two semesters. Enrollment limited to piano majors, or by instructor consent.
- 1113,1114. **Voice (1:0:2 each)** [MUSI 1183, 1184]. Correct posture and studies for breath control; development of resonance; study of vowel formation; vocalization. Simple songs. Laboratory ensemble experience.
- 1123,1124. **Group Keyboard Instruction I and II (1:0:2 each)** [MUSI 1114, 1115, 1181, 1182, 2114, 2115, 2181, 2182]. Beginning instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.
1303. **Singers' Diction I (3).** Singers' diction in Latin, Italian, and English utilizing the International Phonetic Alphabet. Prerequisite for MUAP 1304.
1304. **Singers' Diction II (3).** Prerequisite: MUAP 1303. Singers' diction in French and German utilizing the International Phonetic Alphabet.
- 2103,2104. **Strings (1:0:2 each)** [MUSI 1189, 2189]. Fundamentals of playing and teaching string instruments. Laboratory ensemble experience.
- 2123,2124. **Group Keyboard Instruction III and IV (1:0:2 each).** Intermediate instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.
- 2133,2134. **Class Guitar (1:0:2 each)** [MUSI 1192, 1193]. Beginning and intermediate instruction in guitar; basic left and right hand approaches of classical technique; basic chords and accompaniment styles.
3101. **Dimensions of Performance (1:1:1).** Prerequisite: Consent of instructor. 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.
- 3103,3104. **Brass Instruments (1:0:2 each).** Fundamentals of playing and teaching brass instruments. Laboratory ensemble experience.
3105. **Technology for the Applied Music Teacher (1:0:2).** Prerequisite: MUSI 3341 or consent of instructor. Implementation of music technologies in applied teaching studios. Topics covered include MIDI-based materials and equipment, instructional software, and audio/visual recording.
3190. **Junior Recital (1).** Prerequisite: MUAP 3001 on the same instrument or voice; Corequisite: Concurrent enrollment in MUAP 3002. Credit no credit grading.
3205. **Jazz Improvisation (2).** Prerequisite: Consent of instructor. Study and application of techniques of improvisation in jazz performance. May be repeated for credit.
3206. **Conducting (2:2:0).** Basic conducting techniques.
3207. **Choral Conducting (2).** Prerequisite: MUAP 3206. Specific techniques of choral conducting and choral rehearsal.
3208. **Instrumental Conducting (2).** Prerequisite: MUAP 3206. Advanced baton techniques, score reading, and interpretation.
3303. **Vocal Literature (3).** Prerequisite: MUHL 2301, 2302. Historical and comparative analytical survey of the standard vocal literature of the 19th and 20th centuries.
- 4103,4104. **Woodwinds (1:0:2 each).** Fundamentals of playing and teaching woodwinds. Laboratory ensemble experience.
4190. **Senior Recital (1).** Prerequisite: MUAP 4001 on the same instrument or voice; Corequisite: Concurrent enrollment in MUAP 4002. Credit no credit grading.
- 4301, 4302. **Keyboard Literature I and II (3 each).** A survey of keyboard literature from earliest times to the present. Class performance and listening.
- 4303, 4304. **Piano Pedagogy (3 each).** Teaching procedures for prospective piano teachers, including rudiments, techniques, and materials.
4305. **Vocal Pedagogy (3).** Pedagogical attitudes in identifying and solving vocal problems based on a thorough knowledge of functional anatomy with an emphasis on the following: anatomy of breathing, phonation, articulation, as well as repertoire selection, memorization skills, coaching, program development, and performance skills.
4307. **Choral Conducting (3).** Prerequisite: MUAP 3207. Study and performances of representative choral works of all periods. Participation in a major choral organization required. An individual study course.
4308. **Instrumental Conducting (3).** Prerequisite: MUAP 3208. Study and performance of instrumental works of all periods. Participation in a major instrumental ensemble required. An individual study course.
- Applied Music 1001, 1002, 2001, 2002, 3001, 3002. Instrument or Voice (1 each).**
- Applied Music 1001, 1002, 2001, 2002, 3001, 3002, 4001, 4002. (2 to 4 each).**

Graduate Courses

5001. **Applied Music (V1-4).**
5101. **Dimensions of Performance (1:1:1).** Prerequisite: Consent of instructor. An interactive course open to all performers. Expressive movement, group dynamics, and free improvisation are used to maximize the spontaneity, confidence, and creativity of performers. May be repeated for credit.
5105. **Technology for the Applied Music Teacher (1:0:2).** Prerequisite: MUSI 3341, 5341, or consent of instructor. Implementation of music technologies in applied teaching studios. Topics covered include MIDI-based materials and equipment, instructional software, and audio/visual recording.
5205. **Jazz Improvisation (2).** Prerequisite: Consent of instructor. Study and application of techniques of improvisation in jazz performance. May be repeated for credit.
5302. **Applied Music Literature (3).** Prerequisite: The undergraduate music literature courses required on the B.M. or B.M.E. degree. Advanced study of literature for the various applied music areas. Individual research projects and class performance.
5303. **Pedagogy of Applied Music (3).** Advanced study in the pedagogy of applied instrumental or vocal masterworks from easy-moderate to difficult. Emphasis in the pedagogy of interpretation, technique, and memorization.
5304. **Techniques of String Education (3).** Study of the latest trends in individual and group string instruction. Laboratory observation and analysis.
5305. **String Methods and Etude Materials (3).** Advanced studies in the materials, methods, procedures, philosophies, and/or techniques of string pedagogy. Final demonstration project, research paper, and/or recital required.
- 5306, 5307. **Conducting Techniques and Analysis (3 each).** Structural analysis and study of conducting problems. Individual instruction course. Participation in a major ensemble required. May be repeated with consent of instructor.
5313. **Materials and Methods of Keyboard Instruction (3).** Investigation of elementary and intermediate levels of piano methods, repertoire, and pedagogical procedures.
5314. **Problems in Keyboard Pedagogy (3).** Advanced studies in the materials, methods, procedures, philosophies, and/or techniques of keyboard pedagogy. Final demonstration project, research paper, and/or recital required.
5315. **Techniques of Group Piano Instruction (3).** Materials, methods, and procedures for teaching class piano, with particular attention to managing electronic keyboard laboratories.
5323. **Diction for Singers (3:3:0).** A comprehensive study of the basic rules of German, French, and Italian lyric diction using the International Phonetic Alphabet to analyze and transcribe vocal repertoire.
6000. **Thesis Recital (V1-6).**

Music Composition (MUCP)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

- 1201, 1202. **Introduction to Contemporary Music (2 each)** [MUSI 1286, 1287]. *Open to both majors and nonmajors.* A survey of current trends, with activities emphasizing creative musicianship and new technology in composition. May be an individual study course. (For songwriting, see MUTH 1300.)
- 2301, 2302. **Music Composition (3 each)** [MUSI 2386]. *For composition majors.* Prerequisite: MUCP 1202 or the equivalent. Work in traditional forms and media and also electronic media, together with the principles of notation, layout, reproduction, and copyright. May be an individual study course.
3001. **Projects in Electronic and Experimental Music (V2-4).** *Open to both majors and nonmajors.* Prerequisite: MUCP 1202, or the equivalent, and instructor approval. Independent study and creative projects utilizing the resources of the Experimental Music Studio. May be repeated for credit.
- 3301, 3302. **Music Composition (3 each).** *For composition majors.* Prerequisite: MUCP 2302 and formal approval to continue in the Bachelor of Music program in Music Composition. Continued work in both traditional and electronic media. May be an individual study course.
4207. **Instrumentation (2:2:0).** Prerequisite: MUTH 2404 or equivalent, or by permission of the division of theory and composition. A study of the properties of woodwind, brass, percussion, and string instruments, their transpositions, and their sectional treatment, leading to full scorings for both band and orchestra.
4208. **Orchestration (2).** Prerequisite: MUCP 4207. More advanced work in scoring for both band and orchestra.
- 4401, 4402. **Music Composition (4 each).** *For composition majors.* Prerequisite: MUCP 3302 or the equivalent. Advanced work on a larger scale, culminating in a senior recital as noted in the curriculum. May be an individual study course.

Graduate Courses

5307. **Contemporary Techniques (3).** A study of current musical practices and the materials of new music, emphasizing the work of living composers. May be an individual study course.
- 5308, 5309. **Composition (3 each).** Prerequisite: MUCP 4402, MUTH 4303, or equivalent. Advanced writing for chamber ensembles, orchestra, band, chorus, or electronic media. May be individual study courses. May be repeated for credit.
5312. **Advanced Orchestration (3).** Scoring for large instrumental, choral, and dramatic ensembles. May be an individual study course.

Music Education (MUED)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3311. **Curriculum and Instruction in Education and Music (3:3:0).** Prerequisite: Junior standing and acceptance to the Teacher Education Program. Foundations, patterns, and issues in curriculum development. Preparation of resource-teaching units. Transfer and application to the discipline of music. Field experiences required.
3312. **Methods in Education and Music (3:3:0).** Prerequisite: Junior standing and acceptance to the teacher education program. Foundations of teaching, methods and techniques, evaluation, and classroom management. Transfer and application to the discipline of music. Field experiences required.

Graduate Courses

- 5211, 5212, 5213. **Teaching Applied Music in the Public Schools I, II, III (2 each).** Techniques, materials, and procedures for class and individual instruction of applied areas in the public schools. I. Woodwinds; II. Brass; III. Percussion.
5326. **Instrumental Music Workshop (3:3:0).** Prerequisite: Departmental approval. Emphasis upon the organization and development of instrumental groups in the public schools, and upon development of performance excellence by these groups. May be repeated in a new section.
5332. **Learning and Music (3:3:0).** A study of aesthetic, sociological, and psychological foundations of music education applied to teaching. An emphasis is given to historical development and present day applications.
5333. **Tests, Measurements, and Evaluations in Music (3:3:0).** A study of general descriptive statistical measures as applied to music testing. Emphasis is placed upon existing music aptitude and achievement tests used in the discipline.
5337. **Workshop of Contemporary Trends in Elementary Music Education (3:3:0).** For graduates in elementary education and for specialists in music at the elementary level. Music activities for elementary school students stressing techniques and materials of current pedagogical approaches. Topics will vary. May be repeated for credit.
5340. **Introduction to Graduate Studies in Music Education (3:3:0).** A study of historical perspectives, basic concepts, and present research practices in music education.
5344. **Special Problems in Music Education (3).** Prerequisite: Consent of advisor. Investigation and execution of special problems in the field of music education. May be repeated with a new problem.
6000. **Master's Thesis (V1-6).**

Music Ensemble (MUEN)

(To interpret course descriptions, see pg. 10)

Undergraduate Courses

1103. **Marching Band (1:0:5).**
2100. **New Music Ensemble (1:0:3).**
3101. **Choir (1:0:3).**
3102. **Music Theatre (1:0:3).**
3103. **Band (1:0:3).**
3104. **Orchestra (1:0:5).**
3105. **Jazz Ensemble (1:0:3).**
3106. **Small Ensemble (1:0:1).**
3110. **Medium Ensemble (1:0:2).**
3201. **University Choir (2:0:5).**
3202. **Music Theatre (2:0:5).**
3203. **Band (2:0:5).**
3204. **Orchestra (2:0:5).**

Graduate Courses

5101. **Choir (1:0:5).**
5102. **Music Theatre (1:0:5).**
5103. **Band (1:0:5).**
5104. **Orchestra (1:0:5).**
5105. **Jazz Ensemble (1:0:5).**
5106. **Small Ensemble (1:0:1).**
5107. **New Music Ensemble (1:0:5).** The rehearsal and performance of twentieth-century music, with an emphasis upon the works of living composers. Audition required.
5110. **Medium Ensemble (1:0:2).**

Music History and Literature (MUHL)

(To interpret course descriptions, see pg. 10)

Undergraduate Courses

1308. **Music Appreciation (3:3:0)** [MUSI 1306, 1307]. *Beginning course for nonmajors.* Encourages appreciation of music through consideration of a variety of musical styles.
2301. **History of Music (3:3:0).** Prerequisite: MUSI 1200. Survey of music history, culture and style from antiquity to 1650. Part I of MUHL 2301, 2302, 2303 sequence.
2302. **History of Music (3:3:0).** Prerequisite: MUSI 1200, MUHL 2301. Survey of music history, culture and style from 1650-1800. Part II of MUHL 2301, 2302, 2303 sequence. (Writing Intensive)
2303. **History of Music (3:3:0).** Prerequisite: MUSI 1200, MUHL 2301, and 2302. Survey of music history, culture and style from 1880-present. Part III of MUHL 2301, 2302, 2303 sequence. (Writing Intensive)
- 2308, 2309. **Heritage of Music (3:3:0 each)** [MUSI 1308, 1309]. *For nonmusic majors.* Studies selected compositions through an interpretation of their historical, functional, and cultural significance.
3304. **History of Jazz (3:3:0).** Historical and analytical survey of jazz from its beginning through "Rock" its form, style, literature, and influence on 20th century music. *This course may count toward the upper level music literature or theory elective requirements for performance majors.*
3308. **Masterpieces in Music (3:3:0).** For nonmusic majors. Studies representative musical works from the Baroque Period to the present in relation to their historical and general cultural context.

3310. **History of Rock and Roll (3:3:0).** This course focuses on hearing, understanding, and contextualizing Anglo-American rock and roll, a popular idiom rooted in the music of African Americans and rural whites.
4300. **Special Topics in Music History and Literature (3:3:0).** Prerequisite: MUHL 2301, 2302, and 2303. Topics may cover any historical period of music, music literature, or composers. May be repeated under a different topic.
4321. **Constructs in Ethnomusicology (3:3:0).** Detailed examination of topics in ethnomusicology (the study of musical behavior in its original contexts) and its history, philosophies, methods and areas of study.

Graduate Courses

5311. **Symphonic Literature (3:3:0).** Studies in the development of orchestral music from the Classic Period to the present.
5312. **Chamber Music Literature (3:3:0).** Studies in the development of chamber music from the Classic Period to the present.
5313. **Great Composer Seminar (3:3:0).** Critical examination of the works of a single composer, e.g., Bach, Haydn, Mozart, Beethoven, Wagner, Verdi, Brahms, or Stravinsky. A different composer will be studied each time the course is offered. May be repeated for credit.
5321. **Constructs in Ethnomusicology (3:3:0).** Detailed examination of topics in ethnomusicology (the study of musical behavior in its original contexts) and its history, philosophies, methods and areas of study.
5330. **Music in the United States (3:3:0).** A study of twentieth-century American music together with its historical and cultural background.
- 5331, 5332, 5333, 5334, 5335, 5336, 5337. **Seminar in the History and Literature of Music; Medieval (5331), Renaissance (5332), Baroque (5333), Classic Period (5334), Romantic Period (5335), Twentieth Century (5336), World Music (5337) (3:3:0 each).** May be repeated with consent of instructor.
6000. **Master's Thesis (V1-6).**

Music Technology (MUMT)

(To interpret course descriptions, see pg. 10)

1261. **Foundations of Music Technology (2:2:0).** Prerequisite: For majors only or consent of instructor. A survey of the history, current trends, and innovations in music technology. May be an individual study course.
2361. **Sound Synthesis and Sampling (3:3:0).** Prerequisite: MUMT 1261, MUCP 1201, or equivalent. Basic theory and practical techniques of analog and digital sound synthesis and sampling. Open to both majors and nonmajors.
3342. **Advanced Synthesis and MIDI I (3:3:0).** Prerequisite: MUMT 2361; majors only or consent of instructor. Overview of the Musical Instrument Digital Interface (MIDI) protocol, along with associated hardware and software. Emphasis will be on basic MIDI communication, systems, and theory.

3343. **Advanced Synthesis and MIDI II (3:3:0).** Prerequisite: MUMT 3342; majors only or consent of instructor. Development of intermediate and advanced projects using MIDI systems. Emphasis on inter-application and inter-device control.
3351. **Authoring Systems for Music (3:3:0).** Prerequisite: C S 1303 or equivalent; majors only or consent of instructor. Overview of computer music synthesis languages, authoring systems, and programming environments, including work with Max, Csound, HMSL, and others.
3361. **Digital Audio I (3:3:0).** Prerequisite: MUMT 1261, MUCP 1201; majors only or consent of instructor. A practical introduction to the foundational theories and techniques of digital signal processing as related to musical composition, performance, and production.
3362. **Digital Audio II (3:3:0).** Prerequisite: MUMT 3361; majors only or consent of instructor. Provides an exploration of advanced concepts in digital audio applied to the field of music technology, including work in the areas of music education, performance, production, and research.
4362. **Special Topics in Music Technology (Senior Project) (3).** Prerequisite: Completion of all other MUMT course work; majors only or consent of instructor. The culminating course for music technology, consisting of a senior project developed in consultation with the instructor. May be repeated once for credit.

(Music) Student Teaching Secondary (MUSE)

(To interpret course descriptions, see pg. 10.)

4000. **Student Teaching in Music Secondary (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.

Music (MUSI)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1101. **Introduction to Music Teaching (1:1:2).** Overview of music teaching careers. Includes field-based observations and guest lecturers from the music professions. Open to all music majors.
1200. **College Academic Music Skills (2:2:0).** Music research, reading, writing, and study skills required for academic success.
2000. **Independent Studies in Music (V1-3).** Individual study at the freshman and sophomore levels, providing greater depth than required by the established curricula. Enrollment and credit hours subject to the approval of divisional coordinators.
2301. **Essential Elements of Music (3:3:0) [MUSI 1304].** Basic elements of music with appropriate techniques and principles of singing, playing, and moving to and listening to music. *Not for music majors.*

3202. **Music for the Adolescent (2).** Content, organization, and administration of large and small instrumental and choral ensembles, programs of individual applied music, and appreciation of music for the adolescent.
- 3216, 3217. **Choral Techniques (2 each).** Materials, repertoire, and procedures for preparing choral performances.
- 3218, 3219. **String and Orchestral Techniques (2 each).** Materials, repertoire, and procedures for preparing orchestral and string ensemble performances.
- 3221, 3222. **General Music Techniques (2 each).** Materials, repertoire, and activities appropriate for general music classes with particular emphasis on music literature for children. Must be taken sequentially.
- 3225, 3226. **Band Techniques (2 each).** Prerequisite: 2 yrs. college marching experience. Materials, repertoire, and procedures for preparing band performances. Must be taken sequentially.
- 3237, 3238. **Music for Children (2 each).** 3237 prerequisite to 3238. A study of musical activities, materials, and creative ideas. Emphasis on developing the child's voice, movement, playing of simple melodic and harmonic instruments, and listening skills. *For majors and specialists only.*
3336. **Music for Young Children (3:3:0).** Simultaneous study of music and the development of the young child. Basic singing, listening, and age-appropriate activities and repertoire are emphasized.
3341. **Introduction to Technology for Musicians (3:3:0).** Prerequisite: Music reading skills and basic keyboard skills. Introduces technological resources for all aspects of the musical experience. Topics covered include computer-assisted instruction, computer-generated notation, MIDI sequencing, digital sampling, and nonmusic topics such as Web site development.
4301. **Individual Studies in Music (3).**

Graduate Courses

5100. **Teaching Music in College (1).**
5310. **Historical and Critical Perspectives in Music (3:3:0).** Historical and critical overview of the field including introduction to major theories and methodologies, study of particular artists, works or movements that provide insight into specific creative techniques, basic media and techniques of the field; and interdisciplinary relationships with the other arts. Not for music majors.
5314. **Music in Contemporary Context (3:3:0).** Contemporary issues in the field including current artistic trends, theory and criticism, organization (e.g., funding, administration), and cultural policy (e.g., education, assessment, multi-cultural issues, censorship).
5341. **Introduction to Technology for Musicians (3:3:0).** Technological resources for all aspects of the musical experience, primarily from the standpoint of the Macintosh operating system. Topics covered include computer-assisted instruction, music printing, MIDI sequencing, digital sampling, HyperCard software development, and nonmusic topics such as word processing, graphics, multimedia, and electronic communication.

5342. **Advanced Technology for Musicians (3)**. Prerequisite: MUSI 3341 or 5341 or consent of instructor. Intensive and extensive student-centered study topics to be selected from programming and software development in music, MIDI sequencing, multimedia development, advanced music notation, and digital sampling and synthesis.
7000. **Research (V1-12)**.
7301. **Music Bibliography and Research (3)**. Required of all doctoral students.
8000. **Doctor's Dissertation (V1-12)**.
- 8301, 8302, 8303, 8304. **Doctoral Performance Projects I-IV (3 each)**. Individual directed projects in music performance or composition.

Music Theory (MUTH)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1101. **Developmental Aural Skills (1)**. Corequisite: MUTH 1301. For music majors or with consent of instructor. Developmental diction, sight singing, and keyboard skills.
1103. **Elementary Aural Skills I (1:0:2) [MUSI 1216, 1316]**. Corequisite: MUTH 1303. For music majors or with consent of instructor. Dictation, sight-singing, and keyboard skills.
1104. **Elementary Aural Skills II (1:0:2) [MUSI 1217, 1317]**. Prerequisite: Completion of MUTH 1303 and 1103 with a grade of C or better, or equivalent. Corequisite: MUTH 1304. Dictation, sight-singing, and keyboard skills.
1300. **Songwriting (3:3:0) [MUSI 1303]**. 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.
1301. **Introduction to Music Theory (3:3:0) [MUSI 1301]**. Corequisite: MUTH 1101. An introduction to the elements of melody, rhythm, harmony, and sight-singing.
1303. **Elementary Music Theory I (3:3:0) [MUSI 1311]**. Corequisite: MUTH 1103. For music majors or with consent of instructor. Melody, rhythm, and diatonic harmony.
1304. **Elementary Music Theory II (3:3:0) [MUSI 1312]**. Prerequisite: Completion of MUTH 1303 and 1103 with a grade of C or better, or equivalent. Corequisite: MUTH 1104. Melody, rhythm, and diatonic harmony.
2103. **Intermediate Aural Skills I (1:0:2) [MUSI 2116, 2216]**. Prerequisite: Completion of MUTH 1304 and 1104 with a grade of C or better, or equivalent. Corequisite: MUTH 2303. Dictation, sight-singing, and keyboard skills.
2104. **Intermediate Aural Skills II (1:0:2) [MUSI 2117, 2217]**. Prerequisite: Completion of MUTH 2303 and 2103 with a grade of C or better, or equivalent. Corequisite: MUTH 2304. Dictation, sight-singing, and keyboard skills.
2303. **Intermediate Music Theory I (3:3:0) [MUSI 2311]**. Prerequisite: MUTH 1304 and 1104 with a grade of C or better, or equivalent. Corequisite: MUTH 2103. Diatonic and chromatic harmony.
2304. **Intermediate Music Theory II (3:3:0) [MUSI 2312]**. Prerequisite: Completion of MUTH 2303 and 2103 with a grade of C or better, or equivalent. Corequisite: MUTH 2104. Diatonic and chromatic harmony; survey of twentieth-century techniques.
3303. **Form, Analysis, and Synthesis (3:3:0)**. Prerequisite: Completion of MUTH 2304 and 2104 with a grade of C or better or equivalent. The analysis and synthesis of Classical, Romantic, Impressionist, and Contemporary styles, including harmonic and nonharmonic practices and the principles of both small and large part-forms. May be an individual study course.
3308. **Twentieth Century Techniques (3)**. Prerequisite: MUTH 3303 or the equivalent. The study of contemporary techniques, modes, synthetic scales, serialism, and vertical structures with syntheses and a term project.
- 4302, 4303. **Fundamentals of Composition (3 each)**. Prerequisite: MUTH 3303. Original writing in small forms for voice, solo instruments, and small ensembles; the development of individual style. An individual study course.
4305. **Modal Counterpoint (3)**. Prerequisite: MUTH 2304 and 2104 with a grade of C or better or equivalent. A study of 16th century vocal counterpoint, beginning with the principles of melodic writing and concentrating upon the analysis and synthesis of polyphonic textures, as found in the motet and the mass.
4307. **Tonal Counterpoint and Fugue (3)**. Prerequisite: MUTH 2304 and 2104 with a grade of C or better or equivalent. The analysis and synthesis of 18th century counterpoint in two to four voices, concentrating upon the instrumental style and techniques of the invention and the fugue.

Graduate Courses

5300. **Studies in Harmony and Voice Leading (3)**. Common-practice harmony, counterpoint, and figured bass. Prerequisite to enrollment in graduate music theory unless waived by placement or preliminary examination or by consent of the Division of Theory-Composition. Not intended to fulfill major or minor graduate degree requirements.
- 5303, 5304. **Styles (3:3:0 each)**. A study of the development of harmonic, melodic, rhythmic, modal, and tonal practices from Gregorian Chant to the present.
5306. **Pedagogy of Theory (3)**. A survey of the materials, organization, techniques, and problems of college freshman and sophomore theory courses.
5310. **Modal Counterpoint (3)**. A study of sixteenth-century vocal counterpoint, beginning with the principles of melodic writing and concentrating on the analysis and synthesis of polyphonic textures, as found in the motet and the Mass.
5311. **Tonal Counterpoint and Fugue (3)**. The analysis and synthesis of eighteenth-century counterpoint in two to four voices, concentrating upon the instrumental style and techniques of the invention and the fugue.
5313. **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 or preliminary examination or by consent of the Division of Theory - Composition. Does not fulfill graduate degree requirements.
5315. **Analytical Techniques (3:3:0)**. Topics will alternate between tonal music (Schenkerian analysis) and post-tonal music. May be repeated once for credit as the topic varies.
5320. **Special Topics in Music Theory (3)**. Topics include history of music theory, advanced analysis projects, and other topics as needed. Some topics offered on-line. May be repeated for credit on different topic.
6000. **Master's Thesis (V1-6)**.

Department of Theatre and Dance

Faculty

Frederick B. Christoffel, Chairperson

Professors: Bert and Whitmore; *Associate Professors:* Christoffel and Marks; *Assistant Professors:* Bilkey, Donahue, Gelber, and Merz.

About the Program

This department supervises the following degree programs:

- Bachelor of Arts in Dance
- Bachelor of Arts in Theatre Arts
- Bachelor of Fine Arts in Theatre Arts
- Master of Arts in Theatre Arts
- Master of Fine Arts in Theatre Arts
- Doctor of Philosophy in Fine Arts with a major in Theatre

Undergraduate Program

The department sponsors a major season of plays in the University Theatre, a season of student-directed plays in the Laboratory Theatre, a summer repertory season of plays, and various workshops. In addition, it sponsors chapters of Alpha Psi Omega (national theatre honorary), Chi Tau Epsilon (national dance honorary), and the United States Institute of Theatre Technology. It is an institutional member of the Texas Educational Theatre Association, the Texas Nonprofit Theatre Inc., the Southwest Theatre Association, the Association for Theatre in Higher Education, the United States Institute of Theatre Technology, and the American College Dance Festival Association.

Grades below C in required courses of theatre and dance majors and minors are not acceptable in fulfillment of degree requirements. Transfer students must complete the following minimum numbers of credit hours of major or minor courses in residence at Texas Tech: B.A. theatre majors—9 hours; B.F.A. theatre majors—30 hours; B.A. dance majors—27 hours; theatre or dance minors—6 hours.

Bachelor of Arts

Theatre Arts Major

Students seeking the B.A. degree with a major in theatre arts must complete the following requirements in addition to those required by the university and the College of Visual and Performing Arts: TH A 1101, 1102, 1103, 1301, 1303, 2302, 3105, 3303, 3304, 3305, 3308, 3309, 3335, 4302, two hours of dance, and 3 hours of electives for a total of 39 to 42 hours.

Theatre Arts Minor

For a minor in theatre arts, the following courses for a total of 18 hours (of which a minimum of 6 hours must be taken in residence) are required: TH A 1303, 2302, 3335; 3 hours from the following list with no course counted more than once: TH A 1101, 1102,

1103, 1104, 3105, and 1 hour from any dance course; one of the following courses: TH A 3308 and 3309; as well as one of the following courses: TH A 3303, 3304, and 3305.

Dance Major

Students seeking the B.A. degree with a major in dance are required to complete 36-42 hours of study. The B.A. in dance is undergoing revisions. Students entering Texas Tech in fall 2004 or later should consult the undergraduate advisor in the department for program specifics.

Dance Minor

Students seeking a minor in dance will complete the following courses: DAN 1107, 1204 (2 semesters), 1304 (2 semesters), 2102, 3104 (2 semesters), 4201, and 4207.

Bachelor of Fine Arts

Students seeking preprofessional training leading to a B.F.A. degree in theatre arts specialize either in acting or in design technology. Entrance to the B.F.A. program is by audition and interview. Students usually audition for the program at the end of their third long semester and are admitted at the discretion of the faculty. Continuance in the program is dependent upon annual review and the faculty's assessment of the student's timely progress. Students whose progress is found unsatisfactory will be placed on programmatic probation.

Students on programmatic probation who fail to improve will be removed from the program. The minimum number of hours required for B.F.A. theatre majors is a total of 126-133, at least 40 of which must be at the

junior and senior levels. Note that some of the following courses must be completed before entering the B.F.A. program; students should consult advisors for details.

Core Requirements

TH A 1101, 1102, 1103, 1104, 1303, 2101, 2302, 3104, 3105, 3303, 3304, 3305, 3308, 3309, 3335, 4208, 4302, 4303.

Acting and Directing Specialization Courses

TH A 1301, 1302, 2312, 3105 (two times additional to core), 3106, 3302, 3306, 3307, 3322, 3332, 4000 (twice). In addition, students must complete 17 hours from the following: TH A 2305, 2306, DAN 1102, 1103*, 1107*, 1204*, 1304*, 2100, 2102, 3104, 3201, 3313, 4102, 4207, MUAP (voice) 1001, 1002, 1113, 1114, 2001, 2002, 3001, 3002.

Design and Technology Specialization Courses

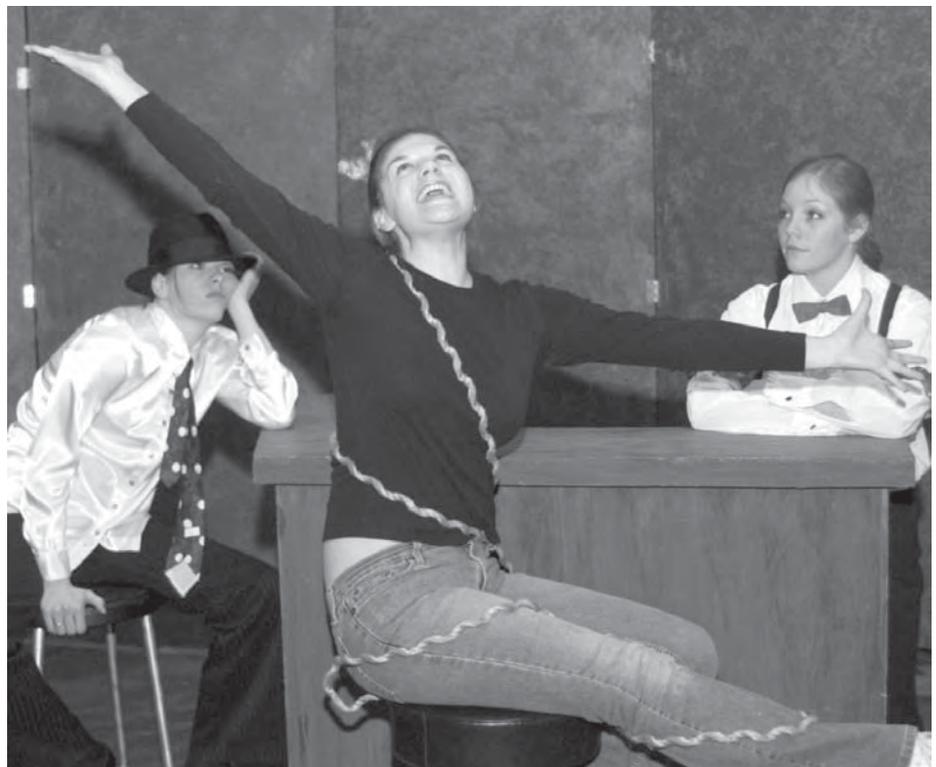
TH A 2306, 3306, 3307, 4108 (twice), 4000 (twice), 4309 (twice), 4310 and 4311; ART 1302, 1303, 2304, and 3323 or 2303. Also 9 hours must be selected from TH A 3100, 3101, 3102, 3103, 4309, 4310, and 4311**.

* Strongly recommended.

** Students with an emphasis in scenery, lighting, or costume design must take 6 of the additional 9 hours in their area of specialization.

Teacher Education

Students desiring secondary certification in theatre arts must complete the following: TH A 1301, 1303, 2302, 3303, 3304, 3305, 3308, 3309, 4302, and one 3-hour elective. Students desiring secondary certification in dance must complete the following: DAN 1102 or 2102, 1103, 1107, 1204, 1304, 3104, 3207, 3209, 3313, 4200, 4201, 4207, and MUTH 1300 or 3336.



Graduate Program / Theatre and Dance

Master of Arts

The Master of Arts degree in theatre arts requires a minimum of 30 semester hours beyond the baccalaureate. Completion of the M.A. degree requires a thesis and a final exam.

Master of Fine Arts

The Master of Fine Arts degree is a terminal professional degree that provides for intensive specialization in acting and directing, design, playwriting, or arts administration. A minimum of 60 hours is required beyond the baccalaureate. Completion of the M.F.A. degree requires a thesis or a thesis project. In the case of acting-directing and design candidates, the thesis is based on a performance or production project accomplished during their program. In the case of playwriting candidates, the thesis is based on a script which is produced during their program.

Ph.D. in Fine Arts

The department participates with the faculties in art, music, and philosophy in a multi-disciplinary program leading to the Ph.D. degree in Fine Arts, which is detailed in the catalog section introducing the College of Visual and Performing Arts.

Doctoral students whose major area is theatre can choose two of the following fields of concentration: acting and directing; design; history, theory, and criticism; arts administration; and playwriting. Work towards the degree is both scholarly and practical, requires a minimum of 60 semester hours at the graduate level beyond the master's degree, includes a rigorous comprehensive examination, and culminates in a dissertation requirement that allows a choice of several avenues of research.

Applicants for the Ph.D. program with the major area of theatre must have completed a master's degree or its equivalent in theatre or a related field. Applicants must meet minimum

Graduate School requirements, be recommended by the faculty, and be approved by the Graduate Committee within the college.

For admission to any graduate program in theatre, the applicant must fulfill all requirements of the Graduate School as well as departmental requirements (contact graduate advisor in the department). All incoming students must take a diagnostic examination at the start of the fall term. This will provide a basis for faculty decisions about any leveling courses that may be required and credits that may be transferred. After this examination, a degree plan must be decided upon and filed; master's students must file during their first term and doctoral students should file before the end of the second term.

To be educated practically as well as academically, all graduate students are expected to participate actively in the department's production program.

Dance (DAN)

(To interpret course descriptions, see pg. 10.)

1102. **Pantomime (1:0:2).** An introduction and guide to the specialized exercises and essential physical elements to the art of pantomime. May be repeated once for credit.
1103. **Jazz (1:0:3)** [DANC 1147, 1148, 1247, 1248, 1347, 1348, 2147, 2148, 2247, 2248, 2347, 2348]. A study of jazz techniques. May be repeated once for credit.
1107. **Musical Stage Dance (1:0:3).** An introduction to musical stage forms including hybrid forms of dance specifically for the Broadway, television, or musical stage. May be repeated once for credit.
1204. **Modern Dance (2:0:4.5)** [DANC 1145, 1146, 1245, 1246, 1345, 1346, 2145, 2146, 2245, 2246, 2345, 2346]. A study of modern dance techniques. May be repeated for credit.
1304. **Ballet (3:0:7.5)** [DANC 1341, 2341, 2342]. The academic study of ballet from its beginning to the most sophisticated forms. May be repeated for credit.
2100. **Dance Activities in Theatre (1:0:2)** [DANC 2301]. Skills and knowledge in ballet, modern and jazz dance activities. Intended for students with limited dance experience. May be repeated for credit.
2102. **Improvisation (1:0:2).** Experiences in improvisation to develop spontaneity and heighten awareness so that movement response can become instantaneous. May be repeated once for credit.
3104. **Dance Production Activities (1).** Prerequisite: Consent of instructor. Participation in a dance production, either as a lighting designer, performer, choreographer, or crew head. May be repeated once for credit.
3201. **Modern Dance Repertoire (2:0:4).** Prerequisite: DAN 1204 and consent of instructor. Exposure to various modern dance choreographies.

3207. **Dance for Children (2:1:2).** Creative movement, singing and rhythmic games, ballet, modern, and jazz dance for children.
3209. **Pedagogy (2:1:2).** Prerequisite: Consent of instructor. Basic principles and guidelines for the teaching of ballet and modern dance. (Writing Intensive)
3313. **History of the Dance (3:3:0).** History and philosophy of dance and the relationships of dance to allied arts. (Writing Intensive)
4102. **Partnering (1:0:2).** Prerequisite: Consent of instructor. An introduction to supported adagio the assimilation of the easiest methods of partner relationship on the stage. May be repeated once for credit.
4104. **Senior Concert (1).** Prerequisite: DAN 4207. Senior presentation of an original dance composition, including selection of music, costume, and lighting designs.
4200. **Ethnic Dance (2:1:2).** A study of Spanish, Mexican, and Italian folk dance; also character dance.
4201. **Special Topics in Dance (2:2:0).** Prerequisite: Consent of instructor. Introduction to special topics in dance for in-depth study. (Writing Intensive)
4207. **Choreography (2:1:2).** Prerequisite: DAN 1204, 1304. The study of the craft of composing ballet and modern dances.

Theatre Arts (THA)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

1101. **Theatre Activities: Scenery and Properties (1)** [DRAM 1120, 1220]. Opportunity to participate extensively in the theatre activities in scenery and properties.
1102. **Theatre Activities: Lighting and Sound (1)** [DRAM 1121]. Opportunity to participate extensively in theatre activities in lighting and sound.

1103. **Theatre Activities: Costume and Makeup (1).** Opportunity to participate extensively in theatre activities in costume and makeup.
1104. **Theatre Activities: House Management (1).** Opportunity to participate extensively in theatre activities in the area of house management.
1301. **Voice for the Actor (3:3:3)** [DRAM 2336]. Explores "freeing" the natural resources of the human voice with emphasis on characterization and vocal flexibility.
1302. **Movement for the Actor (3:3:3)** [DRAM 1322]. Explores the physical skills necessary for the actor with emphasis on individual physical creativity and imagination. Required of B.F.A. acting majors.
1303. **Introduction to Theatre (3:3:0).** Introduction to theatre as a career and academic pursuit: basic concepts, practices, and values. Required of all theatre majors prior to admission to upper-level courses. Offered in fall semester only. For theatre majors and minors only.
2101. **Stage Makeup (1:0:3)** [DRAM 1141, 1241, 1341,].
2301. **Introduction to Acting (3:3:0)** [DRAM 1351]. Fundamental principles of acting for *nonmajors*, with emphasis on establishing a working vocabulary and basic acting process. Applies toward Visual and Performing Arts requirement for the B.A. degree.
2302. **Principles of Acting I (3:3:3).** Explores the fundamental principles of acting for the theatre major. Emphasis on establishing a process and working vocabulary necessary for the profession.
2303. **Theatre Appreciation (3:2:2)** [DRAM 1310]. Study and application of the various activities and methods of theatrical practice. Attendance at representative plays is required. Applies toward Visual and Performing Arts requirement.

2304. **Introduction to Cinema (3:3:1)** [DRAM 2366, 2367]. A study of the cinematic art form. Applies toward Visual and Performing Arts requirement for the B.A. degree.
2306. **Stage Management (3:3:0)**. Prerequisite: THA 1303. An in-depth study of the functions and responsibilities of the stage manager in the performing arts.
2312. **Principles of Acting II (3:3:3)** [DRAM 1352]. Prerequisite: THA 2302. Explores representative acting theories in practice with emphasis on given circumstances and character development. Required of B.F.A. acting majors.
3100. **Advanced Theatre Activities: Stage Management (1)**. Prerequisite: THA 2306. Opportunity to participate extensively in activities in stage management in University Theatre productions.
3101. **Advanced Theatre Activities: Scenery and Properties (1)**. Opportunity to participate extensively in theatre activities in scenery and properties with emphasis on leadership experiences.
3102. **Advanced Theatre Activities: Lighting and Sound (1)**. Prerequisite: THA 3304. Opportunity to participate extensively in theatre activities in lighting and sound with emphasis on leadership experiences.
3103. **Advanced Theatre Activities: Costume and Makeup (1)**. Prerequisite: THA 3305. Opportunity to participate extensively in theatre activities in costume and makeup with emphasis on leadership experiences.
3104. **Advanced Theatre Activities: House Management (1)**. Opportunity to participate extensively in theatre activities in house management with emphasis on leadership experiences.
3105. **Rehearsal and Performance (1)**. Credit for acting or stage managing in departmental productions or acting in approved directing scenes. May be repeated for credit.
3106. **Auditioning (1:0:2)**. Prerequisite: THA 1301 and 2302. A practicum for developing audition techniques and examining guidelines for audition procedures, with emphasis on resume organization and audition material selection and performance.
3302. **Acting Period Styles I (3:3:3)**. Prerequisite: THA 2312. Scene study in a spectrum of periods and styles, from the Greeks to Renaissance theatre. Required of B.F.A. acting majors. (Writing Intensive)
3303. **Principles of Theatrical Scenery (3:2:3)**. Prerequisite: THA 1303 or equivalent. The study of technical problems of play production. Design, construction, and painting of scenery and properties and special effects.
3304. **Principles of Theatrical Lighting (3:2:3)**. Prerequisite: THA 1303 and 3303 or equivalent. Study of the theory and practice of theatrical stage lighting. Elementary electricity, lighting control and instruments, lighting design.
3305. **Principles of Theatrical Costuming (3:2:3)**. Prerequisite: THA 1303 or equivalent. Study and application of the theories and techniques of theatrical costuming. Survey of historical dress. Design for the stage. Construction of theatrical clothing.
- 3306, 3307. **Practicum in Repertory Theatre I, II (3:0:9 each)**. Prerequisite: THA 1301, 1303, 2302, or equivalent. Practical work in the organization, mounting, and presentation of plays in a repertory situation. May be repeated for credit.
3308. **History of Theatre I (3:3:0)**. A comprehensive review of world theatre from its beginning to the 17th century. May be applied toward fulfillment of Visual and Performing Arts requirement for the B.A. degree. (Writing Intensive)
3309. **History of Theatre II (3:3:0)**. A comprehensive overview of world theatre from the 17th century to the present. May be applied toward fulfillment of Visual and Performing Arts requirement for the B.A. degree. (Writing Intensive)
3322. **Acting Period Styles II (3:3:3)**. Prerequisite: THA 2312. Scene study in a spectrum of periods and styles from Restoration to contemporary theatre. Required of B.F.A. acting majors. (Writing Intensive)
3332. **Acting Period Styles III (3:3:3)**. Prerequisite: THA 2312. Scene study in the performance of Shakespearean texts and the conventions and performance styles of Elizabethan theatre. Required of B.F.A. acting majors. (Writing Intensive)
3335. **Script Analysis (3:3:0)**. An introduction to dramatic structure and methods of script analysis as a preparation for writing, directing, designing, performing, and criticizing plays. (Writing Intensive)
3336. **Computerized Drafting for the Theatre (3:2:3)**. Traditional and computer-aided drafting techniques for theatrical presentation.
3337. **Computer Rendering for the Theatre (3:2:3)**. Computer-aided rendering techniques and portfolio tools for theatrical presentation.
4000. **Projects in Theatre and Dance (V1-6)**. Prerequisite: Junior or senior standing and 9 hours of theatre or dance and consent of instructor. Individual study under the guidance of a faculty member. May be repeated for credit.
4108. **Scene Painting (1)**. Prerequisite: THA 3303, and 3304. Study of the art and craft of scene painting styles and techniques. May be repeated for credit.
4208. **Professional Career Management (2:2:0)**. Prerequisite: Junior or senior standing. An overview of the various aspects of developing and managing a career in the performing arts including auditioning, resume writing, portfolio development, and contract evaluation.
4302. **Stage Directing Methods (3:2:3)**. Prerequisite: Junior standing, THA 1303, 2302, 3303, 3304, and 3305. Study and practice of fundamental principles and techniques of directing. Student direction of representative plays. (Writing Intensive)
4303. **Theory and Practice of Playwriting (3:3:0)**. Prerequisite: THA 3335. Study of the techniques of dramaturgy. Practical work in the writing of drama. May be repeated for credit. (Writing Intensive)
4309. **Principles of Scene Design (3:0:9)**. Prerequisite: THA 1303, 3303, and 3304. Study of theory and practice of theatrical scene design. May be repeated for credit.
4310. **Costume Design (3:0:9)**. Prerequisite: 1303 and 3305. Theory and practice of costume design for technical production. May be repeated for credit.
4311. **Theory and Practice of Lighting Design (3:0:9)**. Prerequisite: THA 1303, 3303, and 3304. Study of the theory, process, and practice in lighting design for theatre, opera, and dance. May be repeated for credit.

Graduate Courses

5300. **Dramatic Analysis (3:3:0)**. Study of dramatic structures and script analysis methods as a preparation for writing, directing, designing, performing, and criticizing plays.
5301. **Playwriting I (3:3:0)**. Prerequisite: THA 5300. Basic graduate-level study in the theory and practice of playwriting, focusing on crafting the short play.
5302. **Playwriting II (3:3:0)**. Prerequisite: THA 5301. Instruction and practice in crafting the full-length play script. May be repeated once for credit.
5303. **Theatre Scene Design (3:0:9)**. Advanced work in the process of designing for the stage. Includes work on models, sketches, renderings, and theatre drafting. May be repeated for credit.
5304. **Theatre Lighting Design (3:0:9)**. Advanced work in theatrical lighting design with an emphasis on the use of light as artistic expression. May be repeated for credit.
5305. **Theatre Costume Design (3:0:9)**. Advanced work in the total process of designing costumes for the stage through design projects for representative plays. May be repeated for credit.
5306. **Theatre History Survey (3:3:0)**. A survey of the major periods and traditions of world theatre and various approaches to theatre historiography. Required of all theatre arts doctoral students.
- 5307, 5308. **Advanced Practicum in Repertory Theatre I, II (3:0:9 each)**. Prerequisite: An undergraduate major in theatre arts, or consent of instructor. Practical work in supervision of the organization, mounting, and presentation of plays in a repertory situation. May be repeated for credit.
5309. **Seminar in Theatre History (3:3:0)**. Prerequisite: An undergraduate major in theatre arts or consent of instructor. Consideration of the theatre of a specific historical epoch, or the comparative study of the theatre of several periods.
5310. **Historical and Critical Perspectives in Theatre Arts (3:3:0)**. Historical and critical overview of the field including introduction to major theories and methodologies; study of particular artists; works or movements that provide insight into specific creative techniques; basic media and techniques of the field; and interdisciplinary relationships with the other arts.
5311. **Advanced Directing (3:2:3)**. Prerequisite: Undergraduate directing course or consent of instructor. Study of procedures and techniques of directing. Enrollment in noncredit lab is required.
5312. **Theatre Management (3:3:0)**. Study of university, community, and professional theatre management with special attention to policy making, audience building, play selection, staff organization, budget preparation, and relationships

- with governmental and private agencies and foundations.
5313. **Dramatic Criticism (3:3:0).** Principles of dramatic criticism from Aristotle to the present day.
5314. **Theatre Arts in Contemporary Context (3:3:0).** Study of contemporary issues in the field: Current artistic trends, theory and criticism, organization (e.g., funding, administration), and cultural policy (e.g., education, assessment, multi-cultural issues, censorship).
5316. **Promotion in Theatre Arts (3:3:0).** An approach to the field of promotion with emphasis on application to theatre arts.
5317. **Funding of Theatre Arts (3:3:0).** A seminar in locating and arranging funding for theatre organizations.
5318. **Advocacy for the Performing Arts (3:3:0).** Study of the importance and impact of external environments on the formation, production, and funding of arts activities.
5320. **Theatre Planning (3:3:0).** A study of the planning and design of theatre facilities.
5321. **Playwriting III (3:3:0).** Prerequisite: TH A 5301 or consent of instructor. Study of selected topics in the theory and practice and process of playwriting.
5322. **New Script Production (3).** Practical work for playwrights participating in the production of their original full-length scripts.
5323. **Problems in Lighting, Costuming, and Scenery (3:3:0).** Development of scenery, costume, and lighting designs for selected plays and theatre buildings from research to presentation.
5324. **The Teaching of Acting (3:3:0).** Study of modern theories and practices of acting and actor training. Design of the acting course.
5325. **Period Styles in Acting (3:3:3).** Prerequisite: TH A 5329. Scene study in various periods ranging from Ancient Greece through Medieval, Spanish Golden Age, Jacobean, Restoration, and beyond. Two labs at progressive skill levels.
5326. **Seminar in Directing Methods (3:3:0).** A study of the methods of selected modern directors and directing theories.
5327. **Special Problems in Directing (3).** Individual directing project on or off campus. Project must be approved by instructor before enrollment.
5328. **Special Problems in Playwriting (3).** Prerequisite: TH A 5301. Advanced study in developing, writing, and revising play scripts. May be repeated for credit.
5329. **Advanced Scene Study (3:3:3).** Scene study in realist and contemporary acting styles. Various approaches to acting in 20th century drama. Required of all first-year acting and directing MFA students.
5331. **Studies in Contemporary Theatre (3:3:0).** A seminar in contemporary theatre theories and practices.
5333. **Studies in the Production of Pre-Modern Drama (3:3:0).** A study of the problems of producing classical, Elizabethan, French neo-classic, Restoration, and eighteenth-century drama for present-day audiences.
5334. **Topics in Acting (3:3:3).** In-depth workshop in specific acting styles, genres, national and ethnic theatres, and techniques or training.
5336. **Graphics Presentations for the Theatre: Computer Drafting (3:2:3).** Computer-aided drafting techniques for theatrical presentation.
5337. **Graphics Presentations for the Theatre: Computer Rendering (3:2:3).** Computer-aided rendering techniques and portfolio tools for theatrical presentation.
5341. **Seminar in Dramatic Theory (3:3:0).** Prerequisite: An undergraduate major in theatre arts or consent of instructor. The consideration of a specific theoretical approach to the theatre or the comparative study of several theoretical approaches. May be repeated for credit.
5343. **Seminar in Voice and Movement (3:3:3).** Intensive training in specific voice and movement techniques and methodologies culminating in a studio performance of improvisations, montages, and solo performances.
5350. **Seminar in Theatre Research Methods (3:3:0).** Examination of research and critical processes in dramatic history, theory, and performance or production through current philosophical orientations, methodologies, and techniques. Required of all graduate students.
6000. **Master's Thesis (V1-6).**
6001. **Internship (V1-6).** Prerequisite: Consent of instructor. Service assignment in an arts organization for students in the graduate theatre and dance program. May be repeated for credit.
7000. **Research (V1-12).**
8000. **Doctor's Dissertation (V1-12).**



Texas Tech University Health Sciences Center



M. Roy Wilson, MD
President

General Information

Texas Tech University Health Sciences Center cooperates with Texas Tech University to offer undergraduate and graduate programs in selected areas related to the health sciences. The Texas Tech University Health Sciences Center programs are administered through the School of Medicine, School of Pharmacy, School of Allied Health Sciences, Graduate School of Biomedical Sciences, and the School of Nursing.

The School of Allied Health Sciences offers bachelor's, master's, and doctor's level studies in athletic training; clinical laboratory science; clinical services management; rehabilitation sciences; occupational therapy; physical therapy; physician assistant studies; speech-language pathology; audiology; communication sciences and disorders; speech, language, and hearing sciences (undergraduate); molecular pathology; and rehabilitation counseling. Programs are currently offered at the master's and doctor's level within the Graduate School of Biomedical Sciences in health services research, biotechnology, cell and molecular biology, medical biochemistry, medical microbiology, pharmaceutical sciences, pharmacology, and physiology. The School of Nursing offers bachelor's and master's level programs and collaborates with the Texas Woman's University College of Nursing to offer a Ph.D. in nursing.

Prospective students and others interested in services for students with disabilities should make inquiries to the coordinator of programs listed below. Qualified students are considered for admission without regard to race, color, religion, sex national origin, or disability.

Further information about programs in the Health Sciences Center may be obtained as follows:

Office of Admissions and Student Affairs
School of Allied Health Sciences, 2B 194 HSC
Texas Tech University Health Sciences Center
3601 - 4th St.
Lubbock, Texas 79430-6294
(806) 743-3220
email: allied.health@ttuhsc.edu
www.ttuhsc.edu/SAH

Graduate School of Biomedical Sciences
2B 106 HSC
Texas Tech University Health Sciences Center
3601 - 4th St.
Lubbock, Texas 79430-6206
(806) 743-2556
email: graduate.school@ttuhsc.edu
www.ttuhsc.edu/gsbs

School of Nursing
Student Affairs Program Offices
3601 - 4th St.
Lubbock, Texas 79430
B.S.N. Undergraduate (806) 743-2737
R.N.-B.S.N. Undergraduate 1-800-493-3954 / (806) 743-4842
M.S.N. Graduate 1-800-851-8240 / (806) 743-3063
www.tnunursing.com



School of Allied Health Sciences

Dr. Paul P. Brooke Jr., *Dean*

About the School

The Health Sciences Center School of Allied Health Sciences offers the following degree programs:

- Bachelor of Science in Clinical Laboratory Science
- Bachelor of Science in Clinical Services Management
- Bachelor of Science in Speech, Language and Hearing Sciences
- Master of Science in Speech-Language Pathology
- Master of Science in Rehabilitation Sciences
- Master of Science in Molecular Pathology
- Master of Physician Assistant Studies
- Master of Athletic Training
- Master of Occupational Therapy
- Master of Physical Therapy
- Master of Rehabilitation Counseling
- Doctor of Audiology
- Doctor of Philosophy in Communication Sciences and Disorders
- Doctor of Science in Physical Therapy

All programs are fully accredited and include both didactic and clinical practice components. Admission to School of Allied Health Sciences programs is competitive and by application to the school. Admission and application deadlines vary for each program.

Admission to Texas Tech University does not confer admission to the Texas Tech University Health Sciences Center School of Allied Health Sciences nor does admission to the School of Allied Health Sciences confer admission to Texas Tech University.

Prospective students and other interested persons are encouraged to contact the Office of Admissions and Student Affairs for information on allied health careers and educational programs. Students who are attending Texas Tech University and wish to take the courses to satisfy prerequisite requirements for these professional programs may enroll in the College of Arts and Sciences as allied health sciences majors. These students will be advised through the Office of Preprofessional Health Careers at Texas Tech University, Room 340, Chemistry Building, (806) 742-3078.



Department of Speech, Language and Hearing Sciences

Faculty

Rajinder K. Koul, *Chairperson*

Associate Professors: Koul, Paschall, and Sancibrian; *Assistant Professors:* Amlani, Aoyama, Bogschutz, Corwin, Gustafson, Hicks, and Zhang; *Clinical Instructors:* Clapsaddle, Schmitt, and Sims; *Instructors:* Flores-Rivas and Keller.

About the Program

This department offers study in the following degree programs:

- Bachelor of Science in Speech, Language and Hearing Sciences
- Master of Science in Speech-Language Pathology
- Doctor of Audiology
- Doctor of Philosophy in Communication Sciences and Disorders

Undergraduate Program

Speech, Language and Hearing Sciences

The ability to communicate is our most basic human characteristic. Communication is essential to learning, working, and social interactions. However, one in 10 Americans has a communication disorder because of a stroke, an undetected hearing loss, a stuttering problem, a language disorder, a movement or muscle problem, or some other problem that interferes with speech, language, or hearing. This makes them the single largest population of challenged Americans. To meet these needs, speech-language pathologists and audiologists are educated to diagnose and treat all communication disorders and their related problems. Diagnostic techniques include many behavioral, cognitive, physiological, and technological procedures designed to assess speech, language, and hearing. Treatment for communication disorders is varied and often employs an interdisciplinary approach. Working closely with physicians, dentists, psychologists, educators, engineers, physical therapists, occupational therapists,

and dietitians, the speech-language pathologist or audiologist is solely responsible for treating the patients' communicative needs.

Speech-language pathologists and audiologists provide professional services in many different types of facilities such as hospitals, rehabilitation centers, nursing care facilities, community clinics, colleges and universities, burn clinics, private offices, state and local health departments, public and private schools, and state and federal governmental agencies. Services are provided for all ages and may be administered over a brief period or continue for several years.

Admission to the Bachelor of Science Program.

Admission to the baccalaureate program begins in March of each year for the following fall class. Class enrollment is limited. Admission guidelines include (1) a formal application, (2) a cumulative 3.0 GPA, (3) a grade of C or better in all prerequisite courses, (4) demonstration of superior communication skills, and (5) proof of appropriate immunizations against infectious diseases. Applicants whose native language is not English must earn a score of at least 550 on the

Test of English as a Foreign Language prior to admission. Applicants whose prerequisite courses were taken longer than seven years ago should contact the department to determine current acceptability. Students are required to adhere to all policies as outlined by the department, the School of Allied Health, and Texas Tech University Health Sciences Center. Students also have specific rights as outlined in the Student Handbook.

Prerequisite courses for entry into the bachelor's program include those on the accompanying table or their approved equivalents for a total of 66 hours. These courses may be completed at any accredited college or university. Course requirements may change without notice.

Students should be aware that the terminal degree for licensure in speech-language pathology is at the master's level and licensure in audiology is at the doctor's level. For further information on these advanced degrees, contact the admissions office at the School of Allied Health Sciences.

Speech, Language, and Hearing Sciences Prerequisite Curriculum

Content Area	Equivalent TTU Courses	Semester Hours
English*	ENGL 1301, 1302, and 2311 or 3365, or 3366	9
U.S. History	HIST 2300 and 2301	6
U.S. Political Science	POLS 1301 and 2302	6
Mathematics**	MATH 1320 (or higher level) and 2300 or PSY 3400 or SOC 3391	6
Lab. Sciences	One biological/life science, one physical science required. Suggested courses are BIOL 1402, ZOO 2403, PHYS 1401	12
Behavioral Education***	Any courses from anthropology, communication, education, human development and family studies, health, philosophy, psychology, or sociology.	15
Humanities		3
Visual & Performing Arts		3
General Electives		6
TOTAL		66

*One technical writing course is required.

**One course in statistics is required.

***One course addressing life span issues and one course addressing multicultural issues are required.

Speech, Language and Hearing Sciences (AHSL)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3219. **Supervised Observation Laboratory: AUD (2:2:0).** A supervised observation of various audiometric procedures and patient types. Discussion of clinical protocols, assessment, and management for individuals with hearing disorders.
3220. **Supervised Observation Laboratory: SLP (2:2:0).** A supervised observation of clinical assessment and management of individuals with speech and language disorders. May be repeated for credit.
3221. **Clinical Methods (2:2:0).** A review of clinical methodologies used in speech-language pathology and audiology, including specific clinical activities, report writing, and professional development.
3320. **Introduction to Communication Disorders (3:3:0).** An overview of communication disorders which can affect children and adults. The impact of these disorders on an individual's psychological, social, emotional, cultural, and educational status will be discussed.
3323. **Language Development (3:3:0).** An introduction to current theories of language and language development, including methods of obtaining and analyzing language samples.
3324. **Language Disorders (3:3:0).** An emphasis on language disorders in children. Topics include the nature and etiologies of language disorders, with an overview of the principles of assessment and treatment.
3325. **Fluency Disorders (3:3:0).** An extensive review of current information on fluency disorders in children and adults, including clinical assessment and management strategies.
3327. **Phonetics (3:3:0).** An introduction to production and classification of speech sounds; principles and theories of phonetics; emphasis on development of clinical transcription skills.
3421. **Speech and Hearing Science (3:3:0).** An introduction to the physics of sound, speech acoustics, speech perception, and psychoacoustics.
3426. **Phonetics/Articulation and Phonological Disorders (4:3:1).** The basic principles of assessment and treatment for children and adults with phonological and articulatory disorders. Includes lab for development of advanced clinical transcription skills.
3442. **Clinical Audiology (4:3:1).** An introduction to hearing assessment techniques and auditory disorders, with adaptation of testing for special populations such as infants, geriatrics, and different language backgrounds. The student will gain proficiency with pure-tone, speech, and impedance testing techniques.
3522. **Anatomy & Physiology (5:5:0).** A study of the anatomical and physiological aspects of speech and hearing in both normal and clinical populations.
4300. **Senior Research Project (3).** An individual study of a specific problem in one of the areas of speech or hearing disorders. Students are required, in advance of registration, to consult with the instructor and secure approval of the specific project to be pursued.
4344. **Multicultural Issues in Communication Disorders (3:3:0).** Assessment and management of communication disorders in culturally and linguistically diverse populations. Topics include

Graduate Program

Speech-Language Pathology. This professional education requires two years of study beyond the baccalaureate level. Admission into the professional program begins in February of each year for the fall class. Class enrollment is limited each year and admission is competitive. To be considered for admission into the professional program, the applicant must meet a number of requirements that include a baccalaureate degree in communication disorders or completion of leveling course work. Students have two options for satisfying the requirements for the comprehensive examination. They may conduct an independent investigation culminating in a master's thesis or complete a two-day written examination.

Audiology. This professional education requires four years of study beyond the baccalaureate level which includes a professional residency year. Admission into the professional program begins in fall of each year. Class enrollment is limited each year and admission is competitive. To be considered for admission into the professional program, the applicant must meet a number of requirements that include a baccalaureate degree in communication disorders, basic sciences, or a similar program. Admissions are also open to current holders of a Master's degree in audiology via application and portfolio review. Students will complete both a research project and comprehensive audiology examinations before graduation.

Students enrolled in either program are required to adhere to all policies as outlined by the department, the school, and the Health Sciences Center. Students also have specific rights as outlined in the student handbook.

Students must maintain a 3.0 grade-point average in order to continue in the program. By the time of graduation, students are expected to have completed the requirements for professional certification by the American Speech-Language-Hearing Association.

For additional information concerning a career in either speech-language pathology or audiology contact the department. All programs are accredited by the Council on Academic Accreditation and the Council on Professional Services Accreditation of the American Speech-Language-Hearing Association.

typical and disordered communication, and perspectives on clinical, theoretical, and research implications.

4380. **Clinical Practicum: SLP (3)**. A supervised clinical experience in case management. May be repeated for credit.
4390. **Clinical Practicum: Audiology (3)**. A supervised clinical experience in case management. May be repeated for credit.
4410. **Basic Sign Language for the Health Professions (4:4:0)**. An intensive, introductory course in American Sign Language. Issues related to deaf culture and the use of signs in health care settings will be discussed.
4426. **Neural Bases of Speech and Language (4:3:1)**. An exposure to neuroanatomy and neurophysiology through individualized and interactive learning. This course provides strong foundations for future graduate courses in aphasia and motor speech disorders, as well as an understanding of neuroanatomy, neurophysiology, and neuropathologies of speech and language.
4427. **Assessment Procedures in Speech-Language Pathology (4:3:1)**. The development of competencies in the selection, use, and interpretation of a wide range of speech and language assessment procedures for children and adults from diverse etiologic, cultural, and ethnic groups.
4446. **Diagnostic Audiology (4:3:1)**. This course will present advanced diagnostic techniques for children and adults including those from diverse populations or with special needs.

Speech-Language Pathology Courses

5010. **Independent Study (V1-3)**. A course used for individual leveling plans created by the program director.
5100. **Foundations (1:1:0)**. A forum for the discussion of professional issues in communication disorders. May be repeated for credit.
5310. **Special Topics in Speech Pathology (3:3:0)**. Directed study for non-thesis candidates. May be repeated for credit.
5320. **Research Design (3:3:0)**. The purpose of this course is to summarize the basic concepts of science and research. Emphasis will be placed on the nature of experimental designs and basic inferential statistical analyses. Discussions will also include the application of relevant methodologies in clinical settings.
5325. **Childhood Speech Disorders (3:3:0)**. Current approaches to assessment and management of pediatric speech disorders and developmental phonological disorders in special populations.
5328. **Seminar in Voice Disorders (3:3:0)**. Advanced discussion of the etiology, diagnosis, and treatment of voice disorders.
5329. **Fluency Disorders (3:3:0)**. An extensive review of current information on fluency disorders in children and adults.
5330. **Dysphagia (3:3:0)**. A detailed study of the anatomy and physiology of normal and disordered swallowing patterns, with discussion of current diagnostic techniques and treatment alternatives.
5339. **Research in Speech and Language Science (3:3:0)**. Prepares students for understanding and conducting research in

speech and language science. Emphasis is placed on how to conduct a literature search and write a literature review. Students will learn how to present research findings at professional meetings and how to apply research findings in evidence-based practice.

5343. **Aural Rehabilitation (3:3:0)**. The study of aural habilitation and rehabilitation procedures, intervention techniques, and the use of amplification for hearing-impaired children and adults. Psychosocial issues of hearing loss will be discussed in relation to the hearing impairment as well as the cultural history of the patient.
5362. **Motor Speech Disorders (3:3:0)**. A study of the neurologic foundations of speech, speech disorders that can develop as a result of damage to the nervous system, and the ways in which motor speech disorders can be addressed, diagnosed, and managed.
5380. **Graduate Clinical Practicum: SLP (3:3:0)**. Supervised clinical practice in speech and/or language pathology.
5385. **Internship in Speech Pathology (3:3:0)**. Intensive supervised case management within an on-going clinic on or off campus. May be repeated for credit.
5424. **Pediatric Language Assessment & Intervention (4:4:0)**. Comparison of typical and atypical language in children from infancy through adolescence. Assessment and management strategies for diverse populations, and varied service delivery models.
5463. **Adult Language Assessment & Intervention (4:3:1)**. Effects of normal aging on communication. Assessment and intervention models for acquired adult language disorders (e.g. aphasia, dementia, traumatic brain injury). Medical terminology and report writing is also included.
5466. **Augmentative and Alternative Communication (3:3:0)**. A study of the emerging area of augmentative and alternative communication, including a perspective on how these alternative and augmentative systems fit within the broad area of communication development and disorders.
6000. **Master's Thesis (3)**. May be repeated for credit. Consent of instructor required.

Audiology Courses

7000. **Doctoral Research (V1-3)**. May be repeated for credit. Instructor permission is required.
7020. **Au.D. Independent Study (V1-3)**. Independent study for advanced students in the fourth year of the Au.D. program. Three enrollments required before graduation. May not be taken before all courses and comprehensive examinations are successfully completed. May be repeated for credit.
7030. **Clinic Independent Study (V1-3)**. Independent study for students in summer clinical placements in the first two years of the Au.D. program. This course can be repeated for credit.
7130. **Advanced Concepts in Audiology (1:1:0)**. Provide training on using additional testing and techniques to expand the diagnostic and rehabilitative focus of audiologists.
7147. **Aural Rehabilitation Lab (1:0:1)**. Designed to provide clinical training on using additional testing and techniques to expand the diagnostic and rehabilitative focus of audiologists.
7164. **Auditory Electrophysiology Lab (1:0:1)**. Hands-on experiences with equipment utilized to allow students to practice and demonstrate the skills instructed in "auditory electrophysiology" lecture course.
7166. **Research Colloquium (1:1:0)**. Seminar discussion on applied research techniques in the field of audiology. Emphasis is placed on analyzing research applied to patients across the lifespan.
7175. **Professional Issues in Audiology (1:1:0)**. Overview of the social, political, and economic climate in hearing healthcare delivery. Basic and advanced strategies for practice management and development. Interprofessional relationships and responsibilities. Supervision of other professionals.
7255. **Instrumentation (2:2:0)**. This course will present the physiologic and behavioral effects of noise exposure, hearing conservation programs and clinical services to children and adults from diverse populations. Instrumentation associated with the measurement of noise across multiple environments will be a central aspect of the course.
7321. **Clinical Observation and Methods (3:0:3)**. Supervised observation of clinical assessment and management of individuals with communication disorders.
7322. **Auditory Processing Disorders (3:3:0)**. This course is designed to address the functional aspects of the auditory system. It will include an overview of anatomy, testing for auditory processing disorders, differential diagnosis, and management. It will also include information on differentiating functional difficulties as symptomology of other disabilities versus auditory processing disorders as the primary diagnosis.
7324. **Language Disorders (3:3:0)**. An emphasis on language disorders across the lifespan. Topics include the nature and etiologies of language disorders, with an overview of the principles of treatment.
7340. **Auditory Anatomy and Physiology (3:3:0)**. This course is an in-depth exposure to the structure and function of the auditory system. Emphasis is placed on peripheral structure and function, up to and including important brainstem nuclei. An introduction to cortical structures and processing is presented.
7343. **Cortical Connections (3:3:0)**. Seminar course related to cortical processing speech and other acoustic signals and perceptual stimuli. Includes a discussion of cellular, intracellular, and cortical communication and connections involved in analysis and perception of sound, including speech.
7345. **Advanced Amplification (4:3:1)**. Advanced topics in clinical amplification including programmable instruments, digital processing and digital amplification, multimicrophone technology and other noise reduction systems will be presented.
7347. **Aural Rehabilitation (3:3:0)**. The study of aural habilitation and rehabilitation procedures, intervention techniques,

- and the use of amplification for hearing-impaired children and adults. Psychosocial issues of hearing loss will be discussed in relation to the hearing impairment as well as the cultural history of the patient.
7348. **Educational Audiology (3:3:0).** Audiological considerations in educational settings. The incidence, treatment and educational sequela of hearing impairment in the auditory-verbal classroom will be covered.
7349. **Auditory Neuroscience (3:3:0).** This course will assist students in understanding anatomy/physiology and cell biology of the auditory system from cochlea up to cortex, subsided by introduction of nervous system and neural signaling and virtual lab exercise. Completion of this course should establish a solid base for understanding, applying, designing, and initiating different auditory test applications and research.
7351. **Counseling in Audiology (3:3:0).** An introduction to counseling the communicatively disordered and their families. Emphasis will be placed on special education, vocational and emotional issues surrounding hearing impairment. Considerations of special populations and lifespan issues will be included.
7352. **Clinical Disorders in Audiology (3:3:0).** The purpose of this course is to provide students with information to understand the following areas: 1) the anatomy and physiology of auditory mechanisms and lowering areas; 2) etiology and pathology of auditory disorders; and 3) audiological and otologic evaluation/management of auditory disorders.
7364. **Auditory Electrophysiology (3:3:0).** Covers theoretical knowledge and applied skills of normal and pathological auditory systems.
7367. **Clinical Electrophysiology (3:3:0).** This course will provide clinical instruction in the application of electrophysiological testing techniques and interpretation. Emphasis will be placed on evaluation of auditory functional and site of lesion testing, protocols, and interpretation.
7370. **Cochlear Implants (3:3:0).** Electrophysiology of implantable devices. Also includes processor strategies, and speech/language learning in prelingually deafened listeners.
7390. **Clinical Practicum - Individualized Experience (3:3:0).** The course is intended to allow for individualized student instruction of clinical procedures and protocols. This course may be repeated for credit.
- 7391-7399. **Clinical Practicum (3:3:0).** Supervised clinical practicum in audiology.
7442. **Psychoacoustics and Auditory Perception (4:3:1).** This course will present the physiological bases of auditory perception and the corresponding behavioral manifestations including higher-level cognitive and developmental aspects of speech perception. Includes laboratory.
7446. **Diagnostic Audiology (4:3:1).** This course will present advanced diagnostic techniques for children and adults including those from diverse populations or with special needs.
7450. **Pediatric Audiology (4:3:1).** A study of behavioral and objective audiological evaluation, as well as the habilitation and rehabilitation, of infants and children. Also includes information on the fundamental basis of oto-acoustic emissions and its usage for testing infants and children.
7465. **Balance Function (4:3:1).** Covers theoretical knowledge and applied skills of normal and pathological vestibular system. Includes laboratory.
7544. **Amplification (5).** A comprehensive introduction of amplification devices, methods, and techniques. Consideration of special populations and their diverse needs will also be included.

Ph.D. Courses

8000. **Doctoral Research Seminar (6).** Students will enroll in pre-dissertation research projects. This research is expected to make a significant contribution to the student's chosen area of study.
8320. **Cortical Connections (3:3:0).** This course will study the functional significance of the complex array of connection between cortical regions and sub-cortical regions that support cortical functions. Topics covered include brain & language, animal communication, motor speech processes, the descending pathways, memory & attention, cortical processing of pitch information, thalamocortical organization, cerebellum & cognition, perception of complex sounds, sound source localization.
8321. **Linguistics (3:3:0).** This course is designed to prepare students for understanding and conducting research in speech and language science. Emphasis is placed on how to conduct a literature search and write a literature review. Students will learn how to present research findings at professional meetings, and how to apply research findings in evidence-based practice.
8322. **Advanced Auditory Research (3:3:0).** Seminar devoted to the understanding of frontier knowledge in the area of auditory research and to applying the knowledge in developing and performing research projects. May be repeated as topic varies.
8323. **Seminar in Language and Culture (3:3:0).** Selected topics on language and culture will be explored through reading of current research in the field. Topics include psycholinguistics, sociolinguistics, dialects, language variations, bilingualism, multicultural and multilingual communication, speech perception and production and language development. May be repeated as topic varies.
8324. **Seminar in Augmentative and Alternative Communication (3:3:0).** The purpose of this course is to present the theoretical and clinical basis of AAC. Emphasis will be placed on evaluating efficacy of AAC intervention with individuals with developmental and acquired disabilities. Discussions will include application of relevant research methodologies in clinical settings. May be repeated as topic varies.
8325. **Seminar in Speech Perception (3:3:0).** Seminar devoted to the area of understanding speech. Topics to include research and clinical application of speech perception studies. May be repeated as topic varies.
8326. **Seminar in Speech Intelligibility, Noise and Reverberation (3:3:0).** The effects of noise and reverberation can be detrimental to the communication process. This course provides students with a review of speech production and perception along with an in-depth look at the effects of perceiving speech cues under real world conditions. May be repeated as topic varies.
8327. **Seminar in Acoustical Indices (3:3:0).** Predicting speech intelligibility performance for hearing impaired listeners under real world conditions has been elusive. This course provides students with the fundamentals of various indices, the ongoing research, and future practices and needs. May be repeated as topic varies.
8328. **Seminar in Pediatric Audiology (3:3:0).** Selected studies in infant, child and adolescent audiology. Studies can include areas such as diagnostic audiology, aural rehabilitation in children and educational audiology. May be repeated as topic varies.
8329. **Seminar in Adult Neurogenics (3:3:0).** Seminar devoted to the study of the impact of neurological impairments on the speech and swallowing abilities of adults. Topics to include pathophysiology of neurogenic communication disorders and dysphagia, quality of life in adults with neurological impairments, and research in adult neurogenics. May be repeated as topic varies.
8330. **Seminar in Healthcare Policy and Administration (3:3:0).** Seminar devoted to study of major issues facing U.S. health care in the 21st century. Topics included overview of US healthcare organizations and delivery systems; economics of healthcare policy; issues of access to care; managed care; quality assessment; and healthcare finance.
9000. **Doctoral Dissertation (9).** The Doctor of Philosophy degree in Communication Sciences and Disorders is a research degree and is conferred only in recognition of high achievement in independent scientific research and scholarship.

Department of Laboratory Sciences and Primary Care

Faculty

Hal S. Larsen, Chairperson

Professor: Larsen; *Associate Professors:* Border, Cole, Hubbard, and Rice-Spearman; *Assistant Professors:* Hearn, Jankowski, Le, Maxwell, Ream, Spannagel, Tatum, and Taylor; *Faculty Associates:* Chestnutt and Collins.

About the Program

This department offers study in the following degree programs:

- Bachelor of Science in Clinical Laboratory Science
- Master of Physician Assistant Studies
- Master of Science in Molecular Pathology

Undergraduate Program

Clinical Laboratory Science Program.

Medical Technologists (MT) or Clinical Laboratory Scientists (CLS) perform diagnostic laboratory procedures in hospital, clinic or veterinary laboratories. Diagnostic analyses in hematology, chemistry, microbiology, immunology, and urinalysis yield information which is of vital importance in establishing a medical diagnosis.

The clinical laboratory science program requires students to complete two years of lower division courses followed by a two-year upper-division professional curriculum at Texas Tech University Health Sciences Center. Admission is by application only. Transfer students may also apply.

The program in Clinical Laboratory Science offers three options: a standard option, a premedical (dental, veterinary, pharmacy) option, and a prephysician assistant option. Students enrolled in the premedical option are assigned to a faculty advisor. Particular attention is given in the areas of course selection, MCAT preparation, recommendations, and personal expectations. Students enrolled under this option will also have the opportunity to attend lectures in the TTUHSC School of Medicine and tour different areas of the medical complex.

Honors College students accepted into the CLS program may complete Honors College credit in the School of Allied Health Sciences and graduate with the honors designation. Professional level courses are listed and described in the *School of Allied Health Sciences Catalog*. Students who wish to apply should contact the Office of Admissions and Student Affairs at the School of Allied Health Sciences for information and forms.

Contact Information: Lori Rice-Spearman, Program Director, (806) 743-3252.

Clinical Laboratory Science Prerequisite Curriculum Standard Option

Content Area	Equivalent TTU Courses	Semester Hours
Biology or Anatomy and Physiology	BIOL 1403 and 1404; or ZOO 2403 and 2404	8
Science Elective*	(Genetics)	3-4
Chemistry	CHEM 1307 & 1107, 1308 & 1108, and 2303 & 2103	12
English	ENGL 1301 and 1302	6
History	HIST 2300 and 2301	6
Political Science	POLS 1301 and 2302	6
Mathematics (College Algebra)	MATH 1320	3
Microbiology	MBIO 3401	4
Electives**		9
TOTAL		57-58

*Genetics recommended if pursuing the Master of Science in molecular pathology.

**Electives must be social/behavioral sciences, humanities, and visual and performing arts.

Premedical Option

Content Area	Equivalent TTU Courses	Semester Hours
Biology	BIOL 1403 and 1404	8
Chemistry	CHEM 1307 & 1107, 1308 & 1108, 3305 & 3105, and 3306 & 3106	16
English	ENGL 1301 and 1302	6
History	HIST 2300 and 2301	6
Statistics-Mathematics	MATH 1351 or 2300	3
Microbiology	MBIO 3401	4
Physics	PHYS 1306 & 1103 and 1307 & 1104	8
Political Science	POLS 1301 and 2302	6
Science Elective*		3-4
Elective**		9
TOTAL		69-70

*Genetics recommended if pursuing the Master of Science in molecular pathology.

**Electives must be social/behavioral sciences, humanities, and visual and performing arts.



Prephysician Assistant Option

Content Area	Equivalent TTU Courses	Semester Hours
Biology	BIOL 1403 and 1404	8
Anatomy and Physiology	ZOOL 2403 and 2404	8
Microbiology	MBIO 3401	4
Chemistry	CHEM 1307 & 1107, 1308 & 1108, and 2305 & 2105	12
English	ENGL 1301 and 1302	6
Mathematics (Algebra)	MATH 1320	3
History	HIST 2300 and 2301	6
Political Science	POLS 1301 and 2302	6
Nutrition	F&N 1325	3
Behavior Science		6
Elective*		3
TOTAL		71

*Electives must be humanities and visual and performing arts.

Physician Assistant Prerequisite Curriculum

Content Area	Equivalent TTU Courses	Semester Hours
English	ENGL 1301 and 1302	6
College Algebra	MATH 1320 (or higher level math)	3
Biology	BIOL 1403 and 1404	8
Microbiology	MBIO 3401	4
Human Ana. and Phys.	ZOOL 2403 and 2404	8
General Chemistry	CHEM 1307 & 1107 and 1308 & 1108	8
Behavioral Science		9
Human Nutrition	F&N 3320 or 3340	3
Statistics	MATH 2300 or PSY 3400	3
Electives*		14
TOTAL		66

*Computer Basics and Medical Terminology recommended but not required.

Graduate Program

Physician Assistant Program. The Department of Laboratory Sciences and Primary Care offers study towards a graduate degree in Physician Assistant Studies. The master's degree program is offered at a TTUHSC site located on the campus of Midland College in Midland, Texas. To be considered for admission, the applicant must have completed at least 66 semester hours of prerequisite courses with a cumulative GPA of 3.0 or above. A baccalaureate degree is not required for admission. Individuals already holding a baccalaureate or graduate degree in another field are eligible, but they must meet the same prerequisite course and grade requirements as all other applicants. Contact the School of Allied Health Sciences Admissions and Student Affairs Office or the Physician Assistant Studies Program for specific requirements.

Applications are accepted through the Central Application Service for Physician Assistants (CASPA) beginning in the summer preceding the year of expected matriculation. New classes begin each year in late May. Applications must be received by CASPA by December 15 to be considered for admission into the professional curriculum, beginning the following May. It is the applicant's responsibility to ensure that all required supporting documentation is received by the deadline.

Upon successful completion of the professional program, students are eligible to take the NCCPA National Certification Examination required for state licensure to practice as a physician assistant in Texas. Further information about the program, school requirements, and other related matters may be obtained from the School of Allied Health Sciences Admissions and Student Affairs Office or the Physician Assistant Program.

The preceding table illustrates the prerequisites for the Allied Health Physician Assistant Program.

Molecular Pathology Program. The diagnostic molecular scientist is a professional who is qualified by academic and applied education to provide service in the molecular diagnosis of acquired, inherited and infectious diseases. The goal of

molecular diagnostics is to enhance the value of clinical laboratory services by providing an environment in which new tests based on the application of knowledge and new techniques at the most basic cellular level (i.e., molecular techniques) can be established, validated, and applied to the testing of patient specimens.

The entry level degree is the Master of Science in Molecular Pathology. To qualify for admission to the program, applicants must have completed or plan to complete a bachelor's degree with all prerequisite courses from an accredited U.S. college or university prior to enrollment. A cumulative grade point average of 3.0 or above is necessary to qualify for admission. Applications may be submitted at any time; however, applications must be received by March 1 to be considered for enrollment when course work begins the following summer. All qualified candidates selected by the admissions committee will be invited for an on-campus interview. Prerequisite requirements include the following:

- Graduate of a NAACLS accredited Clinical Laboratory Science Program (cumulative 3.0 GPA including a 3 credit hour genetics course) or
- Graduate of a NAACLS accredited Clinical Laboratory Technician Program with a bachelor's degree (cumulative 3.0 GPA including a 3 credit hour genetics course) or
- Graduate of an accredited university with a bachelor's degree in chemistry, biology, biochemistry, or microbiology that includes the following courses:

Semester Hours

General Chemistry with Lab.....	8
Microbiology.....	4
Biochemistry.....	3-4
Cell Biology.....	4
Anatomy & Physiology.....	4
College Algebra.....	3
General Biology.....	8
Organic Chemistry.....	8

Clinical Laboratory Sciences (AHMT)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3110. **Introduction to Clinical Laboratory Science (1:1:0).** An overview and introduction to the profession.
3310. **Urinalysis and Body Fluids I (3:2:3).** Analysis of the physical, chemical, and microscopic parameters of urine and body fluids. Special emphasis is placed on understanding kidney function and pathology.
3400. **Clinical Chemistry I (4:3:6).** An introduction to the basic principles and methodologies of clinical chemistry.
3405. **Clinical Bacteriology I (4:3:6).** Study of the isolation, cultivation, identification, and susceptibility testing of pathogenic bacteria. The taxonomy, physiology, and pathogenesis of medically important bacteria are covered.
3450. **Clinical Chemistry II (4:3:6).** Prerequisite: 3400. The qualitative and quantitative chemical analysis of blood and other body fluids. Correlation of test results to health and disease states.
3455. **Principles of Immunology (4:3:6).** Fundamentals of immunology and the human immune system. An introduction to the theory, practical application, and technical performance of immunologic and serologic procedures used in diagnostic laboratory medicine.
3460. **Clinical Bacteriology II (4:3:6).** Prerequisite: AHMT 3405. A continuation of AHMT 3405 with an emphasis on clinical correlations and case studies.
3465. **Immunohematology I (4:3:6).** Prerequisite: AHMT 3455. The theory, practical application, and technical performance of blood bank procedures required for transfusion of blood, blood components, and the handling and storage of blood components. Correlation of test results to normal and abnormal physiology.
3470. **Hematology I (4:3:6).** An introduction to the study of coagulation, blood cells, blood forming organs, and related diagnostic laboratory procedures.
4105. **Senior Seminar (1:1:0).** A Comprehensive review of topics in clinical laboratory science.
4185. **Clinical Correlations (1:1:0).** Prerequisite: AHMT 3400, 3405, 3450, 3455, 3460, 3465, 3470, 4480. Review of current topics and case studies in clinical laboratory science.
4300. **Applied Statistics and Research (3:3:0).** Introduction to descriptive, inferential, and non-parametric statistics related to basic and clinical science.
4305. **Molecular Diagnostics (3:3:0).** Introduction to basic genetics and genetic testing techniques used in molecular and forensic pathology.
4320. **Laboratory Management (2:3:0).** An introduction to management with emphasis upon management issues and concerns specific to the clinical laboratory.
4455. **Clinical Parasitology and Mycology (4:3:6).** Prerequisite: AHMT 3405 and 3460. Study of medically significant protozoan and helminthic parasites and their vectors, and pathogenic fungi.
4480. **Hematology II (4:3:6).** Prerequisite: AHMT 3470. The study of blood cells and their abnormalities with emphasis on disease processes.

4640. **Clinical Preceptorship I (6:6:0).** An introductory supervised clinical practicum in an affiliated clinical laboratory.
4741. **Clinical Preceptorship II (7:7:0).** An intermediate supervised clinical practicum in an affiliated clinical laboratory.
4842. **Clinical Preceptorship III (8:8:0).** An advanced supervised clinical practicum in an affiliated clinical laboratory.

Physician Assistant (AHPA)

Graduate Courses

5101. **Introduction to the Physician Assistant Profession (1:1:0).** This lecture series explores the role and socialization of the physician assistant as a health care professional. The course will discuss the history of the profession, the evolution of the physician – PA team, maintenance of professional credentials, practice issues and future trends.
5201. **Medical Ethics & Jurisprudence (2:2:0).** This lecture series examines prominent ethical issues in healthcare delivery. Students are engaged in discussion of ethical dilemmas relevant to clinical practice and the unique relationship of the physician and physician assistant. The course also examines quality assurance and risk management, legal issues, practice statutes and rules regulating physician assistant practice in Texas.
5202. **Introduction to Pharmacology (2:2:0).** This is a lecture series that introduces the actions of basic pharmacologic agents in the human. The mechanism of action, principal actions and adverse reactions of conventional classes of drugs is examined. This course will review fundamental pharmacology calculations, measurements and symbols.
5301. **Clinical Laboratory (3:3:0).** This lecture series describes the significance, ordering and interpretation of laboratory studies routinely ordered in the clinical setting. Concepts of microbiology, including immunology and infectious disease will be examined. Case studies are incorporated into the teaching process.
5306. **Pharmacology I (3:3:0).** This lecture series introduces the actions of basic pharmacologic agents in the human. The mechanism of action, principal actions and adverse reactions of conventional classes of drugs is examined. A review of fundamental pharmacology calculations, measurements and symbols are performed. This course is taught in part by interactive teleconferencing from the TTUHSC campus in Lubbock and partly at the PA program main facility in Midland.
5307. **Pharmacology II (3:3:0).** This lecture series builds on Pharmacology I. The action and interaction of pharmacological agents is discussed. Therapeutic applications, adverse reactions and contraindications to familiar drugs are considered. Instruction in proper writing of prescriptions is presented. This is a distance-learning course taught by interactive teleconferencing from the TTUHSC campus in Lubbock.
5308. **Neuroscience (3:3:0).** This is a lecture series that details the human nervous system, with emphasis on the recognition of neuroanatomical arrangement.

- The course will explore neurophysiology and concepts of neurochemistry. This is a distance-learning course taught by interactive teleconferencing from the TTUHSC campus in Lubbock.
5309. **Pediatrics/Geriatrics (3:3:0).** This lecture series surveys the acute and chronic disease states frequently encountered in the primary care setting as well as normal child growth and development. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing critical thinking and a problem oriented approach to diagnosis and treatment. The family medicine relevance to neonatology, pediatrics, and geriatrics including responses to death and dying, advance directives and end of life decisions are explored. Referral of patients to other healthcare providers or agencies is discussed. Case studies and patient education are incorporated into the teaching process.
5310. **Medical Interviewing (3:3:0).** This course will focus on the “how to” aspects of patient interviewing, communication skills and counseling skills. Class sessions will include lectures, interviewing labs and role-playing exercises. Small groups will meet on a regularly scheduled basis each week to discuss and “actively” practice interviewing skills. This practice may include interviewing other students, simulated patients or actual patients in the hospital.
5311. **Cardiology (3:3:0).** This lecture series examines the complex disease states frequently encountered in the adult internal medicine setting. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing a problem oriented approach to diagnosis and treatment. The approach to problems in cardiology and EKG interpretation is explored.
5312. **Clinical Medicine III (3:3:0).** This lecture series examines the complex disease states frequently encountered in the primary care medicine setting. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing critical thinking and a problem oriented approach to diagnosis and treatment. Referral of patients to other healthcare providers or agencies is discussed. The approach to problems in orthopedic and musculoskeletal disease processes including acute, chronic, continuing, rehabilitative care is explored. Case studies and patient education are incorporated into the teaching process.
5313. **Clinical Medicine IV (3:3:0).** This lecture series surveys the acute and chronic disease states frequently encountered in the primary care setting. Students are challenged to correlate the subjective signs and symptoms with physical examination findings and clinical pathophysiology in developing critical thinking and a problem oriented approach to diagnosis and treatment. The family medicine relevance to genitourinary, reproductive (including family planning) and endocrinology processes including

- acute, chronic, continuing, rehabilitative care are explored. Referral of patients to other healthcare providers or agencies is discussed. Case studies and patient education are incorporated into the teaching process.
5403. **Clinical Medicine I (4:4:0).** This is a lecture series that distinguishes the complex disease states frequently encountered in the adult internal medicine setting. Students will be challenged correlate the subjective signs and symptoms with physical examination findings to the clinical pathophysiology in developing a problem oriented approach to diagnosis and treatment. The approach to problems in otolaryngology, cardiology, pulmonology, gastroenterology, hematology and endocrinology are explored.
5404. **Clinical Medicine II (4:4:0).** This is a lecture series that differentiates the acute and chronic disease states frequently encountered in the family practice setting. Students will be challenged to correlate the subjective signs and symptoms with physical examination findings to the clinical pathophysiology in developing a problem oriented approach to diagnosis and treatment. The family medicine relevance to neonatology, obstetrics, gynecology, pediatrics, dermatology and psychiatry are explored.
5406. **Physiology (4:4:0).** This is a lecture series that investigates human physiology through a detailed explanation of the functions and activities of bodily processes as related to the health care. The series discusses the fundamental principles of cellular physiology, considers the important concepts necessary for understanding the integrated cellular function of the human body and develops the explanation of human physiology as relevant to the health professional.
5407. **Pathology (4:4:0).** This is a lecture series that integrates normal human physiology with the pathological basis of disease. The series illustrates abnormal cellular physiologic function in disease conditions, introduces major concepts of cellular pathophysiology and demonstrates abnormal physiologic function in disease conditions. The principles of cellular pathophysiology are applied to organ system pathology and the study of representative and important diseases.
5501. **Human Anatomy (5:4:3).** This is a lecture/laboratory series that encompasses a regional study of the gross morphological features of the human body. The course will explore the development of the human embryo from fertilization to parturition. The lecture portion of this course is a distance-learning arrangement taught by interactive teleconferencing from the TTUHSC campus in Lubbock. A portion of the laboratory experience will involve computer-assisted learning. Students will participate in a human cadaver prosection laboratory held at TTUHSC in Lubbock on alternate Fridays during the semester.
5502. **Physical Examination (5:3:2).** This is a lecture / laboratory series in which the pediatric, adult, geriatric and trauma patient physical examination is demonstrated and practiced. Students learn and apply the techniques of a comprehensive physical examination with the proper use of diagnostic instruments. Integration of the medical history (AHPA 5310 – Medical Interviewing) with the physical examination is reviewed and rehearsed. The laboratory experience utilizes students acting as patients, other simulated patients and real patients in a long term care facility.
6301. **Preventive Medicine & Community Health (3:3:0).** This is a lecture series that explores preventable disease and resources for health maintenance and risk factor reduction within the community. The course will consider communicable disease, acute disease, chronic disease, environmental health, occupational medicine and epidemiology.
6302. **Medical Spanish (3:3:0).** This lecture series is designed to introduce the non-Spanish-speaking healthcare provider to basic and essential medical Spanish terminology in order to elicit information necessary to obtain a comprehensive medical history and perform a physical examination. Laboratory/Radiographic results and treatment plans will also be included.
6304. **Healthcare Management (4:4:0).** This lecture series informs and prepares the graduate for basic clinical office or hospital practice management. Discussion emphasizes reimbursement issues, coding/billing procedures, licensing and authorization of privileges that are exclusive to physician assistant practice. The impact of socioeconomic issues and healthcare delivery systems are also explored.
6306. **Medical Psychology (3:3:0).** This lecture series analyzes acute and chronic psychiatric diseases frequently encountered in primary care clinical practice. It also explores personality development, child development, normative responses to stress, psychosomatic manifestations of illness and injury, sexuality, responses to death and dying and basic counseling techniques. Adherence to the concepts of privilege and confidentiality in communicating with patients and a commitment to the patient's welfare is stressed. The course will apply interviewing techniques, developed in AHPA 5310' – Medical Interviewing, to the approach to the patient with a psychiatric illness.
6404. **Master Project Track (4:4:0).** This course is taught during the grand rounds held at the completion of each clerkship and includes a research and writing project. The basics of biomedical research are explored prior to the writing phase. Students are instructed on the techniques necessary to search and interpret the medical literature and its application to patient care. Students prepare and submit a manuscript for evaluation. The document must be informative, established from published evidence based research and stress current and operational knowledge of new medical findings. Throughout the clinical year during grand rounds at the end of each clinical rotation, the students are instructed and monitored in the stages of developing a text suitable for publication.
6501. **Clinical Medicine V (5:4:2).** This lecture series explores specialized and tertiary healthcare. Students learn the importance of the relationship between primary care practice and specialty practices. Areas of study include medical specialties, surgical specialties, and emergency medicine. Technical health care in sophisticated, research and teaching hospitals is evaluated. This course prepares the student for clinical clerkships. Discussions address appropriate protocol, behavior and dress within the clinical setting. Weekly workshops enable students to learn and perform procedures that are essential to clinical practice. Students perform histories and physical examinations and develop further case presentation skills. A summative evaluation of clinical skills will be administered near the end of the clinical curriculum. PACKRAT (Physician Assistant Clinical Knowledge Rating and Assessment Tool) will be administered as a summative evaluation at the end of the didactic phase, and then administered again at the end of the clinical phase to document the students' progress in developing a medical data base. Case studies and patient education are incorporated into the teaching process.
6601. **Family Medicine Clerkship (6:0:40).** This clerkship will provide experience with common diseases and chronic illnesses in the family practice setting and will be composed of one six-week rotation. The learning experience will include the family medicine approach to direct care, initial care, comprehensive care and continuity of care.
6602. **Internal Medicine Clerkship (6:0:40).** This six-week rotation will provide clinical experience with acute and chronic illnesses seen in the general internal medicine practice. The student will experience the traditional approach to the comprehensive care of adult patients to include continuity of care. Clinical experience in preventive medicine and health and wellness maintenance techniques, especially in secondary and tertiary settings, will be provided.
6603. **Prenatal Care and Gynecology Clerkship (6:0:40).** This clerkship provides a six-week clinical experience in the care of prenatal and gynecologic patients. Training will emphasize the examination of the female patient with focus on the most common gynecologic problems and their diagnostic assessment, the formulation of appropriate treatment plans, the utilization of preventive medicine modalities and the evaluation and education of the pre-natal patient.
6604. **Pediatrics Clerkship (6:0:40).** The pediatric rotation is designed to provide PA students with experience in the specialty of pediatric medicine for six weeks. This clerkship will provide the opportunity for students to gain general pediatric knowledge and to apply that clinical knowledge to the development of the necessary proficiency for a PA to function in a primary care pediatric setting.
6605. **Emergency Medicine Clerkship (6:0:40).** The emergency medicine rotation will provide the PA student with experience in the emergency department with urgent and emergent medical problems and with trauma and surgical cases. This six-week clerkship will

include the emergency approach to direct initial and comprehensive care for patients in the acute care setting.

6606. **Geriatrics Clerkship (6:0:40).** The geriatric rotation will provide a clinical experience with one of the most rapidly growing patient populations in the United States. The six-week clerkship will provide the student with an opportunity to create a knowledge base and to gain clinical experience in the unique medical, psychosocial, environmental and cultural aspects of aging.
6607. **Psychiatry Clerkship (6:0:40).** The six-week psychiatry clerkship will provide experience with common acute and chronic psychiatric diseases and illnesses in both the outpatient and inpatient settings. The student will also learn about and interact with public and private treatment facilities for substance abusers and their affiliated support groups, local public counseling agencies, and state psychiatric facilities.
6608. **Surgery Clerkship (6:0:40).** The six-week rotation in surgery will provide experience in the presentation and treatment of surgical disease and illness. This rotation will allow the PA student to experience the approach to and the management of the surgical patient in the pre-operative, intra-operative, and post-operative phase of care.

Molecular Pathology (AHMP)

Graduate Courses

5100. **Issues in Molecular Pathology I (1:1:0).** Presentation of current topics regarding the biomedical application of genetic information using a journal club format. Ethical issues, regulatory issues, and principles of educational methodologies will also be discussed.
5101. **Issues in Molecular Pathology II (1:1:0).** Prerequisite: AHMP 5100. Basic business and management principles relative to laboratory management and administration will be presented.
5300. **Applied Statistics & Research (3:2:3).** Introduction to descriptive, inferential, and non-parametric statistics related to basic and clinical science; introduction to the process of basic and clinical research and research design.
5301. **Clinical Laboratory Survey (3:3:1).** Survey of the clinical laboratory that includes common laboratory assays (hematology, clinical chemistry, microbiology, transfusion services, and body fluids) and addresses the purpose, function, and utilization of laboratory services.
5309. **Diagnostic Molecular Pathology (3:3:0).** Presentation of human genetic disease with a focus on causative genetic alterations in neoplastic, immunologic, endocrine, viral, and infectious diseases.
5405. **Applied Molecular Techniques I (4:3:6).** Introduction to basic genetic testing techniques used in molecular and forensic pathology with discussion of
- quality laboratory practice including quality control, quality assurance, and quality improvement. Lab component will focus on the use of DNA and RNA technologies in clinical settings in addition to their use in identity testing.
5406. **Molecular Biology of the Cell (4:4:0).** Comprehensive survey course in eukaryotic molecular biology and genetics required by all students planning a career in molecular pathology or basic biomedical research.
5407. **Pathophysiology (4:4:0).** Presentation of the basis of human disease with regard to the major determinants of disease in human organ systems with discussion of normal anatomy and physiology.
5408. **Applied Molecular Techniques II (4:3:6).** Prerequisite: AHMP 5405. Advanced training and technical experience in the use of DNA and RNA technologies applied to the clinical setting. Independent work on research project.
5741. **Graduate Research (V1-3).** Supervised independent advanced molecular clinical research in an affiliated laboratory. Course culminates in the preparation of an original scientific paper and public presentation of the research project. Concurrent enrollment in AHMP 5742.
5742. **Clinical Preceptorship (V1-3).** Supervised advanced molecular clinical practicum in an affiliated laboratory with emphasis on patient testing, quality assurance, and case studies assessment. Concurrent enrollment in AHMP 5741.

Department of Rehabilitation Sciences

Faculty

Steven F. Sawyer, Chairperson

Professor: Brooke; **Associate Professors:** Clopton, Daniel, Knotts, Sawyer, and Sizer; **Assistant Professors:** Boss, Brismee, Brooks, Cook, Elliot, Geddie, Gilbert, Hooten, Jonely, Matthews, Munger, Ramey, Rogers, Schultz, Scott, Smith, Spears, Stickle, Taylor, and Williamson; **Instructor:** Potter.

About the Program

This department offers study in the following degree programs:

- Bachelor of Science in Clinical Services Management
- Master of Athletic Training
- Master of Occupational Therapy
- Master of Physical Therapy
- Master of Rehabilitation Counseling
- Master of Science in Rehabilitation Sciences
- Doctor of Science in Physical Therapy

Undergraduate Program

Bachelor of Science, Clinical Services Management. The program objective is to expand educational access to graduates who have an Associate of Applied Science degree (A.A.S.) from a community college technical

program in allied health disciplines. This program will provide the appropriate educational foundation and prerequisite credit hours to students who have an A.A.S. degree and desire to pursue a baccalaureate degree. Examples are certified occupational therapy assistants, medical technologists, physical therapy assistants, radiology technologists, respiratory care technicians, and EMS technicians.

Curriculum. The Bachelor of Science in Clinical Services Management degree program is a "2 + 2" format designed to provide wide exposure to the skills, knowledge, and abilities needed for success in supervisory management in our health care delivery system. Students "attend" classes in a nontraditional format through the use of internet distance learning technology using the WebCT platform. The curriculum structure allows for completion of degree requirements at a pace set by the ability and availability of the student.

The program consists of 54 semester credit hours of upper-level undergraduate courses. Courses will rotate and students will register as they appear each semester. There is no prescribed sequencing of courses within the program. Students will select courses from their degree plan and register each semester to complete the 120-hour degree plan objective. The distance education format will rely primarily on internet-based (WebCT) course offerings.

Application Information. Applicants to the B.S., CSM program at TTUHSC must have

earned an Associate of Applied Science degree from an accredited community college or university. Students must also complete the Texas common core courses by their anticipated graduation date to be awarded a baccalaureate degree.

Applications will be accepted on an ongoing basis. Each semester, the School of Allied Health Sciences Admissions Office will provide admissions application and processing. After the receipt of applications, notice of acceptance will be given 60 days prior to the next semester of class offerings.

Athletic Training (AHAT)

(To interpret course descriptions, see pg. 10.)

Graduate Courses

5098. **Practicum in Athletic Training (3:3:0).** A structured remediation of clinical observation, hands-on clinical experience and skills, and/or on-field athletic training.
5099. **Independent Study in Athletic Training (V1-3).** Designed to meet the professional student's particular needs and may include a structured review of previously presented classroom and/or laboratory experiences, literature review and discussion.
5105. **Research Seminar (1:1:0).** This course focuses on the application of information introduced in Research Methods

- (AHAT 5200). Emphasis will be placed on becoming good consumers of the literature.
5120. **Research-Directed Study I (1:0:3).** Completion of a research project including preparation of a manuscript suitable for publication in the sports health care literature.
5122. **Introduction to Clinical Education (1:0:3).** An introduction to basic skills necessary to practice as an athletic training student. The main concepts are medical terminology, basic documentation, OSHA training, first responder responsibilities, taping techniques, safe modality application, and identification of common general medical conditions.
5124. **Seminar in Athletic Training (1:0:3).** Graduate seminar focusing on current events in athletic training and preparation for NATABOC certification and Texas Licensure athletic training credentialing exams.
5126. **Research-Directed Study II (1:0:3).** Completion of a research project including preparation of a manuscript suitable for publication in the sports health care literature.
5200. **Research Methods (2:2:0).** Development of a working knowledge of descriptive and experimental research techniques and statistics.
5201. **Clinical Rotation I (2:0:6).** Hands-on experience in athletic training under the supervision of a certified athletic trainer.
5204. **Principles of Kinesiology (2:1:3).** An in-depth study of applied human anatomy and basic kinesiology with emphasis on normal gross form and function as it relates to athletic training practice.
5206. **Clinical Rotation II (2:0:6).** Hands-on experience in athletic training under the supervision of a certified athletic trainer.
5210. **Orthopaedic Assessment I (2:1:3).** Theory, principles, clinical applications and literature review associated with athletic training evaluation, assessment, and management of musculoskeletal conditions within the upper extremity.
5223. **Special Populations and Concerns for the Athletic Trainer (2:2:0).** Survey of injury and illness risk factors associated with sports participation by the preadolescent, geriatric, male, female, and the physically and mentally challenged athlete.
5224. **Management/Identification of General Medical Conditions (2:2:0).** Study of the etiology, pathology, and clinical manifestations of common illnesses, infectious diseases, and dermatological conditions in athletic populations.
5225. **Clinical Rotation III (2:0:6).** Hands-on experience in athletic training under the supervision of a certified athletic trainer.
5227. **Current Medical Diagnosis and Treatment I (2:2:0).** Physician presentation of the medical approach to the management of musculoskeletal disorders and afflictions.
5228. **Clinical Rotation IV (2:0:6).** Hands-on experience in athletic training under the supervision of a certified athletic trainer.
5302. **Rehabilitation of Sports Injuries (3:2:3).** Assimilation of all aspects of patient evaluation, treatment, and rehabilitation of injuries, with a focus on functional rehabilitation and return to activity.
5303. **Management and Prevention of Injuries (3:2:3).** A study of athletic training room procedures stressing the practical aspects of care and prevention of athletic injury is included. The course covers the cognitive, affective and psychomotor objectives of athletic training room procedures and management of acute injuries.
5304. **Special Topics in Athletic Training (3:3:0).** This course will cover topics such as cell biology, psychosocial concerns, and pharmacology as they relate to the athletic training profession.
5305. **Clinical Kinesiology (3:2:3).** Problem-solving approach to the study of human movement with integration of biomechanics fundamental to understanding exercise concepts and musculoskeletal evaluation.
5322. **Administration of Athletic Training Programs & Professional Development (3:3:3).** The planning, coordinating, and supervising all administrative components of an athletic training program.
5500. **Anatomy (5:3:6).** Integrated study of gross human anatomy embodying gross morphology and coordinating with development and histological aspects of the body.
5505. **Patient Evaluation and Management I (5:3:6).** Development of clinical skills fundamental to patient management. Introduction to record keeping, clinical evaluation procedures; including skill assessment, posture, joint mobility, muscle strength, and sensory function and clinical decision-making.
5506. **Patient Evaluation and Management II (5:3:6).** Theory, principles, literature review, and clinical applications associated with athletic training evaluation, assessment and management.
5529. **Musculoskeletal Evaluation and Management II (5:3:6).** Theory, principles, literature review and clinical applications associated with athletic training evaluation, assessment and management of musculoskeletal conditions within the lower extremity and spine.

Clinical Services Management (AHCM)

Undergraduate Courses

4301. **Introduction to Healthcare Management (3:3:0).** Reviews basic healthcare management principles and studies the roles and functions of contemporary healthcare managers.
4302. **Financial Management for Clinical Supervisors (3:3:0).** Examines the basic principles of financial management related to clinical support activities.
4303. **Principles of Personnel Management for Clinical Supervisors (3:3:0).** Provides an overview of interpersonal dynamics, conflict resolution, and supervisor responsibilities.
4304. **Management of Clinical Services in Healthcare Organizations (3:3:0).** Provides an overview of operations management and practical decision-making by analyzing the day-to-day operations in clinical support service activities.
4305. **Capital Project Design (3:3:0)** Methods for management of capital projects. Topics include financial considerations, procurement, site preparation, contracting, scheduling, and acceptance for operational readiness.
4306. **Marketing Principles and Entrepreneurship for Healthcare Professionals (3:3:0).** The course covers the principles of marketing and their application in healthcare delivery systems.
4307. **Material Management for Clinical Supervisors (3:3:0).** An overview of identifying material requirements for a clinical support service activity, commercial sources, procurement, tendering contracts, and inventory management controls.
4311. **The U.S. Healthcare System (3:3:0).** A review of the healthcare system, both public and private sector examining organizational structures and the legislative, legal, and market impacts upon the current integrated delivery system.
4312. **Foundations of Managed Care (3:3:0).** Examines principles of managed care and contemporary issues in the organization and administration of managed healthcare organizations.
4313. **Community Health Issues (3:3:0).** A review of national, state, and local community agencies; preventive health services, public health, wellness, personal fitness, stress management, changing lifestyles, and analysis of national issues in the past 50 years.
4314. **Quality Assurance and Risk Management (3:3:0).** An overview of legal requirements and ethical standards in healthcare. Topics include the principles of total quality management (TQM), continuous quality improvement (CQI), joint commission on accreditation of healthcare organizations (JCAHO) requirements, quality assurance, risk management, outcomes measures, benchmarking, and utilization management in the clinical support service setting.
4315. **Issues in Gerontology for Healthcare Managers (3:3:0).** Overview of the physical, psychosocial, cognitive, cultural, and environmental factors that affect persons as they age.
4316. **Integrated Delivery Systems and Organizational Relationships (3:3:0).** An overview of the components and organizational issues of integrated delivery systems.
4317. **Statistics for Healthcare Supervisors (3:3:0).** Introduction to descriptive and inferential statistics, quantitative and qualitative research designs, and relate their application for clinical and managerial operations in a healthcare organization.
4331. **Leadership in Healthcare Organizations (3:3:0).** An overview of management theory and leadership principles. Topics include behavioral and managerial practices with emphasis upon interpersonal relations, problem solving skills, time management, stress management, and wellness.
4352. **Exercise Science and Sports Medicine Management (3:3:0).** Examines issues and skills needed in planning, coordinating, and supervising all administrative components in an exercise science or sports medicine program.
4354. **Rehabilitation Counseling Policy and Practice (3:3:0).** An introduction to the history and philosophy of rehabilitation and the legislative and policy background that give the foundation for rehabilitation counseling.

Graduate Program / Rehabilitation Sciences

Athletic Training. An athletic trainer is an educated and skilled professional specializing in the prevention, treatment, and rehabilitation of injuries common to participation in sport activities as described by the National Athletic Trainers' Association. Athletic trainers are integral members of the health care team, working in cooperation with physicians and other allied health personnel in settings such as secondary schools, colleges and universities, sports medicine clinics, professional sports programs, industrial settings and other healthcare environments.

The master's degree in athletic training is an entry-level program offered at the TTUHSC-Lubbock campus only. To be considered for admission, the candidate must hold a bachelor's degree with a minimum cumulative GPA of 2.7 or above, including the following prerequisites:

Semester Hours

Anatomy and Physiology	6-8
Exercise Physiology	3
Statistics	3
Nutrition	3
Kinesiology	
or Biomechanics	3
First Aid and CPR	

Applications are accepted beginning September 1 preceding the year of expected matriculation. Applications must be received in the School of Allied Health Sciences Admissions and Student Affairs Office by February 1 to be considered for admission into the professional curriculum the following summer. It is the applicant's responsibility to ensure that all required supporting documentation is received by the deadline.

Upon successful completion of the professional program, students may be eligible to sit for the National Athletic Trainers' Association Board of Certification (NATABOC) examination, which is required to practice athletic training in every state except Texas. Upon successful completion of the NATABOC certification examination, students will be eligible to sit for the Texas State Licensure Examination, which is required to practice athletic training in the State of Texas. Additional athletic training licensure registration requirements vary among states according to athletic training practice acts and state regulations governing athletic training.

Occupational Therapy Program. Occupational therapy enables clients to develop or maintain the physical, cognitive, and emotional abilities needed to meet the demands of work, home, and community environments. It may also modify tasks and environments to facilitate optimal performance. The occupational therapist assesses the individual's strengths and weaknesses, determines how these affect ability to function in daily life, and then develops prevention, maintenance, or rehabilitation programs.

Therapists are involved in collaboration with parents, families, and significant others; treatment planning and implementation; administration; research; education; consultation; and service. They also offer services focusing on prevention of impairment and disability.

Occupational therapy practitioners are licensed professionals whose education includes the study of human growth and development with specific emphasis on the social, emotional, and physiological effects of illness and injury. Practitioners must complete supervised clinical internships in a variety of health care settings and pass a national examination.

The Office of Admissions and Student Affairs accepts applications each year between September 1 and March 1 for admission into the class beginning the following May. Applicants wishing to apply for early admission to the program should submit their application by October 15. The entry-level master's degree in occupational therapy is offered at the TTUHSC Lubbock campus only. For more complete admissions information visit www.ttuhs.edu/sah; allied.health@ttuhsc.edu; (806) 743-3220; or mail inquiries to Admissions and Student Affairs, MS 8310, 3601-4th Street, Lubbock, TX 79430.

Prerequisite courses for entry into the master's program include those listed below or their approved equivalents for a total of 90 hours.

Semester Hours

English	6
Physics	3
Anatomy and Physiology w/lab.	6-8
Introductory Psychology	3
Abnormal Psychology	3
Introductory Sociology	3
Statistics	3
Electives	61-63
TOTAL	90

Physical Therapy Program. Physical therapy is a health profession with the primary purpose of promoting optimal human health and function through the application of scientific principles to prevent, identify, assess, correct, and alleviate acute or prolonged movement dysfunction. As members of the health care team, physical therapists evaluate, treat, and instruct human beings to alleviate and/or limit physical disability and pain from injury, disease, and other conditions. Physical therapists may use physical elements such as heat, cold, sound, light, water, exercise, electricity, massage, mobilization, and positioning to reach patient goals.

The entry level degree is the Master of Physical Therapy degree. This degree will be offered at three of the four Texas Tech University Health Sciences campuses: Amarillo, Lubbock, and Odessa.

The Office of Admissions and Student Affairs accepts applications each year between September 1 and February 1 for admission into the class beginning the following May. Applicants wishing to apply for early admission to the program should submit their application by October 15. Class size is limited and all admissions are competitive. It is the applicant's responsibility to assure that all required supporting documentation is received by the deadline.

Prerequisite courses for entry into the master's program include those listed below or their approved equivalents for a total of 90 hours. These courses may be completed at any accredited college or university, but only 66 hours may transfer from a two-year college.

Semester Hours

English/Technical Writing	6
Psychology and Sociology	6
Mathematics	3
Statistics	3
General Biology	8
Anatomy and Physiology	6-8
(1 course must be upper division)	
Gen. Chemistry (lab. required)	8
Gen. Physics (lab. required)	8
Electives*	46-48
TOTAL	90

* **Recommended courses:** Speech, developmental and general psychology.

Upon successful completion of the professional program, students are eligible to take the state licensure examination that is required to practice as a physical therapist.

Further information about the program, school requirements, and other related matters may be obtained from the School of Allied Health Sciences.

Rehabilitation Counseling Program. The last few decades have seen an increasing recognition of the need and right of persons with disabilities to access meaningful work and employment. Rehabilitation counseling specialists work in assisting persons with disabilities to make vocational decisions, obtain employment, and gain independence. Federal legislation, changes in the labor market, and an increasing awareness of the skills and abilities possessed by persons with disabilities have resulted in excellent employment opportunities in this field. State agencies, nonprofit organizations, health care facilities, private rehabilitation firms, insurance companies, health management organizations, probation and corrections, educational institutions, private industry, and research organizations all offer employment to rehabilitation counseling professionals.

Graduate Program (continued from previous page)

The master's degree in rehabilitation counseling is offered by distance education and full-time residency on campus is not required. To be considered for admission, the applicant should hold a bachelor's degree from a regionally accredited college or university and an overall GPA of 2.7 in the last 60 hours of college credit. Provisional admission may be offered to applicant's with a GPA of less than 2.7, but such applications are considered on an individual basis. Graduate Record Examination (GRE) or Millers Analogies Test (MAT) scores are not required for entry into the MRC program. Prior work or volunteer experience in human service settings is considered a valuable attribute for applicants, but is not mandatory. Persons with disabilities are particularly encouraged to apply.

Students may start their program in either the fall or spring semester. Applications must be received in the School of Allied Health Sciences Admissions and Student Affairs Office by July 1 for the fall semester and November 15 for the spring semester. It is the applicant's responsibility to assure that all supporting documentation is received by the deadline. Detailed information on application procedures and admission criteria can be obtained by contacting either the program director at (806) 743-3242 or the School of Allied Health Sciences Admissions and Student Affairs Office (806) 743-3220.

Upon successful completion of the professional program, students may apply to take the rehabilitation counseling certification examination, and if successful, be awarded certification as a Certified Rehabilitation Counselor (CRC).

Students will normally submit a completed application form, transcripts, a letter from the applicant outlining their rationale for applying to the program, 3 letters of reference, and a resume or summary of previous work or voluntary experience in rehabilitation. Qualified candidates will be contacted for an interview.

Program in Rehabilitation Sciences. The mission for the M.S. in Rehabilitation Sciences is to provide master's-level education to licensed rehabilitation clinicians within the greater Texas and Southwest region. An overwhelming majority of practicing OT's and PT's in this region are educated at a baccalaureate level and would benefit from a contemporary education. The M.S. in Rehabilitation Sciences

provides practicing clinicians the opportunity to continue their education while maintaining their current work and home environment.

The degree is entirely distance-based, designed specifically to increase the availability to as many working practitioners as possible. The use of WebCT in association with the Internet will provide a top-quality educational program requiring no coursework requirements on a traditional campus. The program is focused toward the practicing clinicians and their specific needs in today's changing environment, utilizing a mechanism that is student friendly and effective.

The goal of the M.S. in rehabilitation sciences is to offer a superior graduate-level program based on evidence-based research, individualized instruction, and mechanisms for personal growth as a rehabilitative clinician. The 36-credit hour program offers specialization in clinical practice management. The clinical practice management track offers the post-graduate clinician advanced applicable knowledge skills and competencies regarding the business-related components of rehabilitation services delivery.

Doctor of Science in Physical Therapy. The mission of the Doctor of Science in Physical Therapy (Sc.D.) Program is to provide post-professional education to practicing physical therapists in Texas. There is a strong need for advanced clinical mastery and physical therapy, creating unique decisions and functions for practicing physical therapists. The Sc.D. program will provide practitioners with opportunities to develop the advanced knowledge base, clinical skills, and professional competencies needed for state-of-the-art evaluation and treatment of their patients, as well as the successful management of clinical services located in isolated practice settings. The Sc.D. program provides clinicians a means to develop into highly skilled participants in clinical education and research, thus contributing to the growth and development of evidence-based practice within the profession.

Program Description. The Sc.D. is a clinical doctoral degree designed for licensed physical therapy practitioners to develop into advanced clinicians. It emphasizes orthopaedic physical therapy in response to the great number of orthopaedic afflictions suffered by patients from the agrarian economy of West Texas. Over 80 percent of all patients seeking physical therapy services suffer from orthopaedic afflictions. Thus, this program will provide concentrated study at the applied doctoral level in the clinical science areas of orthopaedic physical therapy practice.

The Sc.D. program emphasizes orthopaedic physical therapy diagnostics and manual therapy. Courses will be conducted through a weekend format with web-based course enhancement. Faculty and students communicate with each other in person, via phone or fax, and through the electronic mail or internet. Students entering the program should have ready access to a computer and be familiar with word processing, spreadsheet, and internet applications. Students without computers are required to purchase one and become familiar with it prior to beginning the program.

Admission to the Program. The following requirements will be considered for admission into the program:

- A bachelor's or master's professional degree in physical therapy
- At least one year of clinical experience
- Currently practicing as a physical therapist
- All official college transcripts
- Acceptable grade point average
- Two supporting letters of reference

Application Process. Although applications may be submitted at anytime, applications are considered approximately three months prior to the beginning of each term. It is in the best interest of the applicant to apply as early as possible. Three reference letters are required: two from professional colleagues and one from a previous or present employer.

All application materials should be sent to the Texas Tech University Health Sciences Center, Office of the Registrar, 3601 4th Street, Lubbock, Texas 79430-8310. Applicants should understand that fulfillment of the basic requirements does not guarantee admission.

- 4360, 4361 **Special Topics (3:3:0)**. Guided independent research projects with focus upon a management problem in the clinical support service setting.
4401. **Healthcare Management Information Systems (4:4:0)**. The basic concepts and tools for collecting and analyzing data used by healthcare organizations. Topics include an overview of current desktop computer technology, local area networks (LAN) and integration of information system networks.
- 4477, 4478. **Case Study–Management Project in Special Topics (4:2:4)**. Guided independent management project with a focus upon a problem related to the specialty area of their A.A.S. degree discipline, or professional interest in a healthcare management issue.

Occupational Therapy (AHOT)

Graduate Courses

5071. **Fieldwork II: Specialization (3-6:0:3-6)**. Prerequisite: AHOT 5631, 5632. Optional additional full-time, supervised clinical experience in an area/facility of the student's choice.
5072. **Special Topics in Occupational Therapy (1-3:1-3:0)**. Selected topics of interest to occupational therapy. Please note that this course is not offered every year.
5073. **Individual Projects (1-3:1-3:0)**. Prerequisite: approval of instructor and program director. Provides an opportunity for students to undertake a special project in an area of interest.
5104. **Occupational Therapy Professional Skills I (1:0:3)**. Introduction to key practice skills in occupational therapy. Study of professional organizations, standards of practice, ethics, cultural diversity, and legal issues.
5106. **Fieldwork I: 1 (1:0:3)**. Prerequisite: AHOT 5104, 5312, 5203. Part-time, supervised, opportunity to observe clinical practice and to participate, within limits, in the occupational therapy process with individuals and groups.
5110. **Rehabilitation of the Hand and Upper Extremity (1:0:3)**. Prerequisite: AHOT 5500, 5202, 5336. This course includes a review of basic anatomy with a study of examination skills including special tests, specific treatment techniques, basic treatment planning, and intermediate splinting skills for common injuries and/or conditions in the shoulder, elbow, forearm, wrist, and hand.
5200. **Fieldwork I: 2 (2:0:3)**. Prerequisite: AHOT 5106, 5421, 5423, 5425 Part-time, supervised, opportunity to observe clinical practice and to participate, within limits, in the occupational therapy process with individuals and groups. As possible, this will allow students to explore occupational therapy contributions in "non traditional" or "role emerging" settings. Students will complete treatment notes and a case study on a client seen during Fieldwork I: 2.
5202. **Principles of Kinesiology (2:1:3)**. Corequisite: AHOT 5500 Study of human motion with emphasis on biomechanics fundamental to understanding the clinical application of musculoskeletal evaluation, posture and gait assessment, and exercise.
5205. **Neurodevelopmental Sequences (2:2:2)**. Study of skill progressions in typical and atypical development and neurological recovery; including the sequences for key occupational tasks (ADL, school learning) and performance components (sensory, motor, cognitive).
5221. **Introduction to Research (2:2:0)**. Prerequisite: AHOT 5304. Introduction to the research process with an overview of research design, measurement, ethics, proposal development, and support resources specific to research in occupational therapy.
5224. **Research Methods: Quantitative and Qualitative Approaches (2:2:0)**. Prerequisite: AHOT 5221. Exploration of research methods, with an emphasis on quantitative and qualitative approaches. Evaluation and use of professional literature relevant to clinical practice.
5232. **Advanced Clinical Reasoning (2:2:0)**. Prerequisite: AHOT 5304, 5312. Capstone course using case studies presented by faculty and students to illustrate occupational therapy process, clinical reasoning skills used by novice and experienced therapists, development of a continuing professional education plan, and preparation for the certification exam.
5300. **Current Medical Diagnoses and Treatment (3:3:0)**. Prerequisite: AHOT 5500 Etiology, differential diagnosis, prognosis, and medical-surgical management of disorders and injuries in children and adults relevant to occupational therapy practice.
5302. **Human Neurosciences (3:3:0)**. Prerequisite: AHOT 5500, 5301. A study of the structure and function of the human nervous system, with emphasis on functional and clinical aspects.
5304. **Clinical Assessment and Reasoning (3:2:3)**. Introduction to the evaluation process, including selection of assessment tools and methods, administration, interpretation, documentation, and introduction to clinical reasoning processes.
5306. **Adaptations and Technology (3:2:3)**. Prerequisite: AHOT 5104. Continued study of occupational analysis and therapeutic modalities specific to occupational therapy practice, including assistive technology, prosthetics, and orthotics; and analysis and design/adaptation of the environment as a means of enhancing occupational therapy.
5308. **Psychosocial Aspects of Illness and Disability (3:3:0)**. Psychological diagnoses. Illness and/or disability experiences from the perspective of the individual: Exploration of the psychological and social impact of illness and disability.
5312. **Occupational Therapy Professional Concepts (3:3:0)**. Study of the profession of occupational therapy including historical and philosophical bases, roles and functions, and theoretical foundations of practice.
5336. **Occupational Therapy Professional Skills II (2:1:3)**. Prerequisite: AHOT 5104 Introduction to key practice skills in occupational therapy including basic evaluation skills, basic documentation skills, and introduction to various modalities and splinting.
5401. **Human Physiology (4:4:0)**. Prerequisite: AHOT 5500 Study of the normal function of the human body. The physiology of the different organ systems is presented in relationship to their anatomical, histological, and biochemical features. The physiological adaptations to stress, trauma, disease processes, and congenital defects are discussed with relevance to the clinical practices of occupational therapy.
5422. **Occupational Function/Dysfunction: Children and Adolescents II (4:3:3)**. Prerequisite: AHOT 5421, 5433. Overview of the physical, psychological, and cognitive issues commonly seen in infants, children, and teens, and the impact of these conditions on occupational performance. Theories that guide pediatric practice. Focus on the occupational therapy process (including evaluation and treatment planning, with young children and their families, school-aged students and adolescents.) Includes family-centered and multidisciplinary collaborative approaches.
5423. **Occupational Function/Dysfunction: Adults I (4:3:3)**. Prerequisite: AHOT 5500, 5300, 5303, 5302, 5308, 5202. This course is the first in a series of two Adult Function/Dysfunction courses. This course covers content on theory, frames of reference, basic documentation, and the occupational therapy process in adult treatment sessions. This course also covers the treatment team and treatment settings found in adult settings. Occupational therapy intervention in cardiac and orthopedic diagnoses will be discussed.
5424. **Occupational Function/Dysfunction: Adults II (4:3:3)**. Prerequisite: AHOT 5423. This course is the second in a series of two Adult Function/Dysfunction courses. This course covers application of frames of reference, documentation, diagnoses, assessment, and the occupational therapy process in adult treatment sessions. This course continues to build on information covered in Medical Diagnosis and focuses on occupational therapy intervention. This course is also designed to prepare the MOT 2 students for their physical disabilities fieldwork I placement immediately following this course.
5425. **Occupational Function/Dysfunction: Older Adults I (4:3:3)**. Prerequisite: AHOT 5433, 5304, 5306, 5304. Overview of the physical, psychosocial, and cognitive issues commonly seen in older adults and the impact of these conditions on occupational performance. Focus on the occupational therapy process in a variety of settings.
5432. **Occupational Function/Dysfunction: Children and Adolescents III (4:4:3)**. Prerequisite: AHOT 5422. Overview of the physical, psychological, and cognitive issues commonly seen in infants, children, and teens, and the impact of these conditions on occupational performance. Theories that guide pediatric practice. Focus on the occupational therapy process (including evaluation and treatment planning, with young children and their families, school-aged students and adolescents.) Includes family-centered and multidisciplinary collaborative approaches.

5500. **Human Anatomy (5:0:15).** Study of human anatomy including integration of gross morphology of the body with the developmental and histological aspects of the human body. Human cadaver dissection is the primary lab activity.
5931. **Fieldwork II: 1 (6:0:6).** Prerequisite: Successful completion of all previous professional and fieldwork courses and approval of program director. Full-time, supervised clinical experience for 12 weeks (480 hours). Development of knowledge and skills needed for entry-level practice. Use of the occupational therapy process, working with individuals and groups. Introduction to clinical administration, supervision, quality assurance, consultation, and research.
5932. **Fieldwork II: 2 (6:0:6).** Prerequisite: Successful completion of all previous professional and fieldwork courses and approval of program director. Further full-time, supervised clinical experience for 12 weeks (480 hours). Development of knowledge and skills needed for entry-level practice. Use of the occupational therapy process, working with individuals and groups. Introduction to clinical administration, supervision, quality assurance, consultation, and research.

Physical Therapy (AHPT)

Graduate Courses

5099. **Independent Study in Physical Therapy (V1-6).** Prerequisite: Instructor approval. A structured review of previously presented classroom and/or laboratory experiences, literature review and discussion, clinical observation and/or hands-on clinical experience.
5104. **Clinical Education (1:1:0).** This course emphasizes the different forms of communication necessary for the PT to succeed as a professional, including written, verbal and nonverbal.
5122. **Residual Limb Care and Prosthetics (1:1:0).** Prerequisite: AHPT 5505, 5506. Study of technological materials and devices used in rehabilitation of patients with residual limbs. Includes in-depth study of materials, biomechanics, and proper fit of upper and lower extremity prostheses. Selection criteria for prosthetics, gait disturbances, and physical therapy management for persons with recent amputations are also included.
5128. **Research Process 3 (1:1:0).** Prerequisite: AHPT 5127. Provides students an opportunity to critically evaluate measurement systems (e.g., subjective clinical assessment tools; EMG) that are commonly used in physical therapy to assess therapeutic outcomes. Theory of operation, measurement accuracy and reliability, and interpretations of findings are discussed for each measurement system. In preparation for performing group research projects, student groups will present their research proposal to the class, which will critically assess the experimental design.
5142. **Current Medical Diagnosis and Treatment 2 (1:1:0).** Corequisite: AHPT 5444. Etiology, differential diagnosis, prognosis, and medical-surgical management of disorders and injuries in adults with neurological conditions.
5150. **Women's Physical Therapy (1:1:0).** Physical therapy prevention, examination, evaluation, and intervention for conditions with specific relevance for women. Developmental issues of special relevance during the childbearing and child-rearing years and later in life will be covered. At the students option observation in labor and delivery may be arranged.
5152. **Seminar in Physical Therapy 1 (1:1:0).** A seminar course examining current clinical and environmental issues in the field of physical therapy. Specific subject matter will change year to year.
5156. **Seminar in Physical Therapy 2 (1:1:0).** A seminar course examining current clinical and environmental issues in the field of physical therapy. Specific subject matter will change year to year.
5158. **Seminar in Physical Therapy 3 (1:1:0).** A seminar course examining current clinical and environmental issues in the field of physical therapy. Specific subject matter will change year to year.
5200. **Introduction to Patient Management (2:1:3).** Introduction to basic clinical skills in the field of physical therapy, medical terminology and basic documentation. Includes transfer techniques, gait training, massage, vital signs, emergency procedures and use of special equipment.
5202. **Principles of Kinesiology (2:1:3).** An in-depth study of applied human anatomy and basic kinesiology with emphasis on normal gross form and function as it relates to physical therapy practice. Hands-on surface anatomy and palpation labs are utilized.
5204. **Health Care Issues and Ethics (2:2:0).** Study of the principles of ethics and the application of ethical principles in health care settings. Special emphasis on ethical dilemmas relevant to the practice of physical therapy including current issues and problems affecting health care.
5205. **Neuroscience I (2:2:0).** An introduction to nervous system function and pathophysiology. Emphasis is placed on axon physiology and its relevance to electrical modalities, synaptic neurotransmission, and nervous system anatomy. Students are introduced to pathologies of the nervous, and the corresponding neurorehabilitative physical therapy treatments.
5206. **Pharmacology (2:2:0).** Study of pharmacology and its relationship to pathophysiology, emphasizing the implications for the practice of physical therapy. Basic principles of pharmacology and pharmacokinetics are addressed with focus on the mechanism of action and effects of specific drugs on the musculoskeletal, cardiovascular and central nervous system.
5208. **Management of Acute Injuries (2:1:3).** Focus on introducing the physical therapy student to the field of athletic training and the management of acute injuries.
5220. **Musculoskeletal Evaluation and Management 1 (2:1:3).** Prerequisite: AHPT 5506. Theory, principles, clinical applications and literature review associated with physical therapy evaluation, assessment, and management of musculoskeletal conditions within the upper extremity.
5223. **Research Process 1 (2:2:0).** Introduces students to fundamentals of experimental research design. Through the use of lecture, class discussion, and reading of selected journal articles, students will obtain the requisite knowledge of the research process and experimental designs commonly used in clinical studies. Fundamental concepts of statistical inference to be continued in Research Process 2.
5227. **Current Medical Diagnosis and Treatment 1 (2:2:0).** Corequisite: AHPT 5529. Physician presentation of the medical approach to the management of musculoskeletal disorders and afflictions, including etiology, differential diagnosis, prognosis, medical and surgical management, and prophylactic measures for each condition relevant to physical therapy.
5228. **Motor Control and Learning (2:2:0).** Prerequisite: AHPT 5205. A clinical review of the principles of motor behavior and learning and their impact of the treatment development process of the physical therapist is the focus of the course.
5231. **Clinical Reasoning 1 (2:1:3).** A structured, interactive review of previously presented classroom material is presented in a facilitation-based learning format. Positioning of the course at the completion of the first year allows a comprehensive learning framework and review. Class learning method-interactive discussion, presentation, and online supplementary review.
5232. **Clinical Reasoning 2 (2:1:3).** Prerequisite: AHPT 5231. A structured, interactive review of previously presented classroom material is presented in a facilitation-based learning format. Positioning of the course at the completion of the second year allows a comprehensive learning framework and review. Class learning method-interactive discussion, presentation, and online supplementary review.
5233. **Clinical Reasoning 3 (2:1:3).** Prerequisite: AHPT 5232. A structured, interactive review of previously presented classroom material is presented in a facilitation-based learning format. Positioning of the course at the completion of the third year allows a comprehensive learning framework and review. Class learning method-interactive discussion, presentation, and online supplementary review.
5234. **Graduate Seminar (2:2:0).** Prerequisite: AHPT 5233. Integrative seminar course format designed to prepare graduates for the licensure examination and entering the work force. Learning method includes online supplementary review and seminar format.
5235. **Health Care Business Administration (2:2:0).** Prerequisite: AHPT 5240. The process involved with organizing, directing, developing, and measuring the management and entrepreneurial components of a physical therapy practice.
5240. **Personnel Management (2:2:0).** Prerequisite: AHPT 5204. Provides initial personnel management perspectives needed by the entry-level physical therapist in a clinical setting.

5243. **Current Medical Diagnosis and Treatment 3 (1:1:0)**. Corequisite: AHPT 5343. Designed to provide information on cardiopulmonary disorders frequently encountered by physical therapists. Physician's presentation of etiology, pathology, clinical signs and symptoms, diagnosis, prognosis, medical/surgical treatment of cardiopulmonary disorders relevant to physical therapy practice.
5245. **Orthotic Devices (2:1:3)**. Prerequisite: AHPT 5122. Study of orthotic devices used in physical therapy management, including in-depth study of materials, biomechanics, and construction of upper and lower extremity orthoses, spinal orthoses, and wheelchair options.
5304. **Clinical Applied Physiology (3:2:3)**. Prerequisite: AHPT 5505. Metabolism, mechanical efficiency, aerobic and anaerobic work, and muscle phenomena of strength, endurance, fatigue, respiration and exercise, maximal aerobic power assessment, prediction of aerobic power, normal physiological responses to acute and chronic exercise, and physical training principles will be discussed.
5305. **Clinical Kinesiology (3:2:3)**. Prerequisite: AHPT 5202. Problem-solving approach to the study of human movement with integration of biomechanics fundamental to understanding exercise concepts and musculoskeletal evaluation.
5320. **Early Growth and Development (3:3:0)**. Prerequisites: Pathophysiology of Body Systems and AHPT 5321. Study of human development issues and theories relevant to the practice of physical therapy for children. Emphasis on typical and atypical physical growth and motor development and on developmental testing.
5321. **Adult Development and Aging (3:3:0)**. In-depth approach to the physical, psychological, emotional, cultural, and socioeconomic influences involved with adult development. Considerable emphasis is placed on age-related changes and current literature regarding effective treatment of this area.
5336. **Clinical Experience 1 (3:0:9)**. Prerequisite: AHPT 5506, 5304. This six-week full-time clinical experience allows the student to practice acquired skills and learn additional basic clinical skills while acting as a student physical therapist under the direct supervision of a licensed professional.
5338. **Clinical Experience 2 (3:0:9)**. Prerequisite: AHPT 5529. This six-week full-time clinical experience allows the student to practice acquired skills and learn additional clinical skills including all basic and advanced orthopedic skills while acting as a student physical therapist under the direct supervision of a licensed professional.
5341. **Developmental Evaluation and Management (3:2:3)**. Prerequisites: AHPT 5320. Introduction to the modification of physical therapy evaluation and management for the special developmental needs of pediatric persons with orthopedic or neuromuscular conditions. Includes physical therapy evaluation and management of cerebral palsy, spina bifida, mental retardation, osteogenesis imperfecta, arthrogryposis multiplex congenital hemophilia, perinatal brachial plexus injury, muscular dystrophy and developmental or congenital musculoskeletal deformities, deficiencies and malformations.
5343. **Cardiopulmonary Evaluation and Management (3:2:3)**. Prerequisite: AHPT 5304. Scientific basis, rationale and application of assessment, prevention and treatment principles, and techniques for patients with acute and chronic cardiopulmonary disorders. Comprehensive and in-depth physical therapy evaluation and management of patients with multi-system disorders will be discussed.
5405. **Pathophysiology of Body Systems (4:4:0)**. Focuses on general physiological principles of diseases and disorders that affect organ systems of the body, with an emphasis on integrating the interrelationship between different organ systems in the context of clinical correlations relevant to physical therapists.
5420. **Neuroscience 2 (4:3:3)**. Prerequisite: AHPT 5205. Examination of the human nervous system, with an emphasis on the functional relationships of neuroanatomical structures.
5444. **Adult Neurological Assessment and Rehabilitation (4:3:3)**. Prerequisite: AHPT 5228. Physical therapy evaluation and intervention for adults with neurological conditions, including the study of acquired nonprogressive and progressive disorders of the central nervous system, polyneuropathies, nonprogressive disorders of the spinal cord, and disorders of the vestibular system.
5446. **Clinical Experience 3 (4:0:12)**. Prerequisite: AHPT 5444, 5341. This eight-week full-time clinical experience allows the student to practice all previously acquired skills and learn additional clinical skills as the culmination of physical therapy training, while acting as a student physical therapist under the direct supervision of a licensed professional.
5448. **Clinical Experience 4 (4:0:12)**. Prerequisite: AHPT 5444, 5341. This eight-week full-time clinical experience allows the student to practice all previously acquired skills and learn additional clinical skills as the culmination of physical therapy training, while acting as a student physical therapist under the direct supervision of a licensed professional.
5500. **Human Anatomy (5:3:6)**. Integrated study of gross human anatomy embodying gross morphology and coordinating with developmental and histological aspects of the body. Included is regional dissection with emphasis on the integumentary, musculoskeletal, nervous, circulatory and respiratory systems.
5505. **Patient Evaluation and Management 1 (5:3:6)**. Prerequisite: AHPT 5200. Includes basic evaluation skills such as history-taking in the acute care and outpatient settings, chart review, goniometry, manual muscle testing, and sensory testing.
5506. **Patient Evaluation and Management 2 (5:3:6)**. Prerequisite: AHPT 5401, AHPT 5505. Theory, principles, literature review and clinical applications associated with physical therapy evaluation assessment and management.
5529. **Musculoskeletal Evaluation and Management 2 (5:3:6)**. Prerequisite: AHPT 5220. Theory, principles, clinical applications, and literature review associated with physical therapy evaluation, assessment, and management of musculoskeletal conditions within the lower extremity and spine.
6201. **Advanced Clinical Practice for Shoulder Afflictions (2:2:0)**. Examination and treatment of dysfunction in the shoulder complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches to arthritis/arthrosis, impingement, instability, labral afflictions, and soft tissue lesions. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6202. **Advanced Clinical Practice for Elbow & Forearm Afflictions (2:2:0)**. Examination and treatment of dysfunction in the elbow/forearm complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6203. **Advanced Clinical Practice for Wrist & Hand Afflictions (2:2:0)**. Examination and treatment of dysfunction in the wrist / hand complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6204. **Advanced Clinical Practice for Hip Afflictions (2:2:0)**. Examination and treatment of dysfunction in the hip complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6205. **Advanced Clinical Practice for Knee Afflictions (2:2:0)**. Examination and treatment of dysfunction in the knee complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6206. **Advanced Clinical Practice for Ankle & Foot Afflictions (2:2:0)**. Examination and treatment of dysfunction in the ankle / foot complex. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special

- tests, soft tissue treatments, and joint-specific treatment measures.
6207. **Advanced Clinical Practice for Upper Cervical Spine Afflictions (2:2:0).** Examination and treatment of dysfunction in the upper cervical complex. The lecture components of this course include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6208. **Advanced Clinical Practice for Lower Cervical Spine (Disc Segment) Afflictions (2:2:0).** Examination and treatment of dysfunction in the cervical disc segments (CDS). Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6209. **Advanced Clinical Practice for Cervico-Thoracic Junction Afflictions & TOS (2:2:0).** Examination and treatment of dysfunction in the cervico-thoracic junction. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6210. **Advanced Clinical Practice for Thoracic Spine and Rib Afflictions (2:2:0).** Examination and treatment of dysfunction in the thoracic spine and ribs. Lecture components of include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6211. **Advanced Clinical Practice for Sacroiliac and Lumbar Primary Disc Afflictions (2:2:0).** Examination and treatment of lumbar 1 degree disc related disorders, as well as dysfunction at the sacroiliac joint. Lectures include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, treatment to 1 degree disc afflictions, and joint-specific treatment measures to the sacroiliac joint.
6212. **Advanced Clinical Practice for Lumbar Secondary Disc Afflictions (2:2:0).** Examination and treatment of 2 degree disc related disorders in the lumbar spine. Lecture components include advancements in patho-anatomy, biomechanics, interpretation of functional examination, pathology, and treatment approaches. Clinical laboratory sessions include surface anatomy, basic functional examination and special tests, soft tissue treatments, and joint-specific treatment measures.
6213. **Clinical Internship (2:2:0).** Prerequisite: 6 of the previously listed clinical courses. Sc.D.,P.T. students will be given the opportunity to develop and enhance advanced clinical skills associated with evaluation and treatment of the extremities. Students will be guided by a clinical mentor and will use skills in problem solving, diagnosis, treatment selection, and management implementation for orthopaedic dysfunction in the spine and or extremities.
6214. **Clinical Internship 2 (2:2:0).** Prerequisite: All 12 of the previously listed clinical courses. Students, guided by a clinical mentor, will be given the opportunity to develop and enhance advanced clinical skills associated with evaluation and treatment of the spine.
6215. **Research Internship I (2:2:0).** Prerequisite: AHPT 6201 through 6212. Sc.D. students will be given the opportunity to conduct directed literature review and concept development that pursues a line of inquiry that is agreed upon between the student and faculty mentor. A manuscript will be required for course completion.
6216. **Research Internship II (2:2:0).** Prerequisite: AHPT 6201 through 6212 and 6215. Sc.D. students will continue the process begun in AHPT 6215, with emphasis on the development of concepts and hypotheses, analysis and synthesis of ideas, and evaluation of current clinical research practices in the pre-elected area of study. A manuscript will be required for course completion.
6301. **Issues in Orthopaedic Physical Therapy and Manual Therapy 1 (3:3:0).** Survey of the professional issues surrounding the advanced practice of orthopaedic physical therapy and manual therapy., including history of orthopaedic manual therapy, legal and ethical aspects of manual therapy, risk management, and communication and patient education in clinical management.
6302. **Issues in Orthopaedic Physical Therapy and Manual Therapy 2 (3:3:0).** Survey of selected topics in basic and applied science as they relate to orthopaedic physical therapy and manual therapy, including neurophysiology, histology, exercise physiology, and applied medical science.
6303. **Basic and Applied Science in Orthopaedics (3:3:0).** Prerequisite: AHPT 7302 or consent of the instructor. Addresses select basic science processes associated within the musculoskeletal system, including histology and physiology of bone, cartilage, tendons, and ligaments. Muscle physiology will be discussed as it relates to orthopaedic dysfunction.
6304. **Orthopaedic Physical Therapy Screening (3:3:0).** Enhances knowledge and clinical skills designed to assist in the screening of patients for orthopaedic conditions which require examination by a physician. Radiology and laboratory screening are presented as special topics to further the therapist's understanding of pathology and the clinical implications of patient presentation.
6305. **Updates in Orthopaedic Surgical Management (3:3:0).** Evaluation of recent developments from the literature in orthopaedic surgical management, in terms of indications, methodology, and rehabilitation. Emphasis will be placed on the implications of each procedure for rehabilitation.
6311. **Clinical Studies in Anatomy; a Lab Course (3:3:0).** Evaluation of prosected human cadaveric specimens with emphasis on musculoskeletal structures. Each session will include a short lecture at the beginning for review of anatomical structures to be observed, as well as the relevance of each of those structures to examination and treatment of orthopaedic afflictions.
6312. **Neuroscience in Orthopaedic Physical Therapy (3:3:0).** Prerequisite: AHPT 6302 or consent of the instructor. Addresses select neuroscience processes associated within the musculoskeletal system, including the neuroscience of motor planning, initiation and control; sensory function and integration; and dysfunction of the nervous system as it relates to orthopaedic afflictions such as pain production and control.
6313. **Biomechanics in Orthopaedic Physical Therapy (3:3:0).** Theory and application of biomechanical principles to orthopaedic physical therapy practice emphasizing the biomechanics of musculoskeletal structures, including bone, cartilage, ligament, tendon, and muscle tissue. Emphasis on joint and tissue mechanics will be related to musculoskeletal injury and orthopaedic affliction.
6314. **Motor Control in Orthopaedic Physical Therapy (3:3:0).** Relates theory and application of motor control and learning principles to orthopaedic physical therapy practice. Emphasis on motor control strategies associated with musculoskeletal function, and motor control dysfunction associated with orthopaedic pathologies.
6315. **Advanced Health Care Administration (3:3:0).** Addresses fundamental and contemporary issues in organization and management of physical therapy services, with an emphasis on the ambulatory setting. Topics will include design, structure, and effective operation of contemporary healthcare services; strategic planning, conflict resolution, managed care systems, insurance regulations, and 3rd-party reimbursement.
6316. **Marketing in Outpatient Physical Therapy (3:3:0).** Addresses fundamental and contemporary issues in marketing as they apply to outpatient physical therapy services, including epidemiology, market analysis, managerial economics, financial planning, marketing strategy decisions, structural relationships, marketing tactics, forecasting, marketing ethics, and entrepreneurship.
7000. **Clinical Research/Education Project (V1-3).** Independent clinical project centering on either a clinical research or teaching design. Content and goals will be established through mutual consent between the student and the project committee.
7104. **Clinical Research/Education Project Presentation (1:1:0).** Student presents the development and findings from the clinical project (with either a research or

teaching emphasis) before the Sc.D.,P.T. faculty, other students, and clinicians from the community.

7301. **Seminar in Clinical Research Design (3:3:0).** Study of methods in clinical research. Processes of obtaining, processing, interpreting, and using clinical data.
7302. **Non-Parametric Statistics for Clinical Research (3:3:0).** Methods in non-parametric statistical analysis and qualitative design. Explore various non-parametric tools and include one, two, and k-sample designs. Emphasis on clinical research using either single-case or small clinical samples.
7303. **Instructional Technology in Allied Health (3:3:0).** Use of technology in educational instruction and evaluation including computer-assisted instructional design, as well as Web-based educational models and design.
7304. **Educational Evaluation in Allied Health (3:3:0).** Discussion of educational evaluation theory and tools, emphasizing methods of objective and performance-based evaluation. Students will learn to draft specific evaluation measures used in an educational setting.
7305. **Curriculum Design and Teaching in Allied Health (3:3:0).** Discussion of the theories and applications of curriculum design, emphasizing applications to entry-level and post-professional educational settings in physical therapy.
7306. **Parametric Statistics for Clinical Research (3:3:0).** Introduces various tools used in parametric statistical analysis including correlation, regression, t-test, analysis of variance, and selected multivariate designs. Emphasis will be placed on research findings that evaluate specific clinical populations.

Rehabilitation Counseling (AHRC)

Graduate Courses

5301. **Foundations of Rehabilitation Counseling (3:3:0).** Introduction to the history and philosophy of rehabilitation, and the legislative and policy background underpinning the modern delivery of rehabilitation counseling services.
5302. **Counseling Theories (3:3:0).** Introduction to the principles of behavior, personality, and human development. Exploration of individual, group, and family counseling theories and practices as they apply to persons with disabilities.
5303. **Medical Aspects of Disability (3:3:0).** Introduction to the medical aspects and implications of disability. Review of medical terminology, functional limitations, medical treatment and vocational implications as they apply to VR. The identification of appropriate medical intervention resources is discussed.
5304. **Vocational and Career Development (3:3:0).** Major theories and approaches to career development and exploration, with particular emphasis on the importance of meaningful employment and a career focus.
5305. **Case Management (3:3:0).** Review of the case management process, including case finding, service coordination, and client advocacy. Discussion of the planning process to maximize personal independence, and the role of the VR process in the identification and use of community resources. The role of computer technology in caseload management, functional assessment, job matching, etc.
5306. **Psycho-Social Aspects of Disability (3:3:0).** Exploration of the psychological and social aspects of disability, with particular emphasis on the impact of the disability experience from the perspective of the VR services consumer.
5308. **Research Methodologies and Interpretation of Research Findings (3:3:0).** Exploration of current trends in research in rehabilitation and related fields. Basic research design, methodologies, analysis, and interpretation will be reviewed. A discussion of the applications of research methodologies, findings, and interpretations in guiding and evaluating rehabilitation counseling practice (e.g. - choosing interventions, planning assessments, evaluating results, etc.) is also included.
5315. **Special Topics/Seminars in Rehabilitation Counseling (3:3:0).** Specialized seminars or courses in specific areas of VR as identified by faculty, students, or the community.
5321. **Vocational Assessment (3:3:0).** Exploration of the approaches, techniques, instruments, and interpretation of vocational assessment, with a strong emphasis on the identification and integration of assessment information from a multidisciplinary perspective.
5322. **Employment Development and Placement (3:3:0).** The roles and techniques involved in the development of employment options and placement of persons with disabilities in employment are explored in-depth. Topic areas to be explored include job analysis, job development, work site modification, ergonomics, role of assistive technology, job placement, employer contacts, supported employment, post placement support, job coaching, and building natural supports.
5342. **Rehabilitation and Substance Abuse (3:3:0).** This course will provide instruction in the issues and treatment of substance abuse as they pertain to persons with disabilities. Attention will be given to treatment modalities, exploring research topics, and building counseling techniques appropriate for this area of service provision.
5346. **Psychiatric Rehabilitation (3:3:0).** Addresses the issues and methods of working with persons that experience psychiatric disabilities. The course will cover areas of psychopathology, assessment issues, treatment and service options, and vocational and integration issues.
5348. **Life Care Planning (3:3:0).** This course will provide an introduction to the process of life care planning. Students will be instructed on the LCP process, ethical considerations, forensic testimony, and service delivery issues.
5350. **Professional Orientation (3:3:0).** This course is required for licensure as a professional counselor (LPC). It focuses on gaining an overall understanding of the counseling profession, familiarity with licensure and certification procedures, reviewing ethical standards and requirements, gain an understanding of the counselor's professional identity, and being exposed to current issues facing the counseling field. Students wanting to take this course will need to contact their academic advisor.
5351. **Human Growth and Development (3:3:0).** This course is required for licensure as a professional counselor (LPC). Human growth and development from conception through senescence, focusing on cognitive, affective, social, and psychomotor development through the lifespan. Students wanting to take this course will need to contact their academic advisor.
5354. **Group Process and Practice (3:3:0).** This course is required for licensure as a professional (LPC). It focuses on understanding the stages of group development, helping students become familiar with the various models of group facilitation, developing skills in group intervention design and implementation, and developing skills in group design and implementation. Students wanting to take this course will need to contact their academic advisor.
5416. **Clinical Internship I (4:4:0).** Supervised VR counseling internship located in a rehabilitation counseling services setting. Internship activities will include an orientation to program components, policies and procedures; an introduction to staff and their role and function; review of confidentiality and ethical standards; observation of all aspects of VR counseling services; work assignments encompassing the tasks of regularly employed VR counselors from intake to placement and/or discharge; reporting/charting and all documentation requirements as set forth by the organization, and evaluation of student performance (including self-evaluation, field site supervisor evaluation, and faculty supervisor evaluation).
5517. **Clinical Internship II (5:5:0).** Supervised VR counseling internship located in a Rehabilitation Counseling services setting. Internship activities will include an orientation to program components, policies and procedures; an introduction to staff and their role and function; review of confidentiality and ethical standards; observation of all aspects of VR counseling services; work assignments encompassing the tasks of regularly employed VR counselors from intake to placement and/or discharge; reporting/charting and all documentation requirements as set forth by the organization, and evaluation of student performance (including self-evaluation, field site supervisor evaluation, and faculty supervisor evaluation).
5611. **Practicum (6:6:0).** Supervised rehabilitation counseling practicum fostering personal growth, skills development, and insights into the VR process and issues that affect service delivery. Includes both on-campus and classroom experiences (audio/ videotape and individual/group interactions) and off-campus experiences in settings that facilitate the development of basic rehabilitation counseling and practice skills. This course may be repeated if the 100 hour requirement is not met.

Rehabilitation Sciences (AHRS)**Graduate Courses**

5301. **Foundations of Rehabilitation-Principles and Practice (3:3:0).** Foundations of rehabilitation is designed to expose the learner to the history and underlying evolution of rehabilitation, including issues associated with the evolving position that rehabilitative providers face. AHRS 5301 consists of current practice patterns, paradigms, and theoretical treatment models. Additionally, the driving forces that make up our clinical models are discussed and evaluated for effectiveness.
5302. **Consumer Dimensions of Rehabilitation (3:3:0).** This course is designed to give the student an understanding of the influence of the consumer on the rehabilitation profession. The course provides an in-depth assessment of alternative products, consumer fraud, and rehabilitation practices that lack scientific merit.
5303. **Quantitative Research Methods (3:3:0).** Provides the learner understanding in the basic statistical and methodological principles underlying clinical and theoretical research, and techniques and methods of conducting appropriate literature reviews.
5304. **Qualitative Research Methods (3:3:0).** Assists the learner in creating a clinical, outcome, or practice-based research proposal or literature review.
5305. **Medical Aspects of Rehabilitation (3:3:0).** This course presents current medical issues that influence the treatment decision-making model in practice. Topics such as Neurological, Cardiopulmonary, and Orthopedic Issues, discussed by physicians or medical experts, are included in the coursework. The course is designed to encompass the realm of medicative side effects and condition altering situations.
5306. **The Health Care Delivery System (3:3:0).** This course provides the student with the basic understanding of the local and international origins, evolution, and trends in institutional and non-traditional health care delivery. Other professions are discussed in detail, as are the inner workings of the hospital and institutional healthcare environment.
5307. **Health Care Management (3:3:0).** The course includes personnel management and the process that is involved with organizing, directing, developing, and measuring the management components of a physical medicine practice. AHRS 5307 includes Human Resources decision making, motivation, and employee management.
5308. **Business Statistics (3:3:0).** Business statistics is designed to provide the learner with the basic Excel statistical skills required in analyzing, reporting, charting and budgeting for clinical practice.
5309. **Coding and Rehabilitation Law (3:3:0).** The course is designed to provide the learner with current coding and rehabilitation practice laws. Case studies and practice analyses assist the learner in applicable digestion of the material.
5311. **Health Care Finance and Resource Management (3:3:0).** This course is designed to increase the learner's ability to work with finance-based equations, familiarize themselves with income statements and balance sheets, and increase their effectiveness in allocating and controlling financial resources.
5312. **Market Assessment and Strategic Management in Rehabilitation (3:3:0).** Includes the components associated with business entry, budgeting, and business progression. Entrepreneurial skills, marketing, project development, and market growth are significant components of this coursework. Industry life cycles and product life cycle reviews are critical to the class content.
5317. **Public Policy (3:3:0).** This course focuses on public policy, legislative processes, insurance and financial planning, retirement income, protective services, and legal issues that affect the population, especially older individuals. The course investigates current events related to the public policy implementation, using both educational and consumer based literature.
5318. **Independent Study (3:3:0).** Students are offered the choice of doing an independent comprehensive literature review, research, or practice-based work related to gerontology. Students design their study plan with faculty assistance.



Graduate School of Biomedical Sciences

Dr. Roderick Nairn, *Dean*

About the Program

Development of a strong program of graduate education in the basic biomedical and related health sciences is one of the responsibilities and goals of the Texas Tech University Health Sciences Center. Present-day medicine cannot exist outside the academic framework and intellectual discipline which the biological, chemical, and medical sciences provide. Graduate training in these areas, an integral component of the overall program of the Health Sciences Center, is provided by the Graduate School of Biomedical Sciences.

Opportunities are offered for study and research leading to the following degrees:

- Master of Science in Biotechnology
- Master of Science in Cell and Molecular Biology
- Master of Science in Health Services Research
- Master of Science in Medical Biochemistry
- Master of Science in Medical Microbiology
- Master of Science in Pharmaceutical Sciences
- Master of Science in Pharmacology
- Master of Science in Physiology
- Doctor of Philosophy in Cell and Molecular Biology
- Doctor of Philosophy in Medical Biochemistry
- Doctor of Philosophy in Medical Microbiology
- Doctor of Philosophy in Pharmaceutical Sciences
- Doctor of Philosophy in Pharmacology
- Doctor of Philosophy in Physiology

Individual program descriptions can be found within the specific department or program sections in this catalog.

Students interested in pursuing a career in academic medicine as a physician-scientist may apply simultaneously to the School of Medicine and the Graduate School of Biomedical Sciences. The M.D.-Ph.D. program permits a student to complete the requirements of both the degrees in one of the approved graduate programs. M.D.-Ph.D. students may receive a stipend, tuition scholarships for both the medical and graduate portions of the program, and health insurance for the duration of the stipend. This program is designed to be completed in seven years and will provide the student with rigorous training in both clinical medicine and biomedical research. Students interested in this program should so indicate on the application forms they simultaneously submit to both the TTUHSC School of Medicine and the Graduate School of Biomedical Sciences.

The graduate courses listed in this section are available to graduate students at Texas Tech University or other qualified applicants as a graduate interdisciplinary student (GIDS). Applications must be made to the Graduate School of Biomedical Sciences, the application fee (\$30 for U.S. citizens and \$55 for international students) paid, and registration accomplished at TTUHSC. Currently enrolled TTUHSC and TTU students are exempt from the fee.

Further information about graduate programs offered through the Health Sciences Center Graduate School of Biomedical Sciences may be obtained by contacting the Graduate School of Biomedical Sciences, Texas Tech University Health Sciences Center, Lubbock, Texas 79430, (806) 743-2556, 1-800-528-5391, FAX (806) 743-2656, or e-mail graduate.school@ttuhsc.edu. Access our website: www.ttuhsc.edu/gsbs for more information and to apply online.

The policies and procedures for the Graduate School of Biomedical Sciences differ from those established by Texas Tech University Graduate School. Policy information is available on the web site at www.ttuhsc.edu/gsbs. Programs are subject to change, depending on availability of resources and educational goals.



Interdisciplinary Courses

The following interdisciplinary courses are available in addition to course offerings in the individual departments and divisions throughout the Graduate School of Biomedical Sciences.

Graduate School of Biomedical Sciences (GSBS)

(To interpret course descriptions, see pg. 10.)

5101. Responsible Conduct of Research (1:1:0) This course will address the regulatory and ethical environment of today's biomedical research using lectures and case discussions. Course is required for all students.

Neuroscience (GIDN)

5910. Integrated Neurosciences (9:8:1). This cooperative, interdepartmental effort offers a detailed study of the nervous system. Students examine both gross and fine structure and function from the subcellular through the behavioral level. (GPHY 5910)

Health Communications (GIHC)

5315. Health Information Research (3:3:0). Critical examination and synthesis of past and ongoing research in the health information process including Internet training.

5319. Seminar in Current Topics of Information Sciences (3:3:0). Prerequisite: Must be enrolled or accepted in a graduate program. This course will vary each semester emphasizing information science topics including Internet training.

Preventive Medicine (GIPM)

6303. Principles of Epidemiology (3:3:0). Considers the variety, behavior, and distribution of both infectious and noninfectious diseases in populations. It will show how an understanding of the etiology, transmission, and pathogenesis of disease can lead to methods of disease prevention. Emphasis will be placed on the principles and methods of epidemiologic investigation. Arranged. F.

6304. Topics in Community Health (3:3:0). Consider various topics in epidemiology, preventive medicine, and community health not normally included in other courses. Emphasis on the interactions of various agencies in the community to abate hazards and promote health. May be repeated for credit with change in content. Arranged.

Department of Cell Biology and Biochemistry

Faculty

Harry M. Weitlauf, Chairperson

Professors: Chilton, Everse, Faust, Hutson, Pence, Phillips, Reid, Stocco, and Weitlauf;
Associate Professors: Beale, Coates, Cornwall, Hardy, Lee, Little, MacDonald, Pelley, Sridhara, Whelly, Williams, and Wright;
Assistant Professors: Coué, Pfarr, Schneider, Urbatsch, and Webster.

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Cell and Molecular Biology
- Master of Science in Biotechnology
- Master of Science in Medical Biochemistry
- Doctor of Philosophy in Cell and Molecular Biology
- Doctor of Philosophy in Medical Biochemistry

Cell and Molecular Biology. The purpose of the Ph.D. program is to prepare students for careers in cellular, developmental, and molecular biology. Employment opportunities for graduates of this program include traditional university professorships, positions in the biotechnology industry, and governmental appointments. The curriculum centers around four courses: Cell Function and Structure, Mechanisms of Cellular Differentiation, Cell Cycle, and Medical Biochemistry. During the first year of study, the student will progress through a minimum of three laboratory rotations in order to determine his or her research interest. Dissertation topics can be pursued in the following areas: Regulation of gene expression, RNA processing, the role of transcription factors in cellular transformation and differentiation, cell cycle, cell and molecular biology of intercellular communication, control of microtubular function, embryo implantation, molecular mechanisms of epididymal sperm function, proliferation and differentiation of gonadal cells, molecular basis of gamete interactions, molecular regulation of ovarian development and function, and development and regeneration of the nervous system.

The Master of Science program in Cell and Molecular Biology offers 2 instructional tracks. The research track is designed for students who need extra preparation for the Ph.D. program or whose career track is geared toward technical or staff level positions in industry or universities. Students undertake study and research in similar areas as that of the Ph.D. program. The education-medical track is designed for students whose eventual goal is towards a teaching career in the anatomical sciences. Students in the education-medical track will take courses in the anatomi-

cal sciences and in modern instructional methods and design, and will participate in the teaching mission of the medical school as teaching assistants.

Students with undergraduate degrees in biology and chemistry are well suited for this program. Please contact Dr. James Hutson (806) 743-2712 or Pam Roddy (806) 743-2701 for more information concerning admission to this program.

Medical Biochemistry. The Medical Biochemistry program is designed to prepare students for research and teaching careers in biochemistry and molecular biology as related to the medical and life sciences. Admission to the program requires prior course work in mathematics, general physics, organic chemistry, analytical chemistry, and biological science. Students with deficiencies in any of these areas may be conditionally admitted pending successful completion of leveling courses prescribed by the program. Students are required to take GBCH 5921, 6222, 6522, 6533, and 6441 or their equivalents as determined by the department. In addition, students are urged to take or to have successfully completed courses in physical chemistry, statistics, and computer programming. GBCH 5921 is open only to students requiring this course as a part of a regular graduate degree program, and enrollment requires the permission of both the department chairperson and the Dean for Graduate School of Biomedical Sciences.

Generally within 12 months after enrolling in the program, each student will take a preliminary examination in general biochemistry. After a major portion of the required course work has been completed, the student must pass a qualifying examination that consists of two parts: a written portion in the form of an original research proposition designed to demonstrate the student's comprehension of some field of study related to biochemistry, ability to develop hypotheses, and competence in the design and conduct of promising and significant experiments; and an oral portion in which the student is expected to defend the proposition and demonstrate an understanding of the fundamental concepts and principles of biochemistry that relate to the proposition.

During the first year in the program, students will rotate through at least three different laboratories to broaden their education and research experience and to help them identify a field of specialization for their dissertation research. Major areas of current research include studies of the regulation of gene expression in a variety of eukaryotic tissues, biochemistry of development, mechanisms of hormone action, biochemistry of neoplasia, genetics of somatic cells in culture, biochemistry of membranes, mechanisms of enzyme action, and recombinant DNA.

Information covering specific requirements for degree programs is contained in the departmental *Graduate Student Handbook*. For more information, contact Dr. Charles Faust, the medical biochemistry program advisor, at (806) 743-2031.

Biotechnology Master of Science Biomedical Track. Although this program is listed among degrees offered by the Department of Cell Biology and Biochemistry, it is an interdisciplinary degree supported by all basic science departments in the Health Sciences Center. The Texas Tech University general academic campus administers a complimentary track in General Science-Agricultural Biotechnology.

The biomedical track is a 21-month curriculum consisting of two terms (nine months) of course work and 12 months of full-time laboratory research. It is typically a nonthesis degree with an optional thesis at the end of the second year by arrangement with the advisor. The research component may be completed either at the HSC campus or at a biotechnology industry laboratory. Students who choose to do their research at the HSC campus will work with a member of the biotechnology graduate faculty. All biotechnology graduate faculty have active research programs that emphasize use of molecular biology methods.

Prerequisites for the program include a bachelor's degree in science with at least one semester of organic chemistry. Please contact Dr. Daniel Hardy (806) 743-2053 for more information regarding admission to the program.

Cell and Molecular Biology (GCMB)

(To interpret course descriptions, see pg. 10.)

- 5112, 5212, 5312. Laboratory Methods (1:0:2; 2:0:4; 3:0:6).** Prerequisite: Consent of instructor. Taken as (1) a hands-on introduction to the laboratories in which a student may wish to do dissertation research or (2) after a student is well established in his or her dissertation research, additional rotations can be done to gain expertise in techniques applicable to the student's research but not available in the faculty advisor's laboratory. Repeatable if different methods are covered for each registration.
- 5113, 5213, 5313. Selected Topics in Cell and Developmental Biology (1:1:0; 2:2:0; 3:3:0).** Topics vary from semester to semester and reflect the research interests of the faculty. Recent offerings have included oncogenes and molecular biology of hormone action. May be repeated provided that different topics are covered for each registration.
- 5302. The Cell Cycle (3:3:0).** Prerequisite: Consent of instructor. Examination of DNA replication and repair, meiosis and recombination, and mitosis and the genetics of cell cycle control.
- 5310. Histology (3:2:4).** Correlation of the structural organization with functional specializations of human tissues and organs; clinical correlations are also an integral part. Since this is the histology course offered in the first-year medical curriculum, departmental approval prior to registration is required.
- 5321. Advanced Gross Anatomy (3:0:3).** An in-depth gross anatomical study devoted to one of the following areas of emphasis: topographical anatomy, head and neck; thorax and abdomen, pelvis and perineum, extremities and back,

- depending on the student's needs. The course may be repeated for credit if another area of emphasis is selected.
5406. **Mechanisms of Cellular Differentiation (4:4:0)**. Prerequisite: Consent of instructor. Determination of cell fate in invertebrates and vertebrates, lineage versus environmental controls, multipotential stem cells, and the regulation of cell type-specific gene expression.
5409. **Biology of Reproduction (4:4:1)**. Various aspects of biological reproduction with an emphasis on human problems. The reproductive process will be taught from union of the gametes to the delivered fetus. Morphology will be stressed.
5611. **Gross Anatomy (6:2:10)**. A highly integrated introductory course of anatomical study (including human prosection) which embodies the gross morphology of the body and coordinates it with the clinical, developmental, and microscopic aspects of the human body.
6000. **Master's Thesis (V1-6)**.
6440. **Cell Function and Structure (4:4:0)**. Topics include structure/function relationships involved in DNA replication, transcription, protein tracking, cytoskeletal organization and function, cell division, and adhesion.
7000. **Research (V1-12)**.
7101. **Seminar (1:1:0)**. Students will attend and participate in departmental seminars.
8000. **Doctoral Dissertation (V1-12)**.

Medical Biochemistry (GBCH)

5621. **General Biochemistry (6:6:0)**. Human life processes at the molecular level with emphasis on biochemical homeostasis and control mechanisms.
5921. **Medical Biochemistry (9:9:0)**. Prerequisite: CHEM 3305, 3306 or equivalent. Human life processes at the molecular level with emphasis on biochemical homeostasis and control mechanisms. These principles are examined through clinical correlations.
6000. **Master's Thesis (V1-6)**.
6101. **Biochemistry Conference (1:1:0)**. Informal conferences between faculty and students considering topics of current interest in biochemistry not normally included in other courses. Literature search, evaluation, organization, writing, and oral presentation by the student are emphasized. Different topic each semester. May be repeated for credit.
6121. **History of Biochemistry (1:1:0)**. Highlights in the advancement of biochemical knowledge will be discussed.
- 6135, 6235, 6335, 6535. **Topics in Biochemistry (1:1:0; 2:2:0; 3:3:0; 5:5:0)**. Prerequisite: Consent of instructor. Lectures in specific areas of biochemistry not normally included in other courses. May be repeated for credit with change of content.
6222. **Medical Biochemistry Problem Solving (2:2:0)**. Concurrent course to GBCH 5921 to help students develop problem solving skills. Discussion of solutions to assigned problems with topics correlated to lectures in GBCH 5921.
6320. **Clinical Biochemistry (3:3:0)**. Prerequisite: GBCH 5921, CHEM 4303, 4306, 4307, or equivalent. A study of clinical chemistry with emphasis on the interpretation of clinical laboratory data and

- concepts of laboratory-assisted diagnosis of human disease.
6441. **Signaling Systems Regulating Cell Function (4:4:0)**. Prerequisite: GBCH 5921 or equivalent and consent of instructor. A study of the current knowledge of biochemical and molecular mechanisms for the regulation of cellular processes by both endocrine and nonendocrine signals that function at the cell surface and within the cell. Topics include structure and function of membranes and organelles, mechanisms of transcription and translation, and regulation of cellular.
6522. **Molecular Biology of Eukaryotes: Nucleic Acids (5:5:0)**. Prerequisite: GBCH 5921 or equivalent and consent of instructor. Study of nucleic acid biosynthesis and gene expression and its control in eukaryotes, as well as studies and applications of principles of genetic engineering to nucleic acid structure and molecular biology.
6533. **Molecular Biology of Eukaryotes: Proteins (5:5:0)**. Prerequisite: GBCH 5921 or equivalent and consent of instructor. An in-depth description of the process of protein biosynthesis, degradation and regulation in eukaryotes, as well as the study of physico-chemical methods

- used to characterize proteins and their molecular structure.
7000. **Research (V1-12)**.
7101. **Biochemistry Seminar (1:1:0)**.
8000. **Doctor's Dissertation (V1-12)**.
9000. **Postdoctoral Research (V1-12)**.

Biotechnology, Medical (GBTC)

5338. **Biochemical Methods (3:1:6)**. Provides integrated approach to modern biochemical techniques. Present methods used to manipulate a gene, purify and characterize the enzymatic properties of the encoded protein.
6000. **Level Courses**
6000. **Master's Thesis (V1-6)**.
6101. **Biotechnology Seminar (1:1:0)**.
6301. **Introduction to Biotechnology (3:3:0)**. Broad coverage of topics with high current interest and utility to the medical and agricultural biotechnology industries. Emphasizes application of technologies.
7000. **Research (V1-12)**.

Division of Health Services Research

Faculty

Tyrone Borders, Program Director

Professor: Rohrer; *Associate Professor:* Rohland; *Assistant Professors:* Arif, Borders, and Xu; *Visiting Faculty:* Aday.

About the Program

This division offers study in the following graduate degree program:

- Master of Science in Health Services Research

The M.S. degree in health services research (HSR) will take advantage of the specialized training of faculty in the division. Health services research can be defined as the study of access, quality, and cost in health care and it requires both a multidisciplinary approach and knowledge of the HSR literature. Our students will study the behavior of consumers and the behavior of health care providers as they seek to respond to consumer needs and the performance of the health care system. We draw careful distinction between any particular discipline and the interdisciplinary field of health services research. For more information contact Dr. Ty Borders at (806) 743-3013.

Health Services Research (GHSR)

(To interpret course descriptions, see pg. 10.)

5111. **Topics in Health Services Research (1:1:0)**. Special topics in health services research that are not normally included in other classes. May be repeated for credit with change in content.
5211. **Topics in Health Services Research (2:2:0)**. Special topics in health services research that are not normally included in other classes. May be repeated for credit with change in content.
5301. **Introduction to Health Care Organization (3:3:0)**. Provides an overview of the health care system in its economic, sociological, epidemiological, policy, and behavioral aspects.
5302. **Health Services Epidemiology (3:3:0)**. Provides an overview of how epidemiological methods, particularly population-based surveys, can be applied to study the determinants and outcomes of health services use.
5303. **Health Economics Research (3:3:0)**. Applies economic theory and methods to the study of health services.
5304. **Mental Health Administration and Services Research (3:3:0)**. Applies principles and methods of psychiatric epidemiology to mental health services research.
5305. **Field Study in HSR (3:3:0)**. Supervised involvement in HSR projects.
5306. **Health Planning and Services Research (3:3:0)**. Applies the methods and findings of utilization research to planning and evaluation of health care programs.
5307. **Directed Readings in Health Services Research (3:3:0)**. Readings and term paper relating to a specialized topic in health services research.
5308. **Introduction to Community Health Care Systems (3:3:0)**. Provides an overview of assessment of community health needs and types of care systems available to meet community needs.

5309. **Data Management (3:3:0)**. Prerequisite: Introductory statistics. The learning objectives are to manage data, conduct statistical analysis, and report scientific findings using industry standard and research oriented computer software.
5311. **Topics in Health Services Research (3:3:0)**. Special topics in health services research that are not normally included in other classes. May be repeated for credit with change in content.
5312. **Introduction to Statistical Methods in Public Health (3:3:0)**. This course is designed for students whose future work will require extensive data analysis in research problems of public health and the biological sciences.
5313. **Statistical Methods in Epidemiology (3:3:0)**. This course will provide the foundation skills for basic epidemiological concepts and statistical methods used in an analysis of epidemiological data.
6000. **Master's Thesis (V1-6)**.
6308. **Teaching Practicum (3:3:0)**. Development of teaching skills by working with an instructor on preparation and delivery of a course in HSR.
6312. **Advanced Survey Methods for Services Research (3:1:2)**. A lecture and laboratory course designed to provide an overview of design, implementation, and analysis of surveys in health services research under direct guidance of a faculty member.
6313. **Advanced Secondary Data Analysis for Health Services Research (3:1:2)**. A lecture and laboratory course designed to provide an overview of secondary data analysis in health services research under direct guidance of a faculty member.
7000. **Health Services Research (V1-12)**.
7101. **Health Services Research Seminar (1:1:0)**.

Department of Microbiology and Immunology

Faculty

Ronald C. Kennedy, Chairperson

Professors: Chaffin, Fralick, Kennedy, Nairn, Pence, Rolfe, and Straus; *Associate Professors:* Bright, Griswold, Hamood, San Francisco, and Siddiqui; *Assistant Professors:* Chiriva-Internati and Reilly; *Research Assistant Professors:* Colmer-Hamood and McVay; *Joint Faculty:* Jumper and Lampe.

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Medical Microbiology
- Doctor of Philosophy in Medical Microbiology

The course work and information presented below describe those aspects of the programs of particular interest to students choosing to study and conduct research in the areas of medical microbiology which are traditionally found in a medical center.

Students seeking information concerning admission to the graduate program in medical microbiology, training, and research opportunities or teaching and research assistantships in the Department of Microbiology and Immunology should contact the chairperson of the department. For further information, see www.ttuhsu.edu/SOM/microbiology/mainweb/main.html.

Microbiology (GMIB)

- 5181, 5281, 5381. **Selected Topics in Microbiology (1:1:0; 2:2:0; 3:3:0)**. Prerequisite: Consent of instructor. Specific areas in microbiology and immunology or related research not normally included in other sources. May be repeated for credit.
5399. **Introduction to Microbiological Research (3:0:3)**. Beginning students. Exposure to experimental design, research methodology and data analysis in the laboratories of three faculty members.
6000. **Master's Thesis (V1-6)**.
6201. **Medical Parasitology (2:1:1)**. An overview of important protozoan helminth and arthropod infections and vectors of disease.
6237. **Medical Mycology for Graduate Students (2:2:0)**. Prerequisite: Medical or pathogenic microbiology or consent of instructor. A study of the biology of pathogenic fungi and human mycoses.
6323. **Genetics and Molecular Biology of Prokaryotes (3:3:0)**. Prerequisite: Biochemistry and general microbiology. Current concepts on the molecular biology and genetics of prokaryotes with emphasis on regulation of gene expression.
6324. **The Molecular Biology of Pathogenic Bacteria (3:3:0)**. Prerequisite: Medical microbiology, biochemistry. Lectures and discussions concerning the molecular analysis of mechanisms by which pathogenic bacteria produce infections. The regulation and expression of virulence factors are emphasized.
6325. **The Biology of Animal Viruses (3:3:0)**. Prerequisite: General biochemistry and general microbiology. Emphasis will be placed on DNA and RNA tumor viruses, tumor suppressor genes and human immunodeficiency virus.
6329. **Advances in Immunology (3:3:0)**. Prerequisite: GMIB 6931 or consent of instructor. A discussion of current knowledge of the immune system with emphasis on molecular and cellular interactions.
6335. **The Pathogenesis of Infectious Disease (3:3:0)**. Prerequisite: Medical or pathogenic microbiology or consent of the instructor. A study of the processes by which microorganisms produce disease in humans and how the host responds.
6931. **Medical Microbiology (9:8:1)**. A study of bacteria, fungi, parasites, and viruses and how they function to produce diseases in humans. The response of the body to invasion by these microorganisms is also discussed.
7000. **Research (V1-12)**.
7101. **Microbiology Seminar (1:1:0)**.
8000. **Doctoral Dissertation (V1-12)**.



Department of Pharmaceutical Sciences

Faculty

Quentin R. Smith, Chairperson

Professors: Mehvar, Smith, and Wang;
Associate Professors: Allen, Bickel, Gunaje,
Klein, Siddiqui, Srivenugopal,
Thekkumkara, Van der Schyf, Weis, and
Wright; *Assistant Professors:* Abbruscato,
Ahsan, Bouma, Chirva-Internati, Lindsey,
Moridani, Stoll, Veronin, Weidanz, and
Youan.

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Pharmaceutical Sciences
- Doctor of Philosophy in Pharmaceutical Sciences

The Doctor of Philosophy degree is housed in the Texas Tech School of Pharmacy at Amarillo. Pharmaceutical sciences encompass all those areas of pharmacy research that pertain to drug design, delivery, formulations, and therapeutics. The faculty members of the department exhibit research interests and expertise in drug design and delivery, pharmacology, pharmaceuticals (including formulations and industrial pharmacy), pharmacokinetics, drug receptor modeling, molecular and reproductive biology, biochemistry, pathophysiology, immunology and cancer therapy, toxicology, and pharmacy administration. The graduate program in pharmaceutical sciences is designed to train students for careers in pharmaceutical industry, academia, and federal agencies including the FDA. Admissions requirements include a degree in pharmacy, chemistry, biology, or related areas, GRE scores, and a TOEFL score of at least 550 (written) or 213 (electronic) for international students. Teaching and research assistantships are awarded on a competitive basis. The departmental courses are listed below. Additional required and elective courses have been arranged through the Departments of Chemistry and Biochemistry, Geology, and Mathematics and Statistics of Texas Tech University, and through the Departments of Physiology and Pharmacology of Texas Tech University Health Sciences Center. For more information contact Dr. Neels Van der Schyf, graduate advisor, pharmsci.gradadv@ttuhsc.edu or (806) 356-4015 ext. 287.

Pharmaceutical Sciences (GPSC)

5101. **Topics in Pharmacology (1:1:0).** Special topics in pharmaceutical sciences that are not normally included in other courses. May be repeated for credit with change in content.
5301. **Topics in Pharmacology (3:3:0).** Special topics in pharmaceutical sciences that are not normally included in other courses. May be repeated for credit with change in content.
5304. **Principles of Drug Action (3:3:0).** Principles that govern drug action within the body (pharmacodynamics) as well as drug absorption, distribution, metabolism, and excretion (pharmacokinetics).
5307. **Pharmaceutical Sciences Research Methods (3:3:3).** A lecture and laboratory course designed to provide an overview of current research methods in pharmaceutical sciences under direct guidance of a faculty member.
5310. **Drug Design and Discovery (3:3:0).** Prerequisite: GPSC 5304. Overview of the new methods for quantitative SAR, computer-aided drug design, mass screening, and combinatorial chemistry.
5320. **Drug Metabolism (3:3:0).** Analysis of the primary metabolic enzymatic systems that are involved in the clearance of drugs from the body and the mechanisms that regulate their activity.
5330. **Pharmacokinetics (3:3:0).** A quantitative treatment at the graduate level of the dynamics of drug disposition in the body and the national design of drug dosage regimens.
5340. **Molecular Drug Action (3:3:0).** Analysis of drug action at the molecular level, including molecular biology and signal transduction.
5350. **Advanced Pharmaceutics (3:3:0).** Prerequisite: DDS3 or equivalent. Quantitative treatment of reactions of pharmaceutical interest. Drug decomposition, approaches to stabilization and preservation, accelerated stability analysis, complexation and micromeritics.
5355. **Advanced Pharmacology (3:3:0).** In-depth discussion of recent research literature with the goal to teach graduate students how to evaluate methods and findings critically in pharmacology.
5356. **Advanced Principles of Disease (3:3:0).** Pathophysiological mechanisms at the molecular and cellular level. Lecture and discussion will cover the etiology, pathogenesis, functional changes, and clinical significance of general diseases.
5360. **Industrial Pharmacy (3:3:0).** Principles of formulation of powders, capsules, and compressed and coated tablets for conventional and controlled drug delivery.
5370. **Biotechnology (3:3:0).** An introduction to the area of molecular biology, genomics, and protein chemistry.
5380. **Special Topics in Drug Design – Immunopharmacology (3:3:0).** Principles of disease treatment with focus on the immunological system and new advances in immunotherapy.
5390. **Pharmaceutical Science Research Design and Analysis (3:3:0).** Overview of experimental design implementation and data analysis, including biostatistics for pharmaceutical science investigations.
5440. **Biopharmaceutics (4:4:0).** Prerequisite: DDS3 and kinetics or equivalent. Advanced treatment of the influence of dosage forms, route of administration, and dosage regimen on drug availability and newer technologies for targeting drug delivery to specific organs and cell types.
5610. **General Biochemistry (6:6:0).** Human life processes at the molecular level with emphasis on biochemical homeostasis and control mechanisms.
6000. **Master's Thesis (V1-6).**
7000. **Pharmaceutical Sciences Research (V1-12).**
7101. **Pharmaceutical Sciences Seminar (1:1:0).** Weekly seminar series designed to provide training in research data presentation and analysis.
8000. **Doctoral Dissertation (V1-12).**

Department of Pharmacology and Neuroscience

Faculty

Reid L. Norman, Chairperson

Professors: Kaye, Lombardini, Norman, Syapin, Strahlendorf and Tenner; *Associate Professors:* Blanton, Dickerson, Freeman, McMahon, and Roghani; *Assistant Professors:* Frame and Popp.

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Pharmacology
- Doctor of Philosophy in Pharmacology

The objective is to prepare students for careers in research and teaching. The faculty of the program seeks to foster a creative and productive research atmosphere, to provide encouragement and positive challenge, and to equip students with the intellectual tools they will need to be effective teachers and investigators. Specialized research training is available in the areas of biochemical pharmacology, circadian pharmacology, autonomic pharmacology, cardiovascular pharmacology, neuropharmacology, and molecular pharmacology.

Pharmacology (GPHM)

- 5101, 5201, 5301. **Topics in Pharmacology (1:1:0, 2:2:0, 3:3:0).** Prerequisite: Consent of instructor. Specific areas of pharmacology not normally included in other courses. May be repeated for credit with change in content.
5303. **Principles of Pharmacology (3:3:0).** Prerequisite: Biochemistry and physiology or consent of instructor. A study of the principles and theories of pharmacokinetics and pharmacodynamics of chemicals in relationship to dose and time. The course will consist of lectures, discussions, and oral presentations of original papers by the class and is oriented for both pharmacology and nonpharmacology majors.
- 5312, 5313. **Medical Pharmacology I and II (3:8:0).** A study of pharmacology with emphasis on mechanisms of drug action,

- interaction, and therapeutics.
5326. **Pharmacology of the Autonomic Nervous System (3:3:0).** Prerequisite: GBCH 5921, GPHY 5803, GPHM 5613 or equivalent. A conceptual study of drugs which alter the function of the autonomic nervous system. Emphasis will be on mechanisms by which drugs affect transmitter synthesis, release, uptake, and metabolism as well as receptor function.
5336. **Molecular and Cellular Pharmacology (3:3:0).** Prerequisite: Consent of instructor. Topic areas include receptor purification, expression cloning, gene microarrays, and electrophysical recording. The course will consist of lectures and student discussions of the topics listed above.
5337. **Neuropsychopharmacology (3:3:0).** Prerequisite: Consent of instructor. A structured in-depth study of specific topics concerning neurochemical pharmacology, behavioral pharmacology, and neuropsychopharmacology. Topics to be studied will vary each semester. The course will consist of lectures, discussions, and oral presentations of original papers by the class.
5425. **Techniques in Pharmacological Research (4:2:6).** Prerequisite: GBCH 5921, GPHY 5803, or equivalent. A lecture and laboratory course designed to provide an introduction to and hands-on experience with standard experimental techniques used in pharmacological research.
6000. **Master's Thesis (V1-6).**
6331. **Principles of Toxicology I (3:3:0).** Prerequisite: Graduate standing in the department or consent of instructor. First half of a two-semester course. Examines the foundations of toxicological sciences. Covers principles, disposition, and first half of toxicology mechanisms.
6332. **Principles of Toxicology II (3:3:0).** Prerequisite: GPHM 6331. Second half of a two-semester course. Covers remaining toxicology mechanisms, toxic agents, and applied toxicology.
7000. **Research (V1-12).**
7101. **Pharmacology Seminar (1:1:0).**
8000. **Doctoral Dissertation (V1-12).**



Department of Physiology

Faculty

Professors: Davies, Heavner, Janssen, Kurtzman, Laski, Lutherer, Nathan, Orem, Pressley, Strahlendorf, and Wesson; *Associate Professors:* Fowler, Jumper, and Martinez-Zaguilan; *Assistant Professor:* Escobar.

About the Program

This department offers study in the following graduate degree programs:

- Master of Science in Physiology
- Doctor of Philosophy in Physiology

The program is designed primarily to train persons for careers in biomedical research and/or teaching in medical institutions or industry, but can accommodate those interested in alternative careers in physiology. Faculty research programs are diverse, encompassing the general areas of systemic, cardiovascular, renal, and neurophysiology. Specific areas include membrane biophysics, Ca⁺⁺ channels and other membrane transporters, pH and Ca⁺⁺ homeostasis, Na⁺/K⁺ ATPase, excitation-contraction coupling, oxygen free radicals and cell injury, apoptosis, neuronal protective mechanisms, cerebral blood flow, hypertension, shock, and mechanisms of rhythm generation such as sleep and control of respiratory and cardiovascular function.

Advanced courses in specialized areas are taught under the topics course and are designed to fit a student's specific needs.

Applicants should have a demonstrated interest in research and preferably have identified an area for their dissertation research. All candidates for graduate degrees who hold assistantships must fulfill certain requirements while appointed as assistants.

GPHY 5803 is normally a prerequisite for all courses in or above the 6000 level but may be waived for students in other programs with approval of the instructor. Enrollment in GPHY 5803 is limited to students admitted to degree programs and requires approval by the thesis director and the department chairperson.

Physiology (GPHY)

5302. **Human Physiology: Cellular and Integrated Mechanisms (3:3:0).** Prerequisite: College biology and consent of instructor. An introduction to the physiology of mammalian organ systems placing emphasis on the human. Subject matter includes membrane transport, muscle, cardiovascular, respiratory, renal, water and electrolyte balance, gastrointestinal, and endocrine physiology as well as neurophysiology.
5350. **Laboratory Methods in Physiology (3:0:3).** Fundamental principles of physiology are explored through a series of hands-on laboratory exercises. Numerous techniques common to research in many fields will be introduced.
5360. **Laboratory Rotations as an Introduction to Modern Physiological Research (3:3:0).** Prerequisite: Consent of instructor. Students work in a specific laboratory assisting an ongoing research project or conducting an independent research effort.
5803. **Medical Physiology (8:7:4).** A study in human physiology emphasizing body-controlling systems and their interrelationships. Pathological mechanisms are also stressed.
5910. **Integrated Neurosciences (9:8:1).** This cooperative, interdepartmental effort offers a detailed study of the nervous system. Students examine both gross and fine structure and function from the subcellular through the behavioral level. (GIDN 5910)
6000. **Master's Thesis (V1-6).**
- 6105, 6205, 6305. **Topics in Physiology (1:1:0; 2:2:0; 3:3:0).** Prerequisite: Consent of instructor. Advanced training in a specialized area of physiology. May be repeated for credit with change in content.
6210. **Advanced Cardiovascular Physiology (2:2:0).** Prerequisite: GPHY 5803 and consent of instructor. Advanced level coverage of topics in cardiovascular physiology with much material being covered in reviews of the research literature.
6311. **Cellular and Molecular Physiology (3:3:0).** Prerequisite: GIDN 5910 or GPHY 5502 or consent of instructor. The study of the structure and function of ion channels and transporters, excitation-contraction coupling, and mechanisms of cell damage and death.
6314. **Membrane Biophysics (3:3:0).** Students are introduced to the mechanisms of ion transport through membrane channels; models of membrane excitability; molecular structures of ion channels and their physiological functions.
6315. **Physiology of Neuroeffector Systems (3:3:0).** A consideration of adrenergic, cholinergic, histaminic, and serotonin receptor systems and their physiological applications. Offered summers even years only.
6318. **Physiology of the Neuron (3:3:0).** Prerequisite: Consent of the instructor. A contemporary and comprehensive coverage of the biology of nerve cells.
7000. **Research (V1-12).**
7101. **Physiology Seminar (1:1:0).** This weekly seminar series provides invited speakers from this and other departments as well as other universities and laboratories with the opportunity to present their current research in some area of physiology.
7102. **Readings in Physiology (1:1:0).** Students review literature on special topics of research. (Students may be assigned or may select these topics.) May be repeated for credit.
7103. **Supervised Teaching in Physiology (1:1:0).** Prerequisite: GPHY 5803. Supervised teaching experience including leading laboratory groups and small-group discussions and presenting lectures in some departmental courses (all under faculty supervision).
8000. **Doctoral Dissertation (V1-12).**

School of Nursing

Dr. Alexia Green, *Dean*

About the Program

The School of Nursing is an integral part of the Texas Tech University Health Sciences Center and is committed to improving the quantity and quality of nursing care available in West Texas. 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 health care environment. Integral to the attainment of this goal is the development of interdisciplinary approaches created when nursing, medicine, allied health, and pharmacy work together. The faculty and staff of the School of Nursing are committed to excellence in nursing education, research, practice, and service.

The School of Nursing offers a Bachelor of Science in Nursing degree for students who are not already licensed as Registered Nurses and an online RN to B.S.N. degree completion program for students who are already licensed as registered nurses. Additionally, the school offers a Master of Science in Nursing degree in several specialties, such as education, administration, clinical research management, and the following nurse practitioner tracks: family, acute care, pediatrics, and geriatrics. The School of Nursing collaborates with the School of Nursing at the Texas Woman's University College of Nursing to offer a Ph.D. in Nursing. The school's programs are accredited by the National League for Nursing Accrediting Commission and has preliminary approval from the Commission on Collegiate Nursing Education.

Faculty

Garrison Professor: Owen; **Horn Professor:** Ketner; **Professors:** Armstrong, Cannon, Decker, Esperat, Green, Johnston, Masten, Valadez, and Yoder-Wise; **Associate Professors:** Allen, Amos, Boswell, Dadich, Feng, Galvan, Merrill, Miller, Saunders, Sridaromont, and Weiss-Kaffie; **Assistant Professors:** Andersen, Ashcraft, Brice, Bridges, Cherry, Collins, Cookman, Edwards, Francis, Jackson, O'Neal, Scott-Tilley, and Woodward; **Instructors:** Acton, Bennett, Burwick, Coates, Curran, Esquibel, Miller, Morris, Slavic, and Walulu.

Undergraduate Program

Bachelor of Science in Nursing. For students who are not currently licensed registered nurses (pre-licensure student), the baccalaureate degree program at TTUHSC offers the opportunity to complete the degree in two calendar years, with admission once each year, during the second summer session. All non-nursing course requirements should be completed prior to enrollment in the School of Nursing, and a grade of C or better is required in each course. At the time of application submission, applicants must have completed a minimum of 30 credit hours of the required non-nursing prerequisite courses, including at least two of the four required science courses. A minimum cumulative grade point average of 2.5 is required to be considered for admission to the School of Nursing. Admission to the program is competitive. Although academic criteria are the most important factors in admission consideration, additional information considered for all applicants include but are not limited to demographic data, diverse work and life experi-



ences, and unique attributes that would contribute to the profession of nursing.

General requirements for both B.S.N. and R.N. to B.S.N. students include:

	<i>Semester Hours</i>
English	6
Statistics*	3
Anatomy and Physiology	8
Chemistry	4
Microbiology	4
Food and Nutrition	3
Humanities	3
Fine Arts Elective	3
U. S. History	6
Political Science	6
Introductory Psychology	3
Introductory Sociology	3
Human Growth and Development	3
TOTAL	55

*Students must complete 3 credit hours of mathematics to meet core curriculum requirements. If the student does not take mathematics statistics, then an additional mathematics course must be completed to meet the core requirement.

Courses can be taken at any accredited community college or institution of higher education that provides comparable courses. Other options are TTU College Level Examination Program (CLEP) or TTU Extended Learning Division.

Suggested Pre-Nursing Curriculum* for the B.S.N. Prelicensure Student

	<i>Semester Hours</i>
1st Semester	
ENGL 1301, Ess. College Rhetoric	3
SOC 1301, Intro. Sociology	3
OR	
ANTH 2302, Cultural Anthropology	3
ZOOL 2403, Human Ana./Phys I	4
HIST 2300, US History to 1877	3
TOTAL	13
2nd Semester	
ENGL 1302, Adv. College Rhetoric.....	3
PSY 1300, General Psychology.....	3
ZOOL 2404, Human Ana./Phys II.....	4
HIST 2301, U.S. History Since 1877.....	3
TOTAL	13
3rd Semester	
CHEM 1305, Chem. & Society I	3
CHEM 1105, Chem. & Society I Lab	1
OR	
CHEM 1307, Prin. of Chemistry I	3
CHEM 1107, Prin. of Chemistry I Lab	1
Food & Nutrition	3
POLS 1301, Am. Gov't. Organization	3
HDFS 2303, Life Span Hum. Dev	3
TOTAL	13
4th Semester	
MBIO 3400, Microbiology	4
POLS 2302, American Public Policy	3
MATH 2300, Statistical Methods	3
OR	
PSY 3400, Statistical Methods	4
OR	
SOC 3391, Intro. to Social Research	3
Humanities/Fine Arts	3
TOTAL	13-14

*Texas Tech University course numbers

Bachelor of Science in Nursing Curriculum for Prelicensure Students

Once students have applied and been accepted to the School of Nursing, they will be able to enroll in nursing courses. Students are classified as full-time students throughout the degree program and must maintain a 2.0 cumulative grade point average to continue in the nursing program.

	<i>Semester Hours</i>
1st Semester	
NURS 3203, Basic Assessment	2
NURS 3204, Basic Phys. Assessment	2
NURS 3301, Care of Aging Adult	3
TOTAL	7
2nd Semester	
NURS 3303, Mgmt-Pharm. Therapy	3
NURS 3602, Nsg. in Wellness/Illness I	6
NURS 3302, Pathophysiology	3
TOTAL	12
3rd Semester	
NURS 3603, Nsg. in Wellness/Illness II	6
NURS 3306, Professional Seminar	3
NURS, Nursing Elective	3
TOTAL	12
4th Semester	
NURS 3400, Childbearing Family Nsg.	4
NURS 3401, Mental Health Nursing	4
TOTAL	8

5th Semester	
NURS 3202, Mgmt-Complex Pharm.	2
NURS 3402, Complex Health Probs.	4
NURS 3601, Role-Complex Health Sit.	6
TOTAL	12

6th Semester	
NURS 4220, Consumer of Research	2
NURS 4304, Adv. Clinical Concepts	3
NURS 4601, Leader and Manager	6
NURS 4301, Prov. & Cons. of Ed.	3
TOTAL	14

7th Semester	
NURS 4101, Synth. of Nsg. Knowledge	1
NURS 4305, Role-Professional Nurse	3
NURS 4500, Role-Community Health	5
TOTAL	9

Application Information. Applications for admission to the Bachelor of Science in Nursing program for students who are not currently licensed as registered nurses should be submitted by March 1 for the following summer semester. Admission to the School of Nursing is competitive, and admission to Texas Tech University does not guarantee admission to Texas Tech University Health Sciences Center.

Registered Nurse–Bachelor of Science in Nursing Program. Students who are already licensed as R.N.'s can apply to the R.N. to B.S.N. program to further their education beyond the diploma or associate's degree level. Nurses with a B.S.N. are in higher demand because of their broader education, critical information, futuristic experiences, and leadership skills. Additionally, baccalaureate education provides a natural progression to graduate nursing education and advance practice roles such as nursing faculty, advanced nurse practitioners, and nursing managers. Texas Tech University Health Sciences Center School of Nursing offers an exciting baccalaureate degree program to enable nurses to meet health care challenges. These courses are accessible on the Web, allowing students to access academic education by computer at work or at home.

A total of 123 credit hours are needed for this degree, including the following: 55-58 credits of general education requirements, 30 credits of RN-BSN course sequence, and 38 advanced placement credit hours (basic nursing program). The program length is two semesters for a full-time student. Enrollment can begin in either the fall, spring, or summer semesters. Degree plans are individualized.

After students receive an admission letter, they will be asked to submit a portfolio to validate their nursing experience. Then the student and the RN-BSN coordinator will review the information and discuss an individualized degree plan. The portfolio is a collection of the student's nursing experiences and assists with advance placement decisions, selection of a nursing elective, and possible substitution of graduate courses for some undergraduate courses.

The following example illustrates a sample full-time program for fall students. The spring enrollment sequence will vary slightly.

Registered Nurse–Bachelor of Science in Nursing Curriculum for Licensed Students

	<i>Semester Hours</i>
1st Semester	
NURS 4380, Nature of Scientific Inquiry	3
NURS 4381, Issues and Trends in Nursing	3
NURS 4382, Aspects of Nursing Research	3
NURS 4384, (CL) Nursing Management I	3
or NURS 4385 (CL) Nursing Management II	
NURS 4388 Client and Peer Teaching	3
2nd Semester	
NURS 4383 Legal and Ethical Issues for RNs	3
NURS 4386 (CL) Leadership in Nursing	3
NURS 4387 (CL) Community Health Practice	3
NURS 4389 Pharmacology Across the Lifespan	3
NURS 4390 (CL) Baccalaureate Nursing Practice	3
TOTAL	30

Collaborative faculty instruction is from Odessa and Lubbock. Course work is offered from the Lubbock and Odessa campuses. Registered nurses are from the entire state of Texas. Out of state students are accepted and can call the department for further information to facilitate enrollment.

Graduate Program / Nursing

The School of Nursing is located in the Texas Tech University Health Sciences Center (TTUHSC) which is a legally separate institution from Texas Tech University. The Health Sciences Center has four campuses throughout West Texas.

The purpose of the Master of Science in Nursing program is to prepare the graduate to practice nursing within an expanded role. In synthesizing a clinical and functional focus, the graduate assumes an encompassing perspective of practice, service, research, and education. The graduate in an expanded role is prepared to:

- Participate in scientific inquiry.
- Integrate scientific analysis of theories, therapies, and research in providing high quality care.
- Disseminate acquired knowledge by participation in scholarly activities.
- Evaluate current legal, ethical, economic, and cultural issues.
- Contribute to the advancement of the profession.
- Implement effective outcomes in an advanced practice setting.
- Implement an advanced practice role.

These objectives are met by all components of the graduate program, including the collaborative program with the University of Texas at Tyler College of Nursing and Health Sciences, and are accomplished through web-based technologies and Healthnet, a two-way interactive video system that links the campuses.

The TTUHSC School of Nursing graduate program offers numerous opportunities for students to pursue a master's education that meets their career plans. The MSN Program is offered at the Lubbock, Odessa, and Hill Country (Fredericksburg/Kerrville, Marble Falls) campuses.

Students can elect to obtain a Master of Science in Nursing with a clinical focus in geriatrics or community health and a functional track of education or administration to complete the degree. The graduate is prepared to assume a leadership position in education or administration. A sub-focus of nursing administration is the clinical research management track, offered as an M.S.N., Post-Masters Certificate, or Non-Degree Certificate. The clinical research management program prepares the graduate to manage clinical research trials in a variety of research settings. Graduates will have an in-depth knowledge of the regulatory guidelines and how these guidelines apply to various research projects and clinical trials. The M.S.N.-Nurse Practitioner and Post-Masters Certificate Programs are offered in several specialty areas such as, family, acute care, geriatrics, and pediatrics. The M.S.N. Family Nurse Practitioner and Post Masters Family Nurse Practitioner programs prepare graduates to assume a primary care provider role in rural agencies and other health care settings in underserved areas. The M.S.N. Acute Care Nurse Practitioner and Post-Masters Certificate Programs prepare graduates to provide culturally sensitive, comprehensive care for adults with common episodic and chronic health problems managed across the continuum of acute care centers. The Acute Care Nurse Practitioner assumes responsibility for promoting, maintaining, and restoring health to adults who are acutely or critically ill. Emphasis includes identification of health risks, promotion of wellness, and diagnostics and management of acute and critical illnesses. The M.S.N. Geriatric Nurse Practitioner and Post Masters Programs prepare graduates to assume a role as a healthcare provider dedicated to improving the health of the elderly. Geriatric Nurse Practitioners serve the elderly and their families in an extensive range of practice settings. The services of Geriatric Nurse Practitioners focus on health maintenance and disease processes that are specific to the elderly. The M.S.N. Pediatric Nurse Practitioner and Post Masters Programs prepares graduates to assume a role as a healthcare provider dedicated to improving children's health. Pediatric

Nurse Practitioners serve children and families in an extensive range of practice settings providing for well and ill children of all ages. Some of the services of Pediatric Nurse Practitioners include well-child examinations, routine developmental screenings, diagnoses and treatment of common childhood illnesses, childhood immunizations, school physicals and health maintenance care.

Upon completion of course requirements, graduates of the Masters and Post Masters Programs are eligible to sit for the following:

- National Certification Board of Pediatric Nurse Practitioners (PNCB) Exam
- American Nurses Credentialing Center (ANCC) Exam
- American Nurses Credentialing Center's Geriatric Nurse Practitioner Exam
- American Academy of Nurse Practitioners Certification Exam
- Society of Clinical Research Associates (SoCRA) Exam.

Collaborative Programs

- University of Texas at Tyler College of Nursing and Health Sciences Students at the collaborative site (University of Texas at Tyler College of Nursing and Health Sciences) can obtain a M.S.N. or a Post Masters specializing in Family Nurse Practitioner, Acute Care Nurse Practitioner, Geriatric Nurse Practitioner, and Pediatric Nurse Practitioner.
- Texas Woman's University
A Ph.D. in Nursing is offered in collaboration with Texas Woman's University College of Nursing (TWU). The Ph.D. degree is awarded by TWU in accordance with program policies of the Graduate School and the College of Nursing. There are three sites for doctoral course offerings—Denton, Houston, and Lubbock. The doctoral program in nursing prepares leaders and scholars who will make a significant contribution to the nursing profession in the discovery, integration, application and dissemination of knowledge.

The Nursing Program is accredited by National League for Nursing Accrediting Commission (NLNAC) and has preliminary approval from the Commission on Collegiate Nursing Education (CCNE).

The minimum requirements for all applicants to the graduate master's nursing programs are the following:

- Have a valid RN license in the State of Texas.
- Have a baccalaureate nursing degree from a nationally discipline accredited college or university.
- Have successfully completed an undergraduate research and statistics course.
- Have a minimum 3.0 GPA or better (on a 4.0 scale) in upper division work and all graduate level work.
- Sufficient test scores GRE, MAT or GMAT for dual degree (not required for post-masters students).
- In addition to the above, applicants to the Post-Masters program must have a Master of Science in Nursing degree from an NLN accredited college or university.

An applicant will not be disqualified for admission based solely on a standardized score.

Although academic criteria are the most important factors in admission consideration, additional information considered for all applicants include but are not limited to demographic data, diverse work and life experiences, and unique attributes that would contribute to the profession of nursing.

Application Information

For further information call 1-800-851-8240, visit our web site at www.ttunursing.com or email us at songrad@ttuhsc.edu.

NOTE: Applications for all campuses should be mailed to the Lubbock Campus, Registrar's Office, Attn: School of Nursing Admissions Evaluator, 3601 - 4th St. Stop 8310, Lubbock, TX 79430-8310.

Opportunities for Involvement in Student Organizations

Texas Nursing Students' Association. TTUHSC School of Nursing claims one of the most active chapters in the state. The chapter has won numerous awards and honors.

Nursing Ambassadors. This organization represents the School of Nursing at various events such as the student recruitment, open houses, and community service.

Undergraduate Dean's Advisory Council. Students serve in an advisory role on this council. The primary purpose is to maintain open communication between students, administration, faculty, and staff.

TTUHSC Student Senate. This organization's primary purpose is to allow students from all HSC schools to have a voice in events and policies affecting student life.

Professional Associations. Students with high academic achievements may become members of Sigma Theta Tau, the International Honor Society for Nursing, and Phi Kappa Phi, an interdisciplinary society.

Mentoring Advanced Practice Students (MAPS). This organization's primary purpose is to provide new graduate students an opportunity to network with a knowledgeable colleague already in the program.

Nursing (NURS)

(To interpret course descriptions, see pg. 10.)

Undergraduate Courses

3030. **Independent Study in Nursing (V1-6).** Topic and objectives of study are mutually agreed upon by the student and selected faculty member. Independent study agreement formalizes the plan for study and guides evaluation. Semester hours and course may be repeated as topic and/or objective of study change.
3040. **Special Topics in Nursing (V1-6).** Designed to focus on subjects of special interest to groups of students. May be repeated for credit as topics vary.
3202. **Nursing Management of Complex Pharmacological Therapy (2:2:0).** Focuses on medication therapy in complex health care situations. Includes an understanding of medication therapy for common health disorders and builds on previous pharmacological knowledge.
3203. **Basic Assessment (2:1:3).** An introduction to nursing as a systematic process with emphasis on gaining skill in techniques of assessment and communication across the life span. Includes introductory concepts of data collection, health history, therapeutic communication and nursing process.
3204. **Basic Physical Assessment (2:1:3).** Further development of nursing as a systematic process with emphasis on gaining skill in techniques of assessment in multiple care settings and across the life span. Includes content about data collection, health/history, physical examination, and nursing process.
3301. **Nursing Care of the Healthy Aging Adult (3:2:3).** An introduction to concepts of healthy aging with a focus on health promotion, maintenance of functional capacity, normal physiologic changes, and improvement of quality of life through interdisciplinary collaboration.
3302. **Basic Concepts of Pathophysiology: Applications in Nursing (3:3:0).** Study of the physiologic basis of disease for beginning nursing practice. Emphasis on application of pathophysiologic concepts to the recognition of pathological conditions across the lifespan.
3303. **Nursing Management of Pharmacological Therapy (3:1.5:4.5).** Introduces the concepts of pharmacotherapeutics and pharmacological treatment of humans experiencing altered states from adaptation through dysfunction to pathological processes. Includes calculation of dosages and therapeutic ranges. Includes techniques of medication administration by all routes commonly used by nurses with practice in simulation. Includes legal/ethical concepts related to pharmacological therapy.
3306. **Professional Seminar: Issues Affecting Nursing Practice (3:3:0).** Focuses on selected historical, professional, legal, economic, political, cultural, and ethical issues that affect the role and functioning of the professional nurse, the practice of nursing, and the delivery of nursing care.
3341. **Nursing Care of the Patient Experiencing Cardiac Dysrhythmias (3:1.4:1.6).** This course includes assessment and nursing diagnosis of adult clients experiencing cardiac dysrhythmias. Pathophysiology, therapeutic modalities, patient/family response and nursing implications are emphasized throughout the course. The importance of interdisciplinary collaboration in the care of the patient experiencing cardiac dysrhythmias is stressed. The course incorporates a variety of teaching modalities including interactive computer technology, computer assisted instruction, video, seminars, and clinical observation.
3357. **Holistic Health Practices in Stress Management (3:3:0).** This course is an introduction to holistic health in stress management. Includes the role of the mind, body and universe in attaining high level wellness; stress and its relationship to health; and the interaction of holistic health practices in the management of stress.
3365. **Introduction and Exploration into the Multiple Aspects of Forensic Science (3:3:0).** Forensic science has multiple, significant procedures and guidelines which contribute to the medicolegal analysis in the criminal justice system. It also provides support and treatment for victims and family members. Multiple disciplines, such as nursing, medicine, law, psychology, and the sciences necessary to make forensic science operate, will be explored. Content to be addressed includes assessment, intervention, and utilization of community resources; legal issues; and evaluation of forensic evidence. This course will give the student a general understanding and appreciation of forensic science.
3371. **Legal and Ethical Issues in Health Care (3:3:0).** Prerequisite: Consent of the instructor and Associate Dean of Undergraduate Program. An interdisciplinary course surveying major legal and ethical issues in the delivery of health care.
3374. **Philosophical Issues and Problems in Human Caring (3:3:0).** Exploration of different avenues of approaching philosophical dilemmas in providing care to clients whose behaviors and value systems are difficult to accept. Examines select issues from the standpoints of philosophy and nursing.
3376. **Advanced Cardiac Life Support (3:1:6).** This course will expand the student's cognitive knowledge and psychomotor skills necessary to provide nursing care to individuals experiencing acute life-threatening physiological dysfunctions. The course is designed to prepare the student for participation in an Advanced Cardiac Life Support providers class according to the standards set by the American Heart Association. Concepts included are advanced pathological processes, critical care skills, legal/ethical issues, collaboration, and professional role development.
3400. **Childbearing Family Health Nursing (4:3:3).** Nursing processes with individuals in the childbearing process. Focuses on developing skills during the phases of nursing process in working with all members of the childbearing family unit. Special emphasis on assessment of family unit, cultural differences in the approach to the childbirth experience, traditional and alternative arrangements for the birth experience, techniques of nursing intervention, and evaluation.
3401. **Mental Health Nursing (4:3:3).** Concepts of human mental health in altered states from adaptation through dysfunction to pathological processes. Focus on utilization of nursing process in the care of clients, groups, and families with mental illness.
3402. **Complex Health Problems (4:4:0).** Combines an emphasis on the critical-thinking process as a major role in professional nursing practice with detailed study of the problems of care which are predominant in acute and critical care settings.
3601. **The Role of the Nurse in Complex Health Situations (6:0:18).** Combines an emphasis on critical thinking as a major role in professional nursing practice with application of nursing process in acute and critical care settings.
3602. **Nursing in Wellness and Illness I (6:3:9).** Concepts of human adaptation, normal and altered states. Includes application of the five steps of the nursing process. Includes the concepts: nutrition, elimination, activity, comfort, and safety.
3603. **Nursing In Wellness and Illness II (6:3:9).** Nursing process with persons experiencing altered states from adaptation through dysfunction to pathological processes. Concepts included are immune response, oxygenation, metabolic, sexuality/reproduction, sensory stimulation & perception and pathology interrupting internal environments such as gas exchange and fluid and electrolyte balance and pharmacologic therapy for each.
4101. **Synthesis of Nursing Knowledge (1: 1:0).** Provides students with an opportunity to synthesize core concepts of nursing care and apply those concepts in simulations, case studies and standardized examinations. (Pre-/co requisites: all 4000 level courses must be completed or in progress).

4220. **The Nurse as a Consumer of Research (2:2:0).** Addresses basic research concepts and explores the relationship of research to theory and practice. Prepares the student as a consumer of research in order that relevant findings may be applied to clinical practice.
4301. **The Roles of the Nurse as Provider and Consumer of Education (3:3:0).** Focuses on collaboration between the nurse and patient with teaching as a major technique and process of nursing intervention. Includes assessment of learning needs, implementing planned learning experiences, and evaluation of process and product of teaching. Relates teaching-learning theories/principles as basis for education intervention. Incorporates knowledge gained from the nursing process and related general education courses in a holistic manner. Practice in the use of teaching strategies in simulated and real health care situations.
4304. **Advanced Clinical Concepts (3:1:6).** Focuses on the role of the nursing professional using selected models of case delivery for the complex client and family. Emphasizes the evaluation of multifaceted nursing care as it relates to the pathological state of the clients and families experiencing complex problems.
4305. **The Role of the Professional Nurse (3:2:3).** Focuses on anticipatory socialization to the professional nursing role. Requires synthesis of the elements of the conceptual framework of the undergraduate curriculum as the student transitions to the role of professional registered nurse.
4380. **Nature of Nursing Theory (3:3:0)** An introduction to the nature of nursing theory. Origins of and strategies for theory development in nursing are examined in terms of importance in guiding the development of the profession as a practice discipline. Nursing theory is analyzed as a foundation for nursing practice and research.
4381. **Issues and Trends in Nursing (3:3:0).** Focuses on current issues and trends relevant to the professional nursing role on a local, state, national and international level.
4382. **Aspects of Nursing Research (3:3:0).** Addresses basic research concepts and explores the relationship of research to theory and practice. Prepares the student as a consumer of research in order that relevant findings may be applied to clinical practice.
4383. **Legal and Ethical Issues for RNs (3:3:0).** Surveys major legal and ethical issues in the delivery of health care. It focuses on basic principles and language of legal and ethics in health care. It provides a foundation in value development and ethical theories. This course is designed to address the issues confronted by individuals who are actively engaged in the practice of professional nursing.
4384. **CL Nursing Management (3:2:1).** For R.N.-B.S.N. students with less than 3 years as an R.N. of full-time nursing experience or portfolio review. Basic management principles that are inherent in the role of professional nursing practice will be presented.
4385. **CL Nursing Management II (3:2:1).** Focuses on the mid-manager responsibilities that are inherent in the role of professional nursing practice.
4386. **CL Leadership in Nursing (3:2:1).** Leadership concepts related to the management of nursing personnel and health care delivery are emphasized.
4387. **CL Community Health Practice (3:2:1).** This clinical course provides students with the opportunity to apply the nursing process, together with public health, professional nursing and community concepts, scientific methods and critical thinking (judgments and reasoning) to the nursing care groups in a community.
4388. **Client and Peer Teaching (3:3:0).** Teaching focuses on collaboration between the nurse and clients/peers. It includes an assessment of learning needs, the implementation of planned learning experiences, and the evaluation of process and product of teaching. Teaching-learning theories/principles are used as bases for educational planning and intervention.
4389. **Pharmacology Across the Lifespan (3:3:0).** This course will build on the foundation resulting from the student's previous nursing educational process. The principles of pharmacology will be applied, in case study format, to non-structured and structured health care settings and to individuals across the lifespan.
4390. **CL. Baccalaureate Nursing Practice (3:2:1).** Focuses on synthesis of essential concepts in the R.N.-B.S.N. Program, the conceptual framework of the Texas Tech University Health Sciences Center School of Nursing, (TTUHSC SON) a conceptual model of nursing, and the Texas BNE competencies for baccalaureate nursing practice.
4500. **The Role of the Nurse in the Health of the Community (5:2.5:7.5).** Detailed study of nursing care of populations in the community incorporating previously learned nursing and sociological theories in a holistic manner. Includes the concepts of community health nursing practice, epidemiology, environmental health, and collaboration with other health care team members.
4601. **The Nurse as Leader and Manager (6:3:9).** Emphasizes the role of the nurse in leadership and beginning management roles as critical elements for nursing's future. Examines the use of selected theoretical role perspectives.

Graduate Courses

5015. **Application of Research in Nursing (V1-3).** This course provides an opportunity for qualified students to work closely with a faculty member who is actively engaged in the conduct of research.
5060. **Independent Study (V1-6).** Designed to meet special needs and interests of a student who proposes a specific plan of study. Course varies from 1-6 semester hours and course may be repeated as topic and/or objective of study changes.
5070. **Elective - Special Topics (V1-6).** Designed to focus on subjects of special interest to groups of students. May be repeated for credit as topics vary.
5140. **Laboratory Methods for Nurses in Advanced Practice (1:0.5:1.5).** Study of selected clinical laboratory procedures and diagnostic radiological imaging including the clinical decision making for selection of appropriate tests and interpretations and significance of test results. Focuses on primary health care practice.
5210. **Developing Nursing Education Programs (2:2:0).** Curriculum concepts applied to various situations such as staff development and basic continuing education programs. Focuses on program level development and implementation including evaluation models.
5231. **The Nursing Administrator: Standards for Excellence (2:2:0).** Focuses on the standards affecting the nursing administrator and the administrative role. Content relates to the Scope of Practice and Standards for Nurse Administrators, the Magnet Recognition Program criteria and the Baldrige National Quality Program. Traditional role content is viewed in light of these elements of quality.
5241. **Administrative Role Development (2:0:6).** The course emphasizes the practicality of applying quality standards in the nursing administration role. The practicum focuses on the concepts formulated in the prerequisite course.
5300. **Community Health I: Foundations of Community Health Nursing (3:1:6).** Study of the major concepts basic to the development, implementation and evaluation of Community Health. Clinical practice focuses on application of nursing theory, epidemiologic concepts, public policy, program planning and exploration of nursing skills and techniques related to aggregate level health promotion, health maintenance, health restoration and disease prevention.
5301. **Community Health II: Role Design and Implementation (3:1:6).** Study of the nursing role components inherent in community health. Identification of facilitators for and barriers to the implementation of community health in health care settings. Clinical practice involves collaboration and implementation of the community health role in selected health care settings.
5302. **Community Health Foundation for Advanced Practice (3:1:6).** Study of the major basic concepts and the nursing role components inherent to community health. Facilitates the transition into the advance practice community health role. The incorporation of interdisciplinary relationships and/or partnerships into the delivery of community health nursing.
5310. **Gerontics I: Foundations of Gerontic Nursing (3:1:6).** Study of the major concepts essential to the development, implementation and evaluation of quality gerontic care. Clinical practice focuses on application of nursing theory and pathophysiological concepts, and exploration of nursing therapies, skills and techniques associated with the provision of gerontic care.
5311. **Gerontics II: Role Design and Implementation (3:1:6).** Study of the nursing role components basic to collaboration and provision of gerontic care, including family dynamics related to the ex-

- tended family and identification of families at risk. Clinical practice focuses on provision of care in a variety of settings.
5314. **Leadership in Education I: Foundations of Nursing Education (3:3:0).** This course focuses on the leadership role of the nurse educator by examining the foundational components of the formal teaching/learning process.
5315. **Leadership in Education II : Critical Elements of the Teaching Role (3:2.5:1.5).** The concepts and components of course development, implementation, evaluation, and revision in academic, continuing education, or staff development setting will be emphasized as critical elements of the teaching role.
5316. **Leadership in Education III: Evaluation and Outcomes (3:2.5:.5).** Concepts related to student evaluation, test construction, evaluation of evidence based teaching and evaluation of distance learning/technology will be introduced. Program evaluation, accreditation processes and professional development of faculty will be discussed and analyzed.
5330. **Theories and Therapies (3:3:0).** Exploration of theories in nursing as a basis for nursing therapies. Analysis of existing theories, theory construction and concept formulation and common specialized therapies such as counseling, touch, and comfort measures.
5333. **Management of Acute and Episodic Conditions in Older Adults (3:1:6)** This course addresses the theoretical and clinical foundation for evidence based management strategies of acute health problems and common syndromes of older adults. Emphasis is on comprehensive assessment, clinical decision-making, and the implementation of scientifically based clinical management plans in collaboration with the health care team. The focus is on empowering the older adult to maintain or regain health through the framework of evidenced based care and use of best practices.
5334. **Management of Chronic Health Conditions in Older Adult (3:1:6).** This course addresses the theoretical and clinical foundation for evidence-based management strategies of chronic and complex health problems of the older adult. Emphasis is placed on the management of older adults with multiple system problems. Clinical practice involves collaboration and implementation of the primary health care role in selected health care settings.
5340. **Primary Health Care Practice I- Advanced Assessment, Pathology, and Management (3:1:6).** Study of major concepts and therapies required in the development, implementation and evaluation of primary health care. Clinical practice focuses on application of nursing theory, pathophysiological and epidemiological concepts and exploration of nursing therapies, skills and techniques essential to the provision of primary health care.
5341. **Primary Health Care Practice II- Advanced Role Application (3:1:6).** Study of nursing role components critical to primary health care. Identification of facilitators for and barriers to the implementation of primary health care. Clinical practice involves collaboration and implementation of primary health care role in selected health care settings.
5342. **Advanced Health Assessment (3:1:6).** Building upon basic physical assessment and history taking knowledge and skills, this course focuses on knowledge and clinical skills required for advanced practice nursing.
5343. **Pharmacotherapeutics for Nurses in Advanced Practice (3:3:0).** Study of advanced pharmacologic and pharmacokinetics principles of drug categories used by nurses in advanced practice.
5344. **Advanced Practice Role Development: Advanced Cardiac Life Support (3:2:3).** Expands the student's ability to analyze and provide appropriate care in situations in which individuals are experiencing acute life-threatening physiological dysfunctions from the perspectives of ethics, law, and advanced clinical practice. This course is designed to prepare the student for participation in an Advanced Cardiac Life Support providers' class according to the standards set by the American Heart Association.
5345. **Advanced Practice Nursing: Application of Pathophysiology (3:3:0).** Study of the physiologic basis of disease for advanced practice nursing. Emphasis on application of pathophysiologic concepts to the recognition of pathologic conditions and the management of clients with a variety of health problems across the life span.
5360. **Clinical Research Management I: Introduction to Clinical Research Management (3:3:0).** This course focuses on an overview of Clinical Research Management. Content includes the defining of the core language of clinical trials research, drug and device development, basic steps in the research process, and the design and conduct of all phases of clinical trials.
5361. **Clinical Research Management II: Regulatory Affairs (3:3:0).** This course focuses on components of the drug and device development process related to regulatory affairs. An overview of structure and function of the FDA and NIH is included. Content provides comprehensive exploration of Investigational Drug Application, New Drug Application and Orphan Drug Applications regulatory statutes, protection of human subject, fundamentals of Good Clinical Practice (GCP), components of the Code of Federal Regulations (CFR), guidance of Office of Human Subjects Protection (OHRP) and International Harmonization Guidelines (ICH).
5371. **Professional Nursing Issues (3:3:0).** Analysis of role issues confronting the nursing profession. Issues are examined from historical, multidisciplinary, and global perspectives with an emphasis on synthesis of advanced nursing role knowledge at a societal-level focus.
5374. **Writing for Publication (3:3:0).** Develops expertise in writing/preparing manuscripts for publication. Special emphasis on choosing journals of manuscript topics, preparing a manuscript according to journal guidelines, and learning to navigate the publication process from inquiry letter to submission of manuscript to peer review and final submission.
5375. **Nursing Ethics through the Life Span (3:3:0).** This graduate course provides an opportunity to examine ethical issues that arise in advanced nursing practice throughout the life span of the client, providing an opportunity to: implement an evidence-based practice; understand the moral significance of nursing; recognize and clarify models of professional relationships; and identify and distinguish between ethical models. Ethical models will be utilized to justify ethical decisions in advanced nursing practice.
5376. **Best Practices for Safe Health Care Systems (3:3:0).** This graduate level interdisciplinary course is designed to explore solutions and practices that promote safer patient care and reduce risk in a variety of health care settings.
5378. **Primary Health Care for Women (3:1.5:1.5).** Prerequisite: NURS 5342 or consent of instructor. Presents the theoretical and clinical basis for advanced practice nursing management of the woman who is essentially well or who has non-acute health problems. Emphasis is on the integration of primary health care screening, preventive health care, and health care promotion. Selected health problems common to women across the age continuum are addressed.
5380. **Pediatric Primary Health Care I (3:1:2).** Designed to develop theoretical and research-based knowledge of child health issues and well-child assessment of infants, children, and adolescents in the context of family and cultures, the course develops advanced practice skills in comprehensive assessment, as well as, management strategies reflecting current nursing and medical knowledge and practice.
5381. **Pediatric Primary Health Care II (3:1:2).** Designed to further develop theoretical and research-based knowledge of diagnosis, treatment, and evaluation of pediatric patients with acute and chronic health problems, the course develops advanced practice skills and comprehensive assessment and management strategies reflecting evidence-based nursing/medical knowledge and practice.
5391. **Principles of Advanced Research (3:3:0).** Course addresses components of the research process including the scientific method in quantitative and qualitative research design.
5392. **Application of Advanced Research (3:2:3).** Examines relationship of research to outcome measures in practice, education, and administrative role.
5410. **Facilitating Learning (4:3:3).** Concepts of teaching/learning theories, principles and strategies and the educational process from assessment of learning needs through evaluation of outcomes. Emphasis is on role development.
5450. **Acute Care Nurse Practitioner Concepts & Diagnostic Skills I: Adult (4:2.5:4).** This course is designed to develop a beginning theoretical and research based knowledge of diagnosis, treatment, and evaluation of adults with acute and chronic health problems. Emphasis will be placed on applying this knowledge to the management of pa-

tients with disorders of selected body systems. Clinical activities focus on enhancing history and physical skills, delineating differential diagnoses, and learning initial clinical management of clients experiencing acute and chronic health problems. Basic role components of the Acute Care Nurse Practitioner will be introduced.

5451. **Acute Care Nurse Practitioner Concepts & Diagnostic Skills II: Adult (4:2:6).** This course is designed to build on major components critical to the knowledge of diagnosis, treatment, and evaluation of adults with acute and chronic health problems. Clinical practice focuses on research-based decision-making process in close collaboration with preceptors.
5452. **Acute Care Nurse Practitioner Concepts III: Adult (4:1:9).** This course is designed to enhance and integrate knowledge of adults with acute and chronic health problems. Clinical practice focuses on proficient evaluation, diagnosis, and management of adults.
5462. **Clinical Research Management III: Application to Clinical Trials (4:4:0).** This course examines key aspects of implementation of a clinical trial. The necessary skills for a successful Clinical Research Associate and/or Study Site Coordinator are examined. Management of clinical trials from perspectives of the study sponsor and study site is discussed. A major focus is on the busi-

ness components of implementing a clinical trial including communication and team building. Site and time management systems will be introduced and used. Content also includes clinical research associate skills, adverse event reporting and clinical audits

6000. **Thesis (V1-6).** A planned process of scholarly inquiry, which implements a quantitative or qualitative design and contributes to nursing's body of knowledge.
6030. **Leadership in Education IV: Role and Practicum.** Immersion in all leadership aspects of the faculty role in an academic, CE or staff development setting with guidance of a preceptor.
6040. **Clinical Research Management Practicum (5:0:15).** This course provides the opportunity for a clinical immersion in activities concerned with management of clinical research.
6050. **Acute Care Nurse Practitioner IV: Role and Practicum (6:1:15).** This course emphasizes clinical practice. Clinical activities allow for immersion in advanced role. Function and responsibility of selected topics of the advanced practice role are addressed.
6060. **Nursing Practicum (3:0:18) (6:0:36).** A clinically focused practicum for individuals pursuing expectations beyond basic graduate degree requirements. Variable credit 3 or 6 hours. Nurse Practitioner students are required to complete the majority of practicum in underserved areas.

6071. **Supervised Teaching (V1-3).** Directed teaching in students' major area under close supervision of one or more faculty
6080. **Pediatric Nursing Practicum (V3-6).** A clinically-focused practicum for individuals pursuing expectations beyond basic graduate degree requirements. Pediatric nurse practitioner students are required to complete the majority of practicum in underserved areas.
6090. **Gerontological Nurse Practitioner Practicum.** This course is a synthesizing, practical experience in development and implementation of the role of the advanced practice nurse. Emphasis is on role development along with the refinement of critical reasoning, skill development, and resource allocation. Under the guidance of a preceptor, students practice in a clinical setting to provide primary care to older adults.



Texas Tech University Health Sciences Center

Faculty Directory

Horn Professors

(Date following departmental affiliation indicates calendar year of Horn Professorship appointment.)

Magne Kristiansen, Electrical Engineering, 1977
Robert J. Baker, Biological Sciences, 1979
William J. Conover, Information Systems and Quantitative Sciences, 1981
Shelby D. Hunt, Marketing, 1983
James G. Hunt, Management, 1984
Janet W. Pérez, Classical and Modern Languages and Literatures, 1986
David B. Knaff, Chemistry and Biochemistry, 1987
Richard A. Bartsch, Chemistry and Biochemistry, 1988
Mary Jeanne Van Appledorn, Music, 1989
Allan J. Kuethe, History, 1990
Clyde F. Martin, Mathematics and Statistics, 1991
Purnendu K. Dasgupta, Chemistry and Biochemistry, 1992
Sankar Chatterjee, Museum Science and Geosciences, 1994
Clyde Hendrick, Psychology, 1996
Roland Menzel, Physics, 1997
Kenneth Ketner, Institute for Studies in Pragmatism, 1999
Daniel Benson, Law, 2000
Stefan Estreicher, Physics, 2000
Gerald Skoog, Education, 2000
Henryk Temkin, Electrical Engineering, 2000
Frits Ruymgaart, Mathematics and Statistics, 2001
William Westney, Music, 2001
Peter Westfall, Information Systems and Quantitative Sciences, 2002
Loretta Bradley, Educational Psychology, 2003
Wijesuriya Dayawansa, Mathematics and Statistics, 2003

Teaching Faculty

(Date following rank indicates calendar year of initial appointment to Texas Tech.)

A

Abbott, James R., Associate Professor in Chemical Engineering, 1999. B.S., California (Davis), 1986; Ph.D., Massachusetts Inst. Tech., 1993.
Abbruscato, Thomas J., Assistant Professor in Pharmaceutical Sciences, 2000. B.S., Arizona, 1992; Ph.D., 1997.
Acosta-Martinez, Veronica, Adjunct Faculty in Plant and Soil Science, 2002. B.S., Puerto Rico, 1994; M.S., Purdue, 1997; Ph.D., Iowa State, 2000.
Acton, Cindy, Instructor in Nursing and Practice Coordinator, 2000. B.S.N., West Texas State, 1983; M.S.N., West Texas A&M, 1997.
Adams, Charlie, Assistant Professor in Education, Nutrition, and Restaurant-Hotel Management, 1997. B.G.S., Texas Tech, 1987; B.S., 1988; M.S., 1990; Ph.D., 1997.
Adams, Gretchen, Assistant Professor in History, 2002. B.A., Oregon, 1994; M.A., 1996; Ph.D., New Hampshire, 2001.
Adams, Melinda, Visiting Assistant Professor in Apparel Design and Manufacturing, 2002. B.S., Nebraska, 1996; M.S., Wyoming, 2000.
Aday, Lu Ann, Visiting Professor in Health Services Research, 2001. B.S., Texas Tech, 1968; M.S., Purdue, 1970; Ph.D., 1973.
Adisoemarta, Paulus S., Lecturer in Petroleum Engineering, 1999. B.S., Bandung Inst. Tech., 1987; M.S., Texas (Austin), 1995; Ph.D., Texas Tech, 1999.
Ahern, Terence C., Associate Professor in Educational Psychology and Leadership, 1991. B.A., California (Santa Cruz), 1974; M.A., Graduate Theological Union, 1978; M.A., Chicago, 1981; M.A., San Francisco State, 1983; Ph.D., Pennsylvania State, 1991.
Ahsan, Fakhru, Assistant Professor in Pharmaceutical Sciences, 2001. B.S., Dhaka (Bangladesh), 1990; M.S., 1992; Ph.D., Madrid (Spain), 1999.
Akchurin, Nural, Associate Professor in Physics and Engineering Physics, 2000. B.A., Vassar College, 1982; Ph.D., Iowa, 1990.
Akers, Cynthia L., Assistant Professor in Agricultural Education and Communications, 1997. B.S., Texas Tech, 1991; M.S., 1992; Ed.D., 2000.
Akins, Future, Instructor in Architecture, 2000. B.A., Texas Tech, 1977; M.F.A., 1977.
Akram, Mujahid H., Assistant Professor in Engineering Technology, 1999. B.S.C.E., Pakistan, 1983; M.S.C.E., West Virginia, 1992; Ph.D., 1995.
Akrofi, Amma K., Visiting Assistant Professor in Curriculum and Instruction, 2002. B.A., Ghana, 1972; Ed.D., Texas Tech, 2002.
Alayyan, Sudqi, Associate Professor in Engineering Technology, 1984. B.S., Texas Tech, 1977; M.S., West Texas A&M, 1993.
Albin, Robert Custer, Professor in Animal and Food Sciences, 1964. B.S., Texas Tech, 1961; M.S., 1962; Ph.D., Nebraska, 1965.
Alexander, Theresa C., Instructor in Apparel Design and Manufacturing, 2000. B.S., Texas Tech, 1996; M.A., Nottingham Trent (England), 1999.
Alford, Kwamé, Assistant Professor in History, 2000. B.S., Morgan State, 1979; M.A., 1994; Ph.D., Missouri (Columbia), 1998.
Al-Hmoud, Rashid, Assistant Professor in Economics, 2000. B.Sc., Jordan, 1991; M.S., Texas Tech, 1992; Ph.D., 1994.
Allen, David D., Associate Professor in Pharmaceutical Sciences, 1996. B.S., Kentucky (College of Pharmacy), 1985; Ph.D., 1993.
Allen, Edward J., Professor in Mathematics, 1985. B.S., Wisconsin-Madison, 1971; M.S., 1972; Ph.D., Tennessee, 1983.
Allen, Linda Joy Svoboda, Professor in Mathematics, 1985. B.A., Coll. of St. Scholastica, 1975; M.S., 1978; Ph.D., Tennessee At Knoxville, 1981.
Allen, Patricia, Associate Professor in Nursing, 2004. B.S.N., Old Dominion, 1976; M.S.N., Catholic U. of America, 1980; Ed.D., Florida International, 1994.
Allen, Randy D., Professor in Biological Sciences and Plant and Soil Sciences, 1989. B.S., Southwestern Union Coll., 1978; M.S. Texas (Arlington), 1981; Ph.D., Texas A&M, 1986.
Allen, Roberta S., Lecturer in Accounting, 1999. B.S., Coll. of Charleston, 1991; M.S.A., Texas Tech, 1996.
Allen, Vivien G., Thornton Distinguished Professor in Plant and Soil Science, 1995. B.S., Tennessee (Martin), 1962; M.S., Louisiana State, 1973; Ph.D., 1979.
Alvarado, Christine, Assistant Professor in Animal and Food Sciences, 2001. B.S., Texas A&M, 1994; M.S., 1997; Ph.D., 2001.
Amlani, Amyn, Assistant Professor in Speech, Language, and Hearing Sciences, 2002. B.A., U. of the Pacific, 1993; M.S., Purdue, 1995; Ph.D., Michigan State, 2002.
Amor, Cherif M., Assistant Professor in Interior Design, 2000. B.Arch., Conitantine (Algeria), 1984; M.Phil. New Castle Upon Tyne (U.K.), 1987; Ph.D., Missouri (Columbia), 2000.
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Vann, W. Pennington, Associate Professor in Civil Engineering, Engineering Physics, and Associate Chairperson, Department of Civil Engineering, 1972. B.A., Columbia, 1958; B.S., 1959; M.S., 1960; Ph.D., Rice, 1966; Reg. Prof. Engr. (Texas).

Vaughn, Mark W., Assistant Professor in Chemical Engineering, 2001. B.S.Ch.E., Arkansas, 1974; Ph.D., Texas A&M, 1995.

Velten, Jeff, Adjunct Faculty in Plant and Soil Science, 1999. B.S., California State (Fullerton), 1973; M.S., California (San Diego), 1976; Ph.D., 1981.

Venhuizen, Von, Assistant Professor in Art, 2002. B.A., Iowa, 1990; M.F.A., Indiana, 1996.

Venkataraman, Ram, Assistant Professor in Mathematics, 2000. B.Tech., Indian Institute of Technology (India), 1990; M.S., Maryland, 1995; Ph.D., 1999.

Vernooy, D. Andrew, Professor and Dean, College of Architecture, 2002. B.S., Princeton, 1970; M.Arch., Texas (Austin), 1978; M.S., 1990; MDS, Harvard, 1991.

Vestal, Tom A., Associate Professor in Agricultural Education and Communications, 2002. B.S., Tarleton State, 1977; M.Ed., Texas Tech, 1982; Ph.D., Texas A&M, 1998.

Viator, Ralph E., Professor in Business Administration, 2000. B.S., Houston, 1973; M.B.A., Lamar, 1976; Ph.D., Texas A&M, 1986.

Victory, Harold Dean Jr., Professor in Mathematics, 1974. B.A., Rice, 1968; M.S., Purdue, 1970; Ph.D., 1974.

Villalobos, Carlos, Associate Professor in Range, Wildlife, and Fisheries Management, 1996. B.S., Chihuahua, 1980; M.S., 1988; Ph.D., Texas Tech, 1995.

Vizcarra, Jorge, Assistant Professor in Animal and Food Sciences, 2001. B.S., Montevideo (Uruguay), 1981; M.S., Oklahoma State, 1991; Ph.D., 1994.

Von Ende, Eleanor Theresa, Associate Professor in Economics, 1990. B.A., Kansas, 1979; M.A., 1982; Ph.D., 1990.

W

Walden, Eric, Assistant Professor in Information Systems and Quantitative Sciences, 2003. B.A., New Mexico State, 1993; M.S., Louisiana State, 1997; Ph.D., Minnesota, 2002.

Walker, Donald Roy, Associate Professor in History, 1987. B.A., Texas (Austin), 1969; M.A., Lamar, 1974; Ph.D., Texas Tech, 1983.

Wallace, Mark C., Associate Professor in Range, Wildlife, and Fisheries Management, 1996. B.S., Washington, 1981; M.S., Arizona, 1984; Ph.D., 1991.

Walter, Tamra, Assistant Professor in Anthropology, 2000. B.A., Austin, 1991; M.A., Montana, 1997; Ph.D., Texas, 2000.

Walulu, Rosemary, Instructor in Nursing, 1997. M.S.N., Texas Tech (Health Sciences Center), 1996.

Wampler, Karen Smith, Professor in Human Development and Family Studies, 1989. B.A., Indiana, 1964; M.A., Pennsylvania, 1967; Ph.D., Purdue, 1979.

Wampler, Richard S., Associate Professor in Human Development and Family Studies, 1989. B.A., Indiana, 1964; M.S.W., Georgia, 1981; Ph.D., Pennsylvania, 1970.

Wang, Alex, Associate Professor in Mathematics, 1989. B.S., Northwest Telecommunication Engineering Inst. (China), 1982; M.S., 1984; Ph.D., Arizona State, 1989.

Wang, Chen, Assistant Professor of Art, 2003. B.A., East China Normal, 1992; M.A., Iowa, 2001; M.F.A., 2003.

Wang, Jia-Sheng, Associate Professor in Environmental Toxicology, 2000. M.B., Shanghai First Medical College, 1978; M.D., 1982; Ph.D., Boston, 1994.

Wanjura, Donald F., Adjunct Faculty in Plant and Soil Science, 1986. B.S., Texas A&M, 1961; M.S., Clemson, 1963; Ph.D., Arizona, 1971.

Ward, J. B., Instructor in Education, Nutrition, and Restaurant-Hotel Management, 2001. B.S., Texas Tech, 1993; M.S., 2001.

Warner, Ronald D., Associate Professor in Clinical Preventive Medicine Microbiology and Immunology, 1998. D.V.M., Ohio, 1971; Ph.D., Ohio, 1989.

Washington, Marvin, Assistant Professor in Management, 2002. B.S., Northwestern, 1989; Ph.D., 1999.

Wass, Kevin, Assistant Professor in Music, 2001. B.S., Dana Coll., 1993; M.M., Indiana, 1995; D.M.A., Michigan, 2002.

Waters, Sara, Professor in Art, 1977. B.F.A., Spalding, 1974; M.F.A., Indiana, 1977.

Watkins, James C., Professor in Architecture, 1983. B.F.A., Kansas City Art Inst., 1974; M.F.A., Indiana, 1977.

Watson, Pat, Assistant Professor in Curriculum and Instruction, 2003. B.S., Southwest Missouri State, 1976; M.S., 1978; Ph.D., Missouri, 2000.

Watson, Richard G., Assistant Professor in Computer Science, 1999. B.S., Texas (El Paso), 1990; M.S., 1994; Ph.D., 1999.

Watts, Elizabeth A., Associate Professor in Mass Communications, 1992. B.A., Adams State College, 1970; Ed.S., Northern Colorado, 1976; Ph.D., Ohio, 1992.

Way, Anthony Biden, Adjunct Faculty in Anthropology and Family and Community Medicine, 1972. B.A., Williams, 1962; M.D., Pennsylvania, 1967; Ph.D., Wisconsin (Madison), 1972.

Webb, Mark O., Assistant Professor in Philosophy, 1994. B.A., Texas Tech, 1982; M.A., 1985; M.A., 1986; Ph.D., Syracuse, 1991.

Webster, Daniel R., Assistant Professor in Cell Biology and Biochemistry, 1993. B.A., DePauw, 1978; Ph.D., Miami, 1984.

Weidanz, Jon A., Assistant Professor in Pharmaceutical Sciences, 2000. B.S., West Virginia, 1985; M.P.H., Alabama, 1987; Ph.D., 1992.

- Weinberg, David A.**, Associate Professor in Mathematics, 1980. S.B., Chicago, 1974; Ph.D., Wisconsin (Madison), 1980.
- Weiss, Margaret T.**, Associate Professor in Pharmaceutical Sciences, 1999. B.S., Loyola, 1970; Ph.D., Medical U. of South Carolina, 1983.
- Weiss-Kaffie, Cynthia J.**, Associate Professor in Nursing, 1996. L.V.N., San Antonio ISD, 1964; A.A., Kent State, 1974; B.S.A.S., Youngstown State, 1976; M.S., Texas Woman's, 1981; Ph.D., 1986; A.P.R.N., Texas Tech (Health Sciences Center), 2001.
- Weitlauf, Harry M.**, Chairperson and Professor in Cell Biology and Biochemistry, 1982. B.S., Washington, 1961; M.D., 1963.
- Weninger, Robert A.**, Professor in Law, 1974. B.B.A., Wisconsin, 1955; LL.B., 1960; LL.M., Chicago, 1964. Admitted to practice in Wisconsin and California.
- Wenthe, William J.**, Associate Professor in English, 1992. B.A., Holy Cross, 1979; M.A., Virginia, 1985; Ph.D., 1992.
- Wernsman, Marjane**, Instructor in Mass Communications, 1999. B.A., Texas A&M, 1975; M.A., 1977; Ph.D., Tennessee (Knoxville), 1986.
- Wernsman, Robert**, Instructor in Mass Communications, 1999. B.S., Peru State (Nebraska), 1974; M.A., Northern Arizona, 1982.
- Wesson, Donald W.**, Professor in Physiology, 1995. B.S., Massachusetts Inst. of Tech., 1974; M.D., Baylor (College of Medicine), 1978.
- West, Joel**, Instructor in Mass Communications, 2002. B.A., Texas Tech, 1989; M.A., 1992.
- Wester, David B.**, Professor in Range, Wildlife, and Fisheries Management, 1983. B.S., Colorado State, 1976; M.S., Texas Tech, 1979; Ph.D., 1984.
- Westfall, Peter**, Horn Professor in Statistics, 1983. B.S., California (Davis), 1979; M.S., 1981; Ph.D., 1983.
- Westney, William F.**, Horn Professor in Music, Browning Artist in Residence, 1978. B.A., Queens (City U. of New York), 1968; M.M.A., Yale, 1971; D.M.A., 1976.
- Wetherbe, James C.**, Professor and Stevenson Chairperson in Information Technology. 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.
- Whelly, Sandra M.**, Associate Professor in Cell Biology and Biochemistry, 1981; A.B. Salve Regina Coll., 1968; Ph.D., Nebraska, 1973.
- White, James Edmund**, Professor in Architecture, 1971. B.Arch., Texas (Austin), 1957; M.S., Texas Tech, 1973; Reg. Arch. (Texas).
- White, John Poston**, Professor in Architecture, 1973. B.Arch., Texas (Austin), 1957; M.Arch., Nebraska, 1973; Reg. Arch. (Texas).
- Whitehead, Carlton J.**, Professor in Management, 1965. B.S., Southeastern Louisiana, 1959; M.B.A., Louisiana State, 1962; Ph.D., 1964.
- Whitlark, James S.**, Professor in English, 1979. B.A., Wayne State, 1971; M.A., 1973; Ph.D., Chicago, 1976.
- Whitmore, Jon**, Professor in Theatre and Dance and President, 2003. B.A., Washington State, 1967; M.S., 1968; Ph.D., California (Santa Barbara), 1974.
- Whittlesey, Bruce Rodman**, Associate Professor in Chemistry and Biochemistry, 1987. B.A., New Coll. of the U. of South Florida, 1978; Ph.D., Texas (Austin), 1985.
- Wiesner, Theodore F.**, Associate Professor in Chemical Engineering, 1996. B.S., Kansas State, 1977; M.S., Houston, 1985; Ph.D., Georgia Inst. Tech., 1994.
- Wigmans, Richard**, Professor and Bucy Chair in Physics, 1992. Ph.D. Vrije Universiteit Amsterdam, 1975.
- Wilcox, James B.**, Professor in Business Administration, 1975. B.S., Pennsylvania State, 1967; M.B.A., Indiana, 1970; D.B.A., 1972.
- Wilde, Gene R.**, Associate Professor in Range, Wildlife, and Fisheries Management, 1995. B.S., Nevada (Las Vegas), 1978; M.S., 1984; Ph.D., Oklahoma State, 1994.
- Wilhelm, Jennifer A.**, Assistant Professor in Curriculum and Instruction, 2001. B.S., Bowling Green State, 1988; M.S., Michigan State, 1991; Ph.D., Texas, 2002.
- Wilhelm, Ronald Joseph**, Assistant Professor in Honors and Physics, 2002. B.S., Bowling Green State, 1985; M.S., 1989; Ph.D., Michigan State, 1995.
- Wilkes, Robert Edward**, Professor in Business Administration, 1976. B.S.B.A., Samford, 1963; M.B.A., Alabama, 1969; Ph.D., 1971.
- Willett, Julie A.**, Associate Professor in History, 1997. A.B., Missouri (Columbia), 1989; M.A., 1992; Ph.D., 1996.
- Williams, David E.**, Professor in Communication Studies, 1991. B.A., Otterbein Coll., 1985; M.A., Northern Illinois, 1987; Ph.D., Ohio, 1990.
- Williams, George Brock**, Assistant Professor in Mathematics, 2001. B.S., Mississippi State, 1993; Ph.D., Tennessee, 1999.
- Williams, James S.**, Assistant Professor in Health, Exercise, and Sport Sciences, 2000. B.S., Lamar, 1979; M.S., Texas (Tyler), 1983; Ph.D., Texas A&M, 1997.
- Williams, Simon C.**, Associate Professor in Cell Biology and Biochemistry, 1995; B.A., Trinity Coll. (Ireland), 1983; Ph.D., Roswell Park Mem. Inst. (New York), 1989.
- Williamson, Elizabeth**, Assistant Professor in Physical Therapy, 2002. B.S., Texas (Health Sciences Center-San Antonio), 1981; M.A., Texas A&M (Corpus Christi), 1993.
- Willig, Michael R.**, Professor in Biological Sciences, 1983. B.S., Pittsburgh, 1974; Ph.D., 1982.
- Willis, David B.**, Assistant Professor in Agricultural and Applied Economics, 1999. B.S., Rocky Mountain (Montana), 1975; M.A., Washington State, 1987; Ph.D., 1993.
- Wilson, Jane Ann Henry**, Associate Professor in Music, 1970. B.M., Texas Tech, 1962; M.M., Indiana, 1965; D.Mus., 1982.
- Wilson, Joann**, Associate Professor in Interior Design, 2001. B.S., Utah, 1969; M.F.A., 1972.
- Winder, John A.**, Adjunct Faculty in Animal and Food Sciences, 1998. B.S., New Mexico State, 1977; M.S., 1979; Ph.D., Colorado State, 1987.
- Winer, Jane Louise**, Professor in Psychology and Dean, College of Arts and Sciences, 1975. B.A., State U. of New York (Albany), 1969; M.L.S., 1970; M.A., Ohio State, 1971; Ph.D., 1975.
- Wingenbach, Gary J.**, Assistant Professor in Agricultural Education and Communications, 2002. B.S., Oregon State, 1991; M.Ag., Oregon State, 1992; M.A.T., Oregon State, 1993; Ph.D., Iowa State, 1995.
- Wink, Jon (Don)**, Chairperson and Professor in Art, 2002. B.F.A., Texas, 1960; M.F.A., Washington, 1963.
- Winslow, Jerome C.**, Assistant Professor in Range, Wildlife, and Fisheries Management, 2000. B.S., Michigan, 1971; B.S., Pennsylvania State, 1981; Ph.D., Wyoming, 1999.
- Woldstad, Jeffrey C.**, Associate Professor in Industrial Engineering, 2003. B.S., Puget Sound, 1983; M.S., 1984; Ph.D., Michigan, 1989.
- Wong, Aliza S.**, Assistant Professor in History, 2001. B.A., Amherst College, 1994; M.A., Colorado, 1997; Ph.D., 2001.
- Wong, Chor Y.**, Assistant Professor of Geography, 2003. B.A., National Taiwan Normal, 1974; M.A., Wilfrid Laurier, 1982; Ph.D., Wisconsin, 1995.
- Wood, Bruce Wilton**, Associate Professor in Music, 2002. B.M.E., Morningside Coll., 1977; M.M., Wisconsin (Madison), 1980; Ph.D., 2002.
- Wood, Diane Sylvia**, Professor in Classical and Modern Languages and Literatures, 1976. B.A., Northern Iowa, 1968; M.A., 1971; Ph.D., Wisconsin, 1975.
- Woodward, Tracey**, Assistant Professor in Nursing, 2000. B.S.N., Louisiana State, 1976; M.S.N., Texas Tech (Health Sciences Center), 1999.
- Woolverton, Kevin Scott**, Adjunct Faculty in Electrical and Computer Engineering, 2001. B.S., Kansas State, 1990; M.S., Oklahoma State, 1994; Ph.D., Texas Tech, 1997.
- Wright, Stephen E.**, Associate Professor in Pharmaceutical Sciences, 1987; B.A., Hendrix Coll. (Arkansas), 1963; M.D., Arkansas (School of Medicine), 1967.
- Wu, Guoyao**, Adjunct Faculty in Animal and Food Sciences, 2003. B.S., South China Agricultural, 1982; M.S., Beijing Agricultural, 1984; Ph.D., Alberta (Canada), 1989.
- Wu, Kenny C.**, Assistant Professor in Education, Nutrition, and Restaurant-Hotel Management, 1995. B.S., Tunghai U. (Taiwan), 1981; M.B.A., Sul Ross State, 1985; M.S., Texas Tech, 1988; Ph.D., 1992.

X

- Xu, Ke Tom**, Assistant Professor in Health Services Research, 1999. B.A., Southwest U. of Finance and Economics, (China), 1992; M.S., 1995; Ph.D., North Carolina (Chapel Hill), 1999.
- Xu, Wenwei**, Associate Professor in Plant and Soil Science, 1998. B.S., Ag. U. of Gansu Province, 1982; M.S., Chinese Academy of Ag. Science, 1985; Ph.D., Missouri (Columbia), 1992.

Y

- Yadav, Surya B.**, Area Coordinator and James and Elizabeth Sowell Professor in Telecom-Technology, 1981. B.Sc.E.E., Banaras U. (India), 1972; M.Tech., Indian Inst. of Technology Kanpur (India), 1974; M.B.I.S., Georgia State, 1978; Ph.D., 1981.
- Yang, Song**, Professor in Mathematics, 1988. B.S., Sichuan, 1982; Ph.D., Michigan State, 1988.
- Yao, Xiaoyi**, Visiting Assistant Professor of Chemistry and Biochemistry, 2004. B.S., East China Normal, 1994; M.S., Shanghai Inst. Biochemistry, 1997; Ph.D., Iowa, 2001.
- Yoder-Wise, Patricia S.**, Professor in Nursing, 1979. B.S.N., Ohio State, 1963; M.S.N., Wayne State, 1968; Ed.D., Texas Tech, 1984.
- Yon, Kristen A.**, Assistant Professor of Music, 2003. B.M., Michigan, 1997; M.M., Cleveland Inst. Music, 2001; D.M.A., Rice, 2004.
- Yoo, Seulhee (Lori)**, Assistant Professor in Apparel Design and Manufacturing, 1999. B.S., Seoul Women's (South Korea), 1991; A.A.S., Fashion Institute of Technology, 1993; M.S., Texas Tech, 1996; Ph.D., 1999.
- Yoshinobu, Aaron**, Assistant Professor in Geosciences, 1999. B.S., San Diego State, 1992; M.S., 1994; Ph.D., Southern California, 1999.
- Youan, Bi-Botti Célestin**, Assistant Professor in Pharmaceutical Sciences, 2001. B.S., Université Nationale de Cote d'Ivoire, 1990; Pharm.D., 1993; M.B.A., United Business Institute (Belgium), 1998; Ph.D., Catholic U. of Louvain (Belgium), 1999.
- Youngblood, Ed**, Assistant Professor in Mass Communications, 2002. B.A., Southwestern, 1987; M.A., Southwest Texas, 1990; Ph.D., Texas Tech, 2002.
- Yu, Kristina H.**, Lecturer in Architecture, 2003. B.Arch., Illinois Inst. Tech., 1993; M.Arch., Harvard, 1995.

Z

Zak, John C., Chairperson and Professor in Biological Sciences, 1986. B.S., Pittsburgh, 1974; M.S., 1976; Ph.D., Calgary, 1981.

Zamora, Jorge, Assistant Professor in Classical and Modern Languages and Literatures, 2001. J.D., Universidad Nacional Autonoma De Mexico, 1984; M.A., Texas Tech, 1994; Ph.D., 1999.

Zartman, Richard E., Professor in Plant and Soil Science, 1974. B.S., Ohio State, 1968; Ph.D., Kentucky, 1974.

Zdenek, Sean, Assistant Professor in English, 2003. B.A., California (Berkeley), 1994; M.A., California State, 1998; Ph.D., Carnegie Mellon, 2001.

Zhang, Hong, Associate Professor in Biological Sciences, 1995. Sc.B., Sichuan Univ., 1982; Ph.D., Michigan State, 1989.

Zhang, Hong-Chao, Professor in Industrial Engineering, 1990. B.S., China, 1976; M.S., Denmark, 1986; Ph.D., Technical U. of Denmark, 1989; Reg. Prof. Engr. (Texas).

Zhang, Ke, Assistant Professor of Educational Psychology and Leadership, 2003. B.A., Nankai University, 1996; M.S., Penn State, 2000; Ph.D. candidate, 2004.

Zhang, Ming, Assistant Professor in Speech, Language, and Hearing Sciences, 2001; M.D., Shanghai Medical U. II, 1980; Advanced M.D., 1988; M.S., 1988; Ph.D., Iowa, 1995.

Zhuang, Yu, Assistant Professor in Computer Science, 2001. B.S., Zhejiang, 1990; M.S., Louisiana State, 1995; M.S., 1998; Ph.D., 2000.

Zieher, Klaus W., Associate Professor in Electrical and Computer Engineering, 1986. Dipl. Phys. Physics, Eberh-Karls U., 1966; M.Sc., Washington (Seattle), 1969; Dr.Rer.Nat., U. Karlsruhe, 1974.

Zimmerman, Craig, Instructor in Biological Sciences, 2004. B.S., Louisiana State, 1983; M.S., Georgia, 1987; Ph.D., Tennessee, 2002.

Zobeck, Ted M., Adjunct Faculty in Plant and Soil Science, 1992. B.S., Michigan, 1973; M.S., Michigan State, 1976; Ph.D., New Mexico State, 1980.

Emeritus Faculty and Administrative Officers

A

Abernathy, John R., Professor of Plant and Soil Science and Dean, College of Agricultural Sciences and Natural Resources, Emeritus, 1997-2004

Abel, Burl Monroe, Associate Professor in Business Administration, Emeritus, 1955-1973.

Adamcik, Joe Alfred, Associate Professor in Chemistry and Biochemistry, Emeritus, 1957-1988.

Ainsworth, Charles Leonard, Professor in Educational Psychology and Leadership and Vice Provost For Academic Affairs, Emeritus, 1967-1995.

Alesch, Eugene Raymond, Associate Professor in Art, Emeritus, 1969-1992.

Allen, Archie Cornelious, Associate Professor in Biological Sciences, Emeritus, 1963-1986.

Allen, Bonnie L., Rockwell Professor in Plant and Soil Science, Emeritus, 1959-2003

Allen, Louise Crawford, Associate Professor in Journalism, Emeritus, 1928-1963.

Amir-Moez, Ali Reza, Professor in Mathematics and Statistics, Emeritus, 1965-1988.

Anderson, John Arthur, Professor in Chemistry and Biochemistry, Emeritus, 1961-1993.

Anderson, Robert Henry, Professor in Educational Psychology and Leadership and Dean of Education, Emeritus, 1973-1983.

Anderson, Robert Paul, Professor in Psychology, Emeritus, 1955-1986.

Andrews, Norwood Henry Jr., Professor in Classical and Modern Languages and Literatures, Emeritus, 1970-2001.

Archer, James Elson, Professor in Computer Science, Emeritus, 1968-1991.

Arnold, Marion Denson, Professor in Petroleum Engineering, Emeritus, 1984-1998.

Arterburn, Joyce A. Davis, Assistant Professor in Health, Exercise, and Sport Sciences, Emeritus, 1959-2004.

Ashby, Clifford Charles, Professor in Theatre and Dance, Emeritus, 1963-1989.

Ashdown, Donald, Professor in Plant and Soil Science, Emeritus, 1952-1984.

Askins, Billy Earl, Professor and Chairperson in Curriculum and Instruction, Emeritus, 1967-2002.

Ater, Elizabeth Carolyn, Associate Professor in Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1969-1996.

Austin, Larry Morton, Professor in Business Administration, Emeritus, 1976-1996.

Averill, Edward Wilson, Professor in Philosophy, Emeritus, 1980-2002.

Ayoub, Mohamed Mohamed, Horn Professor in Industrial Engineering, Emeritus, 1961-2002.

B

Bennett, Harold R., Professor of Mathematics and Statistics, Emeritus, 1968-2004.

Bacon, Thomas Ivey, Associate Professor in Classical and Modern Languages and Literatures, Emeritus, 1964-1977.

Baird, Frank Lorenzo, Associate Professor in Political Science, Emeritus, 1968-1981.

Barber, James Joseph, Professor in Music, Emeritus, 1966-1995.

Barrick, Nolan Ellmore, Kleinschmidt Professor in Architecture, Emeritus, 1953-1979.

Barton, Richard Fleming, Professor in Management, Emeritus, 1967-1990.

Bateman, Harold Marion, Professor in Law, Emeritus, 1972-1990.

Bearden, Keith, Professor of Music, Emeritus, 1980-2004.

Beckner, Weldon Earnest, Professor in Educational Psychology and Leadership, Emeritus, 1965-1992.

Bell, Jean Camille Graves, Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1963-1985.

Bensberg, Gerard Joseph, Professor in Educational Psychology and Leadership, Emeritus, 1971-1990.

Bethea, Robert Morrison, Professor in Chemical Engineering, Emeritus, 1966-1998.

Biggers, Julian Lawson Jr., Professor in Educational Psychology and Leadership, Emeritus, 1966-1992.

Blackwell, Lotus Berry, Associate Professor in Business Administration, Emeritus, 1948-1981.

Blaisdell, Lowell Lawrence, Professor in History, Emeritus, 1957-1990.

Blakeley, Brian Layton, Professor in History, Emeritus, 1970-1999.

Bliese, John Ross Edward, Professor in Communications Studies, Emeritus, 1986-2002.

Boswell, Mary Middleton, Associate Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1968-1985.

Bradford, John Ross, Professor in Chemical Engineering and Dean of Engineering, Emeritus, 1943-1993.

Bravo, Roberto, Associate Professor in Classical and Modern Languages and Literatures, Emeritus, 1971-2004.

Brewer, Charles William, Associate Professor in English, Emeritus, 1972-1996.

Brewer, Mary Louise, Associate Professor in English, Emeritus, 1941-1973.

Bright, Peggy Howard, Associate Professor in Art, Emeritus, 1966-1986.

Brittin, Anthony Norman, Professor in Music, Emeritus, 1963-2002.

Brogniez, Raymond Hector, Associate Professor in Architecture, Emeritus, 1965-1979.

Burns, Jane Offutt, Professor in Accounting, Emeritus, 1986-1997.

Buster, Edna Walker, Associate Professor in Clothing and Textiles, Emeritus, 1927-1955.

Butler, Charles Edward, Associate Professor in Economics, Emeritus, 1971-1991.

Butler, Lester G., Associate Professor in Curriculum and Instruction, Emeritus, 1974-2002.

C

Camp, Earl D., Professor in Biological Sciences, Emeritus, 1945-1985.

Campbell, Robert Gordon, Associate Professor in Anthropology, Emeritus, 1969-1993.

Carper, Herbert Jackson Jr., Professor in Mechanical Engineering, Emeritus, 1978-1997.

Carter, Ralph Marlin, Associate Professor in Educational Psychology and Leadership, Emeritus, 1971-1991.

Caskey, Owen Laverne, Professor in Educational Psychology and Leadership, Emeritus, 1947-1983.

Cebull, Stanley Edward, Professor in Geosciences, Emeritus, 1969-1999.

Ceniza, Sherry, Associate Professor in English, Emeritus, 1990-2004.

Chamberlain, Valerie Meyer, Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1971-1985.

Chandler, Charles Ray, Associate Professor in Sociology, Anthropology and Social Work, Emeritus, 1966-2000.

Cheatham, Beverly Jane, Associate Professor in Art, Emeritus, 1973-1998.

Childers, Carl John Jr., Professor in Architecture, Emeritus, 1959-1985.

Chisholm, Sam Whiten, Professor in Business Administration, Emeritus, 1941-1981.

Chong, Key Ray, Associate Professor in History, Emeritus, 1970-1995.

Christian, Aubry Duane, Associate Professor in Curriculum and Instruction, Emeritus, 1971-1994.

Cismaru, Alfred, Professor in Classical and Modern Languages and Literatures, Emeritus, 1970-1995.

Claborn, Billy Joe, Professor in Civil Engineering, Emeritus, 1963-1992.

Cluff, E. Dale, Professor in Educational Psychology and Leadership and Dean of Libraries, Emeritus, 1982-2001.

Cobb, John William, Professor in Health, Exercise, and Sport Sciences, Emeritus, 1977-1993.

Cornett, Joe D., Professor in Educational Psychology and Leadership, Emeritus, 1968-1997.

Coulter, Murray Whitfield, Associate Professor in Biological Sciences, Emeritus, 1964-1998.

Craig, John Paul, Professor in Electrical and Computer Engineering, Emeritus, 1957-1989.
Cravens, Sydney Paul Associate Professor in Classical and Modern Languages and Literatures, Emeritus, 1972-2002.
Crider, John Richard, Associate Professor in English, Emeritus, 1966-1996.
Culp, James William, Professor in English, Emeritus, 1967-1984.
Cummins, David Charles, Professor in Law, Emeritus, 1970-2000.
Curl, Samuel Everett, Professor in Animal and Food Sciences and Dean, College of Agricultural Sciences and Natural Resources, Emeritus, 1961-1997.
Cutter, Paul Frederick, Professor in Music, Emeritus, 1968-2000.

D

Dale, Charles Edwin, Professor in Business Administration, Emeritus, 1956-1983.
Das Gupta, Kamalaksha, Professor in Physics, Emeritus, 1966-1985.
Davenport, Monty E., Professor in Mechanical Engineering and Vice President for Operations, Emeritus, 1956-1998.
Davidson, Claude Monroe, Professor in Geography, Emeritus, 1969-1998.
Davies, Lewis James Sr., Associate Professor in Sociology, Emeritus, 1962-1986.
Davis, Dale Waverly, Associate Professor in English, Emeritus, 1968-1999.
Davis, Kenneth Waldron, Professor in English, Emeritus, 1960-1994.
Deahl, Robert Waldo, Professor in Music, Emeritus, 1966-1994.
Deethardt, John Fred Jr., Professor in Communications Studies, Emeritus, 1968-1989.
Dietz, Donald Thaddeus, Professor in Classical and Modern Languages and Literatures, Emeritus, 1978-1993.
Downes, John Dixon, Professor in Plant and Soil Science, Emeritus, 1970-1984.
Drew, Leslie, Professor in Biological Sciences, Emeritus, 1977-2000.
Drew, Lola Marie, Associate Professor in Human Development and Family Studies, Emeritus, 1946-1972.
Dudek, Richard Albert, Horn Professor in Industrial Engineering, Emeritus, 1958-1988.
Dunn, Roy Sylvan, Associate Professor in Sociology, Emeritus, 1956-1977.
Duran, Benjamin Sanchez, Professor in Mathematics and Statistics, Emeritus, 1971-2002.
Durland, Donald Lewis, Professor in Art, Emeritus, 1969-1996.
Dvoracek, Marvin John, Associate Professor in Civil Engineering, Emeritus, 1962-1994.

E

Eddleman, Floyd Eugene, Professor in English, Emeritus, 1958-1990.
Edgar, James Hadley Jr., Robert H. Bean Professor in Law, Emeritus, 1971-1992.
Edwards, Wiltring Sherrod, Associate Professor in Human Development and Family Studies, Emeritus, 1962-1984.
Eggenberger, Ulrich Lewis, Professor in Agricultural Education and Communications, Emeritus, 1961-1993.
Elliot, Arthur Mcauley, Professor in Biological Sciences, Emeritus, 1961-1995.
Elliott, Raymond Pruitt, Professor in Music, Emeritus, 1950-1969.
Ewalt, Robert H., Associate Professor in Educational Psychology and Leadership and Vice President for Student Affairs, Emeritus, 1973-2000.

F

Felty, Billy Weldon, Associate Professor in Architecture, Emeritus, 1958-1994.
Filgo, Dorothy Jane, Associate Professor in Educational Psychology and Leadership, Emeritus, 1960-1986.
Fleming, Patrice Margaret Catlin, Professor in Educational Psychology and Leadership, Emeritus, 1967-1978.
Flynn, George Quitman, Professor in History, Emeritus, 1974-1999.
Foerster, Eugene Paul, Associate Professor in Civil Engineering, Emeritus, 1969-1987.
Follows, Arthur Gail, Associate Professor in Music, Emeritus, 1967-1996.
Fowler, Stanley Earl, Professor in Human Development and Family Studies, Emeritus, 1970-1991.
Fox, Elizabeth, Associate Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1982-2002.
Freeman, Billy Gervice, Associate Professor in Agricultural and Applied Economics, Emeritus, 1973-1997.
Freeman, Kenneth Howard, Professor in Educational Psychology and Leadership, Emeritus, 1969-1980.
Funk, Verne James, Professor in Art, Emeritus, 1977-1997.

G

Gately, Mary Sue, Professor in Accounting, Emeritus, 1981-1998.
Gerlach, Mary Agnes, Associate Professor in Clothing and Textiles, Emeritus, 1955-1982.
Gettel, Georgette Elizabeth, Associate Professor in Music, Emeritus, 1963-2000.

Gilbert, Beverly Brian, Associate Professor in English, Emeritus, 1961-1993.
Gillas, John Arthur, Horn Professor in Music, Emeritus, 1971-2002.
Gilliam, John Charles, Professor in Economics, Emeritus, 1962-1992.
Glenn, Edna Smith, Associate Professor in Art, Emeritus, 1968-1987.
Goebel, Ulrich, Professor in Classical and Modern Languages and Literatures, Emeritus, 1979-2001.
Goss, James A., Professor in Anthropology, Emeritus, 1978-2000.
Graham, Lyman Moody Jr., Associate Professor in Engineering Technology, Emeritus, 1956-1984.
Graves, James Wilton, Professor in Agricultural and Applied Economics, Emeritus, 1961-1998.
Greer, Hiram Varner, Associate Professor in Art, Emeritus, 1963-1982.
Grub, Walter, Professor in Civil Engineering, Emeritus, 1966-1985.
Guerrant, William Barnett Jr., Professor in Chemistry and Biochemistry, Emeritus, 1968-1984.
Gustafson, Donald Lloyd, Professor in Computer Science, Emeritus, 1971-1999.
Gustafson, William Howard, Professor of Mathematics and Statistics, Emeritus, 1976-2004.

H

Hagler, Marion Otho, Horn Professor in Electrical and Computer Engineering and Associate Dean, College of Engineering, Emeritus, 1967-2000.
Hanna, James Walter, Associate Professor in Art, Emeritus, 1968-2001.
Hanna, Paul Dean Jr., Professor in Art, Emeritus, 1960-1993.
Harden, Margarette Leggitt, Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1967-1992.
Harper, James William, Associate Professor in History, Emeritus, 1967-2002.
Havens, Murray Clark, Professor in Political Science, Emeritus, 1973-1997.
Hayes, Robert Ames, Professor in History, Emeritus, 1968-1998.
Helmert, Donald Jacob, Professor in Engineering Technology, Emeritus, 1948-1982.
Hickerson, Nancy Parrott, Professor in Anthropology, Emeritus, 1972-1999.
Higdon, David Leon, Horn Professor in English, Emeritus, 1971-2001.
Hildebrand, Shelby Keith, Professor in Mathematics and Statistics, Emeritus, 1963-1997.
Hill, Lewis Edgar, Professor in Economics, Emeritus, 1967-2000.
Horridge, Patricia Emily, Professor of Interior Design, Emeritus, 1976-2004.
Houck, Marilyn A., Associate Professor of Biological Sciences, Emeritus, 1991-2004.
Houghton, Edna Nawanna, Associate Professor in Art, Emeritus, 1932-1973.
Howze, James Dean, Professor in Art, Emeritus, 1958-1992.
Hsia, Hower J., Professor in Mass Communications, Emeritus, 1970-1992.
Hudson, Frank Alden, Professor in Animal and Food Sciences, Emeritus, 1960-1988.
Hunter, John Ray, Associate Professor in Range, Wildlife, and Fisheries Management, Emeritus, 1963-1999.

J

Jacka, Alonzo D., Professor in Geosciences, Emeritus, 1959-1997.
Jackson, Raymond Carl, Horn Professor in Biological Sciences, Emeritus, 1971-1997.
Jobe, Evan Kermit, Associate Professor in Philosophy, Emeritus, 1976-1991.
Johnson, Melvin Hamilton, Associate Professor in Architecture, 1980-1994.
Jones, Clyde, Horn Professor in Biological Sciences and Museum Sciences, Emeritus, 1982-2004.
Jones, U. V., Professor in Law, Emeritus, 1966-1980.
Jonish, James E., Professor in Economics, Emeritus, 1973-1998.
Jordan, Duane Paul, Associate Professor in Mechanical Engineering, Emeritus, 1964-2002.

K

Keho, Cliff Hutchinson, Associate Professor in Civil Engineering, Emeritus, 1957-1988.
Kellogg, Charles N., Associate Professor of Mathematics and Statistics, Emeritus, 1970-2004.
Kellogg, Virginia Katherine, Professor in Music, Emeritus, 1963-1993.
Kelsey, Clyde E. Jr., Professor in Educational Psychology and Leadership, Emeritus, 1972-1987.
Kennedy, Rex Page, Associate Professor in Agricultural and Applied Economics, Emeritus, 1967-1991.
Kenney, Earl Eugene, Professor in Music, Emeritus, 1957-1982.
Killion, Marlin Dean, Director of Bands, Emeritus, 1959-1985.
Kireilis, Ramon Walter, Professor in Health, Exercise, and Sport Sciences, Emeritus, 1950-1979.
Knipping, Paul Arthur, Associate Professor in Health, Exercise, and Sport Sciences, Emeritus, 1976-1993.
Koeller, Shirley Ann, Associate Professor in Curriculum and Instruction, Emeritus, 1978-1996.
Kuhnley, Lyle Carlton, Associate Professor in Biological Sciences, Emeritus, 1959-1981.
Kyre, Martin Theodore Jr., Associate Professor in Political Science, Emeritus, 1963-1990.

L

Lamb, Mina Marie Wolf, Margaret W. Weeks Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1940-1975.
Land, Carlon Sanford, Professor in Petroleum Engineering, Emeritus, 1983-1992.
Langford, Thomas Alexander, Professor in English and Dean, Graduate School, Emeritus, 1961-2001.
Lawrence, James Harold Jr., Professor of Mechanical Engineering, Emeritus, 1956-2004.
Lewis, Truman Orville, Professor in Mathematics and Statistics, Emeritus, 1966-1994.
Little Soldier, Leona Mitchell, Professor in Educational Psychology and Leadership, Emeritus, 1969-1998.
Locke, Bill J., Professor in Psychology, Emeritus, 1969-1996.
Lockhart, Billy Clarence, Professor in Art, Emeritus, 1955-1987.
Logan, Martha Morrow, Associate Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1969-1985.
Long, Robert Allen, Professor in Animal and Food Sciences, Emeritus, 1976-1991.
Lowe, George Dean II, Professor of Sociology, Emeritus, 1975-2004.
Longworth, Donald Sherman, Professor in Human Development and Family Studies, Emeritus, 1966-1982.

M

Mathis, Kary, Thompson Professor of Agricultural and Applied Economics and Director, ICASALS, 1982-2004.
Manley, Max Wayland, Associate Professor in Educational Psychology and Leadership, Emeritus, 1970-1992.
Manning, Thomas Green, Professor in History, Emeritus, 1956-1979.
Marlett, William Robert, Associate Professor in Landscape Architecture, Emeritus, 1968-1995.
Marple, Annette Wilson, Associate Professor in Law, Emeritus, 1973-1992.
Marple, Hugo Dixon, Professor in Music, Emeritus, 1969-1985.
Martin, Robert Edward, Associate Professor in Mechanical Engineering, Emeritus, 1949-1985.
Martin, Ruth Evelyn, Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1986-1999.
Mason, Danny Raymond, Associate Professor in Health, Exercise, and Sport Sciences, Emeritus, 1964-2000.
Matches, Arthur Gerald, Thornton Distinguished Professor in Plant and Soil Science, Emeritus, 1981-1994.
Mattox, Richard Benjamin, Professor in Geosciences, Emeritus, 1954-1982.
Mattson, Bruce Douglas, Professor in Educational Psychology and Leadership, Emeritus, 1965-1983.
Maxwell, Henry James, Professor in Classical and Modern Languages and Literatures, Emeritus, 1963-1989.
Maxwell, Richard Wayne, Associate Professor in Law, Emeritus, 1975-1991.
Mayer-Oakes, William James, Professor in Anthropology, Emeritus, 1971-1989.
Maynard, Judson Dana, Professor in Music, Emeritus, 1961-1992.
McBride, Mary Fletcher, Associate Professor in English, Emeritus, 1972-1992.
McCarty, Darrell Keith, Professor in Music, Emeritus, 1953-1988.
McCullen, Joseph Thomas Jr., Professor in English, Emeritus, 1949-1980.
McCutchan, Gordon Cartwright, Professor in Architecture, Emeritus, 1962-1984.
McDonald, Walter Robert, Horn Professor in English, Emeritus, 1971-2002.
McGowan, Richard Allen, Associate Professor in Music, Emeritus, 1969-1994.
McIntyre, Martin Hugh, Professor in Health, Exercise, and Sport Sciences, Emeritus, 1976-1994.
McLaughlin, Thomas Graham, Professor in Mathematics and Statistics, Emeritus, 1973-2002.
McNally, James Faber, Associate Professor in Health, Exercise, and Sport Sciences, Emeritus, 1952-1989.
McPherson, Clara Mueller, Associate Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1947-1986.
McPherson, Clinton Marsud, Associate Professor in Chemistry and Biochemistry, Emeritus, 1956-1984.
Mecham, John Stephen, Professor in Biological Sciences, Emeritus, 1965-1992.
Mehaffie, Shamus, Professor in Educational Psychology and Leadership, Emeritus, 1971-1990.
Mezack Michael III, Associate Professor in Educational Psychology and Leadership, Emeritus, 1975-1996.
Miller, John David, Associate Professor in Mathematics and Statistics, Emeritus, 1968-1996.
Mills, Jerry Lee, Professor in Chemistry and Biochemistry, Emeritus, 1970-1995.
Mires, Raymond William, Professor in Physics, Emeritus, 1957-1991.
Mitchell, Robert Wetsel, Professor in Biological Sciences, Emeritus, 1965-1991.
Mitra, Arunkumar, Associate Professor in Mathematics and Statistics, Emeritus, 1967-2000.

Mittler, Gene Allen, Professor in Art, Emeritus, 1982-1995.
Mogan, Joseph John, Professor in English, Emeritus, 1966-1996.
Montgomery, Evelyn Ina, Professor in Anthropology, Emeritus, 1964-1979.
Moon, Marvin Lee, Associate Professor in Art, Emeritus, 1973-1996.
Moore, Diana, Associate Professor in Theatre and Dance, Emeritus, 1971-2000.
Morgan, Harmon Loyd, Associate Professor in Mass Communications, Emeritus, 1968-1992.
Morrow, Carmyn Hula, Associate Professor in Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1972-1993.
Murray, Grover Elmer, Professor in Geosciences and President, Emeritus, 1966-1988.
Musiak, Thomas Alec, Professor in Landscape Architecture and Chairperson, Emeritus, 1988-2000.

N

Nagle, Levi Marshall Jr., Professor in Educational Psychology and Leadership, Emeritus, 1959-1978.
Nail, Kline Allen, Professor, Emeritus in English, 1944-1980.
Nelson, Otto Millard, Associate Professor in History and Associate Dean, College of Arts & Sciences, Emeritus, 1965-2000.
Nevius, John R., Professor in Educational Psychology and Leadership, Emeritus, 1974-1995.
Newcomb, Benjamin Havelock, Professor in History, Emeritus, 1964-2000.
Newell, Robert Lee, Professor in Mechanical Engineering, Emeritus, 1941-1982.

O

O'Bar, Mary Tom Riley, Professor in Human Development and Family Studies, Emeritus, 1972-2000.
O'Hair, Edgar, Professor in Electrical and Computer Engineering, Emeritus, 1981-2002.
Oberhelman, Harley Dean, Horn Professor in Classical and Modern Languages and Literatures, Emeritus, 1958-1995.
Oberleas, Donald, Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1985-1998.
Oldham, William J. B., Professor in Computer Science, Emeritus, 1987-2002.
Owens, Mary Lydia Seymour, Professor in Health, Exercise, and Sport Sciences, Emeritus, 1969-1999.
Owens, Thomas Richard, Associate Professor in Agricultural and Applied Economics, Emeritus, 1966-1999.

P

Parker, Harry, Professor of Chemical Engineering, Emeritus, 1970-2004.
Parkinson, Roderick, Associate Professor in Art, Emeritus, 1946-1975.
Pasewark, William Robert, Professor in Educational Psychology and Leadership, Emeritus, 1956-1982.
Patterson, William Taylor, Professor in Classical and Modern Languages and Literatures, Emeritus, 1961-1995.
Payne, Henry David III, Associate Professor in Music, Emeritus, 1967-2002.
Pearson, Neale J., Professor in Political Science, Emeritus, 1969-1996.
Peterson, Arlin, Professor in Educational Psychology and Leadership, Emeritus, 1972-2001.
Peterson, Richard Lewis, Professor in Finance, Emeritus, 1982-1999.
Pettit, Russell Dean, Associate Professor in Range, Wildlife, and Fisheries Management, Emeritus, 1969-1989.
Philbrick, George Rex, Professor in Health, Exercise, and Sport Sciences, Emeritus, 1941-1979.
Phillips, Sherman Alfred Jr., Associate Professor in Plant and Soil Science, Emeritus, 1982-2002.
Pillow, Fannie Ernestine, Associate Professor in Educational Psychology and Leadership, Emeritus, 1965-1976.
Pinder, Robert Henry, Associate Professor in Human Development and Family Studies, Emeritus, 1971-1994.
Platten, Marvin Roger, Associate Professor in Curriculum and Instruction, Emeritus, 1971-1993.
Post, Charles William, Professor in Music, Emeritus, 1957-1984.
Powers, Louis John, Professor in Mechanical Engineering, Emeritus, 1942-1979.
Preston, Rodney Leroy, Horn Professor in Animal and Food Sciences and Thornton Distinguished Chair, Emeritus, 1982-1996.
Proctor, Vernon Willard, Professor in Biological Sciences, Emeritus, 1956-1992.
Purkerson, Ray Abiff, Associate Professor in Educational Psychology and Leadership, Emeritus, 1972-1991.

Q

Queen, John William, Associate Professor in Art, Emeritus, 1960-1991.
Quilliam, William Reed Jr., George Herman Mahon Professor in Law, Emeritus, 1966-1995.

R

Randle, Helen Caldwell, Associate Professor in Human Development and Family Studies, Emeritus, 1965-1977.
Ransdell, Joseph Morton, Associate Professor in Philosophy, Emeritus, 1974-2000.
Ramsey, Boyd, Professor in Animal and Food Sciences, Emeritus, 1968-1998.
Ray, Joseph Bland Bob, Professor in Psychology, Emeritus, 1963-1990.
Reavis, Charles Augustus, Professor in Educational Psychology and Leadership, Emeritus, 1976-2002.
Rebstock, Charles Wesley, Associate Professor in Educational Psychology and Leadership, Emeritus, 1966-1982.
Reeves, Corwin C. Jr., Professor in Geosciences, Emeritus, 1957-1995.
Reid, Maryanne, Associate Professor in Educational Psychology and Leadership, Emeritus, 1963-1995.
Reis, Levern Anthony, Associate Professor in Mechanical Engineering, Emeritus, 1957-1990.
Reynolds, Elbert Brunner Jr., Associate Professor in Mechanical Engineering, Emeritus, 1964-1990.
Roberts, Dayton Young, Professor in Educational Psychology and Leadership, Emeritus, 1973-1990.
Roberts, Larry Spurgeon, Professor in Biological Sciences, Emeritus, 1979-1990.
Roch, Delilah Manire, Associate Professor in Clothing and Textiles, Emeritus, 1967-1982.
Rogers, John Robert, Professor in Educational Psychology and Leadership, Emeritus, 1970-1980.
Rogers, Ruth Marie, Professor in Health, Exercise, and Sport Sciences, Emeritus, 1971-1989.
Ronshausen, Nina Lorraine, Associate Professor in Educational Psychology and Leadership, Emeritus, 1975-1996.
Rooker, Robert Alan, Associate Professor in Mass Communications, Emeritus, 1963-1990.
Rooze, Gene Edward, Professor in Curriculum and Instruction, Emeritus, 1969-1996.
Ross, Billy Irvan, Professor in Mass Communications, Emeritus, 1970-1988.
Rouse, Robert Lyle, Professor in Economics and Business Administration, Emeritus, 1950-1985.

S

Sasser, Elizabeth Skidmore, Professor in Architecture, Emeritus, 1949-1990.
Schaefer, Roger Carl, Associate Professor in Political Science, Emeritus, 1975-2002.
Schettler, Theodore William, Associate Professor in Music, Emeritus, 1968-1983.
Schmidly, David James, Professor in Biological Sciences and President, Emeritus, 1996-2002.
Schoen, Rodric Bruce, Thornton Professor in Law, Emeritus, 1971-2000.
Shaw, Patrick Wilbert, Professor in English, Emeritus, 1972-2002.
Shelden, Martha Gene, Professor in Clothing and Textiles, Emeritus, 1955-1969.
Shine, Henry Joseph, Horn Professor in Chemistry and Biochemistry, Emeritus, 1954-2000.
Shurbet, Deskin Hunt Jr., Professor in Geosciences, Emeritus, 1956-1994.
Shurbet, Gerald Lynn, Associate Professor in Mathematics and Statistics, Emeritus, 1956-1987.
Simpson, Vera Loie Jarrard, Associate Professor in Communications Studies, Emeritus, 1964-1985.
Skillern, Frank F., George W. McCleskey Professor in Water Law, Emeritus, 1971-2004.
Smith, Roland Edgar, Professor in Political Science, Emeritus, 1968-1986.
Sorensen, George Wendell III, Professor in Theatre and Dance, Emeritus, 1976-1996.
Stem, Carl Herbert, Dean in Business Administration, Emeritus, 1975-1997.
Stenis, Tom Basil, Associate Professor in Electrical and Computer Engineering, Emeritus, 1947-1987.
Stephen, Francis B., Professor in Art, Emeritus, 1967-1983.
Stewart, William Addison, Professor in Architecture, Emeritus, 1965-1984.
Stinespring, John Albright, Associate Professor in Art, Emeritus, 1989-2004.
Street, Betty Ann, Associate Professor in Art, Emeritus, 1967-1995.

T

Tamkoc, Metin, Professor in Political Science, Emeritus, 1966-1994.
Tanner, Donald Ray, Professor, Emeritus in Music, 1977-2001.
Tarwater, J. Dalton, Professor in Mathematics and Statistics, Emeritus, 1968-2002.
Tereshkovich, George, Professor in Plant and Soil Science, Emeritus, 1968-1995.
Thomas, Henry Coffman, Professor in Physics, Emeritus, 1958-1984.

Thomas, Orlan Earl, Associate Professor in Music, Emeritus, 1967-2002.
Thompson, Arthur Dudley, Professor in Architecture, Emeritus, 1959-1997.
Thompson, Virginia Mahaley, Associate Professor in Architecture, Emeritus, 1964-1997.
Timmons, Myra Bounds, Associate Professor in Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1961-1995.
Tolley, Richard Earl, Professor, Emeritus in Music, 1959-1991.
Tribble, Leland Floyd, Professor in Animal and Food Sciences, Emeritus, 1967-1989.
Troub, Roger M., Professor in Economics, Emeritus, 1967-1997.
Turner, Fred Donavon, Associate Professor in Music, Emeritus, 1971-2002.
Twyman, Briggs L., Associate Professor in History, Emeritus, 1973-2003.

U

Ulrich, Willie Lee, Professor in Civil Engineering, Emeritus, 1961-1984.
Urban, Lloyd Victor, Professor of Civil Engineering, Emeritus, 1969-2004.

V

Vaughan, Mary Ann, Associate Professor in Music, Emeritus, 1967-1996.
Vines, Darrell Lee, Professor in Electrical and Computer Engineering, Emeritus, 1962-2000.

W

Wade, Charles Ernest, Associate Professor in Finance, Emeritus, 1971-1999.
Wages, Jack Douglas, Professor in English, Emeritus, 1968-1999.
Wagner, Betty Sue Malone, Associate Professor in Human Development and Family Studies, Emeritus, 1969-1994.
Wagner, Fred Philip Jr., Associate Professor in Engineering Technology, Emeritus, 1967-1994.
Walker, Harry Stuart, Associate Professor in Economics, Emeritus, 1953-1986.
Walkup, John Frank, Horn Professor in Electrical and Computer Engineering, Emeritus, 1971-1998.
Wallace, Dorothy Estelle Hays, Professor in Human Development and Family Studies, Emeritus, 1959-1975.
Warren, Terrel Barney, Professor in Architecture, Emeritus, 1964-1976.
Weaver, Richard Alden, Professor in Theatre and Dance, Emeritus, 1972-1996.
Webb, Holmes Andrew, Professor in Educational Psychology and Leadership, Emeritus, 1960-1970.
Weiner, Leonard Harold, Associate Professor in Computer Science, Emeritus, 1976-1990.
White, Gary Elbert, Professor in Accounting, Emeritus, 1979-1999.
White, John Thomas, Associate Professor in Mathematics and Statistics, Emeritus, 1965-2002.
Whittington, William Elmer, Professor in Business Administration, Emeritus, 1947-1975.
Wilde, Richard Edward, Professor in Chemistry and Biochemistry, Emeritus, 1963-1995.
Williams, Ira Lawson, Professor in Civil Engineering, Emeritus, 1952-1974.
Williams, Peggy Jean, Associate Professor in Health, Exercise, and Sport Sciences, Emeritus, 1962-1993.
Williamson, Billie Frances, Assistant Dean and Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1956-1973.
Williamson, Horace Hampton, Associate Professor in Architecture, Emeritus, 1973-1986.
Willingham, Welborn Kiefer, Professor in Educational Psychology and Leadership, Emeritus, 1961-1993.
Wilson, Margaret Eileen, Professor in Health, Exercise, and Sport Sciences, Emeritus, 1965-1990.
Winkler, Herald Warren, Professor in Petroleum Engineering, Emeritus, 1970-1985.
Wittman, John, Professor in Economics, Emeritus, 1960-1990.
Woodson, Eleanor Mary, Associate Professor in Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1970-1987.

Y

Yang, Shiang Ping, Professor in Education, Nutrition, and Restaurant-Hotel Management, Emeritus, 1969-1988.

Z

Zintgraff, Paul Edward, Professor in Educational Psychology and Leadership, Emeritus, 1974-1984.
Zukauckas, Edward William Jr., Associate Professor in Plant and Soil Science, Emeritus, 1952-1984.
Zyla, Wolodymyr Taras, Professor in Classical and Modern Languages and Literatures, Emeritus, 1963-1986.

Residency Status Determination

Definitions

The following definitions are provided for in Coordinating Board Rule, Chapter 21, Subchapter B, Section 21.22. When used in this document, these words and terms shall have the following meanings, unless the context clearly indicates otherwise:

Bona Fide Texas Resident. See Resident.

Competitive Scholarship. A scholarship that is publicized in the school's catalog and is open to both residents and nonresidents, that is designated as competitive by the institution, and whose sum either singularly or in combination with other competitive scholarships totals enough to be a basis for the waiver of nonresident tuition charges.

Conclusive Evidence. Proof that removes uncertainties. In the case of proving residency, conclusive evidence may include, but is not limited to: the purchase of a homestead with substantial down payment, significant employment and business or personal ties in the state that imply a fixed intent to remain in Texas.

Dependent. An individual (minor or 18 years of age or older) who will be claimed as a dependent for federal income tax purposes by a parent or court-appointed legal guardian the year of enrollment and was claimed in the tax year prior to enrollment.

Domicile in Texas. Physically residing in Texas for at least 12 consecutive months with the intent to make Texas one's permanent home. The burden of proof that a domicile has been established lies with the student.

Documenting 12 Months. Among the documents that may be used to prove a person's presence for 12 months in Texas are:

1. Texas high school transcript for the full senior year immediately preceding the semester enrolled;
2. A Texas college or university transcript (in conjunction with other documents from the institution);
3. An employer's statement of date of employment;
4. A permanent driver's license (at least one year old). The license expiration date minus date of enrollment should not exceed three years;
5. Texas voter registration;
6. Lease agreement that includes student's name and period covered;
7. Property tax payments for the year preceding enrollment;
8. Cancelled checks;
9. Utility bills for the year preceding enrollment;
10. A signed, dated and notarized comprehensive residence questionnaire;
11. An income tax form or (if current year federal tax form has not been filed) a signed, notarized statement regarding the student's independence or regarding the individual(s) who claim the student as a dependent;
12. A current credit report that documents the student's length and place of residence;
13. Other third party documentation that confirms residency status for the 12-month period preceding enrollment;
14. For a homeless individual, documentation may consist of written statements from the office of one or more legitimate social service agencies located in Texas, attesting to the provision of services to the individual over the previous 12-month period.

Documenting a Domicile. Material to the determination of the establishment of a domicile in Texas are business or personal facts including, but not limited to:

1. The length of residence and employment prior to enrolling in college;
2. The nature of employment while a student;
3. Physical presence in Texas as a part of a household transferred to the state by an employer (other than the U.S. Armed Forces or Public Health Service) or as a part of a household moved to the state to accept employment; and
4. Purchase of a homestead.

Foreign Students. Individuals from countries other than the United States who do not meet the residency requirements outlined in this publication.

Gainful Employment. Lawful activities intended to provide an income to the individual or allow an individual to avoid the expense of paying another person to perform the tasks (as in child care or the maintenance of a home). A person who is self-employed, employed as a homemaker, or who is living off his/her earnings may be considered gainfully employed for tuition purposes, as may an individual whose primary support is the government (public assistance program).

Homeless Individual. A homeless individual as defined by 42 U.S.C. Section 11302 including,

1. an individual who lacks a fixed, regular, and adequate nighttime residence; and
2. an individual who has a primary nighttime residence that is
 - a supervised publicly or privately operated shelter designed to provide temporary living accommodations;
 - an institution that provides temporary residence for individuals intended to be institutionalized; or
 - a public or private place not designed for, or ordinarily used as, a regular sleeping accommodation for human beings. See "Homeless Individuals".

Independent Student. A student 18 years of age or older or an emancipated minor who is not claimed by a parent or a legal guardian as a dependent for federal income tax purposes during the tax year including the enrollment period.

Minor. An individual who is 17 years of age or younger.

Nonresident. A citizen, national, or permanent resident of the United States or an alien who has been permitted by Congress to adopt the United States as his or her domicile while in this country, or a foreign student who has not met the state requirements for establishing residency for tuition purposes.

Official Census Date. The official reporting date for enrollments; the date upon which the student (by virtue of having obligated him/herself to pay requisite tuition and/or fees) is considered to be enrolled in the institution. (For 16-week semesters, the 12th class day; for 6-week summer sessions, the 4th class day.)

Prior to Enrolling. Prior to and/or including the official census date.

Public Institution of Higher Education. State-supported institutions of higher education, including public community colleges, state colleges, universities, health-related institutions, and technical colleges.

Resident. A citizen, national or permanent resident of the United States or an alien who has been permitted by Congress to adopt the United States as his or her domicile while in this country, or a foreign student who meets the residency requirements outlined in this publication and who has established a domicile in the state of Texas.

Time of Enrollment. The end of working hours on the official census date for the semester or term for that institution.

U.S. Armed Forces. A person who is an officer, enlisted person, selectee, or draftee of the Army, Army Reserve, Air Force, Air Force Reserve, Navy, Navy Reserve, Marine Corps, Marine Corps Reserve, Coast Guard, or Coast Guard Reserves of the United States. Members of the Army and Air National Guard may not qualify for every program directed at members of the U.S. Armed Forces. Where a rule does not explicitly include them, members of the Army or Air National Guard, or spouses or dependents of those members, should present documentation from an appropriately authorized officer that indicates that the individual was acting as a component of the Army or Air Force for the relevant time period.

General Rules

Minors and Dependents

Statutory Provisions: Texas Education Code Sec. 54.052 (a) (1) (2) (3). "Residence" means "domicile." "Resided in" means domiciled in." "Dependent" means an individual who is claimed as a dependent for federal income tax purposes by the individual's parent or guardian at the time of registration and for the tax year preceding the year in which the individual registers.

Texas Education Code Sec. 54.052 (b). For the purposes of this subchapter, the status of a student as a resident or nonresident student is determined as prescribed by this section, subject to the other applicable provisions of this subchapter.

Texas Education Code Sec. 54.052 (c). An individual who is under 18 years of age or is a dependent and who is living away from his family and whose family resides in another state or has not resided in Texas for the 12-month period immediately preceding the date of registration shall be classified as a nonresident student.

Texas Education Code Sec. 54.052 (d). An individual who is 18 years of age or under or is a dependent and whose family has not resided in Texas for the 12-month period immediately preceding the date of registration shall be classified as a nonresident student, regardless of whether he has become the legal ward of residents of Texas or has been adopted by residents of Texas while he is attending an educational institution in Texas, or within a 12-month period before his attendance, or under circumstances indicating that the guardianship or adoption was for the purpose of obtaining status as a resident student.

Texas Education Code Sec. 54.0551. An individual who is 18 years of age or under or is a dependent and who, along with the individual's parents, was formerly a resident of this state is entitled to pay tuition at the rate provided for Texas residents if: (1) the individual and the parent who is the individual's managing conservator or who is the individual's joint managing conservator with whom the individual primarily resides change their legal residence from this state to another state; and (2) the other parent who is the individual's possessory conservator or who is the individual's joint managing conservator with whom the individual does not primarily reside continues to reside in this state and is not delinquent on the payment of any child support.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.23(a):

For a dependent or minor to acquire Texas residency through a parent or court-appointed legal guardian, the parent or legal guardian must meet residency requirements for individuals 18 years of age or older and the dependent or minor must be eligible to domicile in the United States. Residency of an eligible dependent or minor is based on one of the following circumstances:

- (1) The residence of the parent who has claimed the dependent for federal income tax purposes both at the time of enrollment and for the tax year preceding enrollment; or
- (2) The residence of the parent or court-appointed legal guardian with whom the dependent or minor has physically resided for the 12 months prior to enrollment; or
- (3) The residence of a parent or legal guardian who has joint or single custody of the child, if that individual is not delinquent on the payment of child support; or
- (4) The residence of the person to whom custody was granted by court order (e.g., divorce decree, child custody actions, guardianship or adoption proceedings), provided custody was granted at least 12 months prior to the student's enrollment and was not granted for the purpose of obtaining status as a resident student
- (5) If a student was classified as a resident prior to fall semester 2001 based upon the residency of a caretaker or relative, not a court-appointed legal guardian, he or she shall not be reclassified as a nonresident under this section. See "Special Conditions for Minors or Dependents" for information on exceptions provided for in Chapter 21, Subchapter B, Section 21.26(a).

Independent Individuals 18 Years of Age or Older

Statutory Provisions: Texas Education Code Sec. 54.052 (e). An individual who is 18 years of age or over who has come from outside Texas and who is gainfully employed in Texas for a 12-month period immediately preceding registration in an educational institution shall be classified as a resident student as long as he continues to maintain a legal residence in Texas.

Texas Education Code Sec. 54.052 (f). An individual who is 18 years of age or over who resides out of the state or who has come from outside Texas and who registers in an educational institution before having resided in Texas for a 12-month period shall be classified as a nonresident student.

Texas Education Code Sec. 54.052 (g). An individual who would have been classified as a resident for the first five of the six years immediately preceding registration but who resided in another state for all or part of the year immediately preceding registration shall be classified as a resident student.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.23(b):

Independent individuals 18 years of age or older who are gainfully employed in the state for a period of 12 months prior to enrollment are entitled to classification as residents. Students registering in an institution of higher education prior to having physically resided in the state for the 12 months prior to enrollment shall be classified as nonresidents for tuition purposes during that term. Accumulations of summer and other vacation periods do not satisfy the employment requirement. Employment while enrolled in college during a 12-month period can be a basis of reclassification as a resident at the end of that period if other evidence indicates the student has established a domicile in Texas. See "Exceptions" for information on exceptions provided for in Chapter 21, Subchapter B, Section 21.26.

Residency During Transition From Dependent to Independent Student

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.24:

- (a) When Parents or Legal Guardians and Student Remain in Texas. If the resident parents or court-appointed legal guardians of a dependent student eligible to domicile in the United States cease claiming the minor as a dependent for federal income tax purposes, but remain in Texas and the minor remains in Texas, the minor is a resident.
- (b) When the Parents Move Out of State.
 - (1) If the Parents or Legal Guardians Continue to Claim the Student as a Dependent. If the resident parents or court-appointed legal guardians of a dependent student move out of state and continue to claim the student as a dependent, the student becomes a resident of the state in which the parents or legal guardians reside. Even if he or she remains in Texas, the student will not be eligible to establish residence in Texas on his/her own until the student is 18 years of age or older, at least 12 months have passed since the parents last claimed him/her as a dependent for federal income tax purposes and the student has established a domicile in the state of Texas. See "Minors or Dependents Enrolled Before the Parents Move Out-of-State" for information about a waiver for students enrolled in a public college prior to the parents' or legal guardians' move out of state.
 - (2) If the Minor is an Abandoned or Emancipated Child. If the resident parents or court-appointed legal guardians of a minor move out of state and the minor remains in Texas, the minor may be classified as a resident only if he or she meets the qualifications for being an abandoned child or emancipated child. See "Abandoned Child" for information on exceptions provided for in Chapter 21, Subchapter B, Section 21.26(a).
- (c) If the resident parents or court-appointed legal guardians of an individual 18 years of age or older move out of state but the student remains, and the parents provide the student's institution of higher education a letter indicating they will not claim the student as a dependent for federal tax purposes for the current tax year, the student retains his/her residency.

Military Personnel

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.23(c):

Members of the U.S. Armed Forces and commissioned Public Health Service Officers are presumed to maintain the same domicile that was in effect at the time of entering the service during their entire period of active service. They are presumed not to establish a domicile in other states in which they are assigned duty because their presence is not voluntary but under U.S. military or Public Health Service orders. See pages 18-23 of this document (relating to "Waivers for Members of the U.S. Armed Forces, Army National Guard, Air National Guard and Commissioned Officers of the Public Health Service, their Spouse and Dependents") for information on exceptions provided for in Chapter 21, Subchapter B, Section 21.26(b)(11).

Foreign Students

Statutory Provisions: Texas Education Code Sec. 54.057 (a). An alien who is living in this country under a visa permitting permanent residence or who has applied to or has a petition pending with the Immigration and Naturalization Service to attain lawful status under federal immigration law has the same privilege of qualifying for resident status for tuition and fee purposes under this subchapter as has a citizen of the United States. A resident alien residing in a junior college district located immediately adjacent to Texas boundary lines shall be charged the resident tuition by that junior college.

Texas Education Code Sec. 54.057(j). Notwithstanding any other provision of this subchapter, an individual shall be classified as a Texas resident until the

individual establishes a residence outside this state if the individual resided with the individual's parent, guardian, or conservator while attending a public or private high school in this state and

- (1) graduated from a public or private high school or received the equivalent of a high school diploma in this state;
- (2) resided in this state for at least three years as of the date the person graduated from high school or received the equivalent of a high school diploma;
- (3) registers as an entering student in an institution of higher education not earlier than the 2001 fall semester; and
- (4) provides to the institution an affidavit stating that the individual will file an application to become a permanent resident at the earliest opportunity the individual is eligible to do so.

Texas Education Code Sec. 54.057 (b). A nonimmigrant alien who resides in this state in accordance with the Agreement between the Parties to the North Atlantic Treaty Regarding the Status of Their Forces (4 U.S.T. 1792) and the spouse or children of such an alien are residents for tuition and fee purposes under this code.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.23(d):

- (1) A foreign individual has the same privilege of qualifying for Texas resident status for tuition purposes as does a citizen of the United States if he or she
 - (A) Is living in this country under a visa permitting permanent residence or
 - (B) Is permitted by Congress to adopt the United States as his or her domicile, or
 - (C) Has applied to or has a petition pending with the Immigration and Naturalization Service to attain lawful status under federal immigration law, or
 - (D) Has met the Texas Higher Education Coordinating Board requirements for being treated as a permanent resident.
- (2) A foreign individual who enters a Texas institution of higher education in fall 2001 or later is a resident of Texas if he or she
 - (A) Attended a public or private high school while residing at least a part of that time with a parent or legal guardian;
 - (B) Graduated from the high school or received the equivalent of a high school degree in Texas;
 - (C) Resided in Texas for at least three (3) consecutive years as of the date he/she graduated. In March 2003, Immigration and Naturalization Services became the Bureau of Citizenship and Immigration Status (BCIS). The BCIS is a bureau of the Department of Homeland Security. from high school or received the equivalent of a high school degree;
 - (D) Registers as an entering student no earlier than fall 2001; and
 - (E) Provides his/her college an affidavit that he or she intends to file an application to become a permanent resident of the United States at the earliest opportunity the individual is eligible to do so. A list of eligible visas, along with a discussion of eligible applicants for permanent resident status, is available through the Texas Higher Education Coordinating Board web site at www.collegefortexans.com. If an individual provides proof from the Department of Justice or the Immigration and Naturalization Service that the visa he/she holds has been granted eligibility to establish a domicile in the United States, such individuals may be granted the same privileges in establishing Texas residency for tuition purposes.

Married Students

Statutory Provision: Texas Education Code Sec. 54.056. A student who is a resident of Texas and who marries a nonresident is entitled to pay the resident tuition fee as long as the student does not adopt the legal residence of the spouse in another state.

Coordinating Board Rules: Marriage of a Texas resident to a nonresident does not jeopardize the Texas resident's claim to residency. A nonresident who marries a resident of Texas must establish his or her own residency by meeting the standard requirements of an independent individual 18 years of age or older.

Federal Employees other than Members of the U.S. Armed Forces or Public Health Service

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.23(f): The state has no special provisions for determining the residence of federal employees other than members of the U.S. Armed Forces or Public Health Service. Therefore, such persons (including civilian employees of the U.S. Armed Forces) must meet the basic residency requirements for non-military personnel.

Short-Term, Stop-Out Students

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.23(g): If the institution has documentation of residence on file when a dependent or independent student returns after being out of school for 12 months or less, it may continue the student's classification as resident upon confirmation from the student that his or her parents or court-appointed legal guardians (in the case of a dependent student) or

the student him/herself (in the case of an independent student) have not changed their state of residence since the student's last enrollment. The "Guidelines for Determining Residency of Aliens" which contains the full list of visas is available in the "Residency" section of the www.collegefortexans.com web site. In March 2003, Immigration and Naturalization Services became the Bureau of Citizenship and Immigration Status (BCIS). The BCIS is a bureau of the Department of Homeland Security.

Persons Temporarily Absent From the State

Statutory Provision: Texas Education Code Sec. 54.052 (g). An individual who would have been classified as a resident for the first five of the six years immediately preceding registration but who resided in another state for all or part of the year immediately preceding registration shall be classified as a resident student.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.23(h):

Residents who move out of state should be classified as non-residents upon leaving the state, unless their move is temporary and residence has not been established elsewhere.

- (1) Persons who were residents of Texas for at least five years prior to moving from the state, and who return to the state to re-establish their home, having been gone less than a year, are still Texas residents.
- (2) Students or parents or court-appointed legal guardians (in the case of dependent students) who are temporarily (generally less than five years) assigned to work outside the state may continue to claim residency in Texas if they provide conclusive evidence of their intent at the time they leave the state, to return. Among other things, a letter from an employer that the move outside the state is temporary and that a definite future date has been determined for return to Texas may qualify as proof of the temporary nature of the time spent out of state. Out-of-state internships that are part of the academic curriculum and that require the student to return to the school are temporary relocations and do not jeopardize a student's claim to residency.

Inmates of Federal Prisons

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.23(i):

Nonresidents incarcerated in federal prisons located in Texas shall be classified as nonresidents. If, however, such a prisoner files an affidavit with the proper prison authority or institution of higher education, indicating an intention to establish residency in Texas, such residency shall be granted 12 months from the date of the affidavit and shall continue after the prisoner's discharge if he or she remains in Texas. See also page 15 (relating to "Inmates of the Texas Department of Criminal Justice") for information on exceptions provided for in 21.26(b)(8).

Procedures/Core Questions

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.21.25(a):

Each public institution is responsible for incorporating core residency questions into its student admissions process. The Texas Higher Education Coordinating Board, with advice from the institutions, shall develop the required core questions. Answers to the questions should be reviewed to determine each student's proper residency classification. If answers affirm the student's claim to residency, the core questions are sufficient for documenting the student's classification. However, if the student's answers to the core questions are inconsistent, the institution must acquire and maintain appropriate documents to support the student's classification as of the census date of the relevant term.

Reclassification

Statutory Provisions: Texas Education Code Sec. 54.054. A nonresident student classification is presumed to be correct as long as the residence of the individual in the state is primarily for the purpose of attending an educational institution. After residing in Texas for at least 12 months, a nonresident student may be reclassified as a resident student as provided in the rules and regulations adopted by the Coordinating Board, Texas College and University System. Any individual reclassified as a resident student is entitled to pay the tuition fee for a resident of Texas at any subsequent registration as long as he continues to maintain his legal residence in Texas.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.25(b):

- (1) Procedures. Students classified as nonresident students shall be considered to retain that status until they apply for reclassification in the form prescribed by the institution and are officially reclassified as residents for tuition purposes by the proper administrative officers of the institution. Application for reclassification must be submitted prior to the official census date of the relevant term. Reclassification as residents must be made in keeping with the General Rules outlined in this publication.

- (2) Student Intent. If a student's residence in Texas is primarily for the purpose of education and not to establish a domicile, the student shall be classified as a nonresident. The following persons are NOT considered to have come here for the purpose of education: the spouse or dependent child of an individual transferred here by the U.S. Armed Forces, through the state's plan for economic development and diversification, or as a part of a household moved to the state to accept employment. Therefore, once such individuals have physically resided in Texas for 12 consecutive months, even though they may have been enrolled full-time, they may be considered residents if they have otherwise established a domicile in the state.

Student Responsibilities

Statutory Provisions: *Texas Education Code Sec. 54.0521 (a.) Before an individual may register at an institution of higher education paying tuition at the rate provided for residents, the individual must affirm under oath, to the appropriate official at the institution, that the individual is entitled to be classified as a resident for purposes of tuition.*

Texas Education Code Sec. 54.0521 (b.) If the institution later determines that the individual was not entitled to be classified as a resident at the time of the individual's registration, the individual shall, not later than 30 days after the date the individual is notified of the determination, pay to the institution the amount the individual should have paid as a nonresident.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.25(c): The student is responsible for registering under the proper residence classification and for providing documentation as required by the public institution. If there is any question as to the right to classification as a resident of Texas it is the student's obligation, prior to or at the time of enrollment, to raise the question with the administrative officials of the institution for official determination. Students classified as Texas residents must affirm the correctness of that classification by signing an oath of residency as a part of the admissions process. If the student's classification as a resident becomes inappropriate for any reason, it is the responsibility of the student to notify the proper administrative officials at the institution. Failure to notify the institution constitutes a violation of the oath of residency and shall result in disciplinary action by the institution.

Institution Responsibilities

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.25(d): Each institution is responsible for incorporating the core questions and an oath of residency into its student admissions process. It is also responsible for reviewing enrollment and/or registration applications for errors, inconsistencies or misclassifications of residency status on file.

1. If students who have been classified as residents of Texas are found to have been erroneously classified, those students shall be reclassified as nonresidents and shall be required to pay the difference between the resident and nonresident tuition for those semesters in which they were so erroneously classified.
2. If it is found that students have been erroneously classified as nonresidents, they shall be reclassified as residents and may be entitled to a refund of the difference between the resident and nonresident fees for the semesters in which they were so erroneously classified. Normally, the refunds must be requested and substantiated during the semester in which the tuition and fees were paid.

Penalties

Statutory Provisions: *Texas Education Code Sec. 54.0521 (c.) If the individual fails to make a timely payment as required by this section, the individual is not entitled to receive a transcript or to receive credit for courses taken during the time the individual was falsely registered as a resident student. Texas Education Code Sec. 54.053. The governing board of each institution required by this chapter to charge a nonresident tuition or registration fee is subject to the rules, regulations, and interpretations issued by the Coordinating Board, Texas College and University System, for the administration of the nonresident tuition provisions of this subchapter. The rules, regulations, and interpretations promulgated by the Coordinating Board shall be furnished to the presidents or administrative heads of all Texas public senior and junior colleges and universities. The governing board of an institution of higher education may assess and collect from each nonresident student who fails to comply with the rules and regulations of the board concerning nonresident fees a penalty not to exceed \$10 a semester.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21(e): Each institution has been authorized by statute to assess and collect from nonresident students failing to comply with the provisions of tuition statutes and the rules of this title a fee not to exceed \$10 a semester.

- (1) If students have obtained residence classification by concealing or misrepresenting facts, they may be subject to disciplinary action in keeping with procedures adopted by the governing boards of their institutions.
- (2) If it is determined that the student has obtained resident classification by concealing or misrepresenting information, the student shall, not later than 30 days after the date the individual is notified of the determination, pay to the institution the amount the individual should have paid as a nonresident.
- (3) If the individual fails to make a timely payment as required, the individual is not entitled to receive a transcript or to receive credit for courses taken during the time the individual was falsely registered as a resident student.

Appeals to the Texas Higher Education Coordinating Board

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.25(f): If two or more Texas public institutions determine a different residency status for members of the same family with identical evidence of residency currently enrolled at each institution, the family members may appeal the unfavorable decision to the Commissioner of Higher Education. Before making an appeal to the Commissioner, the student classified as a nonresident must exhaust all appeal processes available at the institutional level. A decision by the Commissioner for one family member's residency status will apply to all family members with identical evidence of residency.

Exceptions

Special Conditions for Minors or Dependents

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(a):

- (1) Abandoned child. In the case of an abandoned child, the residence of a person who has stood *in loco parentis* for a period of time may determine the residence. The fact of abandonment must be clearly established and must not have been for the purpose of affecting the residence of the minor. The minor must have actually resided in the home of such person for two years immediately prior to enrolling in a Texas public institution of higher education and such person must have provided substantially all the minor's support. In the event that the *in loco parentis* relationship has not existed for the full two-year period, a shorter period of time is acceptable in unusual hardship cases, such as death of both parents.
- (2) Orphans. A public institution of higher education shall classify orphans as residents if the orphans graduated from established orphans homes in Texas operated by a fraternal, religious or civic organization after having lived there for at least a year, and resided in Texas from the time they graduated from the home until they enrolled in the institution.
- (3) Emancipated Minors. A minor who has been legally emancipated may establish his or her claim to residency following the rules applicable to independent individuals 18 years of age or older.
- (4) Married Minors. Minors who are married may establish their own claim to residency following the rules applicable to independent individuals 18 years of age or older.

Statutory Provisions: *Texas Education Code Sec. 54.055. An individual who is 18 years of age or under or is a dependent and whose parents were formerly residents of Texas is entitled to pay the resident tuition fee following the parents' change of legal residence to another state, as long as the individual remains continuously enrolled in a regular session in a state-supported institution of higher education.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(a)(6): Minors or Dependents Enrolled Before the Parents Move Out of State. If a resident minor or dependent is enrolled in a public institution of higher education in Texas when the parents move out of state, the minor or dependent is eligible, although now a nonresident, to continue paying the resident tuition rate as long as he or she continues to enroll in Texas public institutions in the following fall and spring semesters. Vacation time spent with the parents does not jeopardize the students' eligibility for this waiver. The dependent or minor students must enroll for the next available fall or spring semester immediately following the parents' change of residence to another state.

Waivers That Allow Nonresidents to Register While Paying the Resident or Reduced Nonresident Tuition

Economic Development and Diversification Program Statutory Provisions: *Texas Education Code Sec. 54.052 (h). An individual who has come from outside Texas and registered in an educational institution before having resided in Texas for a 12-month period immediately preceding the date of registration is entitled to pay the tuition fee and other fees required of Texas residents if the individual or a member of his family has located in Texas as an employee of a business or organization that became established in this state as part of the program of state economic development and diversification authorized by the constitution and laws of this state and if the individual files with the Texas institution of higher education at which he registers a letter of intent to establish residency in Texas.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(1): Nonresidents (including citizens and permanent residents of the U.S. and foreign students eligible to domicile in the U.S., but excluding foreign students ineligible to domicile in the U.S.) whose families have been transferred to Texas by a company in keeping with the state's Economic Development and Diversification Program are entitled (although still nonresidents) to pay the resident tuition rate as soon as they move to Texas if they provide the college a letter of intent to establish Texas as their home. If a semester begins before the rest of the family moves to the state, the student may register and pay the resident tuition rate if he/she provides the college a letter from the company indicating the family will move to Texas prior to the end of the given semester. However, in order to pay resident tuition for a second semester, the student will have to give the college a letter from the company, indicating the family has, indeed, moved to Texas. After the family has resided in Texas 12 months, the student is eligible to apply for reclassification as a resident. A current list of eligible companies is maintained on the Texas Higher Education Coordinating Board web site at www.collegefortexans.com.

Teachers, Professors, Their Spouses and Dependents

Statutory Provisions: *Texas Education Code Sec. 54.059. A teacher or professor of an institution of higher education, and the spouse and children of such a teacher or professor, are entitled to register in an institution of higher education by paying the tuition fee and other fees or charges required for Texas residents without regard to the length of time the teacher or professor has resided in Texas. A teacher or professor of an institution of higher education and the teacher's or professor's family are entitled to the benefit of this section if the teacher or professor is employed at least one-half time on a regular monthly salary basis by an institution of higher education.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(2): Nonresidents (including citizens and permanent residents of the U.S. and all foreign students) employed as teachers and professors at least half time on a regular monthly salary basis (not as hourly employees) by public institutions of higher education in Texas are entitled to pay the resident tuition rate at any public institution of higher education in the state for themselves, their spouses and children regardless of how long they have lived in the state. It is the intent of this rule that the employment and waiver last for the same period of time. If the spouse or children attend an institution other than the one employing the teacher or professor, they must provide proof of his or her current employment.

Research and Teaching Assistants, Their Spouses and Dependents

Statutory Provisions: *Texas Education Code Sec. 54.063. A teaching assistant or research assistant of any institution of higher education and the spouse and children of such a teaching assistant or research assistant are entitled to register in a state institution of higher education by paying the tuition fees and other fees or charges required for Texas residents under Section 54.051 of this code, without regard to the length of time the assistant has resided in Texas, if the assistant is employed at least one-half time in a teaching or research assistant position which relates to the assistant's degree program under rules and regulations established by the employer institution.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(3): Nonresidents (including citizens and permanent residents of the U.S. and all foreign students) employed by public institutions of higher education as research or teaching assistants on at least a half-time basis in a position related to their degree programs are entitled to pay the resident tuition rate at any public institution of higher education in the state for themselves, their spouses, and children regardless of how long they have lived in the state. The institutions that employ the students shall determine whether or not the students' jobs relate to their degree programs. It is the intent of this rule that the employment and waiver last for the same period of time. If the spouse or children attend an institution other than the one employing the research or teaching assistant, they must provide their college proof of his or her current employment.

Competitive Scholarship Recipients

Statutory Provisions: *Texas Education Code Sec. 54.064*

- (a) *A student who holds a competitive scholarship of at least \$1,000 for the academic year or summer for which the student is enrolled and who is either a nonresident or a citizen of a country other than the United States of America is entitled to pay the fees and charges required of Texas residents without regard to the length of time the student has resided in Texas. The student must compete with other students, including Texas residents, for the scholarship and the scholarship must be awarded by a scholarship committee officially recognized by the administration and be approved by the Texas Higher Education Coordinating Board under criteria developed by the board. Texas Education Code Sec. 54.064*
- (b) *The total number of students at an institution paying resident tuition under this section for a particular semester may not exceed five percent of the total number of students registered at the institution for the same semester of the preceding academic year. Texas Education Code Sec. 54.065. A student is entitled to pay the fees and charges required of Texas residents without regard to the length of time the student has resided in Texas if the student*
 - (1) *holds a competitive academic scholarship or stipend;*
 - (2) *is accepted in a clinical and biomedical research training program designed to lead to both doctor of medicine and doctor of philosophy degrees; and*
 - (3) *is either a nonresident or a citizen of a country other than the United States of America.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(4):

- (A) Nonresidents (including citizens and permanent residents of the U.S. and all foreign students) who receive eligible competitive scholarships from their institutions totaling at least \$1,000 may be granted a waiver of nonresident tuition for the period of time covered by the scholarship, not to exceed 12 months.
- (B) To be eligible as the basis of a waiver, the scholarship(s) must meet the following criteria:
 - (i) Be granted by a scholarship committee authorized in writing by the institution's administration to grant scholarships that hold the waiver option;
 - (ii) Be granted in keeping with criteria published in the institution's catalog, available to the public in advance of any application deadline;
 - (iii) Be granted under circumstances that cause both the funds and the selection process to be under the control of the institution;
 - (iv) Be open to both resident and nonresident students.
- (C) A waiver based on a competitive scholarship lasts for the period of the scholarship (up to a 12-month period). The scholarship award must specify the term or terms in which the scholarship will be in effect. If the scholarship is terminated, so is the waiver. If the scholarship is to be issued in multiple disbursements and less than \$1,000 is issued when a scholarship is terminated, the student does not owe a refund for the tuition that has been waived, since the waiver was originally made in a good faith expectation of a scholarship of at least \$1,000, but the waiver is canceled for the terms for which the scholarship is canceled.
- (D) The total number of students receiving waivers on the basis of competitive scholarships in any given term may not exceed 5 percent of the students enrolled in the same semester in the prior year.
- (E) If the scholarship recipient is concurrently enrolled at more than one institution, the waiver of nonresident tuition is only effective at the institution awarding the scholarship. An exception for this rule exists for a nonresident student who is simultaneously enrolled in two or more institutions of higher education under a program offered jointly by the institutions under a partnership agreement. If one of the partnership schools awards the student a competitive scholarship-based waiver, the student is also entitled to a waiver at the second institution.
- (F) If a nonresident or foreign student holds a competitive academic scholarship or stipend and is accepted in a clinical biomedical research training program designed to lead to both a doctor of medicine and doctor of philosophy degree, he or she is eligible to pay the resident tuition rate.

Homeless Individuals

Statutory Provision: *Texas Education Code Sec. 54.052 (i). The Texas Higher Education Coordinating Board shall adopt rules allowing a homeless individual, as defined by 42 U.S.C. Sec. 11302, who resides in Texas for the 12-month period immediately preceding the date of registration but who does not have a permanent residence to be classified as a resident student only for purposes of vocational education courses at public junior colleges.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(5): A homeless individual who resides in Texas for the 12-month period immediately preceding the date of registration, but who does not have a permanent residence in Texas, may enroll in vocational education courses at a public junior college by paying the resident tuition rate. Documentation for a homeless individual may consist of written statements from the office of one or more legitimate social service agencies located in Texas, attesting to the provision of services to the homeless individual over the previous 12-month period. The definition can be found at: <http://envirotext.eh.doe.gov/data/uscode/42/11302.shtml>.

Lowered Tuition for Individuals From Bordering States or Mexico Based on Reciprocity

Statutory Provisions: *Texas Education Code Sec. 54.060 (a). The nonresident tuition fee prescribed in this chapter does not apply to a nonresident student who is a resident of Arkansas, Louisiana, New Mexico, or Oklahoma and who registers in a public upper-level institution of higher education, two-year institution in the Lamar University System, Texas public junior college, or public technical institute that is situated in a county immediately adjacent to the state in which the nonresident student resides. The nonresident tuition fee prescribed in this chapter does not apply to a nonresident student who is a resident of New Mexico or Oklahoma and who registers in a public technical institute that is situated in a county that is within 100 miles of the state in which the nonresident student resides and who is admitted for the purpose of utilizing available instructional facilities.*

The nonresident student described in this subsection shall pay an amount equivalent to the amount charged a Texas student registered at a similar school in the state in which the nonresident student resides. For purposes of this subsection, 'public upper-level institution of higher education' means an institution of higher education that offers only junior-level and senior-level courses or only junior-level, senior-level, and graduate-level courses. Texas Education Code Sec. 54.060 (g).

The nonresident tuition fee prescribed by this chapter does not apply to a nonresident student who is a resident of a county or parish of Arkansas, Louisiana, New Mexico, or Oklahoma that is adjacent to this state and who registers in an institution of higher education, the governing board of which has agreed to admit the student at the resident tuition fee prescribed by this chapter. The state in which the student resides must allow a resident of a county of this state that is adjacent to that state to register in a public institution of higher education in that state at the tuition fee charged residents of that state. The student shall pay tuition equal to that charged residents of this state at the institution.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(6)(b): Waivers of nonresident tuition made through each of the following three programs for students from states neighboring Texas must be based on reciprocity. In other words, the Texas institution cannot lower tuition for in-coming students unless it has on file a current written agreement with a similar school in the other state to lower tuition for Texas students attending there. A participating Texas institution is required to file a copy of such agreements with the Texas Higher Education Coordinating Board. To be valid, the agreements may not be more than 2 years old. The amount charged in-coming nonresident students through these programs may not be less than the Texas resident tuition rate.

- (i) New Mexico, Oklahoma, Arkansas or Louisiana Students. New Mexico, Oklahoma, Arkansas or Louisiana students may pay a lowered nonresident tuition when they attend Texas A&M University-Texarkana, Lamar State College-Port Arthur, Lamar State College-Orange or any public community or technical college located in a county adjacent to their home state, if the institution they attend has a current reciprocal agreement with a similar institution in the student's home state.
- (ii) New Mexico and Oklahoma Students. New Mexico and Oklahoma students may pay a lowered nonresident tuition when they attend a public technical college located within 100 miles of the border of their home state, if the

institution they attend has a current reciprocal agreement with a similar institution in the student's home state.

- (iii) Students from counties or parishes of New Mexico, Oklahoma, Arkansas or Louisiana adjacent to Texas. Students from counties or parishes of New Mexico, Oklahoma, Arkansas or Louisiana adjacent to Texas may pay a lowered nonresident tuition when they attend any public institution in Texas, if the institution has a current reciprocal agreement with a similar institution in the student's home state.
- (iv) Students who move to Texas from bordering states. If a dependent student's family or an independent student from a bordering state moves to Texas after the student has received a waiver of nonresident tuition based on reciprocity as described in this section, the student is eligible for a continued waiver for the 12-month period after the relocation to Texas. After that time, however, the student shall be reclassified as a nonresident unless he or she applies for reclassification and proves he or she has become a resident in keeping with these rules.

Lowered Tuition Programs for Individuals From Bordering States or Mexico That Do Not Require Reciprocity

Statutory Provisions: *Texas Education Code Sec. 54.0601. On the written request of the governing board of a general academic teaching institution located not more than 100 miles from the boundary of this state with another state, the Texas Higher Education Coordinating Board may set a nonresident tuition rate that is lower than the nonresident tuition rate otherwise provided by this chapter if the coordinating board determines that the lower rate is in the best interest of the institution and will not cause unreasonable harm to any other institution of higher education.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(6)(b)(i): Undergraduate students from New Mexico, Oklahoma, Arkansas, Louisiana or other states within 135 miles of the Texas border. Undergraduate students from New Mexico, Oklahoma, Arkansas, Louisiana or other states within 135 miles of the Texas border may pay a lowered nonresident tuition when they attend a public university located within 100 miles of the Texas border if the Texas Higher Education Coordinating Board has approved the institution to participate in the program.

Lowered Tuition Programs for Residents of Mexico.

Statutory Provisions: *Texas Education Code Sec. 54.060 (b). The foreign student tuition fee prescribed in this chapter does not apply to a foreign student who is a resident of a nation situated adjacent to Texas, demonstrates financial need as provided in Subsection C, and registers in (1) any general academic teaching institution or component of the Texas State Technical College System located in a county immediately adjacent to the nation in which the foreign student resides; lower division courses at a community or junior college having a partnership agreement pursuant to Subchapter N, Chapter 51, with an upper-level university and both institutions are located in the county immediately adjacent to the nation in which the foreign student resides; (2) Texas A&M University-Kingsville, Texas A&M University-Corpus Christi, or The University of Texas at San Antonio; or (4) courses that are part of a graduate degree program in public health and are conducted in a county immediately adjacent to the nation in which the foreign student resides.*

(c) A foreign student to whom Subsection (b) applies shall pay tuition equal to that charged Texas residents under Sections 54.051 and 54.0512. The coordinating board shall adopt rules governing the determination of financial need of students to whom Subsection (b) applies and rules governing a pilot project to be established at general academic teaching institutions and at components of the Texas State Technical College System in counties that are not immediately adjacent to the nation in which the foreign student resides.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(6)(c):

- (i) Residents of Mexico are those individuals who currently live in Mexico and individuals who are living outside of Mexico temporarily and with definite plans to return. Students planning to stay in the United States indefinitely are not residents of Mexico.
- (ii) An unlimited number of residents of Mexico who have financial need may attend a public university or TSTC campus located in a county adjacent to Mexico, Texas A&M University-Corpus Christi, Texas A&M University-Kingsville, the University of Texas at San Antonio or Texas Southmost College while paying the resident tuition rate.
- (iii) A limited number of residents of Mexico who have financial need may attend a public university or campus of the Texas State Technical College System located in counties away from the Mexico border while paying the resident tuition rate. The program is limited to the greater of two students per 1,000 enrollment, or 10 students.

- (iv) A resident of Mexico with financial need may register in courses that are part of a graduate degree program in public health conducted in a county immediately adjacent to Mexico and pay the resident tuition rate.

Beneficiaries of the Texas Tomorrow Fund

Statutory Provisions: *Texas Education Code Sec. 54.621. Beneficiary*

- (a) The beneficiary of a prepaid tuition contract must be younger than 18 years of age or 18 years of age or older and enrolled in high school at the time the purchaser enters into the contract and must be:
- (1) a resident of this state at the time the purchaser enters into the contract; or
 - (2) a nonresident who is the child of a parent who is a resident of this state at the time that parent enters into the contract.
- (b) The board may require a reasonable period of residence in this state for a beneficiary or the parent of a beneficiary.
- (c) Notwithstanding Section 54.052(d), the tuition and required fees charged by an institution of higher education for semester hours and fees that are paid for by a prepaid tuition contract shall be determined as if the beneficiary of that contract were a resident student.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(7):

The tuition and required fees charged by an institution of higher education for semester hours and fees that are paid for by a prepaid tuition contract shall be determined as if the beneficiary of that contract is a resident student. If a student is a nonresident, any tuition and fees not paid by the contract will be assessed at the nonresident rate.

Inmates of the Texas Department of Criminal Justice

Statutory Provisions: *2003 General Appropriations Act, Article V – Public Safety and Criminal Justice, Rider 41, page V-21. Residential Status of Inmates. All inmates of the Texas Department of Criminal Justice are, for educational purposes only, residents of the State of Texas.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(8):

All inmates of the Texas Department of Criminal Justice are Texas residents for tuition purposes only.

Foreign Service Officers

Statutory Provisions: *Texas Education Code Sec. 54.069. A foreign service officer employed by the United States Department of State and enrolled in an institution of higher education is entitled to pay the tuition and fees at the rates provided for Texas residents if the person is assigned to an office of the department of state that is located in a foreign nation that borders on this state.*

Coordinating Board Rules, Subchapter B, Section 21.26(b)(9):

A foreign service officer employed by the U.S. Department of State enrolled in an institution of higher education is entitled to pay resident tuition and fees if the person is assigned to an office of the Department of State that is located in Mexico.

Registered Nurses in Postgraduate Nursing Degree Programs

Statutory Provisions: *Texas Education Code Sec. 54.069. An institution of higher education may permit a registered nurse authorized to practice professional nursing in Texas to register by paying the tuition fees and other fees or charges required for Texas residents under Section 54.051, without regard to the length of time the registered nurse has resided in Texas, if the registered nurse:*

- (1) is enrolled in a program designed to lead to a master's degree or other higher degree in nursing; and
- (2) intends to teach in a program in Texas designed to prepare students for licensure as registered nurses.

Coordinating Board Rules, Subchapter B, Section 21.26(b)(10): An institution of higher education may permit a registered nurse authorized to practice professional nursing in Texas to register by paying resident tuition and fees without regard to the length of time the registered nurse has resided in Texas if he/she:

- (A) is enrolled in a program designed to lead to a master's degree or other higher degree in nursing; and
- (B) intends to teach in a program in Texas designed to prepare students for licensure as registered nurses.

Waivers for Members of the U.S. Armed Forces, Army National Guard, Air National Guard, Commissioned Officers of the Public Health Service, Their Spouses and Dependents

Effective Fall 2003, A member of the Armed Forces of the United States or the child or spouse of a member of the Armed Forces of the United States who is entitled to pay tuition and fees at the rate provided for Texas residents under another provision of this section while enrolled in a degree or certificate program is entitled to pay tuition and fees at the rate provided for Texas residents in any subsequent term or semester while the person is continuously enrolled in the same degree or certificate program. For purposes of this subsection, a person is not required to enroll in a summer term to remain continuously enrolled in a degree or certificate program. The person's eligibility to pay tuition and fees at the rate provided for Texas residents under this subsection does not terminate because the person is no longer a member of the Armed Forces of the United States or the child or spouse of a member of the Armed Forces of the United States. (Texas Education Code Sec. 54.058(j), House Bill 261, 78th Legislature, 2003 and Coordinating Board Rule, Ch. 21.26 (b)(11)(H)) Section 54.058(j), as added by this Act, applies beginning with the 2003 fall semester to a person who was a member of the Armed Forces of the United States or the child or spouse of a member of the Armed Forces of the United States entitled to pay tuition and fees at the rate provided for Texas residents under Section 54.058, Education Code, while enrolled in a degree or certificate program at a public institution of higher education in this state in the 2003 spring semester or in any term of the 2003 summer session.

Members Assigned to Duty in Texas

Statutory Provisions: *Texas Education Code Sec. 54.058 (b). A person who is an officer, enlisted person, selectee, or draftee of the Army, Army Reserve, Army National Guard, Air National Guard, Air Force, Air Force Reserve, Navy, Navy Reserve, Marine Corps, Marine Corps Reserve, Coast Guard, or Coast Guard Reserve of the United States, who is assigned to duty in Texas, and the spouse and children of such an officer, enlisted person, selectee, or draftee, are entitled to register in a state institution of higher education by paying the tuition fee and other fees or charges required of Texas residents, without regard to the length of time the officer, enlisted person, selectee, or draftee has been assigned to duty or resided in the state. However, out-of-state Army National Guard or Air National Guard members attending training with Texas Army or Air National Guard units under National Guard Bureau regulations may not be exempted from nonresident tuition by virtue of that training status nor may out-of-state Army, Air Force, Navy, Marine Corps, or Coast Guard Reserves training with units in Texas under similar regulations be exempted from nonresident tuition by virtue of that training status. It is the intent of the legislature that only those members of the Army or Air National Guard or other reserve forces mentioned above be exempted from the nonresident tuition fee and other fees and charges only when they become members of Texas units of the military organizations mentioned above.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(a):

Nonresident members of the U.S. Armed Forces, members of Texas units of the Army or Air National Guard, or Commissioned Officers of the Public Health Service who are assigned to duty in Texas are entitled to pay the resident tuition rate for themselves, their spouses and dependent children. To qualify, the student must submit at least once a year a statement from an appropriately authorized officer in the service, certifying that he or she (or a parent or court-appointed legal guardian) will be assigned to duty in Texas at the time of enrollment and is not a member of the National Guard or Reserves who will be in Texas only to attend training with Texas units.

After Assignment in Texas

Statutory Provisions: *Texas Education Code, Sec. 54.058(c) (as amended by House Bill 261, 78th Legislature, 2003). The spouse or child of a member of the Armed Forces of the United States who has been assigned to duty elsewhere immediately following assignment to duty in Texas is entitled to pay the tuition fees and other fees or charges provided for Texas residents as long as the spouse or child resides continuously in Texas.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(b):

The spouses and/or dependent children of nonresident members of the U.S. Armed Forces, members of Texas units of the Army

or Air National Guard, or Commissioned Officers of the Public Health Service are entitled to pay the resident tuition rate as long as the spouse or child resides continuously in Texas.

Out-of-State Military

Statutory Provisions: Texas Education Code Sec. 54.058(g) (As amended by House Bill 261, 78th Legislature, 2003). If a member of the Armed Forces of the United States is stationed outside Texas and the member's spouse or child establishes residence in Texas by residing in Texas and by filing with the Texas institution of higher education at which the spouse or child plans to register a letter of intent to establish residence in Texas, the institution of higher education shall permit the spouse or child to pay the tuition, fees, and other charges provided for Texas residents without regard to length of time that the spouse or child has resided in Texas.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(c):

The spouse and/or dependents of nonresident members of the U.S. Armed Forces, members of Texas units of the Army or Air National Guard, or Commissioned Officers of the Public Health Service stationed outside of Texas are entitled to immediately start paying the resident tuition rate in Texas if the spouse and/or child moves to this state and files a statement of intent to establish residence in Texas with the public institution of higher education they attend. Preliminarily adopted 07/01/03. May be subject to change.

Survivors

Statutory Provisions: Texas Education Code Sec. 54.058(f) (as amended by House Bill 261, 78th Legislature, 2003). The spouse or child of a member of the Armed Forces of the United States who dies or is killed is entitled to pay the resident tuition fee if the spouse or child becomes a resident of Texas within 60 days of the date of death.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(d):

The spouse and/or dependents of nonresident members of the U.S. Armed Forces, members of Texas units of the Army or Air National Guard, or Commissioned Officers of the Public Health Service who die while in service are entitled to pay the resident tuition rate if the spouse and/or child moves to Texas within 60 days of the date of death. To qualify, the students shall submit satisfactory evidence to the institution, establishing the date of death and current residence in Texas. Preliminarily adopted 07/01/03. May be subject to change.

Spouse and Dependents Who Previously Lived in Texas

Statutory Provisions: Texas Education Code Sec. 54.058 (d). A spouse or dependent child of a member of the Armed Forces of the United States, who is not assigned to duty in Texas but who has previously resided in Texas for a 6-month period, is entitled to pay the tuition fees and other fees or charges provided for Texas residents for a term or semester at a state institution of higher education if the member:

1. at least one year preceding the first day of the term or semester executed a document with the applicable military service that is in effect on the first day of the term or semester and that:
 - a. indicates that the member's permanent residence address is in Texas; and
 - b. designates Texas as the member's place of legal residence for income tax purposes;
2. has been registered to vote in Texas for the entire year preceding the first day of the term or semester; and
3. satisfies at least one of the following requirements:
 - a. for the entire year preceding the first day of the term or semester has owned real property in Texas and in that time has not been delinquent in the payment of any taxes on the property;
 - b. has had an automobile registered in Texas for the entire year preceding the first day of the term or semester; or
 - c. at least one year preceding the first day of the term or semester executed a will that has not been revoked or superseded indicating that the member is a resident of this state and deposited the will with the county clerk of the county of the member's residence under Section 71, Texas Probate Code.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(e):

The spouse and dependent children of a nonresident member of the U.S. Armed Forces, members of Texas units of the Army or Air National Guard, or Commissioned Officer of the Public Health Service who previously resided in Texas for at least six months may establish residency for tuition purposes if the member or commissioned officer (at least 12 months prior to the family member's enrollment):

- (i) filed proper documentation with the military or Public Health Service to change his/her permanent residence to Texas and designates Texas as his/her place of legal residence for income tax purposes;

- (ii) registered to vote in Texas, and
- (iii) shows one of the following three things has been in effect for the full 12 months prior to the first day of the relevant term or semester:
 - (I) ownership of real estate in Texas with no delinquent property taxes;
 - (II) registration of an automobile in Texas, or
 - (III) execution of a currently-valid will that indicates he/she is a resident of Texas, that has been deposited with a county clerk in Texas.

Members Who Change Their Residency to Texas

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(f):

A member of the U.S. Armed Forces whose state of record is not Texas may change his/her residency to Texas if he/she does the following things at least 12 months prior to the member's enrollment:

- (I) is assigned to duty in Texas at least 12 consecutive months, during which the member files proper documentation with the military to change his/her permanent residence to Texas, and
- (II) meets four of the 8 conditions listed below for the 12 months prior to enrollment:
 - (III) purchase a residence in Texas and claim it as a homestead;
 - (IV) register to vote in Texas;
 - (V) register an automobile in Texas;
 - (VI) maintain a Texas driver's license;
 - (VII) maintain checking, savings or safety deposit box in Texas;
 - (VIII) have a will or other legal documents on file in Texas that indicate residence in Texas;
- (IX) have membership in professional organizations or other state organizations; and/or
- (X) establish a business in Texas.

Honorably Discharged Veterans, Their Spouses and Dependents

Statutory Provisions: Texas Education Code Sec. 54.058 (i). A former member of the Armed Forces of the United States or the former member's spouse or dependent child is entitled to pay the tuition fees and other fees or charges provided for Texas residents for any term or semester at a state institution of higher education that begins before the first anniversary of the member's separation from the Armed Forces if the former member:

1. has retired or been honorably discharged from the Armed Forces; and
2. has complied with the requirements of Section 54.058 (d).

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(g):

A former member of the U.S. Armed Forces or Commissioned Officer of the Public Health Service and his/her spouse and children are entitled to pay the resident tuition rate for any term beginning prior to the first anniversary of separation from the military or health service if the former member has:

- (i) filed proper documentation with the military or Public Health Service to change his/her permanent residence to Texas and designated Texas as his/her place of legal residence for income tax purposes;
- (ii) registered to vote in Texas; and
- (iii) shows one of the following three things has been in effect for the full 12 months prior to the first day of the relevant term or semester:
 - (I) ownership of real estate in Texas with no delinquent property taxes;
 - (II) registration of an automobile in Texas, or execution of a currently-valid will that indicates he/she is a resident of Texas that has been deposited with a county clerk in Texas.

Previous Recipients of Military Waivers

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(h):

A member of the Armed Forces of the United States or the child or spouse of a member of the Armed Forces of the United States who is entitled to pay tuition and fees at the rate provided for Texas residents under another provision of this section while enrolled in a degree or certificate program is entitled to pay tuition and fees at the rate pay tuition and fees at the rate provided for Texas residents in any subsequent term or semester while the person is continuously enrolled in the same degree or certificate program. For purposes of this subsection, a person is not required to enroll in a summer term to remain continuously enrolled in a degree or certificate program. The person's eligibility to pay tuition and fees at the rate provided for Texas residents under this subsection does not terminate because the person is no longer a member of the Armed Forces of the United States or the child or spouse of a member of the Armed Forces of the United States.

ROTC Students

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(i): A nonresident student who is a member of an ROTC unit must pay nonresident tuition until such time he or she signs a contract that cannot be terminated by the student and that obligates the student to serve a period of active duty in the U.S. Armed Forces. Once the student has signed such a contract, he or she has the same rights for qualifying to pay the resident rate as has a member of the U.S. Armed Forces.

NATO Forces

Statutory Provisions: *Texas Education Code Sec. 54.057(b). A nonimmigrant alien who resided in this state in accordance with the Agreement between the Parties of the North Atlantic Treaty Regarding the Status of Their Forces (4 U.S.T. 1792) and the spouse or children of such an alien are residents for tuition and fee purposes under this code.*

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(j): Foreign individuals stationed in Texas in keeping with the agreement between the parties to the North Atlantic Treaty regarding status of forces, their spouses and dependent children, are entitled to pay the same tuition rate as residents of Texas.

**Radiological Science Students at
Midwestern State University**

Statutory Provisions: *Texas Education Code Sec. 54.058 (h). United States Air Force personnel stationed outside the State of Texas who are enrolled in the bachelor of science or master of science degree program in radiological sciences at Midwestern State University by instructional telecommunication will be*

entitled to pay tuition fees and other fees or charges provided for Texas residents if they began the program while stationed at an Air Force base in Texas. In this subsection, "instructional telecommunication" means instruction delivered primarily by telecommunication technology, including open-channel television, cable television, closed-circuit television, low power television, communication and/or direct broadcast satellite, satellite master antenna system, microwave, videotape, videodisc, computer software, computer networks, and telephone lines.

Coordinating Board Rules, Chapter 21, Subchapter B, Section 21.26(b)(11)(k): Members of the U.S. Armed Forces stationed outside the State of Texas who are enrolled in a bachelor of science or master of science degree program in radiological sciences at Midwestern State University by instructional telecommunication will be entitled to pay tuition and other fees or charges provided for Texas residents if they began the program of study while stationed at a military base in Texas.

**Residency During Transition From
Waiver Recipient to Texas Resident**

Some nonresident students who pay the resident tuition rate as a result of waivers can acquire the right to be reclassified as residents. To do so, they must be U.S. citizens or permanent residents, or foreign individuals eligible to domicile in the United States, or fall in a category identified as eligible to be treated as permanent residents. See "General Rules." In addition, they must follow the procedures for reclassification (see "Procedures") and show that they currently meet the requirements for classification as a resident.

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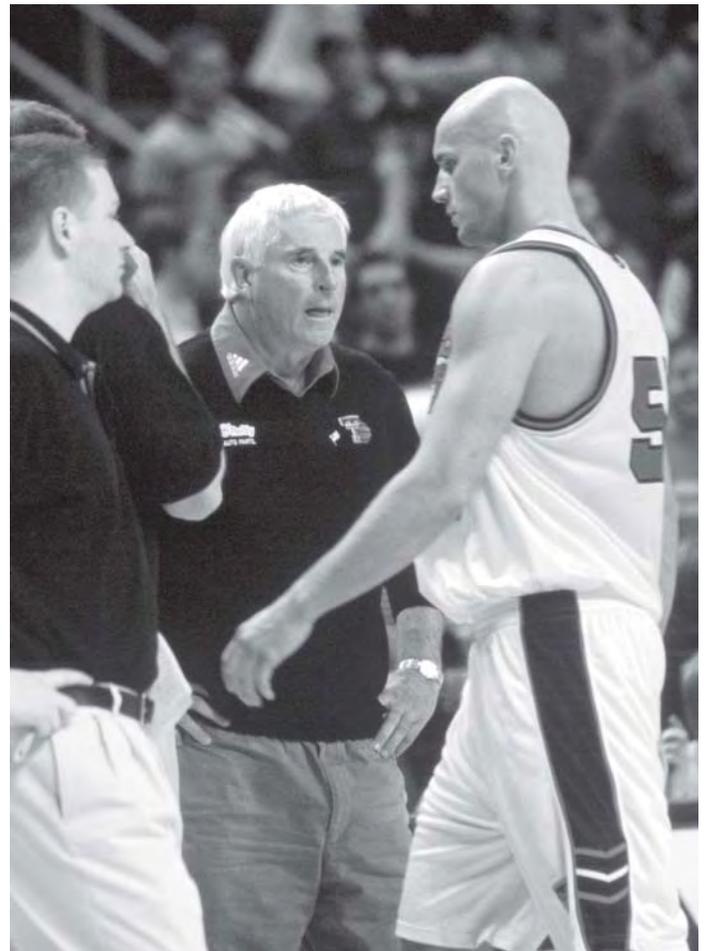
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Legend to Campus Map

1. Administration - E12
2. Administrative Support Center - A12
3. Agricultural Education - E11
4. Agricultural Pavilion - E11
5. Agricultural Sciences - E12
6. Animal Science - E11
7. Animal and Food Science Facility - E6
8. Architecture - F9
9. Art - F9
10. Athletic Ticket Office - A13
11. Athletic Training Center - B13
12. Biology - D11
13. Biology Auditorium - D11
14. Bledsoe Hall - D13
15. Business Administration (Jerry S.Rawls College of Business Administration) - F10
16. Carpenter/Wells Complex - D10
17. Central Warehouse - D9
18. Chemical Engineering - C12
19. Chemistry - E12
20. Chitwood Hall - F8
21. Child Development Research Center - E13
22. Civil Engineering - C13
23. Clement Hall - G9
24. Coleman Hall - G8
25. Credit Union - G4
26. Dairy Barn - F11
27. Dan Law Field - C12
28. Doak Hall - F13
29. Drane Hall - F13
30. Electrical Engineering - D12
31. Electrical Engineering Addition - D12
32. Engineering Center - C13
33. Engineering Lab - C13
34. English/Philosophy/Education Complex - F10
35. Exercise Sciences Center (Men's Gym) - C13
36. Experimental Sciences Research - D12
37. Fish and Wildlife Research - E11
38. Food Technology - E11
39. Football Training Facility - B13
40. Foreign Language - F10
41. Frazier Alumni Pavilion and Plaza - B13
42. Gaston Apartments - C11
43. Gates Hall - G10
44. Goddard Range, Wildlife, and Fisheries Management - F11
45. Gordon Hall - D13
46. Health Sciences Center - B5
47. Holden Hall - D13
48. Horn Hall - G13
49. Hulén Hall - G10
50. Human Sciences - E13
51. Industrial Engineering - C13
52. International Cultural Center - C8
53. Jones SBC Stadium - B13
54. Knapp Hall - G13
55. KTXT-TV - F5
56. Lady Raider Softball Field - D3
57. Law School - G6
58. Livestock Arena - E6
59. Lubbock Municipal Coliseum - B12
60. Marsha Sharp Center for Student Athletes - B13
61. Mass Communications - D13
62. Mathematics and Statistics - D12
63. McClellan Hall - F13
64. Mechanical Engineering - C13
65. Memorial Circle/Pfuger Fountain - E13
66. Merket Alumni Center - G13
67. Murdough Hall - E10
68. Museum/Moody Planetarium - B8
69. Music - F12
70. National Ranching Heritage Center - B9
71. Parking Garage - G9
72. Petroleum Engineering - C12
73. Physical Plant - D10
74. Plant Science - F11
75. PrinTech - D9
76. Psychology - G11
77. Science (Geosciences and Physics) - E12
78. Seismological Observatory - E11
79. Sneed Hall - D13
80. Southwest Collection/Special Collections Library - F11
81. Speech and Hearing Clinic - G10
82. Sport Studies Center (Women's Gym) - G12
83. Stangel Hall - E10
84. Student Union - F12
85. Student Recreation Center (Robert H. Ewalt SRC) - F8
86. Tennis Courts - E9
87. Theatre (Charles E. Maedgen, Jr., Theatre) - G11
88. Thompson Hall - C11
89. Track (Robert B. "Bob" Fuller Track) - C12
90. United Spirit Arena - F6
91. University Greenhouse - E7
92. University Library - F11
93. University Medical Center - B5
94. University Police Department - A12
95. Urbanovsky Park - F9
96. Wall Hall - G11
97. Weeks Hall - E13
98. West Hall - D13
99. Weymouth Hall - G8
100. Wiggins Hall - G8